

# Perinatal Hepatitis B

## Investigative Guidelines

December 2015

### 1. DISEASE REPORTING

#### 1.1 Purpose of Reporting and Surveillance

1. To prevent new cases of hepatitis B.
2. To facilitate case management of infants born to hepatitis B positive mothers, as well as household and sexual contacts of the mother.
3. To recommend appropriate preventive measures, including screening of close contacts and immunization of all susceptible contacts.
4. To assess the burden of perinatal hepatitis B in Oregon.

#### 1.2 Laboratory and Physician Reporting Requirements

Physicians are required to report suspected or confirmed cases within one working day of identification/diagnosis. Positive tests for surface antigen (HBsAg) must be reported by licensed laboratories within one working day (OAR 333-018-0000; 333-018-0015). Reports should be made to the local public health department (LHD) in the case's county of residence (OAR 333-018-0005).

1. Physicians are required to report HBsAg-positive individuals, regardless of whether the hepatitis B virus (HBV) infection is acute or chronic.
  - Oregon law (ORS433.071) requires individuals attending a pregnant woman to collect or order the collection of a blood specimen for submission to a licensed laboratory in order to complete testing for infectious conditions, unless the pregnant individual declines testing. As explained in Oregon Administrative Rules (Section 333.019.0036), the routine testing includes testing for hepatitis B.
  - HBsAg testing may be conducted at the same time as other routine prenatal laboratory tests. All pregnant women should be tested early (at the first prenatal visit) in each pregnancy, even if they have been previously vaccinated or tested.
2. Infants found to be HBsAg-positive, as with other contacts and newly reported hepatitis B cases, need to be reported within one working day of diagnosis.

#### 1.3 Local Health Department Reporting and Follow-Up Responsibilities

1. At the time of initial report or upon receipt of a new lab result for a previously investigated case, verify the pregnancy status of all women of child-bearing age (15-45 years).

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2. A pregnant woman positive for HBsAg, hepatitis B e antigen (HBeAg), or HBV DNA must be enrolled **with each pregnancy** into the Oregon Perinatal Hepatitis B Prevention Program (PHBPP). The case should be enrolled in the PHBPP within one week of receiving the laboratory report. This includes creating a pregnancy in the electronic communicable disease database.
3. Each pregnancy should be added to the individual's hepatitis B case report in the electronic communicable disease database.
4. Every infant born to a hepatitis B case should be added to the case's disease report as a contact.
5. LHDs are required to complete perinatal hepatitis B case management for every infant contact born to a hepatitis B case. See section 5.2 for detailed case management activities.
6. Infants testing positive for HBsAg following case management need to be reported to the Acute and Communicable Disease Prevention Section (ACDP) as soon as possible, but no later than the end of the calendar week of initial physician/lab report. HBsAg-positive infants will become their own case in the communicable disease database. Refer to the chronic hepatitis B Investigative Guidelines for more information.

## 2. THE DISEASE AND ITS EPIDEMIOLOGY

Please refer to the acute and chronic hepatitis B Investigative Guidelines for more information on hepatitis B and its epidemiology

### 2.1 Etiologic Agent

The focus of this Investigative Guideline for Perinatal hepatitis B is case management of infant, household and sexual contacts rather than case investigation. See section 2 of the Acute and Chronic hepatitis B Investigative Guidelines for information about Etiologic Agents, Reservoirs, Incubation Periods, Period of Communicability and Treatment.

### 2.2 Description of Illness

Children who are exposed to the hepatitis B virus (HBV) during birth and early childhood have up to a 90% chance of becoming chronically infected. Up to 25% of those chronic carriers will die as a result of liver disease as an adult. Hepatitis B infection can range from asymptomatic to fulminant hepatitis. As a rule, however, infants and young children (<10 years) typically have asymptomatic infections.

### 2.3 Serologic Markers

Serologic testing for infants (<24 months of age) is done to screen for infection and immunity provided through vaccination. In addition, infants can acquire passive immunity from their mothers, which is detectable up to 24 months of age. Therefore, the recommended serologic markers for testing infants are HBsAg, for infection, and hepatitis B surface antibody (anti-HBs), for immunity. See section 5.2.4 for more details.

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### 2.4 Sources and Routes of Transmission

Perinatal hepatitis B infections result from vertical transmission of hepatitis B from a mother to her fetus or newborn. Breastfeeding is not a significant route of transmission.

## 3. CASE DEFINITIONS, DIAGNOSIS AND LABORATORY SERVICES

### 3.1 Confirmed Case Definitions

An infant 24 months of age or younger, found to be HBsAg-positive and having been born to an HBsAg-positive mother.

### 3.2 Suspect Case Definition

There is no suspect case definition for perinatal hepatitis B at this time

### 3.3 Services Available at the Oregon State Public Health Lab (OSPHL)

The OSPHL offers serologic testing for HBsAg, anti-HBs, and anti-HBc (IgM and total). E antigen testing is not routinely available, but may be arranged under special circumstances; consult with ACDP. For more information, refer to the OSPHL Lab Test Menu at [www.healthoregon.org/labtests](http://www.healthoregon.org/labtests). As of July 2010, OSPHL does not perform PCR testing for hepatitis B virus.

## 4. ROUTINE CASE INVESTIGATION

Please see the acute and chronic hepatitis B Investigative Guidelines for details on routine case investigation. With each pregnancy, it is recommended that the case be interviewed to determine if there are any new household or sexual contacts. If there are household or sexual contacts without a known disease status or vaccine history, refer to section 5.3 for case management guidance for these contacts.

## 5. CONTROLLING FURTHER SPREAD

Through proper case management of pregnant women and their infants, perinatal infections can be prevented. The full passive-active post-exposure prophylaxis course for an infant (Hepatitis B Immunoglobulin [HBIG] + 3 doses vaccine) has been shown to be 85-95% effective in preventing HBV infection. Please see below for a detailed description of case management activities

### 5.1 Case Management of Pregnant Women

All women should be screened for HBsAg during each pregnancy, regardless of vaccination history or previous test results. Susceptible (negative HBsAg test results and no history of vaccination) pregnant women at risk for HBV infection during pregnancy should be vaccinated. Refer to Table 1 for immunization dosage and spacing information.

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Behaviors that place women at high risk of infection include:

- Personal injection drug use OR
- Having had:
  - more than one sex partner in the previous 6 months, or
  - an HBsAg-positive sex partner, or
  - a partner who has been evaluated or treated for a sexually transmitted disease (STD), or
  - a partner who is a recent or current injection drug user.

If a pregnant woman is not tested for HBsAg at a prenatal visit, partakes in high risk behaviors during her pregnancy, or presents with clinical hepatitis, she should be tested at the time of admission to the hospital for delivery.

Identifying HBsAg-positive women ensures their infants receive timely post-exposure prophylaxis and follow-up. The woman's healthcare provider should send a copy of the original laboratory report, if available, indicating the pregnant woman's HBsAg status to the hospital where delivery is planned.

In addition, women who are HBsAg-positive should be enrolled in the PHBPP with each pregnancy and provided with appropriate counseling and medical management, including:

- Medical evaluation and possible treatment of chronic HBV
- Modes of transmission
- Perinatal transmission risk and consequences of perinatal transmission
- Prevention of HBV transmission to contacts
- Importance of post-exposure prophylaxis
- Substance abuse treatment, if appropriate

Please refer to the acute and chronic hepatitis B Investigative Guidelines for details on case investigation.

To ensure the proper screening and post-exposure prophylaxis occurs, hospitals should have the appropriate policies and procedures in place to identify HBsAg-positive or unknown mothers, test as necessary, administer immunoprophylaxis (HBIG and birth dose), as well as report to the LHD and document date and time of immunoprophylaxis in the Electronic Birth Registration System (EBRS).

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Table 1. Hepatitis B vaccines: Recommended dosage and schedules.					
Vaccine	Age group	Dose ( $\mu\text{g}$ ) <sup>1</sup>	Volume (mL)	# Doses	Schedule/Dose interval
<b>Single Antigen Vaccines</b>					
Engerix-B*	0-19 years	10	0.5	3	Age: birth <sup>2</sup> , 1-4, 6-18 months <sup>3</sup> Dose intervals (older children): 0, 1-2, 4 months
	$\geq 20$ years	20	1.0	3	Dose intervals: 0, 1, 6 months
Recombivax HB*	0-19 years	5	0.5	3	Age: birth <sup>2</sup> , 1-4, 6-18 months <sup>3</sup> Dose intervals (older children): 0, 1-2, 4 months
	11-15 years	10	1.0	2	Dose intervals 0, 4-6 months <sup>4</sup>
	$\geq 20$ years	10	1.0	3	Dose intervals: 0, 1, 6 months
<b>Combination vaccines</b>					
Pediarix <sup>5</sup> DTaP+HepB+IPV	6 weeks-6 years	10 (Engerix)	0.5	3	Age: 2, 4, 6 months <sup>3,6</sup> A single antigen hepB dose should be given at birth
Twinrix HepA+HepB	$\geq 18$ years	20 (Engerix)	1.0	3	Dose intervals: 0, 1, 6 months
		20 (Engerix)	1.0	4	Dose intervals: 0, 7, 21-30 days, 12 months
<p><sup>1</sup>. Recombinant hepatitis B surface antigen protein dose.</p> <p><sup>2</sup>. Birth dose administered prior to hospital discharge.</p> <p><sup>3</sup>. The final dose (third or fourth) in the hepatitis B vaccine series should be administered no earlier than age 24 weeks.</p> <p><sup>4</sup>. If an adult formulation of Recombivax HB is used, the vaccine is administered in a 2 dose series.</p> <p><sup>5</sup>. Cannot be administered before 6 weeks of age, but can be used to complete the hepatitis B vaccine series for all infants, including those born to HBsAg+ mothers. Use a single antigen vaccine for the hepatitis B birth dose prior to hospital discharge.</p> <p><sup>6</sup>. Administration of a total of 4 doses of hepatitis B vaccine is permitted when a combination vaccine containing hepatitis B is administered after the birth dose.</p> <p><b>* NOTE:</b> For individuals who are immunocompromised or on dialysis, use single antigen vaccines. Dosage and schedules for children (&lt;20 years) remain the same, however they differ for adults. For adults (<math>\geq 20</math> years):  Engerix-B: Dose, 40 <math>\mu\text{g}</math>; volume, 2.0mL. Two 1.0 mL doses administered at one site, on a 4 dose schedule at 0, 1, 2, and 6 months  Recombivax HB: Special dialysis formulation available. Dose, 40 <math>\mu\text{g}</math>; volume, 2.0mL. Dialysis formulation administered on a 3 dose schedule at 0, 1, and 6 months.</p>					

## 5.2 Case Management of Infants

Refer to Table 2 for a summary of case management activities.

### 1. Mother is HBsAg-positive

All infants born to HBsAg-positive women should receive single antigen hepatitis B vaccine and hepatitis B immune globulin (HBIG) *within 12 hours of birth*. The hepatitis B vaccine and HBIG should be administered concurrently, by intramuscular injection, and at different injection sites.

The vaccine series should be completed according to the recommended schedule for infants born to HBsAg-positive women (Table 2). The final dose in the vaccine series should not be administered before the infant is 24 weeks (164 days) of age. For infants exposed to HBV, the hepatitis B vaccine series is recommended to be completed at 6 months of age.

Post-vaccination testing for anti-HBs and HBsAg should be performed after completion of the vaccine series at 9-12 months of age, generally at the next well-child visit (see section 5.2.4).

#### **Infant is preterm (<37 weeks) and low birth weight [<2,000g]**

- The infant should receive single antigen hepatitis B vaccine and HBIG within 12 hours of birth. The hepatitis B vaccine and HBIG should be administered concurrently, by intramuscular injection, and at different injection sites. However, the initial vaccine (birth dose) should not be counted as part of the vaccine series because of the potentially reduced immunogenicity of hepatitis B vaccine in these infants.
- The vaccine series (3 additional doses) should begin when the infant reaches 1 month of age in accordance with the recommended schedule for infants born to HBsAg-positive women (Table 2). The final dose (4<sup>th</sup> dose) in the vaccine series should not be administered before the infant is 24 weeks (164 days) of age. For infants exposed to HBV, the hepatitis B vaccine series is recommended to be completed at 6 months of age.
- Post-vaccination testing for anti-HBs and HBsAg should be performed after completion of the vaccine series at 9-12 months of age, generally at the next well-child visit (see Section 5.2.4).

### 2. Mother has an unknown HBsAg status at birth

If a pregnant woman presents for delivery without a documented HBsAg test results, testing should be completed as soon as possible.

While test results are pending, all infants born to women without documentation of HBsAg test results should receive the first dose of single antigen hepatitis B vaccine *within 12 hours of birth*. Case management should proceed based on the mother's test results:

- **If the mother is determined to be HBsAg-positive**, her infant should receive the additional protection of HBIG as soon as possible, but no later than 7 days of age. The efficacy of HBIG administered after 48 hours of age,

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however, is not known. Case management should continue according to the recommendations for infants born to HBsAg-positive mothers above.

- **If the mother is not tested to determine her HBsAg status**, the vaccine series should be completed according to the recommended schedule for infants born to HBsAg-unknown women (Table 2). Administration of HBIG is not necessary for these infants.
- **If the mother is determined to be HBsAg-negative**, the vaccine series should be completed according to a recommended schedule for infants born to HBsAg-negative women (Table 2).

### **Infant is preterm (<37 weeks) and low birth weight [<2,000g]**

- The infant should receive single antigen hepatitis B vaccine within 12 hours of birth.
- Due to the potentially decreased immunogenicity of vaccine in preterm infants weighing <2,000g, infants should also **receive HBIG if the mother's HBsAg status cannot be determined within 12 hours of birth**. The hepatitis B vaccine series should begin when the infant reaches 1 month of age in accordance with the appropriate schedule (Table 2).
- If the mother is found to be HBsAg-positive, post-vaccination testing should be performed on the infant after completion of the vaccine series. See Section 5.2.4 for more information.

### **3. Note on infants born to HBsAg-negative mothers**

Infants born to HBsAg-negative women should be immunized against hepatitis B. Refer to Table 1 for the appropriate vaccination schedule for these infants.

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<b>Table 2. Summary of Perinatal Hepatitis B Infant Case Management Activities by Maternal HBsAg Status and Infant's Birth Weight.</b>		
<b>Maternal HBsAg status</b>	<b>Infant's Weight</b>	<b>Recommendations</b>
<b>Positive</b>	≥2,000g	<ol style="list-style-type: none"> <li>1. HBIG* and hepatitis B vaccine within 12 hours of birth</li> <li>2. Administer 2-3 additional doses at 1-2, and 6 months (single-antigen) or 2,4 and 6 months (Pediarix) ‡</li> <li>3. Test for HBsAg and anti-HBs† after completion of the vaccine series at 9-12 months of age</li> </ol>
	<2,000g	<ol style="list-style-type: none"> <li>1. HBIG* and hepatitis B vaccine within 12 hours of birth</li> <li>2. Do not count birth dose as part of the vaccine series</li> <li>3. Administer 3 additional doses at 1,2-3, and 6 months (single-antigen) or 2,4 and 6 months (Pediarix) ‡</li> <li>4. Test for HBsAg and anti-HBs† after completion of the vaccine series at 9-12 months of age</li> </ol>
<b>Unknown</b>	≥2,000g	<ol style="list-style-type: none"> <li>1. Test mother for HBsAg ASAP</li> <li>2. Administer hepatitis B vaccine within 12 hours of birth</li> <li>3. If mother is HBsAg-positive, administer HBIG within 7 days of birth</li> <li>4. If mother remains HBsAg-unknown, HBIG administration is not necessary</li> <li>5. Administer 2-3 additional doses at 1-2, and 6 months (single-antigen) or 2,4 and 6 months (Pediarix) ‡</li> <li>6. Test for HBsAg and anti-HBs† after completion of the vaccine series at 9-12 months of age, if mother is found to be HBsAg-positive</li> </ol>
	<2,000g	<ol style="list-style-type: none"> <li>1. Test mother for HBsAg ASAP</li> <li>2. Administer hepatitis B vaccine within 12 hours of birth</li> <li>3. Administer HBIG if no test results within 12 hours of birth</li> <li>4. Do not count birth dose as part of the vaccine series</li> <li>5. Administer 3 additional doses at 1,2-3, and 6 months (single-antigen) or 2,4 and 6 months (Pediarix) ‡</li> <li>6. Test for HBsAg and anti-HBs† after completion of the vaccine series at 9-12 months of age, if mother is found to be HBsAg-positive</li> </ol>
<b>Negative</b>	≥2,000g	<ol style="list-style-type: none"> <li>1. Administer hepatitis B vaccine before hospital discharge</li> <li>2. Complete vaccine series following the recommended schedule</li> </ol>
	<2,000g	<ol style="list-style-type: none"> <li>1. May delay first dose of hepatitis B vaccine to the time of hospital discharge or 1 month of age</li> <li>2. Complete the vaccine series following the recommended schedule</li> </ol>
<p>* Hepatitis B immune globulin.            ‡ For infants exposed to HBV, the hepatitis B vaccine series is recommended to be completed at 6 months of age            † Antibody to HBsAg.            ** HBIG should be administered to infants of mothers with an unknown HBsAg status if the status cannot be determined within 12 hours of birth or if the mother is found to be HBsAg-positive</p>		

### 4 Post-vaccination serologic testing

As of October 2015, the CDC has reduced the recommended time frame for completing PVST to 9-12 months of age. This updated recommendation stems from the discontinuation of Comvax and the findings of a study in which anti-HBs was less likely to be detected at a protective level ( $\geq 10\text{mIU/mL}$ ) the further PVST was done after completion of the vaccine series. The new PVST window provides the opportunity to complete blood draws at both the nine and twelve month well child checks and reduces the amount of time an unprotected infant is exposed to infected household contacts. In addition, earlier completion of PVST enables prompt revaccination in infants who do not respond to the primary vaccine series.

Infants born to HBsAg-positive mothers are recommended to be tested for both HBsAg and anti-HBs after completion of the hepatitis B vaccine series at 9-12 months of age (typically the next well child check), or 1-2 months after vaccine completion when the series is completed later than 6 months of age. Post-vaccination testing includes serological screening for two different markers, each for a specific reason.

- HBsAg to determine whether they have become infected with the hepatitis B virus; AND
- Anti-HBs to determine whether the vaccine was effective in mounting an immune response in the recipient.

See Table 3 for hepatitis B markers and interpretation of serologic test results. Below are some notes on serologic testing for infants.

- **Testing should not be performed before age 9 months** to avoid detection of anti-HBs from HBIG administered during infancy and to maximize the likelihood of detecting late HBV infection. A late HBV infection has a delayed incubation period, resulting in disease presentation later than is typical. It can occur after the administration of HBIG.
- **Anti-HBc testing of infants is NOT recommended** because passively acquired maternal anti-HBc might be detected in infants born to HBV--infected mothers to age 24 months.
- **HBsAg-negative infants with anti-HBs levels  $\geq 10\text{ mIU/mL}$ , or  $\geq$  or equal to the cut off value for the test method**, are protected and need no further medical management.
- **HBsAg-negative infants with anti-HBs levels  $< 10\text{mIU/mL}$ , or  $<$  than the cut off value for the test method**, should be revaccinated with a second 3-dose series and retested 1-2 months after the final dose of vaccine.

*Note.* A study of infants born to HBsAg-positive mothers who did not respond to a primary vaccine series indicated that all those not infected with HBV responded satisfactorily to a repeat 3-dose revaccination series.<sup>6</sup> Data suggest that children who have no detectable antibody after 6 doses of vaccine would NOT benefit from additional hepatitis B vaccine doses.

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- HBsAg-positive infants** are considered to be infected with hepatitis B, and infectious to others through the usual modes of transmission. The HBsAg-positive child should receive appropriate follow-up. In addition, they must be reported to the LHD and ACDP as soon as possible, but no later than the end of the calendar week of initial physician/lab report.

Serologic Marker				Interpretation
HBsAg <sup>1</sup>	Total anti-HBc <sup>2</sup>	IgM <sup>3</sup> anti-HBc	Anti-HBs <sup>4</sup>	
NEGATIVE	NEGATIVE	NEGATIVE	NEGATIVE	Never infected
POSITIVE <sub>5</sub>	NEGATIVE	NEGATIVE	NEGATIVE	Early acute infection; transient (up to 18 days) after vaccination
POSITIVE	POSITIVE	POSITIVE	NEGATIVE	Acute infection
NEGATIVE	POSITIVE	POSITIVE	NEGATIVE	Acute resolving infection
NEGATIVE	POSITIVE	NEGATIVE	POSITIVE	Recovered from past infection and immune
POSITIVE	POSITIVE	NEGATIVE	NEGATIVE	Chronic infection
NEGATIVE	POSITIVE	NEGATIVE	NEGATIVE	False positive (i.e., susceptible); past infection; “low-level” chronic infection; <sup>6</sup> passive transfer to infant born to HBsAg-positive mother
NEGATIVE	NEGATIVE	NEGATIVE	POSITIVE	Immune if concentration is $\geq 10$ mIU/mL, <sup>7 8</sup> passive transfer after hepatitis B immune globulin administration

<sup>1</sup>. Hepatitis B surface antigen.  
<sup>2</sup>. Antibody to hepatitis B core antigen.  
<sup>3</sup>. Immunoglobulin M.  
<sup>4</sup>. Antibody to HBsAg.  
<sup>5</sup>. To ensure that an HBsAg-positive test result is not a false positive, samples with repeatedly reactive HBsAg results should be tested with a licensed (and, if appropriate, neutralizing confirmatory) test.  
<sup>6</sup>. Persons positive for only anti-HBc are unlikely to be infectious except under circumstances in which they are the source for direct percutaneous exposure of susceptible recipients to large quantities of virus (e.g., blood transfusion or organ transplant).  
<sup>7</sup>. Milli-International Units per milliliter.  
<sup>8</sup>. is dependent on the cut off value for the test methodology; may also be  $\geq 11$  mIU/mL or  $\geq 12$  mIU/mL

*Note:* No cost testing is available to LHDs through the Oregon State Public Health Laboratory. This will be maintained as long as funding is available to support this testing. There is a charge for testing ordered by private providers.

### 5. Documentation, closing case management, reimbursement

- All case management activities (HBIG, vaccine doses, and PVST) should be reported for each infant contact born to a hepatitis B case. Information should

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be recorded as soon as possible, but no later than the end of the week in which it was reported.

2. If case management for the infant is complete, close the infant contact in the system and include the date and reason for completion. Should the child not complete the 3-dose series of vaccine and/or the post-vaccination serology within a reasonable amount of time (as determined by the LHD) and/or the family cannot be contacted by the LHD (typically considered 3 separated attempts with no response), mark the infant as closed to case management, using the reason 'lost to follow-up' and include the date closed.
3. The reimbursement for a completed case investigation of a mother-infant pair is paid annually in the fall for the previous fiscal year (July 1-June 30). Partial reimbursement is also given based on how much follow-up is completed when an infant is closed to case management.

### 5.3 Case Management of Household and Sexual Contacts of HBsAg-positive women

Household contacts, sex partners, and needle-sharing contacts of HBsAg-positive women identified through prenatal screening should be contacted and referred to the LHD for:

- Testing for HBV infection,
- Administration of the first dose of hepatitis B vaccine immediately after collection of a blood sample for serologic testing, and
- Appropriate counseling on methods to prevent or reduce the risk of HBV transmission.

#### 1. Pre-vaccination serologic testing for susceptibility

Pre-vaccination testing is recommended for unvaccinated household, sexual, and needle-sharing contacts of HBsAg-positive individuals. Anti-HBc is the test of choice for pre-vaccination testing.

- Individuals who are **anti-HBc-negative** are **susceptible** and should complete the vaccine series.
- Individuals who are **anti-HBc-positive** should be tested for HBsAg.
- HBsAg testing may be performed on the same specimen collected for anti-HBc testing. Refer to table 3 for interpreting results.

#### 2. Vaccination and/or counseling

- Administered the first hepatitis B vaccine dose at the same time blood is drawn for serologic testing of susceptibility.
- For those found to be free of HBV infection and susceptible to HBV, complete the vaccine series using an age appropriate vaccine dose and schedule (see Table 1). Incompletely vaccinated persons should complete the vaccine series.
- HBsAg-positive individuals and sex partners of HBsAg-positive individuals should be counseled on methods to prevent or reduce the risk of HBV transmission.

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- In the event that the case has had sexual contact with a new partner in the past two weeks, HBIG is recommended.

### 3. Post-vaccination testing for serologic response

Testing after vaccination is recommended only for certain individuals whose subsequent clinical management depends on knowledge of their immune status. This includes the sex partners of HBsAg-positive individuals in order to determine the need for revaccination and for counseling on methods to prevent or reduce the risk of hepatitis B transmission.

- Testing should be performed 1-2 months after administration of the last dose of the vaccine series, using a method that allows determination of a protective level of anti-HBs (usually  $\geq 10$  mIU/mL but is dependent on the test methodology).
- Persons found to have anti-HBs levels of  $< 10$  mIU/mL, or  $<$  than the cut off value for the test methodology, after the primary vaccine series should be revaccinated.
- Persons who do not respond to revaccination should be tested for HBsAg.
- HBsAg-positive individuals should receive appropriate management and any household, sexual, or needle-sharing contacts should be identified, tested, and vaccinated.
- Non-responding HBsAg-negative individuals should be considered susceptible and should be counseled on methods to prevent or reduce the risk of hepatitis B transmission as well as the need to obtain HBIG post-exposure prophylaxis for any known or likely parenteral exposure to HBsAg-positive blood.

### 4. Documentation, closing case management, and reimbursement

As with infant contacts, pre- and post-vaccination serologic testing and vaccine doses should be reported in the communicable disease database for household and sexual contacts. Once case management is done, contacts should be closed to case management. LHDs will be reimbursed for recorded case management of household and sexual contacts identified within one year of an infant's date of birth. Reimbursement is paid annually in the fall for the previous fiscal year (July 1-June 30). Partial reimbursement is also given based on how much follow-up is completed upon closure

## GLOSSARY OF TERMS

**anti-HBc:** Antibody to hepatitis B core antigen (HBcAg) (no test available to measure HBcAg) identifies all previously infected individuals (acute, resolved, or chronic HBV infections; and does not differentiate carriers and non-carriers). It is not present after immunization and passively transferred maternal anti-HBc is detectable for as long as 24 months among infants born to HBsAg-positive women.

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**anti-HBs:** Antibody to HBsAg is used in the identification of people who have resolved infections with HBV, as well as the determination of immunity after immunization.

**HBeAB (aka anti-HBe):** Hepatitis B e antibody is produced by the immune system temporarily during acute HBV infection and may persist in chronic infections. The seroconversion from e antigen to e antibody is a predictor of long-term clearance of HBV. Chronic hepatitis B surface antigen carriers can be positive for either HBeAg or anti-HBe, but are less infectious when anti-HBe is present.

**HBeAg:** Hepatitis B e antigen indicates acute active infection and is used to identify patients who are infectious, and therefore at increased risk of transmitting HBV.

**HBsAg:** Hepatitis B surface antigen is a marker of replicating virus. It is used in the detection of acute or chronic infections. Its presence indicates that the patient is considered to be infectious.

**HBV DNA:** Signifies active replication of the virus and indicates that the patient is infectious. It is usually measured to test for chronic infection, and the viral load may be used to decide whether treatment is warranted.

**IgM anti-HBc:** IgM antibody to HBcAg is used in the identification of people with acute or recent HBV infections (including HBsAg-negative people during the “window” phase of infection).

**Late HBV infection:** A hepatitis B infection with a delayed incubation period, resulting in a later presentation than is typical. This can sometimes occur after the administration of HBIG.

## REFERENCES

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### UPDATE LOG

December 2015: Reorganized case management sections. Reformatted table on vaccine recommendations and combined tables on case management for normal birth weight and low birth weight infants. Removed information related to Comvax. Updated recommended timeframe for completing post vaccination serologic testing. Added HBsAg-negative section. Added an update log. Added glossary of terms. Updated references. Removed contact information section. Reformatted to align with layout of other Investigative Guidelines. (Lee Schrauben).

November 2015: Placed into new template and corrected spelling and link errors. (Leslie Byster)