



# City Health Information

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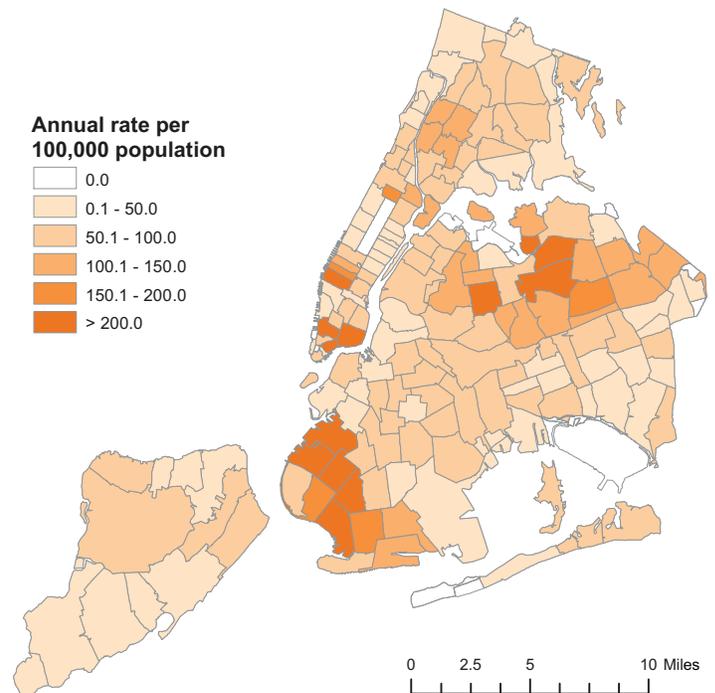
## PREVENTING AND MANAGING HEPATITIS B

- **Vaccinate all children starting at birth and people at high risk of hepatitis B virus infection, including**
  - People with multiple sexual partners
  - Men who have sex with men
  - Household and sexual contacts of people with chronic hepatitis B
  - People 19 to 59 years of age with diabetes
  - People on dialysis
- **Test people at risk for hepatitis B infection.**
- **For patients with chronic hepatitis B infection:**
  - Counsel on avoiding alcohol and preventing transmission to others.
  - Vaccinate against hepatitis A.
  - Monitor for progression of liver disease.
  - Refer patients who have active chronic hepatitis B infection (see page 13), other liver disease, or a serious comorbidity to a specialist.

**H**epatitis B is a vaccine-preventable infection of the liver that is often asymptomatic, acute, and self-limited. If the infection becomes chronic, it can lead to permanent liver damage, cirrhosis, liver failure, liver cancer, and premature death.<sup>1,2</sup> The hepatitis B virus (HBV) is commonly transmitted by percutaneous or mucosal exposure to infectious blood or body fluids (semen, vaginal fluids) through sexual or close household contact (eg, sharing of razors or toothbrushes, exudates from skin lesions, and contaminated surfaces); injection drug use; or occupational or perinatal exposure.<sup>1,3,4</sup> While saliva can be a vehicle of transmission through bites, other types of exposure to saliva, including kissing, are unlikely modes of transmission.<sup>5,6</sup> The hepatitis B virus is 50 to 100 times more infectious than HIV<sup>7</sup> and can survive for at least 7 days on contaminated surfaces or objects,<sup>3</sup> making vaccination of susceptible household and sexual contacts essential.<sup>1,7</sup> Nevertheless, children and adults infected with HBV can participate in contact sports, daycare,

and school, and can share food and utensils or hug without infecting others.<sup>3,8</sup>

### RATES OF NEWLY REPORTED CHRONIC HEPATITIS B INFECTION, NEW YORK CITY, BY ZIP CODE, 2010



From New York City Department of Health and Mental Hygiene, Bureau of Communicable Disease. Surveillance data; 2010.

Comprehensive childhood vaccination programs in the United States (US) have led to a 98% decline in hepatitis B infection between 1990 and 2006 among children younger than 15 years,<sup>9</sup> but the burden of chronic hepatitis B in adults remains large, partly due to immigration from highly endemic areas in Asia and Africa.<sup>9-11</sup> Many cases of hepatitis B are not detected or reported to health departments,<sup>3,12</sup> but it is estimated that 800,000 to 2 million people in the US have chronic infection.<sup>2,3,12</sup> In New York City (NYC), about 100,000 people—or 1.2% of residents—are chronically infected with hepatitis B<sup>11</sup>; 67% of those with newly reported infection are Asian (see page 9 for areas of NYC with high rates of chronic infection).<sup>13</sup>

Vaccination is the most effective way to prevent HBV infection.<sup>3,9,14</sup> Patients should receive 3 doses of hepatitis B vaccine for maximum protection.<sup>15,16</sup>

It is estimated that up to two-thirds of chronically infected people are undiagnosed, usually because they are asymptomatic.<sup>10,17</sup> About 25% of people infected as children and 15% of those infected as adults die prematurely from cirrhosis or liver cancer.<sup>14</sup> Primary care providers should ask about potential exposures to HBV (see **Box 1**), provide the hepatitis B surface antigen (HBsAg) test to those at risk, and vaccinate those who are susceptible.<sup>3,17</sup> Early detection of hepatitis B infection and appropriate medical management can prevent or delay cirrhosis and liver cancer in patients with chronic infection and permit prompt identification of the patient's susceptible contacts for evaluation,<sup>3</sup> including postexposure prophylaxis for those recently exposed.<sup>14</sup> Providers should counsel patients to avoid alcohol, explain how to prevent transmission to others, and monitor them for disease progression.<sup>14</sup> Active chronic hepatitis C virus (HCV) infection, other liver disease, and/or comorbidities are indications for referral to a specialist or other clinician with experience in managing hepatitis.<sup>3,10,14</sup>

## CLINICAL FEATURES AND NATURAL HISTORY

Acute HBV infection is frequently asymptomatic, but patients may experience influenza-like symptoms, loss of appetite, abdominal pain, jaundice, and dark urine. Extrahepatic symptoms include skin rashes, arthralgias, and arthritis.<sup>13</sup> Rarely, patients develop severe, life-threatening inflammation of the liver, known as fulminant hepatitis.<sup>3,7</sup> Approximately 95% of immunocompetent adults infected with HBV recover completely, while 5% become chronically infected.<sup>18</sup> In contrast, 90% of infants infected at birth and 25% to 50% of children infected between 1 and 5 years old will develop chronic infection.<sup>4</sup>

**Table 1** lists groups at increased risk for chronic hepatitis B infection, including all people born in regions with a 2% or higher prevalence of HBsAg—much of Asia, Africa, Eastern Europe, the Middle East, and the Pacific Islands—where infection during birth or childhood is more likely to occur.<sup>19</sup> In countries where prevalence is lower than 2%, high-risk groups include people who have multiple sex partners, men who have sex with men (MSM), injection drug users (IDUs), household and sexual contacts of people with chronic hepatitis B, people with HIV or diabetes, infants of HBV-infected mothers, and those receiving hemodialysis or cytotoxic or immunosuppressant

## BOX 1. HEPATITIS B RISK ASSESSMENT

See **Table 1** for testing and vaccination recommendations

- Where were you born?<sup>a</sup>
- Where were your parents born?<sup>a</sup>
- Do you have hepatitis B or any other liver disease?
- Have you ever injected drugs or shared any drug use equipment (injection equipment, needles, cookers, cotton, straws, pipes)?
- Do you travel to any countries where hepatitis B is common (areas with high or intermediate<sup>a</sup> prevalence)?
- Have you ever been told you have HIV or any sexually transmitted infection?
- (If a man) Do you have sex with men?
- Have you been sexually active with more than one sex partner in the past 6 months?
- Have you ever shared an item that may have had blood or body fluids on it (eg, razor, toothbrush, glucometer, sex toy) with a person who has hepatitis B?
- Have you gotten a tattoo or piercing anywhere other than at a professional establishment or shared tattoo or piercing equipment?
- Have you ever been stuck with a needle or been exposed to someone's blood while on the job?
- Have you ever been on dialysis, do you have diabetes, or are you now on chemotherapy or immunosuppressive therapy?
- Are you pregnant?
- Do you work or receive services at an institution for people with developmental disabilities?

<sup>a</sup>See **Table 1** footnote for areas of higher prevalence of chronic HBV infection.

therapy.<sup>1,3,14,20</sup> Coinfection with hepatitis B increases risk of AIDS or death among people infected with HIV.<sup>21</sup>

## VACCINATION, RISK IDENTIFICATION, AND TESTING

**Routine Vaccination in Children.** The Advisory Committee on Immunization Practices (ACIP) recommends universal hepatitis B vaccination for all infants born in the US and children through age 18 years, starting with a birth dose, followed by a second vaccine dose at 1 to 2 months and a final vaccine dose at 6 to 18 months, according to its immunization schedule (**Resources**).<sup>1,15</sup> In infants born to infected mothers, administer the first dose of hepatitis B vaccine and hepatitis B immune globulin (HBIG) within 12 hours of birth, or as soon as possible, but no later than 7 days after birth. Administer the second vaccine dose at 1 to 2 months, and the final vaccine dose at 6 months.<sup>1,15</sup> For hepatitis B vaccine, the final dose in the series needs to be given no earlier than 24 weeks of age, and at least 16 weeks after the first dose.<sup>15</sup> If one of the doses administered after the birth dose is a combination vaccine and 3 doses are given prior to 24 weeks of age, a fourth dose should be given at or after 24 weeks; see **Resources—ACIP recommendations**.<sup>15</sup> Testing for HBV infection should not be performed before age 9 months or within 1 month of the most

**TABLE 1. RECOMMENDATIONS FOR HEPATITIS B VIRUS TESTING AND VACCINATION**

At-Risk Population	Test <sup>a</sup>	Vaccinate
People born in regions of high and intermediate HBV endemicity (HBsAg prevalence $\geq 2\%$ ), <sup>b</sup> including undocumented and migrant workers, refugees, asylum seekers, and internationally adopted children <sup>8,14</sup>	HBsAg, anti-HBs, and anti-HBc, regardless of immunization status in their country of origin	If susceptible
US-born people whose parents were born in regions of high endemicity (HBsAg prevalence $\geq 8\%$ ) <sup>b,8,14</sup>	HBsAg, anti-HBs, and anti-HBc, regardless of mother's immunization status	If susceptible
Injection drug users <sup>8,14</sup> Men who have sex with men <sup>8,14</sup> Household, needle-sharing, or sexual contacts of people known to be HBsAg-positive <sup>8,14</sup>	If unvaccinated or if vaccinated after initiation of potential exposure: HBsAg and anti-HBs or anti-HBc	Give first dose at time of testing, after the blood draw. If HBsAg-positive, no need to complete vaccine series
People with more than 1 sex partner in past 6 months <sup>8,14</sup> People seeking evaluation or treatment for a sexually transmitted infection <sup>8,14</sup>	Consider HBsAg and anti-HBs	If unvaccinated or if tested and susceptible
People with tattoo/piercing from a nonprofessional provider	HBsAg and anti-HBs	If susceptible
Patients with chronic liver disease <sup>8,14</sup>	HBsAg, anti-HBs, and anti-HBc	If susceptible
Patients on immunosuppressive therapy, eg, chemotherapy, or who are immunosuppressed due to organ transplantation or rheumatologic or gastroenterologic disorders <sup>8,14</sup>	HBsAg, anti-HBs, and anti-HBc	If susceptible; larger or more vaccine doses may be required <sup>c</sup>
People with elevated ALT/AST of unknown etiology <sup>8,14</sup>	HBsAg and anti-HBs, physical examination, and liver function testing	If susceptible
Donors of blood, plasma, organs, tissues, or semen <sup>14</sup>	HBsAg, anti-HBs, and anti-HBc <sup>d</sup>	
People with end-stage renal disease, including those on hemodialysis, predialysis, peritoneal dialysis, and home dialysis <sup>8,14</sup>	For hemodialysis: HBsAg, anti-HBc, and anti-HBs. Monthly HBsAg test for nonresponders. Check anti-HBs titers annually	If susceptible. The 40- $\mu$ g dose formulation is recommended for these adults. If anti-HBs titers are $<10$ mIU/mL, give booster dose
HIV-positive people <sup>8,14</sup>	HBsAg, anti-HBs, and anti-HBc	If susceptible
All pregnant women <sup>8,14</sup>	HBsAg, preferably first trimester. Retest at delivery if HBsAg test result is not available or if mother had risk factor while pregnant. Report all cases of HBsAg-positive pregnant women to the NYC Health Department	If there is a risk factor. Give first dose at time of testing, after the blood draw. If HBsAg-positive, no need to complete vaccine series
Infants born to HBsAg-positive mothers <sup>1,8,14</sup>	HBsAg and anti-HBs 1-2 months after completion of vaccine series. Do not test before age 9 months or within 1 month of most recent vaccine dose	HBIG and first dose of hepatitis B vaccine within 12 hours of delivery
People who have been exposed to potential HBV-infected blood or body fluids (eg, needlestick, sexual assault) <sup>14</sup>	HBsAg (source and exposed person)	If exposed person is unvaccinated, provide HBIG and first dose of vaccine <sup>c</sup>
Adults with diabetes aged 19 through 59 years <sup>22</sup> Adults with diabetes aged 60 years and older, at provider's discretion (see page 13) <sup>22</sup>	Consider HBsAg and anti-HBs	If unvaccinated, as soon as possible after diagnosis, or if tested and susceptible
Clients and staff members of institutions for people with developmental disabilities <sup>14</sup>	Consider HBsAg and anti-HBs	If susceptible
International travelers to areas with high or intermediate HBV endemicity <sup>b,14,19</sup>	Consider HBsAg and anti-HBs	If susceptible

ALT = alanine aminotransferase; AST = aspartate aminotransferase; HBIG = hepatitis B immune globulin; HBsAg = hepatitis B surface antigen; anti-HBc = antibody to hepatitis B core antigen; anti-HBs = antibody to HBsAg.

<sup>a</sup>Do not test for HBsAg within 1 month after vaccinating as a false-positive result is possible.

<sup>b</sup>**High endemicity (HBsAg  $\geq 8\%$ ):** Africa and East and Southeast Asia, including China, Korea, Indonesia, and the Philippines; the Middle East, except Israel; South and Western Pacific islands; the interior Amazon River Basin. **Intermediate endemicity (HBsAg 2%-7%):** South, Central, and Southwest Asia; Israel; Japan; Eastern and Southern Europe; Russia; most areas surrounding the Amazon River Basin; Honduras; Guatemala; Haiti; Dominican Republic; Hawaii.

<sup>c</sup>See [www.cdc.gov/vaccines/pubs/pinkbook/downloads/hepb.pdf](http://www.cdc.gov/vaccines/pubs/pinkbook/downloads/hepb.pdf), p. 125 for immunocompromised persons recommendations and p. 136 for occupational exposure.

<sup>d</sup>Hepatitis B screening required by Code of Federal Regulations, Title 21, Food and Drugs, Part 610.40.

(Continued from page 10)

recent vaccine dose to avoid detection of antibodies to HBsAg from HBIG and to maximize the likelihood of detection of late infection.<sup>1,3</sup>

Previously unvaccinated children and adolescents age 7 through 18 years should receive 3 doses of hepatitis B vaccine as soon as feasible according to the ACIP schedule. Incompletely vaccinated patients age 4 months through 18 years who start late or are more than 1 month behind in their vaccinations should receive the 3-dose vaccine series according to the ACIP-recommended catch-up schedule (**Resources**).<sup>15</sup>

**Identifying Risk in Adults.** Routinely ask all patients about HBV risk factors (see **Box 1**) and provide appropriate testing and vaccination (**Table 1**).<sup>8,10,14</sup> Counsel infected patients about preventing liver damage and disease transmission (see **Box 2** and **Resources**).

**Testing.** Test patients with risk factors, including those born in regions with a 2% or higher prevalence of chronic hepatitis B infection and US-born people whose parents were born in high-prevalence regions (see **Box 1** and **Table 1**),<sup>3,10</sup> even if vaccinated, because they may have developed chronic hepatitis B infection before being vaccinated. Provide culturally appropriate educational materials to help patients understand the need for HBV testing and to those who have chronic HBV infection (**Resources**). Stigma or discrimination in their country of origin may deter people from being tested and obtaining follow-up care, even after immigration to the US.<sup>10</sup>

Approximately 79% of new cases of HBV infection in the US result from high-risk sexual activity and injection drug use.<sup>14</sup> Testing is recommended for MSM, IDUs, and close contacts of HBsAg-positive patients. Testing is recommended even for vaccinated patients if they were vaccinated after initiation of risk behaviors.<sup>3</sup> Several blood tests are available to detect the presence and phase of acute or chronic hepatitis B

infection.<sup>8,14,23</sup> The markers used to identify acute, resolving, and chronic hepatitis B infections are:

- HBsAg, a marker of HBV infection, either acute or chronic; can (rarely) have a false-positive result;
- Anti-HBs or HBsAb (antibody against HBs antigen), a marker of immunity to HBV through vaccination or resolved natural infection;
- Total anti-HBc or HBcAb (total HB core antibody), a marker of past or present infection in an undefined time frame;
- IgM-anti-HBc (IgM antibody against HBc antigen), a marker of acute HBV infection for less than 6 months (false-positives often seen in those with chronic hepatitis B infection; generally useful only when acute infection is suspected);
- HBV DNA (“viral load”), if detectable, indicates the presence of chronic infection;
- HBeAg (hepatitis B “e” antigen), associated with a high HBV viral load;
- Anti-HBe (antibody against HBe antigen), associated with a lower viral load.

See **Tables 1** and **2** for testing recommendations and interpretation of test results.

**Protection With Vaccination for Adults.** There is evidence that vaccination provides long-term protection against HBV infection for at least 20 years. Factors at the time of vaccination such as older age, smoking, obesity, and immunosuppression contribute to decreased vaccine response.<sup>14</sup> Vaccinate anyone aged 19 years or older who wishes to be protected against HBV, even without an acknowledged risk factor. Recommend HBV vaccination for all unvaccinated adults aged 19 years and older with the following indications<sup>8,10,14,16</sup>:

*Behavioral risk:* MSM, current or recent IDUs, people with more than 1 sex partner in the past 6 months, and

**TABLE 2. INTERPRETING HEPATITIS B SEROLOGIC TEST RESULTS**

Serologic marker				Interpretation
HBsAg	Total anti-HBc	IgM anti-HBc <sup>a</sup>	Anti-HBs	
				Susceptible; never infected
				Early acute infection; transient postvaccination result
				Acute infection that could become chronic <sup>a</sup>
				Acute resolving infection
				Vaccinated and immune
				Recovered from past infection and immune
				Chronic infection
				Several possible explanations: Resolved infection (possibly remote) in high-prevalence populations; chronic infection in high-prevalence or HIV/HCV populations; or false-positive <sup>3</sup>

■ = negative test result; ■ = positive test result.

HBsAg = hepatitis B surface antigen; total anti-HBc = total antibody to hepatitis B core antigen; IgM anti-HBc = immunoglobulin antibody against HBc antigen; anti-HBs = antibody to HBsAg.

<sup>a</sup>IgM tests are most useful when there is a clinical suspicion of acute HBV infection and can give false-positive results in people with established diagnoses of chronic hepatitis B.

Adapted from Mast EE, et al. *MMWR Recomm Rep.* 2006;55(RR-16):1-33 and Weinbaum CM, et al. *MMWR Recomm Rep.* 2008;57(RR-8):1-28.

people seeking evaluation or treatment for a sexually transmitted infection;

*Occupational risk:* health care and public safety workers who are exposed to blood or other potentially infectious body fluids;

*Medical risk:* people with HIV or chronic liver disease, end-stage renal disease, including predialysis, hemodialysis, peritoneal dialysis, and home dialysis patients. Adults with diabetes aged 19 through 59 years should receive vaccination, and those aged 60 years and older may receive it at the physician's discretion (considering likelihood of patient acquiring HBV infection from blood glucose monitoring in facilities, having chronic sequelae, or declining immunologic responses to vaccine).<sup>22</sup>

*Other risk:* household contacts and sex partners of people with chronic hepatitis B, clients and staff members of institutions for people with developmental disabilities, and international travelers to areas with high or intermediate prevalence of chronic hepatitis B. Promptly vaccinate pregnant women with any risk factor.<sup>1</sup> Limited data show no apparent risk for adverse events in the developing fetus.<sup>18</sup>

Identify all susceptible household, sex, and needle-sharing contacts of HBsAg-positive people by testing for HBsAg and anti-HBc or anti-HBs; begin vaccination at the same visit, **after** drawing blood. If the person is HBsAg positive, there is no need to continue the series. Susceptible contacts who have not yet been vaccinated or whose vaccination status is uncertain should receive the complete vaccine series.<sup>3</sup> People who are not fully vaccinated should complete the vaccine series.<sup>1,14</sup>

Administer the full 3-dose HBV vaccine series over a 6-month period, injecting into the deltoid muscle at a 90° angle.<sup>3,16</sup> In healthy adults aged 40 years and younger, vaccine efficacy is greater than 90% with the full 3-dose series, but declines to 75% if only 2 doses are received and 30% to 50% with only 1 dose.<sup>14</sup> The 3-dose series does not need to be restarted if the vaccination schedule is interrupted. Because 1 dose will confer at least partial protection, administer vaccine even if you are unsure whether patients will get subsequent doses. Hepatitis B vaccine is contraindicated if the patient has had a severe allergic reaction (eg, anaphylaxis) after a previous dose or an allergy to any vaccine component (**Resources—CDC Recommended Adult Immunization**).<sup>14</sup>

Postvaccination serologic testing 1 to 2 months after the last vaccine dose is recommended only for chronic hemodialysis, HIV-infected, and other immunocompromised patients; infants born to HBsAg-positive mothers; sex and needle-sharing partners of HBsAg-positive individuals, and health care personnel at ongoing risk for injury with sharp instruments or needles.<sup>5,14,24</sup> People who do not have a documented positive anti-HBs test after the first series of HBV vaccine should complete a second 3-dose series.<sup>5</sup> Less than 5% of people receiving 6 doses of HBV vaccine are nonresponders. Persistent nonresponse may be due to chronic hepatitis B<sup>5</sup> or HIV infection.<sup>25</sup> People who do not respond after 6 doses should be tested for HBsAg and total anti-HBc because HBsAg may be negative in people with occult infection or an HBsAg mutation. Those who have negative HBsAg after the second series should be considered susceptible to HBV infection and counseled appropriately.<sup>14</sup>

## BOX 2. WHAT TO TELL YOUR PATIENTS WHO HAVE HBV INFECTION

### To prevent progression of liver disease:

- Avoid alcohol.
- See your doctor regularly to monitor your liver health, even if you feel well.
- Consult a provider before taking any medications, including over-the-counter (eg, acetaminophen, ibuprofen, naproxen) and herbal medicines, herbal teas, supplements, and home remedies.

### To prevent transmission of HBV to other people:

- Encourage all household members, sexual partners, or drug-using partners to get tested and vaccinated.
- Use a condom during sex if your partner is not vaccinated or naturally immune.
- Do not share toothbrushes, razors, glucometers, clippers, nail files, nail scissors, washcloths, syringes, sex toys, or anything that may have come in contact with infected blood or body fluids.
- Cover open cuts and scratches.
- Wash hands well after touching infected blood or body fluids.
- Clean blood spills with detergent or bleach.
- Do not donate blood, organs, tissue, or sperm.

### For injection drug users (IDUs):

- Never share drug use equipment, always use new sterile equipment, wash your hands and injection site before and after each injection, and plan ahead to avoid withdrawal.

## MANAGEMENT AND REFERRAL

Counsel all HBsAg-positive patients on preventing progression of chronic hepatitis B infection to liver damage and preventing transmission of HBV to others (see **Box 2**). Refer IDUs to harm reduction services such as needle exchange and drug use cessation programs (**Resources—NYC DOHMH for Patients**).

**Acute Hepatitis B.** Care is supportive and antiviral treatment is generally not necessary in patients with symptomatic acute HBV, as most immunocompetent patients recover spontaneously.<sup>8,18</sup> Patients with protracted, severe acute HBV infection (increase in international normalized ratio and deep jaundice persisting for more than 4 weeks) may require antiviral therapy and should be referred to a specialist.<sup>8</sup> Monitor patients with acute HBV for clearance of the virus in 6 months.<sup>3</sup> A positive HBsAg at 6 months indicates chronic HBV infection. Encourage patients to inform their close contacts so that they can receive prophylaxis.<sup>3</sup>

**Chronic Hepatitis B.** Monitor patients for progression of liver disease and development of liver cancer,<sup>2,3</sup> and vaccinate against hepatitis A virus (HAV) (2 doses 6-18 months apart),<sup>3</sup> pneumococcal disease, and influenza, according to the ACIP-recommended schedule (**Resources**).<sup>16</sup> Do a full evaluation, including family history of liver disease and hepatocellular carcinoma and a physical exam.<sup>14</sup> Order laboratory tests to<sup>3,8</sup>:

- detect liver disease (complete blood counts with platelets, hepatic panel, and prothrombin time);

- detect HBV replication (HBeAg/anti-HBe, HBV DNA);
- rule out viral coinfections:
  - HCV: EIA, ELISA, chemiluminescent immunoassay, or rapid antibody test; if positive, quantitative viral RNA test (**Resources—City Health Information: Hepatitis C**)
  - HIV in people at risk: Rapid antibody test or ELISA; if positive, Western blot or indirect immunofluorescence assay (**Resources—City Health Information: HIV**)
  - HDV (hepatitis D virus) in people from countries where infection is common (Mediterranean Basin, Middle East, Central Asia, West Africa, Amazon Basin) and people with a history of injection drug use: radioimmunoassay or EIA; if infection is ongoing, RT-PCR.<sup>26</sup>

Refer patients with chronic HBV infection for liver biopsy if initial laboratory testing suggests liver damage, according to current practice guidelines (**Resources**).<sup>3,8</sup>

Because of the complex natural history of chronic hepatitis B infection, patients can fluctuate between periods of active and inactive disease.<sup>27</sup> Determine the phase of chronic hepatitis B infection (see **Table 3**) and manage appropriately. The *immune tolerant* phase is seen only in patients infected neonatally or in early childhood and can last for decades. In the *active* phase, the virus is replicating and the immune system attempts to remove HBV from infected hepatocytes. In the *inactive* or *nonreplicative* phase, liver enzymes and HBV DNA are low; liver inflammation and fibrosis usually improve if the infection remains in this phase.<sup>8,27</sup> Rarely, chronic HBV infection *resolves*. Risks for liver disease decrease significantly in these patients, but hepatocellular carcinoma and cirrhosis can still develop, especially if liver damage was already present.<sup>27</sup>

Antiviral therapy may be appropriate for patients with active chronic hepatitis B (persistent inflammation that tends to progress to cirrhosis or liver cancer). The goal of antiviral therapy is to prevent or delay progression of chronic hepatitis B to cirrhosis, end-stage liver disease, and hepatocellular carcinoma.<sup>28</sup> The Food and Drug Administration has approved

7 medications to treat patients with chronic hepatitis B infection: lamivudine, adefovir, entecavir, telbivudine, tenofovir, interferon alpha, and pegylated interferon. Refer patients with active chronic hepatitis B to a specialist for possible treatment unless you are experienced in antiviral therapy.

**Hepatocellular Carcinoma Surveillance.** Hepatocellular carcinoma, the most common form of liver cancer, is closely associated with HBV infection and is frequently asymptomatic at an early stage.<sup>8,10,29</sup> In 2011 in the US, about 26,000 new cases were diagnosed and 20,000 deaths were attributed to hepatocellular carcinoma.<sup>30</sup> In New York City in 2010, there were 663 deaths from liver cancer.<sup>31</sup> Patients with chronic hepatitis B who are at high risk for hepatocellular carcinoma should have liver ultrasound and alfa-fetoprotein (AFP) level screening every 6 to 12 months.<sup>8,27</sup> Risk groups include:

- Men older than 40 years and women older than 50 years;
- Men and women of any age, especially Asian and Pacific Islanders, with severe liver fibrosis (cirrhosis or bridging fibrosis), an AFP level greater than 10 ng/mL, or a family history of hepatocellular carcinoma;
  - Up to 20% of cases of hepatocellular carcinoma occur in Asian American men younger than age 40 years and women younger than age 50 years with clinically active chronic hepatitis, cirrhosis, or other risk factors.<sup>28</sup>
- Women aged 40 years and older with an HBV DNA level higher than 2000 IU/mL and/or elevated ALT and/or positive HBeAg;
- People coinfecting with HIV and/or HCV;
- Africans older than 20 years.<sup>3,8,23,27</sup>

**Postexposure Prophylaxis.** The Centers for Disease Control and Prevention (CDC) recommends the HBV vaccine series and HBIG to prevent HBV infection in unvaccinated patients after potential exposure. After accidental exposure via percutaneous or mucous membranes, administer HBIG, preferably within 24 hours and no later than 7 days of exposure<sup>14,24</sup>; after sexual exposure to an HBsAg-positive person, administer HBIG within 14 days of exposure.<sup>14</sup> Hepatitis B immune globulin

**TABLE 3. PHASES OF CHRONIC HEPATITIS B INFECTION**

Phase	HBe Status	HBV DNA Level (copies/mL) PCR	ALT Levels	Action
Immune tolerant	HBeAg+	High: >20,000 IU/mL (>10 <sup>5</sup> copies/mL)	Normal	ALT every 3-6 months; refer to specialist if ALT > upper limit of normal.
Active (virus replicating)	HBeAg+ or HBeAg-/anti-HBe+	Moderately high: >2000 IU/mL (>10 <sup>4</sup> copies/mL)	Abnormal	Refer to specialist for antiviral treatment.
Nonreplicative (inactive HBsAg carrier)	HBeAg-/anti-HBe+	Low: <2000 IU/mL (<10 <sup>4</sup> copies/mL) or undetectable	Normal	ALT every 6 months; if > upper limit of normal, do HBV DNA. Refer to specialist if both are elevated.
Resolved <sup>a</sup>	HBeAg-/anti-HBe+	Undetectable	Normal	Refer to specialist if baseline serum albumin/platelet counts are low.

HBeAg = hepatitis B extracellular antigen; HBV DNA = hepatitis B virus DNA; PCR = polymerase chain reaction; ALT = alanine aminotransferase; anti-HBe = antibody to HBeAg.

<sup>a</sup>Risk for cirrhosis and hepatocellular carcinoma is significantly decreased, but not absent.

Adapted from McMahon J. *Am J Med.* 2008;121(12A):S45-S52; McMahon J, Peters M. AASLD guide; 2010.

should also be administered to infants after perinatal exposure (see page 10 and **Resources—NYC Perinatal Hepatitis B Program**) and to unvaccinated infants younger than 12 months who have been exposed to a primary caregiver with acute HBV.<sup>5</sup> These recommendations change if the patient has been vaccinated<sup>1,5,15,16,32</sup> (see **Resources—ACIP recommendations and AAP Red Book**). Hepatitis B immune globulin should be given intramuscularly with the first dose of HBV vaccine at a separate site.

## SUMMARY

Primary care providers can help prevent HBV infection and transmission by providing vaccination and identifying infected or exposed individuals for evaluation. All providers should counsel their HBV patients on measures to prevent progression of liver damage and transmission to others. Providers should monitor patients with acute or chronic hepatitis B infection for possible disease progression and/or complications. Unless they are experienced in managing patients with hepatitis B, providers should refer those with severe, protracted acute or active chronic hepatitis B, other liver disease, and/or a serious comorbidity to a specialist. ♦

## RESOURCES

### For Providers

- American Academy of Pediatrics. Hepatitis B. *Red Book: 2009 Report of the Committee on Infectious Diseases*. 28th ed. 2009:337-356.
- NYC Department of Health and Mental Hygiene—Hepatitis A, B, & C Web site: [www.nyc.gov/html/doh/html/cd/cd-hepatitisabc.shtml](http://www.nyc.gov/html/doh/html/cd/cd-hepatitisabc.shtml)
  - **Online Hepatitis B & C Service Locator** (where to find hepatitis B testing, care, treatment, and support services)
  - Perinatal Hepatitis B Program
  - Immunization Information and Resources
  - Health Insurance: Resources for the Uninsured
  - *City Health Information*: Brief Intervention for Excessive Drinking: [www.nyc.gov/html/doh/downloads/pdf/chi/chi30-1.pdf](http://www.nyc.gov/html/doh/downloads/pdf/chi/chi30-1.pdf)
  - *City Health Information*: Diagnosing and Managing Hepatitis C: [www.nyc.gov/html/doh/downloads/pdf/chi/chi29-7.pdf](http://www.nyc.gov/html/doh/downloads/pdf/chi/chi29-7.pdf)
  - *City Health Information*: HIV Prevention and Care: [www.nyc.gov/html/doh/downloads/pdf/chi/chi29-suppl2.pdf](http://www.nyc.gov/html/doh/downloads/pdf/chi/chi29-suppl2.pdf)
  - *City Health Information*: Improving the Health of People Who Use Drugs: [www.nyc.gov/html/doh/downloads/pdf/chi/chi28-3.pdf](http://www.nyc.gov/html/doh/downloads/pdf/chi/chi28-3.pdf)
- Centers for Disease Control and Prevention: [www.cdc.gov/hepatitis](http://www.cdc.gov/hepatitis)
- Centers for Disease Control and Prevention ACIP Recommended Adult Immunization Schedule—United States, 2012: [www.cdc.gov/vaccines/recs/schedules/downloads/adult/mmr-adult-schedule.pdf](http://www.cdc.gov/vaccines/recs/schedules/downloads/adult/mmr-adult-schedule.pdf)
- 2012 ACIP Recommended Immunization Schedules for Persons Aged 0 Through 18 Years: [www.cdc.gov/vaccines/recs/schedules/downloads/child/0-18yrs-11x17-fold-pr.pdf](http://www.cdc.gov/vaccines/recs/schedules/downloads/child/0-18yrs-11x17-fold-pr.pdf)
- Clinical Trials: [www.clinicaltrials.gov](http://www.clinicaltrials.gov)
- Clinical Care Options (CME): [www.clinicalcareoptions.com/hepatitis](http://www.clinicalcareoptions.com/hepatitis)
- Hep B Foundation: [www.hepb.org](http://www.hepb.org)
- B Free CEED: National Center of Excellence in the Elimination of Hepatitis B Disparities: <http://hepatitis.med.nyu.edu>
- Harm Reduction Coalition: [www.harmreduction.org](http://www.harmreduction.org)
- Immunization Action Coalition: [www.immunize.org](http://www.immunize.org)

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- NYC Hepatitis B Coalition: [www.NYCHepBC.org](http://www.NYCHepBC.org)
- National Viral Hepatitis Roundtable: [www.NVHR.org](http://www.NVHR.org)
- National Hepatitis B Task Force: <http://hepbtaskforce.wordpress.com>

### For Patients

- NYC Department of Health and Mental Hygiene Resources: **Call 311** or go to [www.nyc.gov/html/doh/html/cd/cd-hepatitisabc.shtml](http://www.nyc.gov/html/doh/html/cd/cd-hepatitisabc.shtml) to find:
  - **Online Hepatitis B & C Service Locator** (where to find hepatitis B testing, care, treatment, and support services)
  - **Hepatitis B: The Facts** (booklet for people with chronic hepatitis B)
  - **A Guide to Telling Others You Have Chronic Hepatitis B**
- Health Insurance Information and Resources for the Uninsured
  - Free and Confidential STD Clinics
  - Free Immunization Clinics
  - Free Condoms
  - Free Syringe Exchange
  - Information on how to stop drinking and using drugs
- Centers for Disease Control and Prevention: [www.cdc.gov/hepatitis](http://www.cdc.gov/hepatitis)
- Hepatitis B Foundation: [www.HepB.org](http://www.HepB.org)
- American Liver Foundation: [www.liverfoundation.org](http://www.liverfoundation.org)
- HBV Advocate: [www.hbvadvocate.org](http://www.hbvadvocate.org)
- Asian American Hepatitis B Program: <http://asian-health.med.nyu.edu/centers-projects/asian-american-hepatitis-b-program>
- The New York Organ Donor Network: [www.donatelifeny.org](http://www.donatelifeny.org)
- Guide to Hepatitis B for People with HIV (in English and Spanish): [www.treatmentactiongroup.org/hcv/publications/2009/hbv-guide](http://www.treatmentactiongroup.org/hcv/publications/2009/hbv-guide)
- Hepatitis B Medication Patient Assistance Programs: [www.hepb.org/patients/pharm\\_support\\_programs.htm](http://www.hepb.org/patients/pharm_support_programs.htm)
- NYC Hepatitis B Coalition: [www.NYCHepBC.org](http://www.NYCHepBC.org)



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