

VACCINATE WOMEN

A periodical for obstetrician/gynecologists from the Immunization Action Coalition

Highlighting the latest developments in routine immunization and hepatitis B prevention

Ask the Experts

Editor's note: The Immunization Action Coalition thanks William L. Atkinson, MD, MPH; Andrew T. Kroger, MD, MPH; Eric E. Mast, MD, MPH; and Linda A. Moyer, RN, of the Centers for Disease Control and Prevention (CDC) for answering the following questions for our readers. Dr. Atkinson is a medical epidemiologist, and Dr. Kroger is a medical officer, both at CDC's National Immunization Program. Dr. Mast is chief, Prevention Branch, and Ms. Moyer is an epidemiologist, both at CDC's Division of Viral Hepatitis.

Immunization questions

by William L. Atkinson, MD, MPH
and Andrew T. Kroger, MD, MPH

Who makes recommendations on vaccine use in the United States?

The Advisory Committee on Immunization Practices (ACIP) makes the official federal recommendations for the use of vaccines and immune globulins in the United States. The ACIP consists of 15 experts in fields associated with immunization who have been selected by the Secretary of the U.S. Department of Health and Human Services. ACOG is a liaison member of ACIP. Read more about ACIP at www.cdc.gov/nip/acip.

ACIP statements are published by CDC. IAC maintains an online library of ACIP statements at www.immunize.org/acip; you can order a CD of ACIP statements from CDC at https://www2.cdc.gov/nchstp_od/PIWeb/niporderform.asp.

Every office or clinic providing vaccinations should have a copy of all relevant ACIP statements for easy reference. To always be informed when a new ACIP statement is released, subscribe to IAC's free weekly email news service, IAC Express (www.immunize.org/express).

Which women seen in an Ob/Gyn practice need influenza vaccination?

The ACIP recommends that because of the increased risk for influenza related complications, all women who will be pregnant during the influenza season (December through March) should be vaccinated. Vaccination can occur in any trimester. Only inactivated influenza vaccine (injectable) should be given to pregnant women (not the live, attenuated intranasal vaccine). The vaccine should also be given to the following individuals:

- All women 50 years of age or older
- Women who have a chronic medical condition, such as a chronic disorder of the pulmonary or cardiovascular system (including asthma), a chronic disease of the blood, kidneys, or immune system (including HIV), or diabetes.
- Women (such as healthcare workers or caregivers) who come in contact with or live with persons with high-risk conditions.

- Women who are household contacts or out-of-home caretakers of children 0–23 months of age.

In addition, any other person ≥ 6 months of age who wishes to reduce the likelihood of becoming ill with influenza should be vaccinated.

To access the official influenza recommendations, list of contraindications and precautions, and clinical resources, go to CDC's influenza web section at www.cdc.gov/flu.

Which healthcare workers routinely seen in an Ob/Gyn practice should be vaccinated against influenza?

All of them. It is important to vaccinate all outpatient and hospital healthcare personnel who have contact with patients.

Is influenza a serious problem in the U.S.?

Influenza is the most frequent cause of death from a vaccine-preventable disease in this country. From 1990 through 1999, an average of approximately 36,000 influenza-associated pulmonary and circulatory deaths occurred during each influenza season. In addition to fatalities, influenza is also responsible for an average of 200,000 hospitalizations per year.

Immunization questions?

- Email nipinfo@cdc.gov
- Call your state health dept. (phone numbers at www.immunize.org/coordinators)

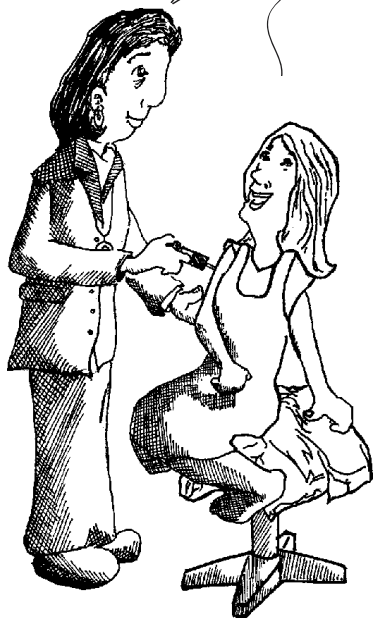
Can vaccinations be given without a physician's order?

Vaccines must always be dispensed with a prescription or order from a physician or other healthcare provider authorized to prescribe medications (such as a nurse practitioner, in some areas). However, there are situations where vaccines can be administered using authorized and signed standing orders. In these situations, the physician or other healthcare provider does not need to be physically present for the vaccine to be administered. Several studies have shown that the use of standing orders can improve vaccination rates, and ACIP recommends the use of standing orders

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I didn't realize how important it is to get a flu shot when pregnant.

Yes, women who are pregnant during the influenza season should get vaccinated, no matter what trimester they're in. It protects moms and helps protect their babies, too.



Sharon Wheeler-Murray

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Vaccinate Women

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IAC, a 501(c)3 nonprofit organization, publishes practical immunization information for health professionals to help increase immunization rates and prevent disease.

The **Hepatitis B Coalition**, a program of IAC, promotes hepatitis B vaccination for all children 0–18 years; HBsAg screening for all pregnant women; testing and vaccination for high-risk groups; and education and treatment for people chronically infected with hepatitis B.

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programs in both outpatient and inpatient settings. To access sample standing orders for eight vaccines given to adults, go to www.immunize.org/catg.d/p3089.pdf.

For whom is tetanus vaccine recommended?

Adults should be given a routine booster dose of Td every 10 years. Adults without documentation of receiving a basic series of tetanus and diphtheria toxoids should first receive a primary series of three doses, on a 0, 1–2m, 6–12m schedule. Combined Td should always be used whenever tetanus toxoid is indicated.

It is important that health professionals ensure patients are immunized against tetanus. According to an *MMWR* report, in 1998–2000, only 40% of persons ≥65 years reported receiving a booster dose of tetanus toxoid in the previous 10 years; 75% of reported tetanus deaths occurred among patients ≥60 years. Many older women may rely on their Ob/Gyn for primary healthcare and for vaccination advice. For professional resources, visit the CDC website at www.cdc.gov/nip/menus/diseases.htm#tetanus.

Hepatitis A and B

by Linda A. Moyer, RN, and Eric E. Mast, MD, MPH

Which women seen in an Ob/Gyn practice need hepatitis B vaccination?

Hepatitis B vaccine has been recommended for everyone aged 0–18 years in the United States since 1998. Adult women who might be seen in your office who are at increased risk of hepatitis B virus (HBV) infection and need vaccination include

Persons at risk of sexual HBV transmission

- Persons diagnosed recently with a sexually transmitted disease (STD)
- Persons with more than one sex partner in a six-month period

Persons at risk of HBV transmission by percutaneous or mucosal exposure to blood

- Injection drug users
- Healthcare professionals and public safety workers with occupational exposure to blood or blood products
- Persons with end-stage kidney disease

Other persons

- Household members and sex partners of persons with chronic HBV infection
- International travelers who go to areas with intermediate or high levels of chronic HBV infection

Hepatitis B vaccine is safe and effective and there is no medical reason not to give it to anyone who wants to be protected against HBV infection.

For more information, go to: www.cdc.gov/ncidod/diseases/hepatitis/b.

DISCLAIMER: *Vaccinate Women* is available to all readers free of charge. Some of the information in this issue is supplied to us by the Centers for Disease Control and Prevention in Atlanta, Georgia, and some information is supplied by third-party sources. The Immunization Action Coalition (IAC) has used its best efforts to accurately publish all of this information, but IAC cannot guarantee that the original information as supplied by others is correct or complete, or that it has been accurately published. Some of the information in this issue is created or compiled by IAC. All of the information in this issue is of a time-critical nature, and we cannot guarantee that some of the information is not now outdated, inaccurate, or incomplete. IAC cannot guarantee that reliance on the information in this issue will cause no injury. Before you rely on the information in this issue, you should first independently verify its current accuracy and completeness. IAC is not licensed to practice medicine or pharmacology, and the providing of the information in this issue does not constitute such practice. Any claim against IAC must be submitted to binding arbitration under the auspices of the American Arbitration Association in St. Paul, Minn.

IAC has developed a screening questionnaire to help patients and providers decide which adults need hepatitis B vaccination. To access "Should You Be Vaccinated Against Hepatitis B?" go to: www.immunize.org/catg.d/2191hepb.pdf.

Looking for a short screening questionnaire for taking your patients' sex histories? Consider using IAC's "Brief Sex History Questionnaire": www.immunize.org/sxhx/index.htm.

Which women need serologic testing for antibody to HBsAg (anti-HBs) after receiving the hepatitis B vaccination series?

It is only necessary to confirm the immune response for the following persons:

- healthcare professionals who are at risk of exposure to blood or body fluids in the workplace
- immunocompromised persons (e.g., dialysis patients, HIV-infected patients)
- sex partners of persons with chronic HBV infection

Postvaccination testing for adults should be performed 1–2 months after the last dose of vaccine.

Do women who have been previously vaccinated against hepatitis B still need to be screened during pregnancy?

Yes. For every pregnancy, women should still be screened for HBsAg during their first trimester, even if they have previously been vaccinated. Just because a woman has been vaccinated does not mean she is HBsAg negative. She might have been infected before she was vaccinated, or she might not have developed a protective antibody response to the vaccine.

Is it safe to give hepatitis B vaccine to a pregnant woman?

Yes. Hepatitis B vaccine contains noninfectious HBsAg, which should not pose a risk to the fetus, and no apparent risk of adverse events to developing fetuses has been demonstrated when hepatitis B vaccine is administered to pregnant women. If the mother is being vaccinated because she is at risk for HBV infection (e.g., a healthcare professional, a person with a sexually transmitted disease, an injection drug user), vaccination should be initiated as soon as her risk factor is identified during the pregnancy. The risk of infection to the fetus or newborn is greater than any theoretical risk of vaccination.

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**For prenatal hepatitis B screening,
make sure the test you or your staff
order is the HBsAg test.
Errors happen all too often!**

How do I interpret some of the common hepatitis B panel results?

Tests	Results	Interpretation
HBsAg anti-HBc anti-HBs	negative negative negative	susceptible
HBsAg anti-HBc anti-HBs	negative negative positive with ≥10mIU/mL*	immune due to vaccination
HBsAg anti-HBc anti-HBs	negative positive positive	immune due to natural infection
HBsAg anti-HBc IgM anti-HBc anti-HBs	positive positive positive negative	acutely infected
HBsAg anti-HBc IgM anti-HBc anti-HBs	positive positive negative negative	chronically infected
HBsAg anti-HBc anti-HBs	negative positive negative	four interpretations possible†

*Postvaccination testing, when it is recommended, should be performed 1–2 months following the last dose of vaccine. Infants born to HBsAg-positive mothers should be tested 3–9 months after the last dose.

- †
1. May be recovering from acute HBV infection.
 2. May be distantly immune, but the test may not be sensitive enough to detect a very low level of anti-HBs in serum.
 3. May be susceptible with a false positive anti-HBc.
 4. May be chronically infected and have an undetectable level of HBsAg present in the serum.

Which women routinely seen in an Ob/Gyn practice need hepatitis A vaccination?

- Anyone who wants to be protected against hepatitis A virus (HAV) infection
- People traveling to or working in any area of the world except the United States, Canada, Western Europe, Japan, New Zealand, and Australia
- Illegal drug users, both oral and injecting

For more information, go to: www.cdc.gov/ncidod/diseases/hepatitis/a.

IAC has developed a screening questionnaire to help patients and providers decide which adults need hepatitis A vaccination. To access “Should You Be Vaccinated Against Hepatitis A?” go to: www.immunize.org/catg.d/2190hepa.pdf.♦



Hepatitis A and B lab tests

Hepatitis A lab nomenclature

anti-HAV: *Antibody to hepatitis A virus.* This diagnostic test detects total antibody of both IgG and IgM subclasses of HAV. Its presence indicates either acute or resolved infection.

IgM anti-HAV: *IgM antibody subclass of anti-HAV.* Its presence indicates a recent infection with HAV (≤6 mos). It is used to diagnose acute hepatitis A.

Hepatitis B lab nomenclature

HBsAg: *Hepatitis B surface antigen* is a marker of infectivity. Its presence indicates either acute or chronic HBV infection.

anti-HBs: *Antibody to hepatitis B surface antigen* is a marker of immunity. Its presence indicates an immune response to HBV infection, an immune response to vaccination, or the presence of passively acquired antibody. (It is also known as **HBsAb**, but this abbreviation is best avoided since it is often confused with abbreviations such as HBsAg.)

anti-HBc (total): *Antibody to hepatitis B core antigen* is a nonspecific marker of acute, chronic, or resolved HBV infection. It is *not* a marker of vaccine-induced immunity. It may be used in prevaccination testing to determine previous exposure to HBV infection. (It is also known as **HBcAb**, but this abbreviation is best avoided since it is often confused with other abbreviations.)

IgM anti-HBc: *IgM antibody subclass of anti-HBc.* Positivity indicates recent infection with HBV (≤6 mos). Its presence indicates acute infection.

HB_eAg: *Hepatitis B “e” antigen* is a marker of a high degree of HBV infectivity, and it correlates with a high level of HBV replication. It is primarily used to help determine the clinical management of patients with chronic HBV infection.

Anti-HBe: *Antibody to hepatitis B “e” antigen* may be present in an infected or immune person. In persons with chronic HBV infection, its presence suggests a low viral titer and a low degree of infectivity.

HBV-DNA: *HBV Deoxyribonucleic acid* is a marker of viral replication. It correlates well with infectivity. It is used to assess and monitor the treatment of patients with chronic HBV infection.

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Medical errors put infants at risk for chronic hepatitis B virus infection—five case reports

*The following five cases were reported in April 2005 by a state hepatitis B coordinator. We have suppressed the name of the state not only to protect their privacy, but to emphasize that such errors **can** and **do** happen everywhere. The cases illustrate a variety of medical errors that led to high-risk infants not receiving the recommended hepatitis B prophylaxis (0.5 mL hepatitis B vaccine and 0.5 mL hepatitis B immune globulin [HBIG] within 12 hours of birth).*

Although 90 percent of perinatal hepatitis B virus (HBV) infections can be prevented by appropriate prophylactic treatment, many newborns don't receive such prophylaxis. Infants who become infected have a 90 percent chance of developing chronic HBV infection with all its serious potential sequelae, including possible cirrhosis and liver cancer later in life.

Case Study #1

A woman known to be chronically infected with HBV delivered her third infant a month early. Unfortunately, her hepatitis B surface antigen (HBsAg) status was incorrectly recorded in her hospital record as negative. The hospital did not have a universal birth dose policy so the infant received no hepatitis B vaccine at birth. The mother assumed that the baby was vaccinated, as her other two infants had been treated appropriately. A few weeks later (at the time of the mother's original due date), the public health department contacted her to make sure the infant had been vaccinated. They discovered the mother had not been given a shot record for her newborn upon discharge, nor had vaccines ever been discussed with her at the hospital. The hospital was contacted, and it was discovered that the infant had not received *any* prophylaxis. The first dose of vaccine was immediately administered but by then, the infant was already one month old. Postvaccination serology will be done at 9–15 months of age to determine if the infant became infected.

Case Study #2

A woman in labor presented to a suburban hospital. The hospital staff found that she had not been tested for HBsAg this pregnancy because her family practice physician said she was negative two years ago so “not to worry about it.” The hospital correctly ordered a test, but did not ask the test to be done STAT and did not give the infant hepatitis B vaccine dose #1 within 12 hours of birth. The infant was discharged two days after birth; the mother's HBsAg test came back positive three days after birth. That same day, public health representatives tracked down the family and made sure the infant immediately received vaccine dose #1 and HBIG. Hepatitis B vaccine doses #2 and #3 were given according to the recommended schedule. At the time of this report, it is too early to do postvaccination serology to determine effectiveness.

Case Study #3

An infant born to an HBsAg-positive mother received HBIG at birth, but not hepatitis B vaccine. Upon investigation, it was learned that the physician forgot to write an order for the vaccine. The hospital did not have standing orders in effect for the universal hepatitis B birth dose, so the infant did not routinely receive hepatitis B vaccine. Public health staff uncovered the error when the infant was two weeks of age, and the infant was immediately vaccinated. Postvaccination serology will be done at 9–15 months of age to determine if the infant became infected.

Case Study #4

State public health department staff conducted a perinatal hepatitis B record review at a hospital that had failed a record review the prior year. One of the corrective actions recommended was to include a hard copy of the maternal HBsAg test result in the record. Upon review, the wrong hepatitis test [hepatitis B surface antibody (HBsAb), rather than hepatitis B surface antigen (HBsAg)] had been ordered in three out of the 35 records reviewed. Furthermore, this same error had been made by three different Ob/Gyn physicians. The Ob/Gyn department head was very surprised to learn of this error and immediately issued a memorandum of clarification to the physicians that HBsAg must be ordered for all pregnant women.

Case Study #5

A woman known to be chronically infected with HBV delivered her second infant five weeks prematurely. Her first infant had been prophylaxed correctly, and postvaccination serology revealed that child to be immune. The woman was tested during her current pregnancy and again found to be HBsAg positive. She was referred to a gastroenterologist who ordered further serology including hepatitis B e antigen and viral load tests. The e antigen was non-reactive, and the viral load was low (which is often the case in persons chronically infected with HBV).

The infant was born five weeks early and transferred to the NICU. The neonatologist at the NICU consulted the mother's gastroenterologist and the two decided that the infant did not need to receive hepatitis B prophylaxis, even though it was clearly documented on the hospital record that the mother was HBsAg positive. Neither HBIG nor hepatitis B vaccine was given to the infant. The hospital did not have a universal birth dose policy, so vaccine was not routinely administered.

The county health department, assuming the appropriate treatment had been given at birth, discovered this error when checking to make sure the infant was scheduled to receive a second dose of vaccine. The infant's pediatrician was not aware that the mother was chronically infected with HBV, and was very disturbed to learn that the infant received no prophylaxis at birth. The infant was immediately seen in the pediatric office and given the first dose of vaccine at two months of age. At the time of this report, it is too early to conduct postvaccination serology.

Labor & Delivery and Nursery Unit Guidelines to Prevent Hepatitis B Virus Transmission

Hepatitis B vaccine should be given to all newborns prior to discharge from the newborn nursery. That's the recommendation of the Centers for Disease Control and Prevention's (CDC) Advisory Committee on Immunization Practices, the American Academy of Pediatrics, the American Academy of Family Physicians, and the American College of Obstetricians and Gynecologists.

The following guidelines are CDC reviewed. Feel free to use them to help your hospital establish standing orders for preventing perinatal hepatitis B virus (HBV) transmission in your Labor & Delivery and Nursery Units.

Labor & Delivery Unit Guidelines

1. Upon admission, review the mother's HBsAg* lab report and place a copy of the test result onto (1) the labor and delivery record and (2) the infant's delivery record. You must examine a copy of the original lab report and not rely on the handwritten prenatal record due to the possibility of transcription error, misinterpretation of test results, or misordering of the test.
2. If the HBsAg result is not available, order the test ASAP.* Instruct the lab to call the nursery with the result ASAP.
3. Alert the nursery if the mother is HBsAg positive or if the mother's HBsAg result is unknown. These infants require immunoprophylaxis within 12 hours of birth with HepB vaccine. If the mother is HBsAg positive, give the infant HBIG as well.
4. If the woman's HBsAg test result is positive or unknown at the time of admission, notify her of the need to give immunoprophylaxis to her infant within 12 hours of birth.

Nursery Unit Guidelines

◆ Infants born to HBsAg-negative mothers

1. Give HepB vaccine (0.5 mL, IM) before discharge from the nursery.[§]
2. Give the mother an immunization record card that includes the HepB vaccination date. Remind the mother to bring this personal record card with her each time she brings her baby to the doctor or clinic.
3. Instruct the mother about the importance of her baby's completing the entire HepB vaccination series.
4. Make sure that the infant's hospital record clearly indicates the date of HepB vaccine administration and that the hospital record is always forwarded to the infant's primary care provider.

◆ Infants born to mothers with unknown HBsAg status

1. Give HepB vaccine (0.5 mL, IM) within 12 hours of birth.[§] *Do not wait for test results before giving vaccine.* (For infants weighing <2kg, see special recommendations in item 6 of this section.)
2. Give the mother an immunization record card noting HepB vaccine date and explain the need for further doses to complete the series.
3. Confirm that the lab has drawn a serum specimen from the mother for an HBsAg test, and verify when the result will be available and that it will be reported to the nursery ASAP. If the nursery does not receive the report at the expected time, call the lab for the result.
4. If the mother's HBsAg report comes back positive:
 - a. Give HBIG (0.5 mL, IM) to the infant ASAP and alert the mother's and infant's physician(s) of the test result. There is little benefit in giving HBIG if >7 days have elapsed since birth.
 - b. Follow instructions in the section **Infants born to HBsAg-positive mothers.**

5. If infant must be discharged before the HBsAg result is known:
 - a. Clearly document how to reach the parents (addresses, telephone numbers, emergency contacts) as well as the infant's primary care provider, in case further treatment is needed.
 - b. Notify the mother's and infant's doctor(s) that the HBsAg result is pending.
6. For infants weighing <2 kg, administer HepB vaccine and HBIG within 12 hours of birth. Do not count this as the first dose. Then initiate the full HepB vaccine series at 1–2 mos. of age.

◆ Infants born to HBsAg-positive mothers

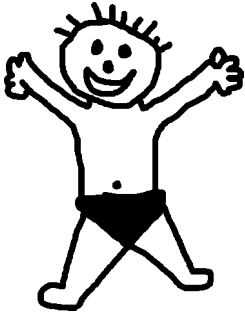
1. Give HBIG (0.5 mL, IM) and HepB vaccine (0.5 mL, IM) at separate sites within 12 hours of birth.[§] (For infants weighing <2 kg, see special recommendations in item 7 of this section.)
2. Give the mother an immunization record card that includes the dates of the HepB vaccine and HBIG, and instruct her to bring this personal record card with her each time her baby sees a provider.
3. Encourage mothers inclined to breastfeed to do so, including immediately after delivery, even if the infant has not yet been vaccinated.
4. Provide the mother with educational and written materials regarding
 - a. the importance of having her baby complete the HepB vaccination schedule on time (1–2 and 6 mos. for monovalent vaccine; 2, 4, and 12–15 mos. for Comvax; or 2, 4, and 6 mos. for Pediarix);
 - b. the importance of postvaccination testing for the infant following the HepB series to assure immunity;
 - c. the mother's need for ongoing medical follow-up for her chronic HBV infection; and
 - d. the importance of testing household members for hepatitis B and then vaccinating if susceptible.
5. Notify your local or state health department that the infant has been born and has received postexposure prophylaxis (include dates of receipt of HBIG and HepB vaccine).
6. Obtain the name, address, and phone number of the infant's primary care clinic and doctor. Notify them of the infant's birth, the receipt of postexposure prophylaxis, and the importance of additional on-time vaccination and postvaccination testing.
7. For infants weighing <2 kg, administer HepB vaccine and HBIG within 12 hours of birth. Do not count this dose as the first dose. Then initiate the full HepB vaccine series at 1–2 mos. of age.

*Be sure you order the correct test—**hepatitis B surface antigen (HBsAg)**—for your patient. Do not confuse this test result with any of the following tests:

1. Anti-HBs or HBsAb = antibody to hepatitis B surface antigen
2. Anti-HBc or HBcAb = antibody to hepatitis B core antigen

Be sure you include a copy of the original lab report with the labor and delivery record and that a copy is placed in the newborn's chart.

[§]Federal law requires that you give parents a HepB Vaccine Information Statement (VIS) prior to vaccine administration. To obtain VISs, download them from IAC's website at: www.immunize.org/vis or call the CDC-Info Contact Center at (800) 232-4636 [(800) CDC-INFO] or call your state health department.



Immunizations for Babies...

A Guide for Parents

These are the vaccinations your baby needs!

At birth	HepB
2 months	HepB + DTaP + PCV + Hib + Polio 1–4 mos ¹
4 months	HepB ² + DTaP + PCV + Hib + Polio
6 months	HepB + DTaP + PCV + Hib ³ + Polio + Influenza 6–18 mos ^{1,2} 6–18 mos ¹ 6–23 mos ⁴
12 months or older	MMR + DTaP + PCV + Hib + Chickenpox + Influenza 12–15 mos ¹ 15–18 mos ^{1,5} 12–15 mos ¹ 12–15 mos ¹ 12–18 mos ¹ 6–23 mos ⁴

Check with your doctor or nurse to make sure your baby is receiving all vaccinations on schedule. Many times vaccines are combined to reduce the number of injections. Be sure you ask for a record card with the dates of your baby's shots; bring this with you to every visit.

Here's a list of the diseases your baby will be protected against:

HepB: hepatitis B, a serious liver disease

DTaP: diphtheria, tetanus (lockjaw), and pertussis (whooping cough)

Hib: *Haemophilus influenzae* type b, a serious brain, throat, and blood infection

Polio: polio, a serious paralyzing disease

PCV: pneumococcal conjugate vaccine protects against a serious blood, lung, and brain infection

Influenza: a serious lung infection

MMR: measles, mumps, and rubella

Chickenpox: also called varicella

Footnotes to above chart (for use by healthcare professionals):

1. This is the age range in which this vaccine should be given.
2. All babies should receive a total of at least 3 doses of HepB vaccine. Babies may receive up to 4 doses when given HepB vaccine at birth followed by combination vaccines containing HepB. The last dose of HepB vaccine should not be given before 24 weeks of age.
3. Depending on the brand of Hib vaccine used for the 1st and 2nd doses, a dose at 6 months of age may not be needed.
4. All children between the ages of 6 and 23 months should receive vaccination for influenza in the fall of each year. First-time vaccinees should receive 2 doses, separated by at least 4 weeks. Children 2 years of age and older with certain medical conditions should be vaccinated every year.
5. DTaP may be given as early as 12 months if it has been 6 months since the previous dose and if the child might not return by 18 months of age.

