

Hepatitis B and Healthcare Personnel

CDC answers frequently asked questions about how to protect healthcare personnel

The Immunization Action Coalition thanks experts at the Centers for Disease Control and Prevention for answering the following questions and answers.

Which people who work in healthcare settings need hepatitis B vaccine?

The Occupational Safety and Health Administration (OSHA) requires that hepatitis B vaccine be offered to healthcare personnel (HCP) who have a reasonable expectation of being exposed to blood and body fluids on the job. This requirement does not include personnel who would not be expected to have occupational risk (e.g., general office workers).

At what anatomic site should hepatitis B vaccine be administered to adults? What needle size should be used?

For adults, administer hepatitis B vaccine intramuscularly (IM) in the deltoid muscle. A 22- to 25-gauge, 1–1½ -inch needle should be used. The gluteus muscle should not be used as a site for administering hepatitis B vaccine. For optimal protection, it is crucial that the vaccine be administered IM, not subcutaneously.

If a person who works in a healthcare setting had one dose only of hepatitis B vaccine 4 months ago, should the series be restarted?

No. The hepatitis B vaccine series should not be restarted when doses are delayed; rather, the series should be continued from where it stopped. The person should receive the second dose of vaccine now and the third dose at least 8 weeks later. There needs to be at least 8 weeks between the second and third doses and at least 16 weeks between the first and the third doses of vaccine.

Is it safe for HCP to be vaccinated during pregnancy?

Yes. Many years of experience with hepatitis B vaccines indicate no apparent risk for adverse events to a developing fetus. Current hepatitis B vaccines contain noninfectious hepatitis B surface antigen (HBsAg) and should pose no risk to the fetus. If not vaccinated, a pregnant woman may contract an HBV infection during pregnancy, which might result in severe disease for the newborn. Women who breastfeed their babies can and should be vaccinated against hepatitis B if needed. Receipt of the vaccine is not a reason to discontinue breastfeeding.

Which HCP need serologic testing after receiving 3 doses of hepatitis B vaccine?

All HCP, including trainees, who have a high risk

of occupational percutaneous or mucosal exposure to blood or body fluids (e.g., HCP with direct patient contact, HCP who have the risk of needlestick or sharps injury, laboratory workers who draw, test or handle blood specimens) should have postvaccination testing for antibody to hepatitis B surface antigen (anti-HBs). Postvaccination testing should be done 1–2 months after the last dose of vaccine. Postvaccination testing for persons at low risk for mucosal or percutaneous exposure to blood or body fluids (e.g., public safety workers and HCP without direct patient contact) likely is not cost-effective; however, those who do not undergo postvaccination testing should be counseled to seek immediate testing if exposed.

What should be done if a person's postvaccination anti-HBs test is negative (less than 10 mIU/mL) 1–2 months after the last dose of vaccine?

Repeat the 3-dose series and test for anti-HBs 1–2 months after the third dose of vaccine. If the test is still negative after a second vaccine series, the person should be tested for HBsAg and total anti-HBc to determine their HBV infection status. People who test negative for HBsAg and total anti-HBc should be considered vaccine non-responders and susceptible to HBV infection. They should be counseled about precautions to prevent HBV infection and the need to obtain hepatitis B immune globulin (HBIG) prophylaxis for any known or likely exposure to HBsAg-positive blood. Those found to be HBsAg negative but total anti-HBc positive were infected in the past and require no vaccination or treatment. If the HBsAg and total anti-HBc tests are positive, the person should receive appropriate counseling for preventing transmission to others as well as referral for ongoing care to a specialist experienced in the medical management of chronic HBV infection. They should not be excluded from work.

How often should I test HCP after they've received the hepatitis B vaccine series to make sure they're protected?

For immunocompetent HCP, periodic testing or periodic boosting is not needed. Postvaccination testing (anti-HBs) should be done 1–2 months after the last dose of the hepatitis B vaccine series. If

Healthcare personnel need more vaccinations than just hepatitis B!

Make sure you are up to date on ALL recommended vaccinations, including influenza, Tdap, MMR, and varicella.

For information about additional vaccines you may need, see the references at the bottom of page 3.

adequate anti-HBs (at least 10 mIU/mL) is present, nothing more needs to be done. This information should be made available to the employee and recorded in the employee's health record. If postvaccination testing is less than 10 mIU/mL, the 3-dose vaccine series should be repeated and anti-HBs testing done, 1–2 months after the last dose of the second series.

Should a healthcare professional who performs invasive procedures and who once had a positive anti-HBs result be revaccinated if the anti-HBs titer is rechecked and is less than 10 mIU/mL?

No. Immunocompetent people known to have responded to hepatitis B vaccination in the past do not require additional passive or active immunization. Postvaccination testing should be done 1–2 months after the original vaccine series is completed. In this scenario, the initial postvaccination testing showed that the healthcare professional was protected. Substantial evidence suggests that adults who respond to a 3-dose hepatitis B vaccine series (anti-HBs of at least 10 mIU/mL) are protected from chronic HBV infection for at least 22 years, even if there is no detectable anti-HBs currently. Only immunocompromised people (e.g., dialysis patients, some HIV-positive people) need to have anti-HBs testing performed periodically. Booster doses of vaccine to maintain their protective anti-HBs concentrations to at least 10 mIU/mL are recommended for dialysis patients and may be given to some HIV-positive patients.

Before reading the recommendations of CDC's Advisory Committee on Immunization Practices (ACIP) that say not to do this, we tested our employees for anti-HBs several years after they were vaccinated and some people had inadequate titers, even though they had all completed a 3-dose series. What should we do now?

The ACIP guidelines do not address this situation; however, we know that anti-HBs concentrations decline over time and immunocompetent HCP who had anti-HBs levels of at least 10 mIU/mL 1–2 months after primary vaccination series re-

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main protected even if their anti-HBs concentration declines to below 10 mIU/mL. There are several options to consider for immunocompetent HCP in this situation, depending on cost considerations, anticipated high risk of exposure (including medical trainees), and employee/employer desire for documented immunity:

- Administer an additional dose of vaccine followed by serological testing (and then two subsequent doses if titers are non-protective followed by serological testing) as long as the series was documented;
- Administer an additional 3-dose series followed by serological testing 1–2 months after the third dose (and if titers are still non-protective, and HBsAg and total anti-HBc are negative, counseling about the importance of seeking care after a potential exposure); or
- Do not vaccinate further at this time, but counsel regarding the importance of seeking immediate assessment after percutaneous or mucosal exposure to blood or blood containing body fluids, and following the guidelines for postexposure management (see Table 1).

How often should anti-HBs testing be done on healthcare professionals who perform invasive procedures?

For people whose immune status is normal, periodic serologic testing to assess anti-HBs concentrations is not necessary. People who perform invasive procedures should be treated no differently from other HCP with respect to anti-HBs testing. If a healthcare professional has an exposure (e.g., needlestick), she/he should be evaluated for their need for immunoprophylaxis according to postexposure guidelines in Table 1.

If HCP received hepatitis B vaccination in the past and were not tested for immunity, should they be tested now?

No. In this scenario, they do not need to be tested unless they have an exposure. If an exposure occurs, refer to the postexposure guidelines in Table 1.

How should a fully vaccinated employee with an unknown anti-HBs response be managed if they have a percutaneous or mucosal exposure to blood or body fluids from an HBsAg-positive source?

This person should be tested for anti-HBs as soon as possible after exposure. If the anti-HBs con-

centration is at least 10 mIU/mL, no further treatment is needed. If the anti-HBs concentration is less than 10 mIU/mL, HBIG and one dose of hepatitis B vaccine should be administered. In these HCP, anti-HBs testing should be repeated 4–6 months after administration of the booster dose and HBIG. If the result is at least 10 mIU/mL, the person is seroprotected. It is necessary to do postvaccination testing later than the usual recommended time frame because anti-HBs from HBIG might be detected if testing is done any earlier. The postvaccination test result should be made available to the employee and recorded in the employee’s health record.

For a pre-employment physical, an applicant states she received all three hepatitis B vaccine doses as an adolescent. Would you test for anti-HBs?

If the person has written documentation of a full hepatitis B vaccine series, testing for anti-HBs at this point is not required. However, knowledge of immunity to HBV is recommended if the employee will have high risk of occupational percutaneous or mucosal exposure to blood or body fluids. If the vaccinated employee without documented immu-

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Table 1: Recommendations for postexposure prophylaxis after percutaneous or mucosal exposure to HBV in an occupational setting

Vaccination and antibody response status of exposed persons ¹	Treatment		
	Source is HBsAg positive	Source is HBsAg negative	Source is unknown or not tested
Unvaccinated	HBIG ² x 1 and begin a hepatitis B vaccine series	Begin a hepatitis B vaccine series	Begin a hepatitis B vaccine series.
Fully vaccinated and known responder³	No treatment	No treatment	No treatment
Vaccinated with 3 doses and known nonresponder³	HBIG ² x 1 and begin a hepatitis B revaccination series ⁴	No treatment	If known high risk source, refer to the column “Source is HBsAg positive.”
Vaccinated with 6 doses and known nonresponder³	HBIG ^{2,5} x 2	No treatment	If known high risk source, refer to the column “Source is HBsAg positive.”
Fully vaccinated with 3 doses but antibody titer unknown	Test exposed person for anti-HBs. ⁶ If adequate, ³ no treatment. If inadequate, HBIG ² x 1 and hepatitis B vaccine booster.	No treatment	Test exposed person for anti-HBs. ⁶ If adequate, ³ no treatment. If inadequate, HBIG ² x 1 and hepatitis B vaccine booster.

1. Persons known to have had HBV infection in the past or who are chronically infected do not require HBIG or vaccine.
 2. Hepatitis B immune globulin (0.06 mL/kg) administered IM.
 3. Adequate response is anti-HBs of at least 10 mIU/mL after vaccination.
 4. Revaccination = additional 3-dose series of hepatitis B vaccine administered after the primary series.
 5. First dose as soon as possible after exposure and the second dose 1 month later.
 6. Testing should be done as soon as possible after exposure.

Source: This table was adapted from Immunization of Health-Care Personnel: Recommendations of the Advisory Committee on Immunization Practices, *MMWR*, 2011; 60(7):1–48; www.cdc.gov/mmwr/pdf/tr/rr6007.pdf

nity to HBV has a subsequent exposure to HBV, hepatitis B immunoprophylaxis should be administered following guidelines for a person who has been vaccinated, but the immune response is not known (see Table 1). This information should be documented in the employee's health record. This approach should be sufficient to meet the needs of the employer and the requirements of OSHA. If there is no written documentation of hepatitis B vaccination, see the next question.

Several physicians in our group have no documentation showing they received hepatitis B vaccine. They are relatively sure, however, that they received the doses many years ago. What do we do now?

Because there is no documentation of vaccination, the 3-dose vaccination series should be administered and postvaccination testing should be performed 1–2 months after the third dose of vaccine. There is no harm in receiving extra doses of vaccine. Care should always be taken to document vaccine lot, date, manufacturer, route, and vaccine dosages. Postvaccination testing results should also be documented, including the date testing was performed. All healthcare settings should develop policies or guidelines to assure valid hepatitis B immunization.

An employee thinks she had 3 doses of hepatitis B vaccine in the past but has no documentation of receiving those doses. Before reading the recommendations to revaccinate her, we obtained an anti-HBs titer and the result was greater than 10 mIU/mL. With this lab result, can't we assume she is immune?

No. A positive anti-HBs indicates that the vaccinated person is immune at the time the person was tested but does not assure that the person has long-term immunity. Long-term immunity has been demonstrated only for people attaining an adequate anti-HBs result of at least 10 mIU/mL after completing a full vaccination series. The most direct way to deal with this is to vaccinate the employee with a 3-dose series of hepatitis B vaccine; test for anti-HBs in 1–2 months and document the result in the employee's health record. An adequate anti-HBs result from a documented 3-dose vaccine series would assure not only seroprotection, but long-term protection.

I'm a nurse who received the hepatitis B vaccine series more than 10 years ago and had a positive follow-up titer (at least 10 mIU/mL). At present, my titer is negative (less than 10 mIU/mL). What should I do now?

Nothing. Data show that vaccine-induced anti-HBs levels might decline over time; however, immune memory (anamnestic anti-HBs response) remains

intact following immunization. People with anti-HBs concentrations that decline to less than 10 mIU/mL are still protected against HBV infection. For HCP with normal immune status who have demonstrated adequate anti-HBs (at least 10 mIU/mL) following full vaccination, booster doses of vaccine or periodic anti-HBs testing are not recommended.

A person who is a known non-responder to hepatitis B vaccine has a percutaneous exposure to HBsAg-positive blood. According to older ACIP recommendations, I have the option to give HBIG x 2 or HBIG x 1 and initiate revaccination. How do I decide which to do?

The current recommended postexposure prophylaxis for people who are non-responders to hepatitis B vaccine (i.e., have not responded to an initial 3-dose series and revaccination with a 3-dose series) is to give HBIG as soon as possible after exposure and a second dose of HBIG one month later (see Table 1).

If an employee does not respond to hepatitis B vaccination (employee has had two full series of hepatitis B vaccine), does s/he need to be removed from activities that expose her/him to bloodborne pathogens? Does the employer have a responsibility in this area beyond providing vaccine?

No. There are no regulations that require removal from job situations where exposure to bloodborne pathogens could occur; this is an individual policy decision within the organization. OSHA regulations require that employees in jobs where there is a reasonable risk of exposure to blood be offered hepatitis B vaccine. In addition, the regulation states that adequate personal protective equipment be provided and that standard precautions be followed. Check your state OSHA regulations regarding additional requirements. If there are no state OSHA regulations, federal OSHA regulations should be followed. Adequate documentation should be placed in the employee record regarding non-response to vaccination. HCP who do not respond to vaccination should be tested for HBsAg and total anti-HBc to determine if they have chronic HBV infection. If the HBsAg and total anti-HBc tests are positive, HCP should receive appropriate counseling for preventing transmission to others as well as referral for ongoing care to a specialist experienced in the medical management of chronic HBV infection. Persons who are HBsAg-positive and who perform exposure-prone procedures should seek counsel from a review panel comprised of experts with a balanced perspective (e.g., infectious disease specialists and their personal physician[s]) regarding the procedures

that they can perform safely. They should not be excluded from work. People who test negative for HBsAg should be considered susceptible to HBV infection and should be counseled about precautions to prevent HBV infection and the need to obtain HBIG prophylaxis for any known or likely exposure to HBsAg-positive blood (see Table 1).

Can a person with chronic HBV infection work in a healthcare setting?

Yes. HCP should not be discriminated against because of their hepatitis B status. All HCP should practice standard precautions, which are designed to prevent HBV transmission, both from patients to HCP and from HCP to patient. There is, however, one caveat concerning HBV-infected HCP. Those who have HBV levels 1000 IU/mL or 5000 genomic equivalents/mL or higher should not perform exposure-prone procedures (e.g., gynecologic, cardiothoracic surgery) unless they have sought counsel from an expert review panel and been advised under what circumstances, if any, they may continue to perform these procedures. For more information on this issue, see "Updated CDC Recommendations for the Management of Hepatitis B Virus-Infected Health-Care Providers and Students," *MMWR*, 2012; 61(RR03):1-12. This document is available at www.cdc.gov/mmwr/pdf/rr/rr6103.pdf.

Keep track of your vaccinations!

Record the dates you received hepatitis B vaccine, as well as the results of your postvaccination serologic testing (anti-HBs).

Remember to keep records of all vaccinations you need – influenza, Tdap, MMR, varicella, and more – so you don't have to repeat them.

To order adult immunization record cards, go to www.immunize.org/adultizcards.

For more information on vaccination recommendations for healthcare personnel, see the following:

1. CDC. Immunization of Health-Care Personnel: Recommendations of the Advisory Committee on Immunization Practices, *MMWR*, 2011; 60(7):1–48, www.cdc.gov/mmwr/pdf/rr/rr6007.pdf
2. Immunization Action Coalition. "Healthcare Personnel Vaccination Recommendations," www.immunize.org/catg.d/p2017.pdf