

# **HEPATITIS B MANUAL**

**NC Immunization Branch  
Women's and Children's Section  
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# DEFINITIONS OF HEPATITIS TERMINOLOGY

**Hepatitis** -Inflammation of the liver.

**Hepatitis A**- A viral illness typically characterized by the presence of fever, anorexia, nausea, vomiting and abdominal discomfort, followed by jaundice. Transmitted by fecal-oral route. Diagnosis based on the presence of IgM antibodies in serum (IgM anti-HAV).

**Hepatitis B (Acute)** - A viral illness typically characterized by the presence of anorexia, vague abdominal discomfort, nausea and vomiting, sometimes arthralgia and rash, often progressing to jaundice; however, patients's symptoms may be mild or absent. Transmission occurs through exchange of infected blood, serous fluids, saliva, semen and vaginal fluids by percutaneous, permucosal, sexual, perinatal and horizontal transmission. Diagnosis is based on the presence of HBsAg and IgM anti-HBc in serum. For further discussion refer to Hepatitis B (Acute) investigation and control measures in this manual.

**Hepatitis B carrier** - Persistent viral infection (typically, without symptoms) with HBsAg present serologically for more than a six month period. Transmission occurs via the routes described for acute hepatitis B with the duration of the HBsAg in the serum for at least six months. For further discussion refer to Hepatitis B Chronic Carrier section and control measures in this manual.

**Hepatitis C** - A viral infection characterized by anorexia, vague abdominal discomfort, nausea and vomiting, progressing to jaundice less frequently than hepatitis B. Transmission occurs by percutaneous exposure to blood and blood products. Transmission through person to person and sexual contact is not well defined. Acute hepatitis C cannot be serologically confirmed due to the unavailability of antigen testing. However, the presence of Anti-HCV in the serum indicates infection either past or present.

**Hepatitis D** - A viral infection with an abrupt onset of symptoms similar to those of hepatitis B. Delta hepatitis always coexists with hepatitis B infection. Diagnosis is made by the demonstration of HDAg.

**IG/ ISG** - Immune Globulin. Prophylaxis given to contacts within 14 days of exposure to hepatitis A confirmed case. Immune Globulin contains antibodies to hepatitis A.

**HBIG** - Hepatitis B Immune Globulin given for prophylaxis for hepatitis B exposure; contains high levels of antibodies to hepatitis B. HBIG is given according to the following schedule:

-For infants born to HBsAg-positive mothers, HBIG should be administered within 12 hours of birth.

-For sexual exposure to HBV, HBIG should be administered as soon as possible after exposure and within 14 days of the exposure.

-For needle sharing, mucosal or other puncture exposures to HBV, HBIG should be administered as soon as possible after exposure and within 7 days of the exposure.

## Hepatitis Serologic Terminology

<b>Acronym</b>	<b>Term</b>	<b>Interpretation</b>
HAV	Hepatitis A Virus	Etiologic agent of Hepatitis A Virus
Anti-HAV (Total)	IgM and IgG antibodies to HAV	Detectible at onset of symptoms; indicator of lifetime immunity.
IgM Anti-HAV	IgM antibody to HAV	Indicates infection within past 6 months. Begins to rise 3 weeks after exposure; peaks after onset of jaundice. Detectable up to 4-6 months after infection.
HBV	Hepatitis B Virus	Etiologic agent of Hepatitis B
HBsAg	Hepatitis B Surface Antigen	Indicates infection and communicability
Anti-HBs	Antibody to HBsAg	Indicates past infection, convalescence and immunity to Hepatitis B. Also present in response to HBIG and/ or Hepatitis B vaccine.
Anti- HBc (Total)	Includes IgM and IgG antibody to Hepatitis B Core antigen	Indicates prior infection at unknown time.
IgM anti-HBc	IgM class antibody to HBcAg	Indicates recent infection with Hepatitis B virus. Begins to rise 7 weeks after exposure, with peak levels at 17 weeks. Usually detectable up to 4-6 months.
HBeAg	Hepatitis B e antigen	Correlates with high HBV replication and infectivity of the blood
Anti-HBe	Antibody to HBeAg	May be seen in active or past disease; Presence in serum of HBsAg carrier suggests lower titer of HBV.
Anti-HCV	Antibody to hepatitis C	Indicates past or present infection with Hepatitis C

# Hepatitis B

## ACUTE HEPATITIS B

Report Within		Report		CD Card	Surveillance Form
24 hrs.	7 days	Confirmed Only	Probable and Confirmed	/	/
/		/			

### Case Definition

Acute illness with

- (a) discrete onset of symptoms, **and**
- (b) jaundice **or** elevated serum aminotransferase levels **and**
- (c) hepatitis B laboratory criteria
  1. IgM antibody to hepatitis B core antigen (anti-HBc IgM) positive **or**
  2. Hepatitis B Surface Antigen (HBsAg) positive, **and**
  3. IgM anti-HAV negative (if done)

### Signs and Symptoms

- C Onset is usually insidious
- C Anorexia
- C Vague abdominal discomfort
- C Nausea and vomiting
- C Arthralgia
- C Mild fever
- C Rash
- C Jaundice occurring three to ten days after the onset of illness
- C Myalgia
- C Headache
- C Dark urine

Only a small proportion of acute hepatitis B virus (HBV) infections may be clinically recognized. In those with clinical illness, the onset is usually insidious with anorexia, vague abdominal discomfort, nausea and vomiting, sometimes arthralgia and rash, often progressing to jaundice (occurring three to ten days after the onset of illness). The infected individual may exhibit mild fever. The prognosis of acute cases of hepatitis B developing into chronic infection is variable. Perinatal infection has a high likelihood (up to 90 percent) of resulting in chronic antigenemia, which can lead to chronic hepatitis, cirrhosis or primary hepatocellular carcinoma. An estimated 15-25 percent of people with chronic HBV infection will die prematurely of either cirrhosis or hepatocellular carcinoma.

**Modes of Transmission:** The highest concentration of hepatitis B virus (HBV) is found in blood and serous fluids. Low titers are found in semen, vaginal secretions and saliva. Although HBV transmission has occurred through bites, saliva is an unlikely vehicle of transmission when exposure is kissing. There is no documented transmission of HBV via tears, sweat, urine, stool or droplet nuclei. Mothers who are HBsAg-positive should not be restricted from breastfeeding. Breastfeeding poses no risk of HBV infection for infants who have begun prophylaxis. The recommendation to discontinue breastfeeding should be considered when cracked, bleeding nipples or abscesses occur.

The virus is transmitted through one or more of the following modes:

- C **Percutaneous Transmission**—Transmission occurs through inoculation (IV, IM, SC or intradermal) with infected blood or blood products via needle-stick injury, shared IV/IM needle use, ear or body piercing, tattoos, acupuncture, other sharp objects contaminated with blood and inadequate sterilization of medical equipment. Percutaneous transmission can also occur through non-intact skin.
- C **Per mucosal Transmission**—Transmission of HBV when infected material comes in contact with mucous membranes of the eyes, nose or mouth through splashes, spills, sprays or indirectly by hand-to-mouth or hand-to-eye routes.
- C **Sexual Transmission**—Absorption of HBV into mucosal surfaces (sexual activity).
- C **Perinatal Transmission**—Transmission of HBV from infected mother to infant.
- C **Horizontal Transmission**—Transmission occurs in household and close community settings. Horizontal transmission usually occurs from one child to another child. Vehicles of transmission include bites, communally shared items (toothbrushes, razors, nail clippers) or contact with draining wounds, discarded soiled bandages, etc. The hepatitis B virus can remain infectious on environmental surfaces up to one month. However, transmission to a person after seven days has not been documented.

**Incubation Period:** 45-180 days; averages 60-90 days.

**Period of Communicability:** All persons who are HBsAg-positive are considered to be infectious. The HBsAg may be present several weeks before the illness onset and may last for several weeks or years. If infected persons develop the chronic carrier state, they will likely remain HBsAg positive for life.

**IF A PATIENT MEETS CASE DEFINITION, NORTH CAROLINA PUBLIC HEALTH LAW REQUIRES YOU TO PERFORM THE FOLLOWING FOUR STEPS:**

#### **1. REPORT THE CASE**

- / Report the case within 24 hours to the local health department.
- / Report cases that meet case definition for public health surveillance.
- / Submit North Carolina Communicable Disease Report Card and Viral Hepatitis Case Report form to the Surveillance Unit.

## 2. MANAGE THE CASE

**Isolation:** Blood, body fluid and tissue precautions are indicated for hepatitis B acute infection.

**Investigation:** Perform case investigation to determine the source of infection and exposure to household, sexual, needle-sharing, mucosal or blood contacts.

**Laboratory Work:** Acute hepatitis B is indicated by discrete onset of symptoms and hepatitis B surface antigen (HBsAg)-positive and/or IgM anti-HBc-positive.

- C **HBsAg** (hepatitis B surface antigen)—most commonly used test for detecting carriers or diagnosing acute hepatitis B infections. HBsAg can be detected as early as one or two weeks and as late as 11 to 12 weeks after exposure to HBV. The presence of HBsAg indicates the person is either acutely or chronically infectious.
- C **Anti-HBc** (total antibodies)—includes both IgM and IgG which indicates either current or past HBV infection at some undefined time.
- C **IgM anti-HBc**—indicates recent infection with HBV. IgM anti-HBc circulates for four-six months after onset of symptoms. A negative test for IgM anti-HBc, together with a positive test for HBsAg in a single blood sample, identifies a probable chronic HBV infection. In early acute cases of HBV infection, the HBsAg may be positive and the IgM anti-HBc not yet detectable.
- C **HBeAg** (HBe antigen)—useful marker for contagiousness. The presence of HBeAg is associated with the number of infective HBV particles in the serum and a higher risk of infectivity.
- C **Anti-HBs** (antibodies to HBsAg)—associated with long-term immunity. Using radioimmunoassay (RIA), a minimum of 10 sample ratio units should be used to designate immunity. Using enzyme immunoassay (ELISA), the manufacturer's recommended positive should be considered an appropriate measure of immunity. The level of anti-HBs may also be expressed in milli-International Units/mL (mIU/mL). Ten mIU/mL is considered to indicate a protective level of immunity. The presence of anti-HBs indicates recovery and immunity to HBV infection. Anti-HBs can be acquired as an immune response to HBV infection, hepatitis B vaccine or passively transferred by the administration of HBIG.
- C **Characteristic pattern of specific antigens and antibodies**—The HBsAg and HBeAg become positive about one to three weeks after exposure and about four to five weeks before jaundice appears. The alanine aminotransferase (ALT) levels increase about one to two weeks before jaundice appears. These elevations persist for one to three months and decrease as clinical improvement progresses.

The appearance of anti-HBc and anti-HBe is a favorable prognostic sign. HBcAg, although present, is not detectable by any currently available practical test. However,

anti-HBc is detectable at onset of jaundice, initially as IgM, indicating acute or early convalescent hepatitis B infection. Both anti-HBs and anti-HBc persist for many years. With chronic infection, HBsAg persists for many years, possibly a lifetime. HBeAg may persist as well; more likely if the infection was symptomatic. Chronic infection is more likely in cases with mild or absent symptoms than in cases with significant clinical disease.

**Follow-Up Laboratory Work:** Test acute HBV cases six months after diagnosis to determine if they are chronic carriers. Control measures should be emphasized at each visit with the patient and with any contacts whenever necessary. If HBsAg remains positive six months after acute hepatitis B infection, report patient as a hepatitis B carrier. Conduct serologic testing and vaccination of household contacts. (See Hepatitis B Carrier)

**Surveillance:** Individuals diagnosed with acute hepatitis B should enter a tracking system until follow-up laboratory testing is complete. If a case moves to another county or state, coordination between health care providers is necessary to ensure completion of medical management and surveillance.

**Treatment:** Individuals diagnosed with acute hepatitis B should be referred to their private physician for disease management.

**Counseling:** All hepatitis B-infected individuals shall be given both verbal and written control measures for blood and body fluid precautions to prevent hepatitis B transmission to household, sexual or needle-sharing contacts. Persons with acute hepatitis B should not care for infants less than 12 months of age.

**Prophylaxis:** None.

**Vaccine:** None.

**Referral:** Individuals diagnosed with acute hepatitis B should be referred to their private physician for disease management.

**Pregnancy:** Screen all pregnant women for HBsAg status during early prenatal visits. If HBsAg results are negative, repeat testing should be considered late in pregnancy for women who are at high risk of HBV infection (e.g. injecting drug use, diagnosed STD or presence of clinical symptoms of hepatitis). Any pregnant woman who is acutely or chronically infected with hepatitis B (HBsAg-positive) requires close surveillance during delivery and her infant needs close surveillance and vaccination tracking after birth. The infant requires HBIG and hepatitis B vaccine within 12 hours of birth. Hospital and pediatric health care provider notification is essential to complete the properly spaced hepatitis B vaccination series at 6 months of age and serological testing at age 9-15 months. (Refer to Hepatitis B Perinatal Program) Complete the Perinatal Hepatitis B Prevention Report I and II and submit the report to the Hepatitis B Coordinator at the Immunization Branch as indicated.

**Health Care Workers:** (self-reporting only) All health care workers who perform surgical, obstetrical or dental procedures and who know themselves to be infected with HIV or hepatitis B should be advised to notify the State Health Director. Health care workers who assist in these procedures in a manner that may result in exposure of patients to their blood and who know themselves to be infected with HIV or hepatitis B should also be advised to notify the State Health Director. The notification shall be made in writing to: Chief, General Communicable Disease Control Branch, 1902 Mail Service Center, Raleigh, NC 27699. This is according to North Carolina Administrative Code 15A NCAC 19A .0207. (See N.C. Administrative Code)

### 3. MANAGE THE CONTACTS OF ACUTE HEPATITIS B INFECTION

**Investigation:** Perform case investigation to determine exposure to household, sexual, blood, mucosal or needle-sharing contacts. If the date of infection is unknown, identify contacts from the previous six months. If the acute case is a primary caregiver for an infant less than 12 months of age, the infant will need prophylaxis. (See Prophylaxis)

**Laboratory Testing:** Test all identified sexual, blood, mucosal and needle-sharing contacts for the presence of HBV. Testing is recommended prior to the administration of HBIG and hepatitis B vaccine if it does not delay treatment beyond 14 days of the last sexual exposure or beyond seven days of the last blood, mucosal or needle-sharing exposure.

**Laboratory Follow-Up:** If the contact's laboratory tests indicate the presence of HBV infection, hepatitis B control measures apply. (see Manage the Case, Acute or Chronic) Contacts whose laboratory data indicate the absence of HBV infection and absence of immunity (HBsAg-negative, IgM anti-HBc-negative and anti-HBs-negative) shall be prophylaxed against hepatitis B. (See Prophylaxis)

**Surveillance:** Sexual, blood, mucosal and needle-sharing contacts should enter a tracking system and be followed until completion of the hepatitis B series. If the acute case is a primary caregiver for an infant less than 12 months old, the infant should receive prophylaxis. (See Prophylaxis)

**Counseling:** Instruct all contacts about control measures to follow until test results are known. All HBV-infected persons should be given both verbal and written control measures. If test results indicate the contacts have not become infected with hepatitis B, control measures should be continued until prophylaxis with HBIG and hepatitis B vaccine series is complete.

- Instruct asymptomatic contacts to **immediately** report any symptoms to their local health department.
- Symptomatic contacts should be considered cases and managed according to the above protocol (See Manage The Case)

**Prophylaxis:** Sexual, blood, mucosal or needle-sharing contacts whose laboratory data indicate the absence of hepatitis B infection and absence of immunity (HBsAg-negative, anti-HBc IgM-negative and anti-HBs-negative) shall be prophylaxed against hepatitis B. Prophylaxis includes a single dose of HBIG, within 14 days of the last sexual exposure or within seven days of the last

blood, mucosal or needle-sharing exposure, and initiation of the hepatitis B vaccination series. Prophylaxis with HBIG and hepatitis B vaccine is indicated for infants less than 12 months old if the mother or primary caregiver has acute hepatitis B infection. On the basis of limited experience, there is no apparent risk of adverse effects to developing fetuses when hepatitis B vaccine is administered to pregnant women. Neither pregnancy nor lactation should be considered a contraindication to vaccination of women. A susceptible pregnant woman may receive hepatitis B vaccine with approval from her obstetrician.

**Vaccine:** Initiation of the hepatitis B vaccine series should occur at the same time HBIG is administered to susceptible sexual, blood, mucosal and needle-sharing contacts as well as for infants less than 12 months old whose primary caregiver has acute hepatitis B infection. (See Prophylaxis)

**Referral:** Contacts diagnosed with acute or chronic hepatitis B should be referred to their private physician for disease management. Infants whose mothers are HBsAg positive should be referred to their private physician for disease management; however, local health departments (LHDs) should continue to conduct active surveillance to ensure that vaccinations and laboratory tests are completed as recommended.

#### **4. PERFORM FOLLOW-UP**

Mail the completed Viral Hepatitis Case Report and the Communicable Disease Report Card to the Surveillance Unit of the General Communicable Disease Control Branch, 1902 Mail Service Center, Raleigh, 27699.

For pregnant women who are HBsAg positive, mail the completed Perinatal Hepatitis B Prevention Report Part I and II to the Hepatitis B Coordinator at the North Carolina Immunization Branch, 1917 Mail Service Center, Raleigh, N.C. 27699.

## Hepatitis B Chronic Carriers

Report Within		Report		CD Card	Surveillance Form
24 hrs.	7 days	Confirmed only	Probable and confirmed	/	/
	/		/		

### Case Definitions

**Probable Carrier**—Asymptomatic person and the following laboratory criteria:

- C Hepatitis B Surface Antigen (HBsAg) positive on **one** occasion, and
- C IgM class antibody to Hepatitis B Core Antigen (IgM anti-HBc)-negative, if done.

**Confirmed Carrier**—Asymptomatic person and the following laboratory criteria:

- C Hepatitis B Surface Antigen (HBsAg)-positive on at least **two** occasions at least six months apart, **or**
- C **Remains** HBsAg-positive six months following acute hepatitis B infection
- C IgM antibody to Hepatitis B Core Antigen (IgM anti-HBc)-negative, if done.

**Signs and Symptoms:** Usually none.

**Modes of Transmission:** The highest concentration of hepatitis B virus (HBV) is found in blood and serous fluids. Low titers are found in semen, vaginal secretions and saliva. Although HBV transmission has occurred through bites, saliva is an unlikely vehicle of transmission when exposure is kissing. There is no documented transmission of HBV via tears, sweat, urine, stool or droplet nuclei. Mothers who are HBsAg-positive should not be restricted from breastfeeding. Breastfeeding poses no risk of HBV infection for infants who have begun prophylaxis. The recommendation to discontinue breastfeeding should be considered when cracked, bleeding nipples or abscesses occur.

The virus is transmitted through one or more of the following modes:

- C **Percutaneous Transmission**—Transmission occurs through inoculation (IV, IM, SC or intradermal) with infected blood or blood products via needle-stick injury, shared IV/IM needle use, ear or body piercing, tattoos, acupuncture, other sharp objects contaminated with blood and inadequate sterilization of medical equipment. Percutaneous transmission can also occur through non-intact skin.
- C **Per mucosal Transmission**---Transmission of HBV when infected material comes in contact with mucous membranes of the eyes, nose or mouth through splashes, spills, sprays or indirectly by hand-to-mouth or hand-to-eye routes.

- C **Sexual Transmission**—Absorption of HBV into mucosal surfaces (sexual activity).
- C **Perinatal Transmission**—Transmission of HBV from infected mother to infant.
- C **Horizontal Transmission**—Transmission occurs in household and close community settings. Horizontal transmission usually occurs from child to child. Vehicles of transmission include bites, communally shared items (toothbrushes, razors, nail clippers) or contact with draining wounds, discarded soiled bandages, etc. The hepatitis B virus can remain infectious on environmental surfaces up to one month. However, transmission to a person after seven days has not been documented.

**Incubation Period:** 45-180 days; averages 60-90 days.

**Period of Communicability:** All persons who are HBsAg-positive are considered to be infectious. The HBsAg may be present several weeks before the onset of illness and last for several weeks or years. In the chronic carrier state, patients will most likely remain HBsAg positive for life.

**IF A PATIENT MEETS CASE DEFINITION, NORTH CAROLINA PUBLIC HEALTH LAW REQUIRES YOU TO PERFORM THE FOLLOWING FOUR STEPS:**

**1. REPORT THE CASE**

- / Report cases within seven days to the local health department.
- / Report cases that meet case definition for public health surveillance.
- / Report both Probable and Confirmed cases.
- / Submit North Carolina Communicable Disease Report Card and Hepatitis B Carrier Surveillance Report form to the Surveillance Unit.

**Note:** If an update of the patient’s medical, laboratory or pregnancy status is needed and the case has already been reported as a carrier in North Carolina, a second Communicable Disease Report Card is not needed. Submit only the “updated” Hepatitis B Carrier Surveillance Report. An updated surveillance report is indicated for the following reasons:

- C probable hepatitis B carrier is now a confirmed carrier,
- C patient is now pregnant,
- C patient has moved to another county, state or country,
- C patient’s name has changed,
- C patient is to be removed from the Hepatitis B Carrier Registry because patient expired or because patient is now HBsAg-negative

**2. MANAGE THE CASE**

**Isolation:** Blood, body fluid and tissue precautions are indicated for hepatitis B chronic infection.

**Investigation:** Perform case investigation to determine the source of infection and exposure to household, sexual, blood, mucosal and needle-sharing contacts.

**Laboratory Work:** Hepatitis B carrier status is indicated by a person with discrete onset of symptoms, positive hepatitis B surface antigen (HBsAg) and IgM anti-HBc-negative.

- **HBsAg** (hepatitis B surface antigen)—most commonly used test for detecting carriers or diagnosing acute hepatitis B infections. HBsAg can be detected as early as one or two weeks and as late as 11 to 12 weeks after exposure to HBV. The presence of HBsAg indicates the person is either acutely or chronically infectious.
- **Anti-HBc** (total antibodies)—includes both IgM and IgG, which indicates either current or past HBV infection at some undefined time.
- **IgM anti-HBc**—indicates recent infection with HBV. IgM anti-HBc circulates for four to six months after onset of symptoms. A negative test for IgM anti-HBc, together with a positive test for HBsAg in a single blood sample, identifies a probable chronic HBV infection. In early acute cases of HBV infection, the HBsAg may be positive and the IgM anti-HBc not yet detectable.
- **HBeAg** (HBe antigen)—useful marker for contagiousness. The presence of HBeAg is associated with the number of infective HBV particles in the serum and a higher risk of infectivity.
- **Anti-HBs** (antibodies to HBsAg)—associated with long-term immunity. Using radioimmunoassay (RIA), a minimum of 10 sample ratio units should be used to designate immunity. Using enzyme immunoassay (ELISA), the manufacturer's recommended positive should be considered an appropriate measure of immunity. The level of anti-HBs may also be expressed in milli-International Units/mL (mIU/mL). Ten mIU/mL is considered to indicate a protective level of immunity. The presence of anti-HBs indicates recovery and immunity to HBV infection. Anti-HBs can be acquired as an immune response to HBV infection, hepatitis B vaccine or passively transferred by the administration of HBIG.
- **Characteristic pattern of specific antigens and antibodies**—The HBsAg and HBeAg become positive about one to three weeks after exposure and about four to five weeks before jaundice appears. The alanine aminotransferase (ALT) levels increase about one to two weeks before jaundice appears. These elevations persist for one to three months and decrease as clinical improvement progresses.

The appearance of anti-HBc and anti-HBe is a favorable prognostic sign. HBcAg, although present, is not detectable by any currently available practical test. However, anti-HBc is detectable at onset of jaundice, initially as IgM, indicating acute or early convalescent hepatitis B infection. Both anti-HBs and anti-HBc persist for many years. With chronic infection, HBsAg persists for many years, possibly for a lifetime. HBeAg may persist as well; more likely if the infection was symptomatic. Chronic infection is more likely in cases with mild or absent symptoms than in cases with significant clinical disease.

**Follow-Up Laboratory Work:** Repeat HBsAg testing six months after initial testing to confirm carrier status. Repeat testing when necessary to determine appropriate control measures for exposed contacts.

**Surveillance:** Individuals diagnosed as chronic carriers of hepatitis B should enter a tracking system until follow-up laboratory testing is complete. If a case moves to another county or state, coordination between health care providers is necessary to ensure completion of medical management and surveillance.

**Treatment:** Individuals diagnosed as chronic carriers of hepatitis B should be referred to their private physician for disease management.

**Counseling.** All hepatitis B-infected individuals shall be given both verbal and written control measures for blood and body fluid precautions to prevent hepatitis B transmission to household, sexual or needle-sharing contacts.

**Prophylaxis:** Susceptible individuals with chronic liver disease should be advised to obtain hepatitis A vaccine, if susceptible, to prevent further liver complications.

**Vaccine:** See Prophylaxis section.

**Referral:** Individuals diagnosed as chronic carriers of hepatitis B should be referred to their private physician for disease management.

**Pregnancy:** Screen all pregnant women for HBsAg status during early prenatal visits. If HBsAg results are negative, repeat testing should be considered late in pregnancy for women who are at high risk of HBV infection (e.g. injecting drug use, diagnosed STD or presence of clinical symptoms of hepatitis). Any pregnant woman who is acutely or chronically infected with hepatitis B (HBsAg-positive) requires close surveillance during delivery and her infant needs close surveillance and vaccination tracking after birth. The infant requires HBIG and hepatitis B vaccine within 12 hours of birth. Hospital and pediatric health care provider notification is essential to complete the properly spaced hepatitis B vaccination series at 6 months of age and serological testing at age 9-15 months. (Refer to Perinatal Hepatitis B) Complete the Perinatal Hepatitis B Prevention Report I and II and submit the report to the Hepatitis B Coordinator at the Immunization Branch as indicated.

**Health Care Workers:** (self-reporting only) All health care workers who perform surgical, obstetrical or dental procedures and who know themselves to be infected with HIV or hepatitis B should be advised to notify the State Health Director. Health care workers who assist in these procedures in a manner that may result in exposure of patients to their blood and who know themselves to be infected with HIV or hepatitis B should also be advised to notify the State Health Director. The notification shall be made in writing to: Chief, General Communicable Disease Control Branch, 1902 Mail Service Center, Raleigh, NC 27699. This is according to North Carolina Administrative Code 15A NCAC 19A .0207. (See N.C. Administrative Code)

### **3. MANAGE THE CONTACTS OF HEPATITIS B CHRONIC CARRIERS**

**Investigation:** Perform case investigation to determine exposure to household, sexual, blood, mucosal or needle-sharing contacts. If the date of infection is unknown, identify sexual, blood, mucosal and needle-sharing contacts from the previous six months.

**Laboratory Testing:** Test all identified household, sexual, blood, mucosal and needle-sharing contacts for the presence of HBV. Testing is recommended prior to the administration of HBIG and hepatitis B vaccine if it does not delay treatment beyond 14 days of the last sexual exposure or beyond seven days of the last blood, mucosal or needle-sharing exposure.

**Laboratory Follow-Up:** If the contacts' laboratory tests indicate the presence of HBV infection, hepatitis B control measures apply (see Manage the Case, Acute and Chronic). Contacts whose laboratory data indicate the absence of HBV infection and absence of immunity (HBsAg-negative, IgM anti-HBc-negative and anti-HBs-negative) shall be prophylaxed against hepatitis B. (See Prophylaxis below)

**Surveillance:** Household, sexual, blood, mucosal and needle-sharing contacts should enter a tracking system and be followed until completion of the hepatitis B vaccination series. (If any acutely infected contact is a primary caregiver of an infant less than 12 months of age, the infant should receive prophylaxis. See Prophylaxis)

**Counseling:** Instruct all contacts about control measures to follow until test results are known. All HBV-infected persons should be given both verbal and written control measures. If test results indicate the contacts have not become infected with hepatitis B, control measures should be continued until prophylaxis with HBIG and hepatitis B vaccine series is complete.

- Instruct asymptomatic contacts to **immediately** report any symptoms to their local health department.
- Symptomatic contacts should be considered as cases and should be managed according to the above protocol. (See Manage the Case, Acute and Chronic)

**Prophylaxis:** Household, sexual, blood, mucosal and needle-sharing contacts whose laboratory data indicate the absence of hepatitis B infection and the absence of immunity (HBsAg-negative, IgM anti-HBc-negative, and anti-HBs-negative) shall be prophylaxed against hepatitis B. Prophylaxis includes a single dose of HBIG, within 14 days of the last sexual exposure or within seven days of the last blood, mucosal or needle-sharing exposure, and initiation of the hepatitis B vaccination series. (Prophylaxis with HBIG and hepatitis B vaccination is indicated for infants less than 12 months old if the mother or primary caregiver has acute hepatitis B infection.) On the basis of limited experience, there is no apparent risk of adverse effects to developing fetuses when hepatitis B vaccine is administered to pregnant women. Neither pregnancy nor lactation should be considered a contraindication to vaccination of women. A susceptible pregnant woman may receive hepatitis B vaccine with approval from her obstetrician.

**Vaccine:** Susceptible sexual, blood, mucosal and needle-sharing contacts should receive hepatitis B vaccine at the same time HBIG is administered. Susceptible household contacts should receive hepatitis B vaccine after laboratory testing is complete. (See Prophylaxis)

**Referral:** Contacts diagnosed with acute or chronic hepatitis B should be referred to their private physician for disease management. Infants whose mothers are HBsAg-positive should be referred to their private physician for disease management; however, local health departments (LHDs) should continue to conduct active surveillance to ensure that vaccinations and laboratory tests are completed as recommended.

#### **4. PERFORM FOLLOW-UP**

Mail the completed Hepatitis B Carrier Surveillance Report and the Communicable Disease Report Card to the Surveillance Unit of the General Communicable Disease Control Branch, 1902 Mail Service Center, Raleigh, NC 27699.

For pregnant women who are HBsAg positive, mail the completed Perinatal Hepatitis B Prevention Report Part I and II to the Hepatitis B Coordinator at the North Carolina Immunization Branch, 1917 Mail Service Center, Raleigh, N.C. 27699.

## Acute Perinatally Acquired Hepatitis B Virus Infection

Report Within		Report		CD Card	Surveillance Form
24 hrs.	7 days	Confirmed Only	Probable and Confirmed	/	/
/		/			

### Case Definition

HBsAg positivity in any infant aged >1-24 months who was born in the United States or in U.S. territories to an HBsAg-positive mother.

### Signs and Symptoms

Acute perinatally acquired hepatitis B infection in any infant or child may range from asymptomatic to fulminant hepatitis.

- C Onset is usually insidious
- C Anorexia
- C Vague abdominal discomfort
- C Nausea and vomiting
- C Arthralgia
- C Mild fever
- C Rash
- C Jaundice occurring three to ten days after the onset of illness
- C Myalgia
- C Headache
- C Dark urine

Usually, the disease is milder and often anicteric in children; in infants it is usually asymptomatic. Only a small proportion of perinatally acquired hepatitis B virus (HBV) infections may be clinically recognized. In those with clinical illness, the onset is usually insidious with anorexia, vague abdominal discomfort, nausea and vomiting, sometimes arthralgia and rash, often progressing to jaundice (occurring three to ten days after the onset of illness). The infected individual may exhibit mild fever. The prognosis of acute cases of hepatitis B developing into chronic infection is variable. Perinatally acquired infection has a high likelihood (up to 90 percent) of resulting in chronic antigenemia, which can lead to chronic hepatitis, cirrhosis or primary hepatocellular carcinoma. An estimated 15-25 percent of people with chronic HBV infection will die prematurely of either cirrhosis or hepatocellular carcinoma.

**Modes of Transmission:** In the United States, children become infected with hepatitis B virus (HBV) through a variety of means. The risk of perinatally acquired HBV infection among infants born to HBV-infected mothers ranges from 10 percent to 90 percent depending on each mother's hepatitis B e antigen (HBeAg) status. Infants who become infected by perinatal transmission have a 90 percent risk of chronic infection, and up to 25 percent will die of chronic liver disease as adults. Even when not infected during the perinatal period, children of HBV-infected mothers remain at high risk during the first 5 years of life due to risk of horizontal transmission. Horizontal transmission of HBV during the first 5 years of life occurs frequently in populations in which HBV infection is endemic. (See Endemic Countries)

The highest concentration of hepatitis B virus (HBV) is found in blood and serous fluids. Low titers are found in semen, vaginal secretions and saliva. Although HBV transmission has occurred through bites, saliva is an unlikely vehicle of transmission when exposure is kissing. There is no documented transmission of HBV via tears, sweat, urine, stool or droplet nuclei. Mothers who are HBsAg-positive should not be restricted from breastfeeding. Breastfeeding poses no risk of HBV infection for infants who have begun prophylaxis. The recommendation to discontinue breastfeeding should be considered when cracked, bleeding nipples or abscesses occur.

The virus is transmitted through one or more of the following modes:

- C **Percutaneous Transmission**—Transmission occurs through inoculation (IV, IM, SC or intradermal) with infected blood or blood products via needle-stick injury, shared IV/IM needle use, ear or body piercing, tattoos, acupuncture, other sharp objects contaminated with blood and inadequate sterilization of medical equipment. Percutaneous transmission can also occur through non-intact skin.
- C **Per mucosal Transmission**—Transmission of HBV when infected material comes in contact with mucous membranes of the eyes, nose or mouth through splashes, spills, sprays or indirectly by hand-to-mouth or hand-to-eye routes.
- C **Sexual Transmission**—Absorption of HBV into mucosal surfaces (sexual activity).
- C **Perinatal Transmission**—Transmission of HBV from infected mother to infant.
- C **Horizontal Transmission**—Transmission occurs in household and close community settings. Horizontal transmission usually occurs from one child to another child. Vehicles of transmission include bites, communally shared items (toothbrushes, razors, nail clippers) or contact with draining wounds, discarded soiled bandages, etc. The hepatitis B virus can remain infectious on environmental surfaces up to one month. However, transmission to a person after seven days has not been documented.

**Incubation Period:** 45-180 days; averages 60-90 days.

**Period of Communicability:** All persons who are HBsAg-positive are considered to be infectious. The HBsAg may be present several weeks before the illness onset and may last for several weeks or years. If infected persons develop the chronic carrier state, they will likely remain HBsAg positive for life.

**IF A PATIENT MEETS CASE DEFINITION, NORTH CAROLINA PUBLIC HEALTH LAW REQUIRES YOU TO PERFORM THE FOLLOWING FOUR STEPS:**

**1. REPORT THE CASE**

- /** Report the case within 24 hours to the local health department.
- /** Report cases that meet case definition for public health surveillance.
- /** Submit North Carolina Communicable Disease Report Card and Viral Hepatitis Case Report form to the Surveillance Unit.

**2. MANAGE THE CASE**

**Isolation:** Blood, body fluid and tissue precautions are indicated for perinatally acquired hepatitis B infection.

**Investigation:** Perform case investigation to determine the source of infection (determine whether the infant was born to an HBsAg-positive mother) and exposure to household, needle-sharing (ear-piercing, etc.), mucosal or blood contacts.

**Laboratory Work:**

Infants born to HBsAg-positive mothers should receive hepatitis B immune globulin (HBIG) and the first dose of hepatitis B vaccine within 12 hours of birth, followed by the second and third doses of vaccine at 1-2 and 6 months of age, respectively. Post-vaccination testing for antibody to HBsAg and HBsAg is recommended from three to six months following completion of the vaccination series. If HBIG and the initial dose of vaccine are delayed for > one month after birth, testing for HBsAg may determine if the infant is already infected.

- **HBsAg** (hepatitis B surface antigen)—most commonly used test for detecting carriers or diagnosing acute hepatitis B infections. HBsAg can be detected as early as one or two weeks and as late as 11 to 12 weeks after exposure to HBV. The presence of HBsAg indicates the person is either acutely or chronically infectious.
- **Anti-HBc** (total antibodies)—includes both IgM and IgG which indicates either current or past HBV infection at some undefined time. Maternal anti-HBc may be present in the infant's blood up to 12 months of life.
- **IgM anti-HBc**—indicates recent infection with HBV. IgM anti-HBc circulates for four-six months after onset of symptoms. A negative test for IgM anti-HBc, together with a positive test for HBsAg in a single blood sample, identifies a probable chronic HBV infection. In early acute cases of HBV infection, the HBsAg may be positive and the IgM anti-HBc not yet detectable.
- **HBeAg** (HBe antigen)—useful marker for contagiousness. The presence of HBeAg is associated with the number of infective HBV particles in the serum and a higher risk of infectivity.

- C **Anti-HBs** (antibodies to HBsAg)—associated with long-term immunity. Using radioimmunoassay (RIA), a minimum of 10 sample ratio units should be used to designate immunity. Using enzyme immunoassay (ELISA), the manufacturer's recommended positive should be considered an appropriate measure of immunity. The level of anti-HBs may also be expressed in milli-International Units/mL (mIU/mL). Ten mIU/mL is considered to indicate a protective level of immunity. The presence of anti-HBs indicates recovery and immunity to HBV infection. Anti-HBs can be acquired as an immune response to HBV infection, hepatitis B vaccine or passively transferred by the administration of HBIG.
  
- C **Characteristic pattern of specific antigens and antibodies**—The HBsAg and HBeAg become positive about one to three weeks after exposure and about four to five weeks before jaundice appears. The alanine aminotransferase (ALT) levels increase about one to two weeks before jaundice appears. These elevations persist for one to three months and decrease as clinical improvement progresses.

The appearance of anti-HBc and anti-HBe is a favorable prognostic sign. HBcAg, although present, is not detectable by any currently available practical test. However, anti-HBc is detectable at onset of jaundice, initially as IgM, indicating acute or early convalescent hepatitis B infection. Both anti-HBs and anti-HBc persist for many years. With chronic infection, HBsAg persists for many years, possibly a lifetime. HBeAg may persist as well; more likely if the infection was symptomatic. Chronic infection is more likely in cases with mild or absent symptoms than in cases with significant clinical disease.

**Follow-Up Laboratory Work:** Test perinatally acquired HBV cases six months after diagnosis to determine if they are chronic carriers. Control measures should be emphasized at each visit with the patient and with any contacts whenever necessary. If HBsAg remains positive six months after acute hepatitis B infection, report patient as a hepatitis B carrier. Conduct serologic testing and vaccination of household contacts. (See [Hepatitis B Carrier](#))

**Surveillance:** Individuals diagnosed with perinatally acquired hepatitis B should enter a tracking system until follow-up laboratory testing is complete. If a case moves to another county or state, coordination between health care providers is necessary to ensure completion of medical management and surveillance.

**Treatment:** Infants and children diagnosed with perinatally acquired hepatitis B should be referred to their private physician for disease management.

**Counseling:** All hepatitis B-infected individuals, or parents and guardians, shall be given both verbal and written control measures for blood and body fluid precautions to prevent hepatitis B transmission to household, sexual or needle-sharing contacts. Persons with acute hepatitis B should not care for infants less than 12 months of age.

**Prophylaxis:** Infants born to HBsAg-positive mothers should receive hepatitis B immune globulin (HBIG) and the first dose of hepatitis B vaccine within 12 hours of birth, followed by the second and third doses of vaccine at 1-2 and 6 months of age, respectively.

**Vaccine:** See Prophylaxis section.

**Referral:** Infants and children diagnosed with perinatally acquired hepatitis B should be referred to their private physician for disease management.

**Pregnancy:** Screen all pregnant women for HBsAg status during early prenatal visits. If HBsAg results are negative, repeat testing should be considered late in pregnancy for women who are at high risk of HBV infection (e.g. injecting drug use, diagnosed STD or presence of clinical symptoms of hepatitis). Any pregnant woman who is acutely or chronically infected with hepatitis B (HBsAg-positive) requires close surveillance during delivery and her infant needs close surveillance and vaccination tracking after birth. The infant requires HBIG and hepatitis B vaccine within 12 hours of birth. Hospital and pediatric health care provider notification is essential to complete the properly spaced hepatitis B vaccination series at 6 months of age and serological testing at age 9-15 months. (Refer to Hepatitis B Perinatal Program section) Complete the Perinatal Hepatitis B Prevention Report I and II and submit the report to the Hepatitis B Coordinator at the Immunization Branch as indicated.

### **3. MANAGE THE CONTACTS OF PERINATALLY ACQUIRED HEPATITIS B INFECTION**

**Investigation:** Determine if the infant was born to an HBsAg-positive mother. Perform case investigation to determine exposure to household, sexual, blood, mucosal or needle-sharing contacts. If the date of infection is unknown, identify contacts from the previous six months. (See Prophylaxis)

**Laboratory Testing:** Test all identified blood, mucosal and needle-sharing (ear-piercing, etc.) contacts for the presence of HBV. Testing of all close contacts should be considered due to the possibility that HBV infection in the first five years of life can occur via horizontal transmission. Testing is recommended prior to the administration of HBIG and hepatitis B vaccine if it does not delay treatment beyond 14 days of the last sexual exposure or beyond seven days of the last blood, mucosal or needle-sharing exposure.

**Laboratory Follow-Up:** If the contacts' laboratory tests indicate the presence of HBV infection, hepatitis B control measures apply. (see Manage the Case, Acute or Chronic.) Contacts whose laboratory data indicate the absence of HBV infection and absence of immunity (HBsAg-negative, IgM anti-HBc-negative and anti-HBs-negative) shall be prophylaxed against hepatitis B. (See Prophylaxis)

**Surveillance:** Blood, mucosal and needle-sharing (ear-piercing, etc.), and other close contacts should enter a tracking system and be followed until completion of the hepatitis B series. If the acute case is a primary caregiver for an infant less than 12 months old, the infant should receive prophylaxis. (See Prophylaxis)

**Counseling:** Instruct all contacts about control measures to follow until test results are known. All HBV-infected persons, or parents of HBV-infected children, should be given both verbal and written control measures. If test results indicate the contacts have not become infected with hepatitis B, control measures should be continued until prophylaxis with HBIG and/or hepatitis B vaccine series is complete.

- Instruct asymptomatic contacts to **immediately** report any symptoms to their local health department.
- Symptomatic contacts should be considered cases and managed according to the above protocol (See Manage The Case)

**Prophylaxis:** Blood, mucosal or needle-sharing (ear-piercing, etc.) contacts whose laboratory data indicate the absence of hepatitis B infection and absence of immunity (HBsAg-negative, anti-HBc IgM-negative and anti-HBs-negative) shall be prophylaxed against hepatitis B. Prophylaxis includes a single dose of HBIG, within seven days of the last blood, mucosal or needle-sharing exposure, and initiation of the hepatitis B vaccination series. Prophylaxis with HBIG and hepatitis B vaccine is indicated for infants less than 12 months old if the mother or primary caregiver has acute hepatitis B infection. On the basis of limited experience, there is no apparent risk of adverse effects to developing fetuses when hepatitis B vaccine is administered to pregnant women. Neither pregnancy nor lactation should be considered a contraindication to vaccination of women. A susceptible pregnant woman may receive hepatitis B vaccine with approval from her obstetrician.

**Vaccine:** Initiation of the hepatitis B vaccine series should occur at the same time HBIG is administered to susceptible blood, mucosal and needle-sharing (ear-piercing, etc.) contacts as well as for infants less than 12 months old whose primary caregiver has acute hepatitis B infection. (See Prophylaxis)

**Referral:** Contacts diagnosed with acute or chronic hepatitis B should be referred to their private physician for disease management. Infants whose mothers are HBsAg positive should be referred to their private physician for disease management; however, local health departments (LHDs) should continue to conduct active surveillance to ensure that vaccinations and laboratory tests are completed as recommended.

#### **4. PERFORM FOLLOW-UP**

Mail the completed Viral Hepatitis Case Report and the Communicable Disease Report Card to the Surveillance Unit of the General Communicable Disease Control Branch, 1902 Mail Service Center, Raleigh, 27699.

For pregnant women who are HBsAg positive, mail the completed Perinatal Hepatitis B Prevention Report Part I and II to the Hepatitis B Coordinator at the North Carolina Immunization Branch, 1917 Mail Service Center, Raleigh, N.C. 27699.

# Hepatitis B Perinatal Program

## HEPATITIS B INFECTED PREGNANT WOMEN

Report Within		Report		CD Card	Surveillance Form
24 hrs.	7 days	Acute HBV	HBV Carrier	/	/
/	/	/	/		<b>Perinatal Hepatitis B Prevention Report I &amp; II</b>
Acute	Chronic				/

### Case Definitions

- C Acute Hepatitis B Infection (Refer to Acute Hepatitis B section)
- C Hepatitis B Carrier (Refer to Hepatitis B Chronic Carrier section)

**Signs and Symptoms:** Refer to previous sections, Acute Hepatitis B and Hepatitis B Chronic Carrier.

Hepatitis B virus (HBV) infection is a major cause of acute and chronic hepatitis, cirrhosis and primary hepatocellular carcinoma. One mode of transmission of HBV is perinatal transmission (from mother to infant at birth). The risk of perinatal HBV infection among infants born to HBV infected mothers ranges from 10-85 percent, depending on the mother's hepatitis B e antigen (HBeAg) status. Chronic HBV infection with persistence of hepatitis B surface antigen (HBsAg) occurs in as many as 90 percent of infants who become infected by perinatal transmission and in 30-60 percent of older children who become infected from 1 to 5 years of age. As many as 6-10 percent of adolescents and adults who acquire HBV infection will become carriers. An estimated 25 percent of chronically infected infants will develop chronic liver disease, cirrhosis or hepatocellular carcinoma, and die as young adults.

The Advisory Committee on Immunization Practices (ACIP), the American Academy of Pediatrics (AAP), and the Centers For Disease Control and Prevention (CDC) recommend maternal identification through screening and newborn prophylaxis to significantly reduce neonatal infection and potential sequelae. North Carolina Administrative Code 15A NCAC 19A.0203 (d) mandates all pregnant women be tested for hepatitis B infection unless known to be infected. Infants born to infected mothers should be given hepatitis B immune globulin (HBIG) and hepatitis B vaccine within 12 hours of birth. The hepatitis B series should be completed at 6 months of age, and post-vaccination serologic testing for HBsAg and anti-HBs should be done at 9-15 months of age.

### Perinatal Hepatitis B Program Objectives

- C Screen all pregnant women for HBsAg status during early prenatal visits. If HBsAg results are negative, repeat testing should be considered late in pregnancy for women who are at high risk of HBV infection (e.g. injecting drug use, diagnosed STD or presence of clinical symptoms of hepatitis).
- C Identify and report pregnant women who are HBsAg-positive within the county (private and public sectors). Determine acute or chronic status of infection and refer to that section for the protocol.
- C Identify all infants born to HBsAg-positive mothers.
- C Assure HBIG and hepatitis B vaccine are given to infants born to HBsAg-positive mothers within 12 hours of birth.
- C Assure completion of the hepatitis B series by 6-8 months of age.

- C Perform post-vaccination testing (HBsAg and anti-HBs) at 9-15 months of age on infants born to HBsAg-positive mothers and that have completed the 3-dose hepatitis B vaccination series.
- C Perform prevaccination testing of household, sexual, blood, mucosal and needle-sharing contacts to HBsAg-positive mothers to determine susceptibility.
- C Administer HBIG and hepatitis B vaccine to all susceptible sexual contacts within 14 days of last exposure. Administer only hepatitis B vaccine if more than 14 days have elapsed since last sexual exposure.
- C Administer HBIG and hepatitis B vaccine to all susceptible blood, mucosal and needle-sharing contacts within seven days of last exposure. Administer only hepatitis B vaccine if more than seven days have elapsed since last blood, mucosal or needle-sharing exposure.
- C Administer hepatitis B vaccine to all susceptible household contacts of a hepatitis B carrier.
- C For both private and public sectors, enter HBsAg-positive mothers, their infants, and their household, sexual, blood, mucosal and needle-sharing contacts into a county tracking system so that the objectives above are attained.
- C Provide control measures and education to HBsAg-positive mothers and their contacts.
- C Submit Perinatal Hepatitis B Prevention Reports (Part I and II) to the Hepatitis B Coordinator at the N. C. Immunization Branch.

**Modes of transmission:** Hepatitis B virus (HBV) is found in highest concentrations in blood and serous fluid. Low titers are found in semen, vaginal secretions and saliva. Although transmission of HBV has occurred through bites, saliva is an unlikely vehicle of transmission through kissing. There is no documented case of HBV transmission via tears, urine, sweat, stool or droplet nuclei. Mothers who are HBsAg-positive should not be restricted from breastfeeding. Breastfeeding poses no risk of HBV infection for infants who have begun prophylaxis. The recommendation to discontinue breastfeeding should be considered when cracked, bleeding nipples or abscesses occur.

The virus is transmitted through one or more of the following modes:

- **Percutaneous Transmission**—Transmission occurs through inoculation (IV, IM, SC or intradermal) with infected blood or blood products via needle-stick injury, shared IV/IM needle use, ear or body piercing, tattoos, acupuncture, other sharp objects contaminated with blood and inadequate sterilization of medical equipment. Percutaneous transmission can also occur through non-intact skin.
- **Permucosal Transmission**—Transmission of HBV when infected material comes in contact with mucous membranes of the eyes, nose or mouth through splashes, spills, sprays or indirectly by hand-to-mouth or hand-to-eye routes.
- **Sexual Transmission**—Absorption of HBV into mucosal surfaces (sexual activity).
- **Perinatal Transmission**—Transmission of HBV from infected mother to infant.
- **Horizontal Transmission**—Transmission occurs in household and close community settings. Horizontal transmission usually occurs from one child to another child. Vehicles of transmission include bites, communally shared items (toothbrushes, razors, nail clippers) or contact with draining wounds, discarded soiled bandages, etc. The hepatitis B virus can remain infectious on environmental surfaces up to one month. However, transmission to a person after seven days has not been documented.

**Incubation Period:** 45-180 days; averages 60-90 days.

**Period of Communicability:** All persons who are HBsAg-positive are considered to be infectious. The HBsAg may be present several weeks before the onset of illness and last for several weeks or years. If the chronic carrier state develops, patients will most likely remain HBsAg positive for life.

**IF A PATIENT MEETS CASE DEFINITION, NORTH CAROLINA PUBLIC HEALTH LAW REQUIRES YOU TO PERFORM THE FOLLOWING FOUR STEPS:**

## 1. REPORT THE CASE

Report the case according to the case definition for public health surveillance:

- Acute Hepatitis B (refer to the [Acute Hepatitis B](#) section), **or**
- Hepatitis B Carrier (refer to the [Hepatitis B Chronic Carrier](#) section)

## 2. MANAGE THE CASE

**Isolation:** Blood, body fluids and tissue precautions are indicated for a pregnant woman who is HBsAg-positive. Immediately bathe the infant with soap and water to remove the mother's body fluids. At delivery, all health care workers (HCWs) should follow universal precautions by wearing surgical gloves, gowns and protective eyeglasses. HCWs whose job activities involve contact with blood, other body fluids or sharps should be vaccinated against hepatitis B. Equipment or items soiled with blood or exudates should be carefully cleaned, disinfected with a 1:10-1:100 dilution of household bleach and handled according to universal precautions. (See [Birthing Hospital Precautions](#))

**Investigation:** Perform case investigation to determine the source of infection and exposure to the infant and/or sexual, blood, mucosal, needle-sharing and household contacts. Notify the delivery hospital to ensure that HBIG and hepatitis B vaccine will be administered to the infant within 12 hours of birth. A copy of the mother's prenatal record should be forwarded to the delivery hospital indicating the mother's actual hepatitis B surface antigen-positive test results. Start the Perinatal Hepatitis B Prevention Report, Part I and Part II, to track the infant's vaccination and postvaccination testing history and follow-up with contacts to the HBsAg-positive woman.

### Laboratory Work

- **HBsAg** (hepatitis B surface antigen)—most commonly used test for detecting carriers or diagnosing acute hepatitis B infections. HBsAg can be detected as early as one or two weeks and as late as 11 to 12 weeks after exposure to HBV. The presence of HBsAg indicates the person is either acutely or chronically infectious.
- **Anti-HBc** (total antibodies)—includes both IgM and IgG, which indicates either current or past HBV infection at some undefined time.
- **IgM anti-HBc**—indicates recent infection with HBV. IgM anti-HBc circulates for four-six months after onset of symptoms. A negative test for IgM anti-HBc, together with a positive test for HBsAg in a single blood sample, identifies a probable chronic HBV infection. In early acute cases of HBV infection, the HBsAg may be positive and the IgM anti-HBc not yet detectable.
- **HBeAg** (HBe antigen)—useful marker for contagiousness. The presence of HBeAg is associated with the number of infective HBV particles in the serum and a high risk of infectivity.
- **Anti-HBs** (antibodies to HBsAg)—associated with long-term immunity. Using radioimmunoassay (RIA), a minimum of 10 sample ratio units should be used to designate immunity. Using enzyme immunoassay (ELISA), the manufacturer's recommended positive should be considered an appropriate measure of immunity. The level of anti-HBs may also be expressed in milli-International Units/mL (mIU/mL). Ten mIU/mL is considered to indicate a protective level of immunity. The presence of anti-HBs indicates recovery and immunity to HBV infection. Anti-HBs can be acquired as an immune response to HBV infection, hepatitis B vaccine or passively transferred by the administration of HBIG.
- **Characteristic pattern of specific antigens and antibodies**—The HBsAg and HBeAg become positive, about one to three weeks after exposure and four to five weeks before jaundice appears. The alanine aminotransferase

(ALT) levels increase about one to two weeks before jaundice appears. These elevations persist for one to three months and decrease as clinical improvement progresses.

The appearance of anti-HBc and anti-HBe is a favorable prognostic sign. HBsAg, although present, is not detectable by any currently available practical test. However, anti-HBc is detectable at onset of jaundice, initially as IgM, indicating acute or early convalescent hepatitis B infection. Both anti-HBs and anti-HBc persist for many years. With chronic infection, HBsAg persists for many years, possibly a lifetime. HBeAg may persist as well; more likely if the infection was symptomatic. Chronic infection is more likely in cases with mild or absent symptoms than in cases with significant clinical disease.

**Follow-Up Laboratory Work:** Repeat HBsAg testing six months after initial testing to confirm carrier status. Then test annually for two years if they remain HBsAg-positive. Repeat testing when necessary to determine appropriate control measures for exposed contacts.

**Surveillance:** Individuals diagnosed with hepatitis B infection should enter a tracking system until follow-up laboratory testing is complete. If a case moves to another county or state, coordination between health care providers is necessary to ensure completion of medical management and surveillance.

**Treatment:** Individuals diagnosed with hepatitis B infection should be referred to their private physician for disease management.

**Counseling:** All hepatitis B-infected individuals shall be given both verbal and written control measures for blood and body fluid precautions to prevent hepatitis B transmission to household, sexual or needle-sharing contacts.

**Prophylaxis:** On the basis of limited experience, there is no apparent risk of adverse effects to developing fetuses when hepatitis B vaccine is administered to pregnant women. Neither pregnancy nor lactation should be considered a contraindication to vaccination of women.

**Vaccine:** None

**Referral:** Individuals diagnosed with hepatitis B infection should be referred to their private physician for disease management.

**Pregnancy:** Screen all pregnant women for HBsAg status during early prenatal visits. If HBsAg results are negative, repeat testing should be considered late in pregnancy for women who are at high risk of HBV infection (e.g. injecting drug use, diagnosed STD or presence of clinical symptoms of hepatitis). Any pregnant woman who is acutely or chronically infected with hepatitis B (HBsAg-positive) requires close surveillance during delivery and her infant needs close surveillance and vaccination tracking after birth. The infant requires HBIG and hepatitis B vaccine within 12 hours of birth. Hospital and pediatric health care provider notification is essential to complete the properly spaced hepatitis B vaccination series at 6 months of age and serologic testing at age 9-15 months. Neither pregnancy nor lactation should be considered a contraindication to vaccination of women. A susceptible pregnant woman may receive hepatitis B vaccine with approval from her obstetrician. Complete the Perinatal Hepatitis B Prevention Report I and II and submit the report to the Hepatitis B Coordinator at the Immunization Branch as indicated.

### 3. MANAGE THE CONTACTS

**Investigation:** Perform case investigation to determine exposure to household, sexual, blood, mucosal or needle-sharing contacts. If the date of infection is unknown, identify sexual, blood, mucosal and needle-sharing contacts during the previous six months.

**Laboratory Testing:** Test all identified household, sexual, blood, mucosal and needle-sharing contacts for the presence of HBV. Testing is recommended prior to the administration of HBIG and hepatitis B vaccine if it does not delay treatment beyond 14 days of the last sexual exposure or beyond seven days of the last blood, mucosal or needle-sharing exposure.

**Laboratory Follow-Up:** If the contacts' laboratory tests indicate the presence of HBV infection, hepatitis B control measures apply (See Manage the Case). Contacts whose laboratory data indicate the absence of HBV infection and the absence of immunity (HBsAg-negative, IgM anti-HBc -negative and anti-HBs-negative) shall be prophylaxed against hepatitis B. (See Prophylaxis below)

**Surveillance:** Household, sexual, blood, mucosal and needle-sharing contacts should enter a tracking system and be followed until completion of the hepatitis B vaccination series. The infant born to a HBsAg-positive mother also should enter a tracking system until completion of the hepatitis B vaccination series and post-vaccination serologic testing. The infant should receive post-vaccination serologic testing for HBsAg and anti-HBs three-nine months after the vaccination series is complete, preferably at 9-15 months of age. If an acutely infected person is a primary caregiver for an infant less than 12 months old, the infant should receive prophylaxis.

**Infant:** The purpose of maternal screening and intervention is to prevent the development of hepatitis B infection among infants born to mothers who are hepatitis B surface antigen (HBsAg) positive. These infants have a 90 percent chance of becoming infected with hepatitis B and subsequently becoming lifelong hepatitis B carriers. An estimated 25 percent of chronically infected infants will develop chronic liver disease, cirrhosis or hepatocellular carcinoma and die as young adults.

Perinatal hepatitis B can be prevented in more than 90 percent of cases when those infants born to HBsAg-positive women are identified and properly immunoprophylaxed. Proper immunoprophylaxis of these infants includes giving hepatitis B vaccine and hepatitis B immune globulin (HBIG) within 12 hours of birth and completion of the hepatitis B series by age 6-8 months. The infants should receive post-vaccination serologic testing for HBsAg and anti-HBs three-nine months after the third hepatitis B vaccination, preferably at 9-15 months of age. (See Birth Hospital Precaution)

**Counseling:** Instruct all contacts about control measures to follow until test results are known. All HBV-infected persons should be given both verbal and written control measures. Parents of infants born to HBsAg-positive mothers should be strictly advised to adhere to the recommended hepatitis B vaccination schedule to prevent hepatitis B infection in their infants. If test results indicate that the contacts have not become infected with hepatitis B, control measures should be continued until prophylaxis with HBIG and hepatitis B vaccine series is complete.

- C Instruct asymptomatic contacts to **immediately** report any symptoms to their local health department.
- C Symptomatic contacts should be considered cases and should be managed according to the above protocol (See Manage the Case, Acute and Chronic).

**Prophylaxis:** Household, sexual, blood, mucosal and needle-sharing contacts whose laboratory data indicate the absence of hepatitis B infection and the absence of immunity (HBsAg negative, IgM anti-HBc negative, and anti-HBs negative) shall be prophylaxed against hepatitis B. Prophylaxis includes a single dose of HBIG, within 14 days of the last sexual exposure or within seven days of the last blood, mucosal or needle-sharing exposure, and initiation of the hepatitis B vaccination series. Prophylaxis with HBIG and hepatitis B vaccine is indicated for infants less than 12 months of age if the mother or primary caregiver has acute hepatitis B infection. On the basis of limited experience, there is no apparent risk of adverse effects to developing fetuses when hepatitis B vaccine is administered to pregnant women. Neither pregnancy nor lactation should be considered a contraindication to vaccination of women. A susceptible pregnant woman may receive hepatitis B vaccine with approval from her obstetrician.

**Vaccine:** Susceptible sexual, blood, mucosal and needle-sharing contacts should receive hepatitis B vaccine at the same time HBIG is administered. Susceptible household contacts should receive hepatitis B vaccination as soon as laboratory testing is complete. (See Prophylaxis above)

**Referral:** Contacts diagnosed with acute or chronic hepatitis B should be referred to their private physician for disease management. Infants whose mothers are HBsAg-positive should be referred to their private physician for disease management; however, local health departments (LHDs) should continue to conduct active surveillance to ensure that vaccinations and laboratory tests are completed as recommended.

**Breastfeeding:** Mothers who are HBsAg-positive should not be restricted from breastfeeding. Breastfeeding poses no risk of HBV infection for infants who have begun prophylaxis. The recommendation to discontinue breastfeeding should be considered when cracked, bleeding nipples or abscesses occur.

**Premature Infants:** Premature infants born to HBsAg-positive mothers should receive immunoprophylaxis with hepatitis B vaccine and HBIG beginning at or shortly after birth.

#### **4. PERFORM FOLLOW-UP**

For pregnant women who are HBsAg positive, mail the completed Perinatal Hepatitis B Prevention Report (Part I and II) to the Hepatitis B Coordinator at the N. C. Immunization Branch, 1917 Mail Service Center, Raleigh, N. C. 27699.

# Birthing Hospital Precautions

## Labor and Delivery

Birthing hospitals should establish policies and procedures for obstetric and nursery staff to follow when a HBsAg-positive mother is admitted to the hospital. The infant's exposure to maternal blood containing hepatitis B virus is the primary mode of transmission of hepatitis B infection. The mother's *actual* HBsAg laboratory report results should be transferred to the infant's record and nursery staff should administer appropriate immunoprophylaxis (HBIG and hepatitis B vaccination) to the infant within 12 hours of birth. Women admitted for delivery who have not had prenatal HBsAg testing should have blood drawn for HBsAg testing as soon as possible. Infants born to mothers whose HBsAg status is unknown should receive hepatitis B vaccine within 12 hours of birth. If the mother is later found to be HBsAg positive, her infant should receive HBIG as soon as possible and within 7 days of birth. (The efficacy of HBIG administered after 48 hours of age is not known.)

All health care workers (HCWs) should follow universal precautions by wearing surgical gloves, gown and protective eyeglasses. HCWs whose job duties involve contact with blood, body fluids or sharps should be vaccinated against hepatitis B. Equipment or items soiled with blood or exudates should be carefully cleaned, disinfected with a solution of household bleach (1:10-1:100) and handled according to universal precautions.

The following labor and delivery guidelines can be used to establish policy and procedure for birthing hospitals.

## Breastfeeding

Women who are HBsAg-positive should not be restricted from breastfeeding. Breastfeeding poses no risk of hepatitis B virus (HBV) infection for infants who have begun prophylaxis. The recommendation to discontinue breastfeeding should be considered when cracked, bleeding nipples or abscesses occur.

## HBIG and Other Infant Vaccination

The administration of HBIG at birth does not interfere with other infant vaccination schedules, therefore, routine infant immunization schedule should not be altered for infants receiving HBIG and hepatitis B vaccine at birth.

## Reporting

The nursery staff should notify the outpatient provider, infection control staff and the local health department before discharge. Appointments should be scheduled for the second and third doses of hepatitis B vaccine. The role of the local health department is to ensure tracking and vaccination of the infant according to Advisory Committee on Immunization Practices (ACIP) recommendations. All people who test HBsAg-positive shall be reported to the local health department, according to North Carolina Administrative Code.

### **Preterm Infants/Low Birthweight Infants**

Studies demonstrate that decreased seroconversion rates might occur among certain premature infants with low birth weights (i.e., <2,000grams) after administration of hepatitis B vaccine at birth. However, by chronological age 1 month, all premature infants, regardless of initial birth weight or gestational age, are as likely to respond as adequately as older and larger infants.

Premature infants born to **HBsAg-positive** mothers and to mothers of **unknown HBsAg status** must receive hepatitis B vaccine and HBIG within 12 hours of birth. If these infants weigh less than 2,000 grams at birth, the initial vaccine dose should not be counted towards completion of the hepatitis B vaccination series. Three additional doses of hepatitis B vaccine should be administered, beginning when the infant is age 1 month.

The optimal timing of the first dose of hepatitis B vaccine has not been determined for premature infants with a birth weight of <2,000 grams born to **HBsAg-negative** mothers. These infants can receive the first dose of the hepatitis B vaccine series at chronological age 1 month. Premature infants discharged from the hospital before chronological age 1 month can also be administered hepatitis B vaccine at discharge, if they are medically stable and have gained weight consistently.

**The full recommended dose of vaccine should be used. Divided or reduced doses of hepatitis B vaccine are not recommended.**

# Perinatal Hepatitis B Tracking System

The LHD will identify HBsAg-positive women during pregnancy and then track the women, infants and other contacts through their immunization schedules and follow-up testing. The information regarding each perinatal hepatitis B case will be reported through completion of the Communicable Disease Report Card, Surveillance Form, and Perinatal Hepatitis B Prevention Report I and II. The North Carolina Immunization Branch Perinatal Hepatitis B Program will generate a statewide database of pregnant women who are HBsAg-positive, their contacts and the infants born to these women. CDC requires this data be used to assess the prevalence of perinatal hepatitis B transmission in North Carolina.

The average time required to complete the tracking process in a perinatal hepatitis B case is 12-18 months. This is an unusual length of time in comparison to follow-up for other communicable diseases, which presents unique challenges for the communicable disease nurse or case manager. There may be long durations between encounters with the patients, who will need to be reminded of upcoming vaccination and serologic testing due dates. To manage this lengthy process of case management and perinatal hepatitis B tracking, it is important to establish an efficient tracking system. The tracking system you choose should enable you to develop a schedule for subsequent telephone or letter contacts—to remind the mother and the physician of the infant's vaccination and testing schedules. The communicable disease nurse should coordinate tracking efforts with the prenatal maternity/OB staff, hospital obstetric staff, newborn nursery staff, infectious disease staff, pediatric staff, etc. After hospital discharge, there also should be coordination with the physician and office nurse, LHD immunization nurses or other individuals who will be involved with completion of the infant's hepatitis B vaccination series and post-vaccination serologic. **Public and private patients** should be entered into the LHD tracking system. If the patient prefers to receive follow-up with a private health care provider, the LHD should notify this provider when immunization or testing is due. The private provider should, then, inform the LHD of the infant's immunization dates as well as the date and results of post-vaccination serologic testing for HBsAg and anti-HBs.

## Tracking Components

There are various ways to organize your tracking system; however, certain basic elements are necessary to ensure that all information is tracked.

### I. The HBsAg-Positive Pregnant Woman

The HBsAg-positive pregnant woman should be identified as the index case for your tracking system and other records should be organized around this case. She is the reason you provide screening and preventive care to her infant and contacts. The demographic, medical and delivery information will be necessary for your tracking system. The basic information needed on all HBsAg-positive pregnant women includes:

#### *Demographic Information*

- C name
- C date of birth

- C social security number
- C race
- C country of birth
- C if immigrant, date of arrival in the United States
- C primary language spoken

*Locating Information*

- C home address and telephone number
- C work address and telephone number
- C emergency telephone numbers [*Obtaining several emergency numbers for next of kin, close friends, or neighbors is important to prevent the infant from becoming lost to follow-up over the course of 18 months.*]

*Medical Information*

- C date(s) and type(s) of test(s)
- C test results [It is important to record the mother's **actual HBsAg** test results in hospital and medical records.]
- C history of past hepatitis B testing
- C physician's name
- C physician's address and telephone number
- C expected date of confinement (EDC or due date)
- C expected delivery hospital
- C expected post-partal and neonatal care providers

**II. The Contacts** (sexual, needle-sharing, household)

*Sexual, needle-sharing and household* contacts who have been exposed to the HBsAg-positive pregnant woman shall be offered testing, HBIG and hepatitis B vaccinations as medically indicated. (See sections for Acute Hepatitis B, Hepatitis B Chronic Carriers and Hepatitis B Infected Pregnant Women.) To ensure each contact completes this process, it is important to track and maintain active surveillance until all follow-up treatment is finished. This information should include:

*Demographic Information*

- C contact's name
- C date of birth
- C race
- C primary language

*Locating Information*

- C home address and telephone number
- C work address and telephone number
- C emergency telephone number

*Medical Information*

- C prior infection with hepatitis B

- C date of screening
- C screening results
- C if indicated:
  - < date of HBIG
  - < date of HBV #1
  - < date of HBV #2
  - < date of HBV #3

### III. The Infant

The infant's birth brings on the last phase of your tracking system. The infant will remain in your tracking system through at least its first year of life. The following information should be collected:

#### *Demographic Information*

- C infant's name
- C date of birth

#### *Locating Information* (if different from mother's)

- C home address and telephone number
- C guardian's name
- C emergency telephone number

#### *Medical Information*

- C date of HBIG
- C date of HBV#1                      manufacturer                      mcg/ml
- C date of HBV#2                      manufacturer                      mcg/ml
- C date of HBV#3                      manufacturer                      mcg/ml
- C date of follow-up serology
- C test results for HBsAg and anti-HBs
- C pediatrician or provider of immunization services
- C provider's address and telephone number

### IV. Tracking Methods

There are various methods to maintain tracking information. For a system to be effective, it should be organized in a way that makes it easy to remind the communicable disease nurse or case manager when an immunization or laboratory test is due.

#### *Case-File System*

The case-file system involves creating a file or card for each case, which contains information about the index case, each contact and each infant. Periodic review is required in order to generate reminder letters. This system's advantage is all information relating to the case is in one file. The disadvantage is you must be sure to

completely review each case every one to two weeks to ensure all patients acquiring intervention are notified of the appropriate follow-up.

### *Tickler System*

The tickler system involves creating a card for each patient and filing the card according to the month and/or week the next intervention is due. Before the appropriate date, the patient's chart is pulled for follow-up. After each activity is completed, the card is re-filed according to the next intervention date. When the patient has completed all appropriate follow-up, the card is "closed" and filed. The index case (HBsAg-positive mother) of the contacts should be documented on each contact's tickler card.

All tracking programs should generate a reminder letter or telephone call two weeks before the next immunization or test is due. If the patient does not come in for treatment two weeks after the activity is due, another letter should be mailed or telephone contact made. These letters may be mailed directly to the patient and/or to the health care provider. If the patient prefers to receive follow-up at their private health care provider, the LHD should continue to notify the provider when the immunization or test is due.

The disadvantage of the tickler system is that it is labor intensive. It takes time to write each card and it is easy to misfile cards. Great care should be taken to keep the file organized.

### *Computer Systems*

While not required for a successful program, the computer is an easy tool to use to organize and link case information. The variety of programs is endless; however, a computer program should be able to collect basic tracking information and identify those patients who are overdue for their next intervention.

Programs have been developed to collect case information, generate CDC reports and maintain an accurate county data summary. An important feature is the ability to index files according to mother's or infant's last name. The usefulness of these programs varies according to county needs.

**CASE-FILE SYSTEM**

Front of Card

<b>HEPATITIS B CASE-FILECARD</b>				
<b>Chronic</b> _____		<b>Acute</b> _____		<b>Contact</b> _____
				<b>Infant</b> _____
Name _____		DOB _____		Race _____ Sex _____
SS# _____ - _____ - _____		Guardian _____		
Home Address _____				
Work _____		Phone (____) _____ - _____		Emergency Phone (____) _____ - _____
Country of Birth _____			Date of Arrival in U.S. _____	
<b>Name of Index Case</b> _____			<b>Record #</b> _____	
History of Hepatitis? ( <i>check one</i> ) <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> UK      Pregnant? _____ (EDC _____)				
Date of Test: _____		Type of Test: _____		Test Results: _____
Physician's Name/Address _____				
_____				
Expected Delivery Hospital _____				
<b>Contact Name:</b>		<b>Age: (DOB)</b>	<b>HBIG</b>	<b>HBV:</b>
				<b>Lab:</b>
<b>NOTES</b>				

Back of Card

**NOTES**

# TICKLER CARD SYSTEM

Front of Card

<b>HEPATITIS B TICKLER CARD</b>	
<b>Chronic</b> _____	<b>Acute</b> _____
<b>Contact</b> _____	<b>Infant</b> _____
Name _____ DOB _____ Race _____ Sex _____	
SS# _____ - _____ - _____ Guardian _____	
Home Address _____	
Work _____ Phone (____) _____ - _____ Emergency Phone (____) _____ - _____	
Country of Birth _____ Date of Arrival in U.S. _____	
<b>Name of Index Case</b> _____	<b>Record #</b> _____
History of Hepatitis? ( <i>check one</i> ) ___Y ___N ___UK Pregnant? ___(EDC _____)	
Date of Test _____ Type of Test _____ Test Results _____	
Physician's Name and Address _____	
Expected Delivery Hospital _____	
Contact Name _____ Age _____ HBIG _____ HBV _____ Lab _____	
<b>NOTES</b>	
(OVER)	

Back of Card

**NOTES**

# Prophylaxis Against Hepatitis B Virus Infection

Two types of products are available for prophylaxis against HBV infection. Hepatitis B vaccine, which provides long-term protection against HBV infection, is recommended for pre-exposure and post-exposure prophylaxis. HBIG provides temporary protection (i.e. three to six months) and is only indicated in certain post-exposure settings.

## **Hepatitis B Immune Globulin (HBIG)**

HBIG is prepared from plasma known to contain high titers of antibody against HBsAg (anti-HBs). In the United States, HBIG has an anti-HBs titer of greater than 100,000 by radioimmunoassay. The human plasma from which HBIG is prepared is screened to be certain it is free of antibodies to HIV. In addition, the process used to prepare HBIG inactivates and eliminates HIV from the final product. There is no evidence that HBV or HIV can be transmitted by HBIG. HBIG is used for passive prophylaxis for percutaneous, mucosal and sexual exposures to a HBsAg-positive person, for perinatal exposure of an infant to a HBsAg-positive mother at birth or for household exposure of an infant less than 12 months old to a primary care giver with acute hepatitis B.

All candidates for HBIG are, by definition, in a high-risk category, and should be considered for vaccination. Both manufacturers of HBIG (Abbott and Bayer) produce thimerosal-free HBIG products.

HBIG and Immune globulin (IG) are prepared by cold ethanol fractionation of pooled plasma. IG contains low titers of anti-HBs. Because titers are relatively low, there is no valid current use for IG in the prevention of HBV transmission, unless HBIG is unavailable.

## **Hepatitis B Vaccine**

Two types of hepatitis B vaccine are licensed in the United States. One, which was manufactured from the plasma of chronically infected people, is no longer produced in the United States. Recombinant DNA technology is used to produce all currently available vaccine. These vaccines are produced using HBsAg synthesized by *Saccharomyces cerevisiae* (common bakers' yeast), into which a plasmid containing the gene for HBsAg has been inserted. Purified HBsAg is obtained by lysing the yeast cells and separating HBsAg from the yeast components through biochemical and biophysical techniques. Hepatitis B vaccines are packaged to contain 10-40ug HBsAg protein/ml after adsorption with aluminum hydroxide (0.5 mg/ml). Thimerosal (1:20,000 concentration) was once added as a preservative. However, thimerosal-free vaccine has been available since March 2000, and should be used for vaccinations given to children and pregnant women.

## **HEPATITIS B VACCINE USAGE**

### **Routes and Sites of Administration**

The recommended series of three intramuscular doses of hepatitis B vaccine induces a protective antibody response (anti-HBs  $\geq 10$  milli-international units [mIU]/mL) in greater than 90 percent of healthy adults and in greater than 95 percent of infants, children and adolescents. Hepatitis B vaccine should be administered only in the deltoid muscle of adults and children or in the anterolateral thigh muscle of neonates and infants. Immunogenicity of the adult vaccine is substantially lower when injections are administered in the buttock. When hepatitis B vaccine is administered to infants simultaneously with other vaccines, separate sites in the anterolateral thigh may be used for multiple intramuscular injections. This method is preferable to administering vaccine in the buttock or deltoid sites.

For patients undergoing hemodialysis and other immunosuppressed patients, higher doses or increased number of doses are required. Persons with HIV have an impaired response to hepatitis B vaccine.

### **Vaccination During Pregnancy**

On the basis of limited experience, there is no apparent risk of adverse effects to developing fetuses when hepatitis B vaccine is administered to pregnant women (CDC, unpublished data). The vaccine contains noninfectious HBsAg particles and should cause no risk to the fetus. HBV infection affecting a pregnant woman may result in severe disease for the mother and chronic infection for the newborn. Therefore, neither pregnancy nor lactation should be considered a contraindication to vaccination of women. However, consult with the patient's physician before administering any vaccine to a pregnant woman.

### **Pre-Exposure Prophylaxis**

The vaccination schedule most often used for adults and children has been three intramuscular injections, with the second and third doses administered one and six months, respectively, after the first. An alternate schedule of four doses has been approved for one vaccine that would allow more rapid induction of immunity. However, for pre-exposure prophylaxis, there is no clear evidence this regimen provides greater protection than is obtained with the standard three-dose schedule. Each vaccine has been evaluated to determine the age-specific dose at which an optimum antibody response is achieved. The recommended dose varies by product, recipient's age and, in certain situations, recipient's status. These recommendations are indicated in product information included with each vaccine vial. The North Carolina Immunization Branch provides further recommendations.

### **Simultaneous Administration of Other Vaccines**

No interference with the antibody response of the other vaccines has been demonstrated when hepatitis B has been administered simultaneously with other vaccines.

## **Interrupted Schedules**

If the vaccination series is interrupted after the first dose, the second dose should be administered as soon as possible. The second and third doses should be separated by an interval of at least two months. If only the third dose is delayed, it should be administered when convenient.

## **Availability of Vaccine From Different Manufacturers**

When one, or two, doses of one manufacturer's vaccine are followed by subsequent doses from a different manufacturer the immune response has been shown to be comparable with the response from a full course of the same manufacturer's vaccine.

## **Health Care Workers**

The risk of health care workers contracting HBV infection depends on how often they are exposed to blood, or blood products through percutaneous and mucosal exposures. If tasks involve contact with blood, blood-contaminated body fluids or sharps, these workers should be vaccinated. Therefore, it is recommended that vaccination be completed during training in schools of medicine, dentistry, nursing, laboratory technology and other health professional training programs. The Advisory Committee on Immunization Practices and the Hospital Infection Control Practices Advisory Committee recommend post-vaccination testing of HCWs who have contact with patients or blood and are at ongoing risk for injuries with sharp instruments or needlesticks. Testing for anti-HBs should be done one-two months after completion of the three-dose series

## **Hemodialysis and Immunocompromised Individuals**

Larger vaccine doses or an increased number of doses are required to induce protective antibodies in a high proportion of hemodialysis patients and also may be necessary for other immunocompromised people (e.g., those who take immunosuppressive drugs or who are HIV-positive), although few data are available concerning these individuals' response to higher doses of vaccine. Consult the product information and attending physician for dosages.

## **Pre-Vaccination Testing for Susceptibility**

Susceptibility testing is not indicated for immunization programs for children or most adolescents because of the low HBV infection rate and relatively low vaccine cost. For adults, the decision to perform pre-vaccination testing should include an analysis of cost effectiveness because of the higher cost of the vaccine. Testing for prior infection should be considered for adults in risk groups with high rates of infection (e.g., injecting drug users, homosexual men and household contacts of HBV carriers). The decision for testing should be based on whether the costs of testing balance the costs of vaccine saved by not vaccinating people who are already infected.

## **Post-Vaccination Testing for Serologic Response**

Such testing is not necessary after routine vaccination of infants, children or adolescents. Testing for immunity is advised only for people whose subsequent clinical management depends on knowledge of their immune status (e.g., infants born to HBsAg-positive mothers, dialysis patients and staff, and people with HIV infection). Post-vaccination testing also should be considered for people at occupational risk who may have exposures from injuries with sharp instruments because knowledge of their antibody response will aid in determining appropriate post-exposure prophylaxis. When necessary, post-vaccination testing should be performed from one to two months after completion of the vaccine series. Testing after immunoprophylaxis of infants born to HBsAg-positive mothers should be performed from three to nine months after the completion of the vaccination series.

## **Re-Vaccination of Nonresponders**

When people who do not respond to the primary vaccine series are re-vaccinated, 15-25 percent produce an adequate antibody response after one additional dose, and 30-50 percent produce adequate antibody response after three additional doses. Therefore, revaccination with one or more additional doses should be considered for people who do not respond to vaccination initially. Re-vaccinated persons should be tested at the completion of their second vaccination series. If the entire series has been repeated (e.g., a total of six doses given), and immunity is not achieved, there is no need to give subsequent doses. In this case, a measurable immune response cannot be achieved. Testing for HBsAg should be done to rule out hepatitis B chronic carrier status. The HBsAg-negative non-responder should be counseled regarding the risks of an exposure and the need for HBIG prophylaxis if an exposure incident occurs.

## **Vaccine Efficacy and Booster Doses**

Clinical trials of the hepatitis B vaccines licensed in the United States have shown they are 80-90 percent effective in preventing HBV infection and clinical hepatitis among susceptible children and adults. If a protective antibody response develops after vaccination, vaccine recipients are virtually 100 percent protected against clinical illness.

For children and adults whose immune status is normal, neither booster doses of vaccine nor serologic testing to assess antibody levels is recommended. The possible need for booster doses will be assessed as additional information becomes available. For hemodialysis patients, vaccine-induced protection may be less complete and may persist only as long as antibody levels are greater than or equal to 10 mIU/mL. For these patients, the need for booster doses should be assessed by annual antibody testing, and a booster dose should be administered when antibody levels decline to less than 10 mIU/mL.

## **Vaccine Side Effects and Adverse Reactions**

Hepatitis B vaccine has been shown to be safe when administered to both adults and children. Over four million adults have been vaccinated in the United States, and at least as many children have received hepatitis B vaccine worldwide.

## **Vaccine-Associated Side Effects**

Hepatitis B vaccines have been shown to be safe when administered to both adults and children. Pain at the injection site (3-29 percent) and a temperature greater than 37.7 C (1-6 percent) have been among the most frequently reported side effects among adults and children receiving the vaccine. In placebo-controlled studies, these side effects were reported no more frequently among vaccinees than among people receiving a placebo. Among children receiving both hepatitis B vaccine and DTP vaccine, these mild side effects have been observed no more frequently than among children receiving DTP vaccine alone. Any presumed risk of adverse events possibly associated with hepatitis B vaccination must be balanced against the expected risk of acute and chronic liver disease associated with the current five percent lifetime risk of HBV infection in the United States. It is estimated that, for each U.S. birth cohort, 2,000-5,000 people will die from HBV-related liver disease.

## **Serious Adverse Events**

In the United States, surveillance of adverse reactions has shown a possible association between Guillain-Barre Syndrome (GBS) and receipt of the first dose of plasma-derived hepatitis B vaccine (54, CDC unpublished data). GBS was reported at a very low rate (0.5/100,000) among vaccinees. No deaths were reported, and all reported cases were among adults. An estimated 2.5 million adults received one or more doses of recombinant hepatitis B vaccine during the period 1986-1990. Available data from reporting systems for adverse events do not indicate an association between receipt of recombinant vaccine and GBS (CDC, unpublished data).

As hepatitis B vaccine is introduced for routine vaccination of infants, surveillance for vaccine-associated adverse events will continue to be an important part of the program in spite of the current safety record. Any adverse event suspected to be associated with hepatitis B vaccination should be reported to the Vaccine Adverse Event Reporting System (VAERS). VAERS forms can be obtained by calling the North Carolina Immunization Branch at 1-800-344-0569. Call your regional immunization consultant, or the Immunization Branch at 919-733-7752, if you have questions about hepatitis B vaccine administration.

## **Adverse Events Following Vaccination**

The most common adverse event following hepatitis B vaccine is pain at the injection site, reported in 13-29 percent of adults and 3-9 percent of children. Such mild systemic complaints as fatigue, headache and irritability have been reported in 11-17 percent of adults and 0-20 percent of children. Low-grade fever (greater than 37.7 degrees C) has been reported in 1 percent of adults and 0.4-6.4 percent of children. Serious systemic adverse events and allergic reactions are rarely reported following hepatitis B vaccine.

## **Contraindications and Precautions**

Serious allergic reaction to a prior dose of hepatitis B vaccine or a vaccine component, such as baker's yeast, is a contraindication to further doses of vaccine. Such allergic reactions are rare.

People with moderate to severe illness should not be vaccinated until their condition improves. However, minor illnesses, such as upper respiratory infections, are not a contraindication to vaccination.

On the basis of limited experience, there is no apparent risk of adverse effects to developing fetuses when hepatitis B vaccine is administered to pregnant women (CDC unpublished data). The vaccine contains noninfectious HBsAg particles and should cause no risk to the fetus. HBV infection affecting a pregnant woman may result in severe disease for the mother and chronic infection for the newborn baby. Therefore, neither pregnancy nor lactation should be considered a contraindication to vaccination of women. Consult with the pregnant patient's physician before administering any vaccine.

**Hepatitis B vaccine does not contain live virus**, so it may be used in people with immunodeficiency. However, response to vaccination in such people may be sub-optimal.

### **Vaccine Storage and Handling**

Hepatitis B vaccines should be stored refrigerated at 2°-8°C (35°-46°F) but not frozen. Freezing destroys the potency of the vaccine.

### **Maternal Screening**

In 1988, the Advisory Committee on Immunization Practices (ACIP), in consultation with the American College of Obstetrics and Gynecology and the American Academy of Pediatrics, recommended that all pregnant women be routinely tested for HBsAg during an early prenatal visit in each pregnancy. If a woman has not been screened prenatally, or the results are unavailable at the time of delivery, HBsAg testing should be done at admission for delivery. This identifies infants born to HBsAg-positive mothers for prompt prophylaxis at birth, as well as at age 1 month and age 6 months follow-ups. Also, household members and sexual partners of HBV carriers must be evaluated for the need for hepatitis B vaccine.

North Carolina Administrative Code states all pregnant shall be tested for hepatitis B infection unless known to be infected.

# Hepatitis B Vaccine Schedule

## Infants born to HBsAg-positive women

Age	Treatment
Birth (within 1 <sup>st</sup> 12 hours)	HBIG and dose 1 hepatitis B vaccine
1-2 months	Dose 2 hepatitis B vaccine
6 months	Dose 3 hepatitis B vaccine
9-15 months	Post-vaccination serologic testing (HBsAg and anti-HBs)

**Note. Any infant born to a HBsAg-positive woman who has not received HBIG and Hepatitis B-1 by 12 hours of birth or who has not received Hepatitis B-3 by the age of 6-8 months is not adequately prophylaxed.**

## Infants born to HBsAg Positive women

Age	Treatment	Vaccine	
		Recombivax- HB Dose-mcg (ml)	Engerix-B Dose-mcg (ml)
Birth	HBIG (0.5ml) <b>and</b> #1 dose of Hepatitis B vaccine	5 mcg (0.5ml)	10mcg (0.5ml)
1-2 months	#2 dose of Hepatitis B vaccine	5 mcg (0.5ml)	10mcg (0.5ml)
6 months	#3 dose of Hepatitis B vaccine	5 mcg (0.5ml)	10mcg (0.5ml)
9-15 months	Post-Vaccination serologic testing (HbsAg and anti-HBs)		

## Infants born to HBsAg-negative women

Age	Treatment
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0-2 months	Dose 1 hepatitis B vaccine
1-4 months	Dose 2 hepatitis B vaccine
6-18 months	Dose 3 hepatitis B vaccine

**Note.** The vaccination schedule for infants born to HBsAg-negative women is flexible and includes three doses of vaccine in the first 18 months of life. The minimum interval between doses one and two is one month and between doses two and three is two months. The minimum interval between doses one and three is four months. Dose three of hepatitis B vaccine should not be given before 6 months of age. North Carolina Immunization Law requires that one dose be given by 3 months of age, the second dose by age 5 months and the third dose by 19 months of age.

### Minimum Intervals between doses of hepatitis B vaccine:

Hepatitis B #1 and #2	1 month (4 weeks or 28 days)
Hepatitis B #2 and #3	2 months (8 weeks or 56 days)**
Hepatitis B #1 and #3	4 months (16 weeks or 112 days)**

\*\*The one exception to these minimum intervals is that dose #3 must not be administered before 6 months of age.

### Children and adolescents

Routinely given as three-dose series at 0, 1, and 6 month with acceptable alternative schedules of doses at 0,1,4 month and 0,2,4 month intervals.

### Adults $\geq$ 20 years

Routinely given as three-dose series at 0, 1, and 6 month with acceptable alternative schedules of doses at 0,1,4 month and 0,2,4 month intervals.

Note: It is not necessary to add doses or to restart the series if the interval between doses is longer than the recommended interval.

## Interpreting Hepatitis Testing Panels

POPULATION	LABORATORY TEST RESULTS				STATE LABORATORY'S INTERPRETATION
	HBsAG	IgM Anti-HBc	IgM Anti-HAV	Anti-HBs	
<i>Symptomatic</i>	+	+	-		<i>acute HBV infection</i>
	+	-	-		<i>chronic or early acute HBV infection</i>
	-	+	-		<i>recent acute HBV infection</i>
	-	-	+		<i>recent acute HAV infection</i>
	+	-	+		<i>chronic HBV and recent acute HAV infection</i>
	-	+	+		<i>recent HBV and recent acute HAV infection</i>
	+	+	+		<i>acute HBV infection and recent HAV infection</i>
	-	-	-		<i>possible incubating hepatitis virus infection</i>
<i>Prenatal or refugee</i>	-	-	-		<i>possible incubating hepatitis virus infection</i>
	+	+			<i>acute HBV infection</i>
	+	-			<i>chronic or early acute HBV infection</i>
<i>Sexual or Needle-sharing contact of known infected person OR household contact of chronic carrier</i>	-				<i>possible incubating hepatitis virus infection</i>
	+	-			<i>chronic or early acute HBV infection</i>
	-			+	<i>immune; sufficient antibody level</i>
	-		-	-	<i>Susceptible; Insufficient antibody level</i>
<i>Follow-up of infant born to HBsAg+ mother</i>	+			-	<i>HBV infection</i>
	-			-	<i>Susceptible; Insufficient antibody level</i>
	-			+	<i>immune; sufficient antibody level</i>
<i>Follow-up of previous HBsAg+ person</i>	+	+	-	-	<i>infection not resolved; potential HBV carrier</i>
	+	-	-	-	<i>infection not resolved; potential HBV carrier</i>
	-			+	<i>HBV infection resolved or history of HBV vaccine</i>
	-	-		-	<i>susceptible</i>
<i>Previously vaccinated health department employee</i>				+	<i>immune; sufficient antibody level</i>
				-	<i>susceptible; insufficient antibody level</i>
<i>Source patient of exposure incident</i>	+				<i>HBV infection</i>
	-	-		-	<i>no evidence of HBV infection</i>

# HEPATITIS B TEST RESULTS

<b>Test</b>	<b>Results</b>	<b>Interpretation</b>
HBsAg	negative	<b>Susceptible</b>  (never infected)
Anti-HBc IgM	negative	
Anti-HBc	negative	
Anti-HBs	negative	
HBsAg	negative	<b>Immune (safe)</b> <b>will not develop</b> <b>HBV again</b>
Anti-HBc IgM	negative	
Anti-HBc	neg or pos	
Anti-HBs	positive	
HbsAg	positive	<b>Acutely infected</b>
Anti-HBc IgM	positive	
Anti-HBc	positive	
Anti-HBs	negative	
HBsAg	positive	<b>Chronically</b> <b>infected</b>
Anti-HBc	positive	
Anti-HBc IgM	negative	
Anti-HBs	negative	
HbsAg	negative	<b>Four</b> <b>interpretations</b> <b>possible*</b>
Anti-HBc IgM	negative	
Anti-HBc	positive	
Anti-HBs	negative	

\*

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 result.
4. May be undetectable level of HBsAg present in the serum and the person is actually a carrier.

# Counseling Patients With Hepatitis B

People can get hepatitis B from you by coming in contact with your blood, serum and other body fluids; i.e., saliva and semen or vaginal fluids. People with the hepatitis B virus may feel healthy, but are still capable of passing the hepatitis B infection to other people. Fortunately, hepatitis B virus is not spread by sneezing or coughing, or from casual contact such as holding hands. Here are some important guidelines for you to follow so that others are protected:

- C Tell your sex partner(s) that you are infected with hepatitis B virus. Your sex partner(s) must see their doctor or the local health department for hepatitis B testing. If, according to the blood tests, your partner has never had hepatitis B, he or she should be vaccinated. After the three-shot series is complete, your partner needs to return to the doctor for blood testing to make sure the vaccine has protected her or him. Use condoms until your partner is proven to be protected from hepatitis B.
- C Obtain blood testing six months after diagnosis to determine if you are a chronic carrier.
- C Make sure that all household members see their doctors or go to the local health department for hepatitis B testing and vaccination.
- C Tell your doctor and dentist that you are infected with hepatitis B virus, so that you can be cared for appropriately.
- C See your doctor every six to 12 months to have your liver checked for injury or cancer.
- C Cover all cuts and open sores with bandages.
- C People with hepatitis B infection do not need to be restricted from employment as food handlers or health care workers.
- C Health care workers who perform or assist with surgical, obstetrical or dental procedures and who know themselves to be infected with HIV or hepatitis B shall notify the state health director according to N.C. Administrative Code (self-reporting only).
- C Discard in a plastic bag used personal items that have any blood or body fluids on them such as tissues, menstrual pads, tampons or bloody bandages.
- C Wash your hands well after touching your blood or body fluids.
- C Clean up your blood spills, then clean the area again with a bleach solution of one part household bleach to 10 parts water. Clothes contaminated with blood should be laundered.
- C Do not share toothbrushes, razors, needles for ear or body piercing, nail files, clippers, scissors, or anything that may come in contact with your blood or body fluids.
- C Do not share food that has been in your mouth (e.g., chewing gum) and do not pre-chew food for babies.
- C Do not share syringes and needles.
- C Do not donate blood, plasma, body organs, tissue and sperm.

- C Know that if someone is exposed to your blood—be it a family member, a friend, or even a stranger—preventive treatment is available for that person. Notify the local health department or your doctor so that a health care professional can notify that individual. The exposed person should receive hepatitis B immune globulin (HBIG) and start the hepatitis B vaccine series within a few days. With proper, timely treatment, that person has an excellent chance of being protected from hepatitis B.
- C Review with your doctor **all** medication that you are taking. Even some over-the-counter medication can injure your liver.
- C If you become pregnant, tell your doctor that you are a hepatitis B carrier. It is important that your baby be given hepatitis B immune globulin (HBIG) and begin receiving hepatitis B “high risk” vaccine within 12 hours of birth. Infants should complete the hepatitis B series by age 6 months.
- C Avoid alcoholic beverages. Alcohol can damage your liver.
- C Ask your doctor about other ways to protect your liver such as vaccinations against influenza and hepatitis A.
- C Do not eat raw oysters. Raw oysters may carry a bacteria (*Vibrio vulnificus*) which can cause a serious blood infection in individuals with chronic liver disease.

Your local health department is available to provide assistance and counseling to you concerning your hepatitis B infection. Please call the (*county name*) Health Department for assistance at (*phone number*).

\_\_\_\_\_

Patient

\_\_\_\_\_

Date

\_\_\_\_\_

Communicable Disease Nurse

\_\_\_\_\_

Date

# Important Facts About Hepatitis B

- C Hepatitis B infection is a serious liver disease caused by a virus that can infect anyone who comes in contact with it.
- C Most people who get hepatitis B never feel sick.
- C Hepatitis B can result in liver failure, liver cancer or death.
- C Hepatitis B is spread by contact with blood or other body fluids such as serum, saliva, semen and vaginal secretions.
- C Hepatitis B virus can remain infectious on surfaces for up to a month.
- C A person with hepatitis B infection can pass the disease to his/her sexual partner. A shot called Hepatitis B Immune Globulin (HBIG) and the hepatitis B vaccine can prevent your partner from getting hepatitis B infection. Contact your local health department if an exposure has occurred.
- C All pregnant women should have a blood test for hepatitis B virus. Talk with your doctor or local health department.
- C A pregnant woman with hepatitis B infection can pass it to her infant at birth.
- C Infants born to hepatitis B infected mothers are very likely to develop hepatitis B infection, too. These infants will need two shots, one called HBIG and one hepatitis B vaccine, soon after birth to prevent infection.
- C Infants and children who get hepatitis B disease are more likely than adults to become permanently infected and die of liver failure or liver cancer.
- C A vaccine exists that can prevent hepatitis B more than 90 percent of the time. The vaccine is safe, with no serious side effects.
- C A person who has never had hepatitis B infection can be protected with the vaccine.
- C The Centers for Disease Control, the American Academy of Pediatrics and the American Academy of Family Physicians recommend the hepatitis B vaccine for all babies in the United States.
- C Adolescents who have not been immunized for hepatitis B and are entering the sixth grade should receive the hepatitis B series.
- C Teenagers who are not yet immunized should receive hepatitis B vaccine to protect themselves before they become sexually active.
- C The vaccine is given as a series of three injections. After the first dose is given, the second dose is given one to two months later and the third is given approximately six months after the first dose.
- C You must ask your doctor or local health department for hepatitis B vaccination. For more information, contact your doctor or your local health department.



## A. VACUNAS – MANUAL SOBRE ENFERMEDADES EVITABLES

### Orden de Cumplimiento referente a la Hepatitis B

Yo, \_\_\_\_\_, Director de Salud Pública, del Departamento de Salud Pública del Condado de \_\_\_\_\_, conforme a la autoridad que se me ha conferido por la Ley General de Carolina del Norte 130A-144, le expido esta Orden de Cumplimiento a usted \_\_\_\_\_

\_\_\_\_\_  
(nombre del paciente)

Después de mi investigación, he determinado que usted fue positivamente diagnosticado con el virus de la hepatitis B y que se le ha informado y orientado apropiadamente con respecto a las medidas de control que son exigidas por el Código Administrativo de Carolina del Norte para evitar la diseminación de infecciones por hepatitis B. También tengo causa de sospechar que usted no ha cumplido con la(s) siguiente(s) medida(s) de control, que se le ha(n) exigido: (detallar las medidas de control)

Este comportamiento constituye una violación de las leyes de Carolina del Norte sobre Enfermedades Transmisibles.

Por lo tanto, se le ordena cumplir con las siguientes medidas de control, conforme al Código Administrativo de Carolina del Norte G.S. 130A-144 y 15A NCAC 19A . 0203:

- A. NO deberá tener relaciones sexuales a menos que use condones y a menos que se sepa que el/la compañero/a está infectado/a con o es inmune a la hepatitis B.
- B. NO deberá compartir agujas o jeringas.
- C. NO podrá donar o vender sangre, plasma, plaquetas u otros productos sanguíneos, ni tampoco semen, óvulos, tejidos, órganos o leche humana.
- D. Deberá identificar al director de salud pública de su condado todos sus compañeros/as sexuales y la gente con quien ha compartido agujas desde la fecha de infección; ó, si le tiempo de infección inicial es desconocido, deberá indentificar compañeros/as de los seis meses anteriores.
- E. Durante todo el período de infección, deberá notificar a sus compañeros/as sexuales de su infección y aconsejarles de que se dirijan a su(s) médico(s) o al departamento de salud pública local para obtener información acerca de las medidas de control y durante todo el período de infección, deberá notificar al director de salud pública de su condado de todos sus nuevos compañeros/as sexuales.
- F. Deberá indentificar al director de salud pública de su condado toda la gente que comparte su hogar.
- G. Deberá someterse a pruebas serológicas seis (6) meses después del diagnóstico para determinar si usted es un “portador crónico”.

Si usted no cumple estrictamente con esta orden, quedará sujeto a enjuiciamiento por un delito menor que, según G.S. 130A-25, es castigable por hasta dos (2) años de encarcelamiento y/o una multa ilimitada.

El Departamento de Salud Pública sigue estando a su disposición para proporcionarle ayuda y orientación con respecto a la hepatitis B y su cumplimiento con esta orden.

\_\_\_\_\_  
Firma del paciente

\_\_\_\_\_  
Fecha

\_\_\_\_\_  
Firma del Director de Salud Pública

\_\_\_\_\_  
Fecha

\_\_\_\_\_  
Firma de la Enfermera de Enfermedades Transmisibles

\_\_\_\_\_  
Fecha

## Sample Certified Letter to Parents

*Health Department Letterhead*

*(Month 00, Year)*

*(Parent Name)*

*(Address)*

*(City, State Zip)*

Dear Mr. and Mrs. *(parents' last name)*:

Your baby, *(baby's name)*, is behind schedule for *(his/her)* hepatitis B shots. To be effective, hepatitis B vaccine should be given at birth, age 1-2 months and age 6 months. I have already made *(number)* phone calls and mailed *(number)* letters to you, but have had no response.

It is important for your baby to receive all three doses of the hepatitis B vaccine on time to prevent hepatitis B infection. You can take your baby to your private doctor, or to your local health department clinic any *(clinic day)* from *(times)*.

Hepatitis B is a liver infection that can cause serious health problems such as cancer, cirrhosis, and even death. Babies who become exposed to the hepatitis B virus at birth and do not receive enough doses of the appropriate vaccine have a 90 percent chance of becoming infected for the rest of their lives. Of the babies who become infected with hepatitis B, up to 25 percent will die of chronic liver disease as young adults. This is why it is so important for your baby to be protected with the properly scheduled hepatitis B vaccine.

Your baby needs to complete all three shots of hepatitis B vaccine by age 6-8 months. Your baby may develop hepatitis B infection unless preventive steps are taken. The estimated medical cost and other related losses for a person who is chronically infected with hepatitis B averages \$422,000 during a lifetime. I have informed you of the dangers the hepatitis B virus could pose to your baby, but the responsibility is yours.

To schedule an appointment for your baby to receive hepatitis B vaccine and to ask any questions you may have, please call me today at *(phone number)*.

Sincerely,

*(Nurse's Name)*

*(Title)*

## Sample Letter to Health Care Provider

### *Health Department Letterhead*

(Month 00, Year)

TO: (health care provider name)  
FROM: (your name)  
Communicable Disease Nurse  
SUBJECT: (patient name)

According to (*county name*) County Health Department records, you are listed as the physician who will provide follow-up care for (*infant name*), born to (*mother's name*) on (*infant's date of birth*). The mother of this infant tested positive for hepatitis B surface antigen (HBsAg) during her pregnancy; her infant received 0.5 ml of hepatitis B immune globulin (HBIG) and 0.5 ml of hepatitis B vaccine on (*date vaccine was administered*). The infant should have received a second dose of vaccine at age 1-2 months, due (*date*), and a third dose at age 6-8 months, due (*date*). The infant should be tested for hepatitis B surface antigen (HBsAg) and antibody to HBsAg (anti-HBs) 3-9 months after the third dose of vaccine, preferably at age 9-15 months, due (*date*).

In the United States, two manufacturers produce hepatitis B vaccine. Although each vaccine's antigen content is different, vaccines made by different manufacturers are interchangeable. The infant can be given either pediatric hepatitis B single antigen vaccine. **Always follow the manufacturer's dosage recommendations.**

According to the Advisory Committee for Immunization Practices, the hepatitis B infection can be prevented in up to 90 percent of cases if the appropriate vaccine is given according to the recommended schedule. Please arrange for your patient to receive the missing dose(s) of hepatitis B vaccine and/or follow-up serology tests.

If your patient has already received the appropriate vaccine and/or testing, please complete the information requested below and return it to us by mail. If you have additional questions or need my assistance with this patient, please call me at (*phone number*).

-----  
Infant's Name \_\_\_\_\_ DOB \_\_\_\_\_

Date of HBIG: \_\_\_\_\_

Date of infant's serology test: \_\_\_\_\_

Date of HBV#1: \_\_\_\_\_

HBsAg result: \_\_\_\_\_

Date of HBV#2: \_\_\_\_\_

Anti-HBs result: \_\_\_\_\_

Date of HBV#3: \_\_\_\_\_

## Sample Letter to Congratulate Birth Parents

*Health Department Letterhead*

*(Month 00, Year)*

*(Parents' Names)*

*(Address)*

*(City, State Zip)*

Dear Mr. and Mrs. *(last name)*:

Congratulations on the birth of your new baby! This is probably a busy time for you and your family; however, hepatitis B infection can threaten the health of your baby unless the necessary steps are taken to protect *(his/her)* welfare.

*(Hospital name)* has reported your baby received hepatitis B immune globulin and the first dose of hepatitis B vaccine shortly after birth. It is very important your baby receive two more doses of the hepatitis B vaccine, at age 1-2 months and at age 6 months, to prevent hepatitis B infection. If you have not made an appointment for the 1-2 month shot, please call your doctor, or come by the health department any *(day)* between *(times)*. If your baby is in the care of a private doctor, please let me know.

When babies are born to mothers who are infected with hepatitis B, these babies also have a high risk of becoming infected. If these babies become infected, they have a 90 percent chance of being infected for the rest of their lives. Twenty-five percent of these infected babies will die of chronic liver disease as young adults. Babies must receive the necessary vaccinations to fight hepatitis B infection and these vaccinations must be given at the recommended times. This is why it is so important for your baby to be protected with hepatitis B vaccine.

To schedule an appointment for your baby to receive hepatitis B vaccine and to ask any additional questions, call *(name)* at *(phone number)* today. Thank you for your prompt attention to this matter.

Sincerely,

*(nurse's name)*

*(title)*

## Sample Letter for Vaccine Follow-Up

*Health Department Letterhead*

*(Month 00, Year)*

*(Mother's Name)*

*(Address)*

*(City, State, Zip)*

Dear Ms. *(mother's name)*

Your baby, *(baby's name)*, needs the *(second or third)* shot of hepatitis B vaccine. Your baby was exposed to the infection at birth and needs to receive hepatitis B vaccine at birth, at age 1-2 months and at age 6 months. It is very important for your baby to receive all three shots of hepatitis B vaccine, according to the recommended schedule, to prevent hepatitis B infection.

Please take your baby to your private doctor, or you may bring your baby to the health department clinic any *(clinic days)* from *(times)*. If you take your baby to another doctor for treatment, please let me know.

Babies who become infected with hepatitis B from exposure at birth and who do not receive the needed vaccine on time have a 90 percent chance of becoming infected for the rest of their lives. Of the babies who become infected, up to 25 percent will die of chronic liver disease as young adults. This is why it is so important for your baby to be protected with hepatitis B vaccine.

To schedule an appointment for your baby to receive hepatitis B vaccine, and to ask any additional questions, please call *(nurse's name)* at *(phone number)* today.

Sincerely,

*(Nurse's Name)*

*(Title)*

## Sample Letter for Serology Follow-up

*Health Department Letterhead*

*(Month 00, Year)*

*(Mother's Name)*

*(Address)*

*(City, State Zip)*

Dear Ms.*(Mother's Name)*:

I am writing to urge you to have your baby, *(baby's name)*, tested for hepatitis B surface antigen and hepatitis B surface antibody. Your baby was exposed to hepatitis B infection at birth and has received the recommended doses of hepatitis B vaccine according to the recommended schedule. Now it is important to conduct a blood test to determine if the vaccine has provided enough protection. If not, we may recommend additional doses of the vaccine.

Babies who become infected with hepatitis B from exposure at birth have a 90 percent chance of becoming infected for the rest of their lives. Of the babies who become infected, up to 25 percent will die with chronic liver disease as young adults. This is why it is so important for you to know if your baby has received the necessary protection with the vaccine. The blood test is available at no cost to you through the health department. Results will be sent to your doctor for review.

Please call *(nurse's name)* at *(phone number)* today to schedule this appointment, and to ask any additional questions.

Sincerely,

*(Nurse's Name)*

*(Title)*



2. **NOTIFY** your local health department by calling the following contact person:

\_\_\_\_\_ County Health Department at (\_\_\_\_\_) \_\_\_\_\_ - \_\_\_\_\_  
Ext. \_\_\_\_\_

Contact Person

---

*Purpose*

The goal of the local health department is to ensure all infants born to HBsAg-positive mothers are immunized on time to prevent chronic hepatitis B disease. Please join our efforts to stop the cycle of perinatal hepatitis B from mother to baby.

*Adapted from materials developed by the Hepatitis B Coalition, Centers for Disease Control and Prevention, and the Perinatal Hepatitis B Program of the North Carolina Immunization Branch.*

# Guidelines for Health Care Providers/Local Health Departments in Treating HBsAg + Women and Their Infants

## *Pregnant Women*

1. All pregnant women shall be tested for Hepatitis B Surface Antigen (HBsAg) according to North Carolina Administrative Code.
2. Sexual partners of HBsAg-positive pregnant women should be referred to the local health department for serologic testing, hepatitis B vaccine and for hepatitis B immune globulin (HBIG) counseling, if indicated.
3. Household contacts of HBsAg-positive pregnant women should be referred for serologic testing and for hepatitis B vaccine.
4. Pregnant women who test HBsAg-positive should be reported to the local health department for follow-up of infant, sexual and household contacts. Notify the contact person listed below.

## *Infants*

1. An infant born to a hepatitis B surface antigen (HBsAg)-positive woman should receive HBIG and hepatitis B vaccine within 12 hours of birth. Administer the appropriate dosage of hepatitis B vaccine:
  - a. HBIG 0.5 ml IM
  - b. Hepatitis B Vaccine (Engerix 10 mcg / 0.5 ml **OR** Recombivax 5 mcg/ 0.5ml)
  - c. Give within 12 hours of birth at separate injection sites.
2. Administer doses two and three of hepatitis B vaccine (Engerix 10 mcg/ 0.5 ml **OR** Recombivax 5 mcg/0.5ml) at age 1-2 months and complete the series by age 6 months.
3. Obtain serologic testing (HBsAg and Anti-HBs) three-nine months after the third dose of hepatitis B vaccine, preferably between 9-15 months of age, to evaluate protection against hepatitis B.
4. Report to the local health department for tracking and follow-up. Notify the contact person listed below.

## *Report*

1. Report all people who test HBsAg-positive within seven days to your local health department according to North Carolina Administrative Code.

\_\_\_\_\_ County Health Department at (\_\_\_\_\_) \_\_\_\_\_ - \_\_\_\_\_

Contact Person: \_\_\_\_\_

## *Purpose*

The goal of the local health department is to ensure all infants born to HBsAg-positive mothers are immunized on time to prevent chronic hepatitis B disease. Join our efforts to stop the cycle of hepatitis B transmission from mother to infant.

*Adapted from materials developed by the Hepatitis B Coalition, Center for Disease Control and Prevention and the Perinatal Hepatitis B Program with the North Carolina Immunization Branch.*

# Stop The Cycle Of Hepatitis B From Mother To Baby.

## What is hepatitis B?

Hepatitis B is a disease caused by a virus that attacks the liver. Hepatitis B virus infection can lead to severe illness, liver damage and even death. Each year, more than 100,000 people become infected with hepatitis B in the United States. Hepatitis B virus can be especially dangerous for the babies of women who have the disease or who are carriers of the virus. Babies infected at birth may suffer liver problems or develop liver cancer later in life.

In North Carolina, every pregnant woman is required to have a blood test to determine if she is infected with hepatitis B virus. Transmission of hepatitis B infection to infants from infected mothers at birth can be prevented 90-95 percent of the time with proper immunization given to the infant at birth, 1-2 months and 6 months of age.

## Why is hepatitis B so serious in pregnant women?

Pregnant women who are infected with hepatitis B virus frequently spread the disease to their babies. Approximately 90 percent of these babies develop lifelong hepatitis B infections; up to 25 percent will develop liver failure or liver cancer. Every pregnant woman should be tested early in pregnancy to determine if she is infected with hepatitis B virus. If so, her baby must be protected at birth.

## How does a person get hepatitis B infection?

Hepatitis B infection is caused by a virus. The virus can be passed from person-to-person through contact with blood and other body fluids, such as during sexual intercourse. Sharing needles to inject drugs is another way hepatitis B infection can be spread. A pregnant woman who has the infection can pass it to her baby during birth when the baby comes in contact with her blood and other body fluids.

## Could I have hepatitis B infection?

Anyone could have hepatitis B, but some people are more likely to be infected than others. If you are of Asian, Caribbean, Pacific Island, American Indian, native Alaskan or South American origin, you have a much greater chance of being infected and becoming a carrier of hepatitis B because the infection is more common among these populations. You may also be at greater risk if you have:

- C had a number of sexual partners
- C had a sexually transmitted disease
- C shared needles to shoot drugs
- C worked in a health care-related field
- C lived with someone on kidney dialysis
- C lived with someone who had hepatitis B infection

Any one of the above risk factors puts you at increased risk of coming in contact with body fluids possibly infected with the hepatitis B virus. However, half of the people with hepatitis B infection do not have any of the above risk factors.

### **What happens if I give my baby the hepatitis B virus?**

Babies who are infected at birth and not treated can develop severe hepatitis, which could be fatal. More likely, if not treated, these babies will become carriers of the disease. A carrier is a person who may not feel or look sick but may suffer liver problems or develop liver cancer later in life. They also can spread the disease to others through their infected blood and body fluids.

### **How do I know if I have hepatitis B infection?**

The symptoms of hepatitis B usually include yellow coloring of the skin and eyes (jaundice), dark urine, stomach pain and fever. Many people lose their appetites, feel tired or feel like they have the flu. Most adults who become infected with hepatitis B virus recover after a few months and become immune. However, others become carriers and may carry the virus in their bodies for years or for life, even though they look and feel well. Ninety percent of babies who are infected at birth will become hepatitis B carriers.

### **Can I infect my baby even if I don't feel sick?**

Yes. If you have hepatitis B virus in your blood, you can give your baby the virus whether you feel sick or not.

### **How can I protect my baby?**

If you are pregnant, it is important to find out if you carry the hepatitis B virus. Ask your doctor for the results of the blood test. If your hepatitis B test is positive, be sure to tell your doctor or nurse at the time you are admitted to the hospital for your baby's birth. Your baby should be vaccinated at birth with two shots—one of hepatitis B immune globulin (HBIG) and one of hepatitis B vaccine. The baby will need two additional shots of hepatitis B vaccine—one at age 1-2 months and one at age 6 months. Completing hepatitis B vaccine on time has been shown to be 90- 95 percent effective in preventing hepatitis B virus infection. It is also important for your baby to have a blood test at age 9-15 months to make sure the vaccine has been successful in preventing infection and to determine if more hepatitis B vaccine is needed to provide complete protection.

**WARNING:** If HBIG or hepatitis B vaccine are not given on schedule, your baby may not be fully protected against hepatitis B infection. Discuss hepatitis B with your doctor or nurse at each immunization visit so your baby will get all of his/her needed shots.

### **Can I breastfeed my baby even if I have hepatitis B?**

Yes. If you are infected with hepatitis B, you may breastfeed your infant after the infant has been vaccinated with HBIG and hepatitis B vaccine. The only precaution is that you should stop breastfeeding if you develop an open sore or cracked, bleeding nipples.

### **Is the immunization only for infants?**

No. Sexual partners and household members should have a blood test and be vaccinated with hepatitis B vaccine, which will prevent the spread to other household members. Contact your

doctor or local health department for more information. The local health department can provide testing and vaccination for sexual partners and household members at no cost.

**See your doctor or local health department.**

If you are pregnant, ask your doctor for a blood test for hepatitis B virus. If your hepatitis B test is positive, make sure your baby receives all the shots needed to protect against hepatitis B. For more information, contact your local health department.

# HEPATITIS B WALLET CARD

## Front of Card

**NAME**

**DOB**

I was informed my test results on (Date) \_\_\_\_\_ for Hepatitis B (HBsAg) were positive, and I should show this card to my doctor and dentist at each visit. I also will inform the doctor and nurse of my results when I am admitted to deliver my baby. I understand that my baby needs to have special shots called HBIG and hepatitis B vaccine within 12 hours of birth. To be fully protected, my baby needs additional hepatitis B vaccinations at age 1-2 months and age 6 months. My baby can be 85-95% protected by completing the hepatitis B vaccine series. Also, my baby needs to have a blood test at age 9-15 months to determine vaccine protection.

Date: \_\_\_ / \_\_\_ / \_\_\_\_\_

## Back of Card

Stop the Cycle of Perinatal Hepatitis B Transmission

LOGO:

-----  
Health Department Stamp

# What You Should Know About Hepatitis B

## What is hepatitis B infection?

Hepatitis B is a serious disease caused by a highly infectious virus which can lead to severe illness, liver damage and, in some cases, even death. Each year in the United States, more than 100,000 people become infected with hepatitis B, approximately 5,000 people die of liver failure and another 1,500 die of liver cancer related to hepatitis B. Hepatitis B is the most common cause of liver cancer in the world.

## How is it spread?

Hepatitis B virus can be passed from one person to another through exchanged blood and other body fluids, such as with sexual intercourse or by sharing needles to inject drugs. The hepatitis B virus is found in an infected person's blood, semen, vaginal fluids and other body fluids. Pregnant women who are infected with hepatitis B virus transmit the disease to their infants. It may be spread from an infected person to another person in the following ways:

- unprotected sex (without using a condom)
- during birth from mother to child
- contact with blood or open sores of an infected person
- close contact among household members, such as sharing items like razors, toothbrushes, nail clippers, etc.
- pre-chewing food for babies or sharing chewing gum
- using unsterile needles in ear piercing, injecting drug use, tattooing, or acupuncture

Hepatitis B infection is **NOT** spread by:

- casual contact, like holding hands
- eating food prepared by a carrier of the virus
- kissing on the cheek or dry lip kissing
- sharing silverware, plates or cups
- visiting an infected person's home
- playing with a child who is a carrier of the virus
- sneezing or coughing

## What are the symptoms of acute hepatitis B infection?

Most people who get hepatitis B as babies or children do not look or feel sick at all. Similarly, over half of the adults who get hepatitis B never have any symptoms of the disease. Once you get hepatitis B infection, it may take from six weeks to six months for signs or symptoms to appear. If people do have signs or symptoms, they may include:

- loss of appetite
- yellow skin and eyes (jaundice)
- nausea, vomiting
- fever
- weakness, tiredness, inability to work for weeks or months
- abdominal pain
- dark urine

Most people recover from acute hepatitis B infection in about six months. About 10 percent of adults will become chronic carriers after they recover. Approximately 90 percent of infants infected with hepatitis B virus will become carriers. Hepatitis B carriers continue to have the hepatitis B virus and can infect others, even though their symptoms diminish.

### **Who is at risk for hepatitis B infection?**

About 5 percent (1 in 20) people in the United States will get hepatitis B infection sometime during their lives. Engaging in certain behaviors increases your chances of coming in contact with body fluids infected with hepatitis B. You may be at risk for hepatitis B if you:

- have a job that exposes you to human blood (health care workers)
- share a household with someone who has chronic hepatitis infection
- are an injecting drug user or share needles to inject drugs
- have sex with a person infected with hepatitis B virus
- have sex with more than one partner during a six-month period
- are a homosexual or bisexual male
- received blood transfusions in the past—before 1975 when reliable testing became available
- are a child whose parents were born in Asia, Africa, the Amazon Basin in South America, the Pacific Islands, Eastern Europe or the Middle East
- were born in an area listed above
- are an adopted child from an area listed above
- are an Alaskan native
- are a patient or worker in an institution for the developmentally disabled
- have hemophilia
- are an inmate of a long-term correctional facility
- travel internationally to areas with a high prevalence of hepatitis B
- are on kidney dialysis or have lived with someone on kidney dialysis
- ever had a sexually transmitted disease (gonorrhea, syphilis, chlamydia, venereal warts or herpes)

These behaviors may put you at higher risk by increasing your chances of coming in contact with body fluids infected with hepatitis B virus.

### **I'm not in a high-risk group. How did I get hepatitis B infection?**

Many people do not know when or how they acquired the infection. Studies have demonstrated that 30-40 percent of people who acquire hepatitis B infection are unable to identify risk factors for the disease.

## **HEPATITIS B CARRIERS**

### **What does it mean to be a hepatitis B carrier?**

People who do not recover from hepatitis B are called carriers. Today, an estimated 1-1.25 million people are carriers in the United States with over 10,000 more people becoming chronic carriers each year. An HBV carrier is someone who has had hepatitis B in his/her blood for more than six months. Five to ten percent of adults who acquire HBV become carriers. Children who are infected under age 5 have a 20-90 percent chance of becoming lifelong carriers. Many babies born to carrier mothers also will become carriers of hepatitis B unless the babies are given special shots at birth and during their first six months of life.

A carrier usually has no signs or symptoms of HBV, but remains infected with the virus for many years or a lifetime, and is capable of passing the disease onto others. Sometimes HBV carriers will spontaneously clear the infection from their bodies, but most will not. Most carriers have no serious problems with hepatitis B and lead normal, healthy lives. However, other carriers become sick because they are at significantly higher risk than the general population for liver failure or liver cancer.

### **How to protect others from hepatitis B:**

People can get hepatitis B from a carrier by coming in contact with his/her blood, serum or other body fluids like saliva, semen and vaginal fluids. People with hepatitis B virus may feel healthy, but are still capable of passing the hepatitis B infection to other people. Fortunately, hepatitis B virus is not spread by sneezing or coughing, or from such casual contact such as holding hands. The following are important guidelines for you to follow so that others are protected:

- C Tell your sex partner(s) you are infected with the hepatitis B virus. Sexual partner(s) must see a physician or go to the health department for hepatitis B blood testing. If the blood tests show that the partner has never had hepatitis B, he or she should be vaccinated with the hepatitis B series. Use condoms until your partner is proven to be protected from hepatitis B.
- C Make sure all household members see their physicians or go to the local health department for hepatitis B testing and vaccination.
- C Wash your hands well after touching your blood or infectious body fluids.
- C Tell your health care providers you are infected with hepatitis B virus.
- C See your doctor every six to 12 months to have your liver checked for injury or cancer, and for ongoing education about hepatitis B.
- C Cover all cuts and open sores with bandages. Do not allow others to come in contact with your blood. Place soiled bandages in a plastic bag, tie securely and place in the trash can.
- C Place personal items such as tissues, menstrual pads and tampons in a plastic bag, tie securely and place in the trash can.
- C Clean up your blood spills, then clean the area again with a bleach solution of one part household bleach to 10 parts water.
- C Do not share items such as toothbrushes, razors, needles for tattoos, needles for ear or body piercing, nail files, clippers, scissors, or anything that may come in contact with your blood or body fluids.
- C Do not share food or chewing gum and do not pre-chew food for babies.
- C Do not share syringes and needles.
- C Do not donate blood, plasma, body organs, tissue or sperm.
- C Know that if someone is exposed to your blood — a family member, friend or even a stranger — preventive treatment is available for that person. Notify the local health department or your health care provider, so a health care professional can notify the individual. If the exposed person receives hepatitis B immune globulin (HBIG) and starts the hepatitis B vaccine series within a few days, that person has an excellent chance of being protected from hepatitis B infection.
- C Learn more about hepatitis B so you can make the best decisions for yourself and provide the best protection for your family and friends.

### **Why is hepatitis B so serious in pregnant women?**

Pregnant women who are infected with HBV frequently transmit the disease to their babies. Up to 90 percent of these babies may develop lifelong HBV infections, and as many as 25 percent

will develop liver failure or liver cancer. All pregnant women should be tested early in pregnancy to determine if they are infected with hepatitis B virus. If the blood test is positive, the baby should be vaccinated at birth with two shots — one HBIG and one hepatitis B vaccine. The infants will need additional doses of hepatitis B vaccine at age 1-2 months and age 6 months. Completing the scheduled hepatitis B vaccination series on time has shown to be 85-95 percent effective in preventing mother-to-infant transmission of hepatitis B infection. It also is important for the infant to have a blood test at age 9-15 months of age to ensure the hepatitis B vaccine provided complete protection against the hepatitis B virus.

### **How can hepatitis B infection be prevented?**

Hepatitis B vaccine can provide protection in 90-95 percent of healthy people. The vaccine can be given safely to infants, children and adults in three doses over an approximate six-month period. Even pregnant women can safely be given these shots if their risk factors show they need it. Hepatitis B shots are very safe and side effects are rare.

### **What can I do to take care of myself?**

A person with hepatitis B should see a doctor regularly. About six months after the acute illness, the doctor will repeat the hepatitis B test to determine if the infection has subsided. The doctor can order tests to determine how the liver is working and to check for early signs of liver cancer. If liver disease develops, the doctor may recommend hepatitis A vaccine to protect the liver from yet another threatening liver disease.

People with hepatitis B infection should ask the doctor about alcoholic beverages; alcohol may worsen your liver condition.

Tell your doctor and dentist you have hepatitis B infection. Be sure your doctor knows about all medicines you are taking. Some medications may have a harmful effect on your liver.

### **What about immunization?**

Hepatitis B is a very serious disease, but it is preventable. The hepatitis B vaccine can protect people who have not yet been infected with the virus. The following people should see a doctor or local health department for hepatitis B screening and vaccination:

- C sexual and needle-sharing partners of a person who is infected with hepatitis B
- C newborn babies of mothers who test positive for hepatitis B virus
- C all household members of a hepatitis B chronic carrier
- C dental and health care workers who are in contact with blood and other body fluids

### **How do I know if I have hepatitis?**

The symptoms of hepatitis B usually include yellow coloring of the skin and eyes (jaundice), dark urine and fever. Many people lose their appetites, feel tired or feel like they have flu. Many people are severely ill for months. If you have these symptoms, check with your doctor. He or she can tell if you have hepatitis B infection. However, some people who are carriers of the infection never feel sick.

If you have ever had hepatitis B, it is possible you did not fully recover and are now a carrier. Your doctor can give you a simple blood test to determine if you have hepatitis B or are a carrier.

### **Where can I go for help?**

To know more about hepatitis B, talk with your family doctor or visit your local health department.

*Adapted from materials developed by the Hepatitis B Coalition, the Hepatitis B Branch of the Centers for Disease Control and Prevention and the Perinatal Hepatitis B Program of the North Carolina Immunization Branch.*

# NC Hepatitis B Protocol for Refugees

Revised 10/20/01

## TESTING

Persons arriving in North Carolina with official refugee status from hepatitis endemic countries should receive (preferably within 30 days of their arrival) the appropriate hepatitis B testing panels based on the criteria outlined in the NC State Laboratory of Public Health SCOPE Manual. All refugees from endemic countries should be referred to the local health department for testing and follow-up. Endemic describes a disease prevalence that is more or less recurring continuously in a particular location or population. The attached map from the Centers for Disease Control identifies hepatitis B endemic countries with high and intermediate rates of chronic infection.

## VACCINATION

All susceptible individuals with refugee status from endemic countries should receive the first dose of hepatitis B vaccine at the time of their health screening exam and be scheduled to receive the second and third doses at the appropriate intervals.

The NC Immunization Branch has authorized the use of state-supplied vaccine for refugees from endemic countries. All children, 0-18 years old, can receive state-supplied vaccine through the Universal Childhood Vaccine Distribution Program. Adult refugees, who are greater than 18 years of age and from endemic countries can receive the state-supplied vaccine at local health departments.

## FOLLOW-UP

Follow-up reporting, investigation, surveillance, and treatment should be conducted according to the NC General Statutes, the NC Administrative Code and the *Control of Communicable Disease Manual*.

## REPORTING

Hepatitis B acute (Code 15) and hepatitis B chronic carrier (Code 115) cases should be reported to the Surveillance Unit according to the following case definitions:

- **Acute hepatitis B**

IgM anti-HBc-positive (if done) and/or  
HBsAG-positive, and  
IgM anti-HAV-negative (if done)

- **Hepatitis B chronic carrier**

Probable: Asymptomatic person with a single positive serology for HBsAG, and negative for IgM anti-HBc.

Confirmed: HBsAg positive on at least two occasions at least six months apart, or HBsAG-positive six months following an acute hepatitis B infection.

Note: both probable and confirmed cases should be reported.

Immunization Branch, Division of Maternal and Child Health, DHHS

# HEPATITIS B ENDEMIC COUNTRIES-1998

## CDC HEPATITIS BRANCH

Afghanistan	Ghana	Micronesia, FSM
Albania	Greece	Moldova
Algeria	Grenada	Mongolia
American Samoa	Guadeloupe	Morocco
Angola	Guam	Mozambique
Antigua and Barbuda	Guatemala	Myanmar
Armenia	Guinea	Namibia
Azerbaijan	Guinea-Bissau	Nepal
Bahrain	Guyana	Netherlands Antilles
Bangladesh	Haiti	New Caledonia
Benin	Honduras	Niger
Bhutan	Hong Kong	Nigeria
Botswana	India	Northern Marania
Brazil	Indonesia	Oman
Brunei	Iran	Pakistan
Bulgaria	Iraq	Palau
Burkina Faso	Israel	Papua New Guinea
Burundi	Italy	Paraguay
Byelorussia	Jamaica	Peru
Cambodia (Kampuchea)	Japan	Philippines
Cameroon	Jordan	Poland
Cape Verde	Kazakhstan	Portugal
Cayman Islands	Kenya	Puerto Rico
Central African Republic	Kirgyzstan	Qatar
Chad	Kiribati	Reunion
China	Korea, Peoples (DPR)	Romania
Comoros	Korea, Republic of	Russia
Congo, People's Republic of the	Kuwait	Rwanda
Cook Islands	Laos	Samoa, Western
Cote d'Ivoire	Latvia	Sao Tome and Principe
Cyprus	Lebanon	Saudi Arabia
Czechoslovakia	Lesotho	Senegal
Djibouti	Liberia	Seychelles
Dominica	Libya	Sierra Leone
Dominican Republic	Lithuania	Singapore
Ecuador	Macau	Slovakia
Egypt, Arab Republic of	Madagascar	Solomon Islands
Equatorial Guinea	Malawi	Somalia
Estonia	Malaysia	South Africa
Ethiopia	Maldives	Spain
Fiji	Mali	St. Kitts and Nevis
French Guiana	Malta	St. Lucia
French Polynesia	Marshall Islands	Sudan
Gabon	Martinique	Suriname
Gambia, The	Mauritania	
Georgia	Mauritius	

Syrian Arab Republic  
Swaziland  
Taiwan  
Tajikistan  
Tanzania, United Rep.  
Thailand  
Togo  
Tonga  
Tunisia  
Turkey  
Turkmenistan  
Uganda  
Ukraine  
United Arab Emirates  
UNRWA  
Uzbekistan  
Vanuatu  
Venezuela  
Vietnam  
Virgin Islands, U.S.  
Wallis and Futuna  
Yemen  
Yemen Dem  
Yugoslavia  
Zaire  
Zambia  
Zimbabwe

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Tele: (651)647-9009. Web: <http://www.immunize.org/>

Immunization Action Coalition, *Materials in Other Languages*: <http://www.immunize.org/>

National Immunization Program, Web: <http://www.cdc.gov/nip/ed/> Tele: 1-800-232-2522.

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# Important Immunization Web Sites

**Immunization Action Coalition\***

(651) 647-9009

[www.immunize.org](http://www.immunize.org)

**American Liver Foundation\***

(800) 223-0179

[www.liverfoundation.org](http://www.liverfoundation.org)

**Centers for Disease Control and Prevention\***

(888) 443-7232

[www.cdc.gov/hepatitis](http://www.cdc.gov/hepatitis)

**Hepatitis B Foundation\***

(215) 489-4900

[www.hepb.org](http://www.hepb.org)

**Hepatitis Foundation International\***

(800) 891-0707

[www.hepfi.org](http://www.hepfi.org)

**National Digestive Diseases Information Clearinghouse**

(301) 654-3810

[www.niddk.nih.gov](http://www.niddk.nih.gov)

**Parents of Kids with Infectious Diseases (PKIDS)**

(877) 557-5437

[www.pkids.org](http://www.pkids.org)

\*Materials available in languages other than English.