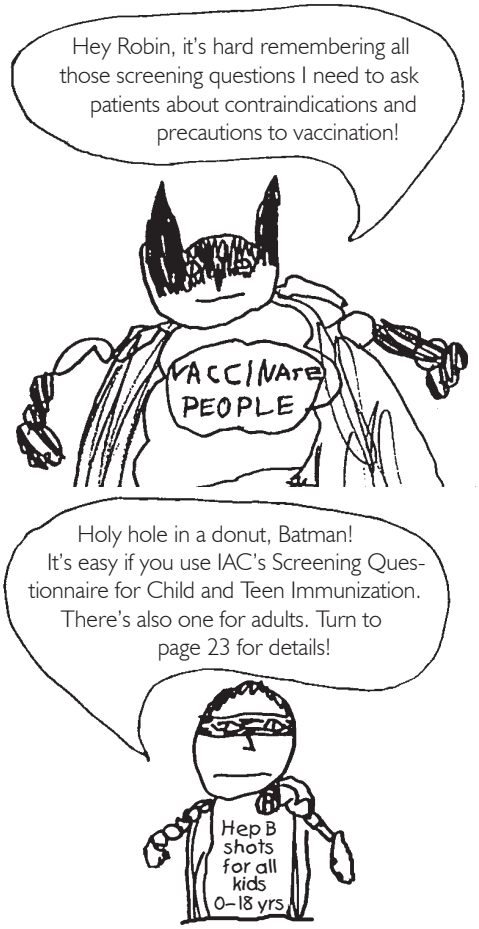
Volume 18 – Number 1

March 2008
(content current as of Feb. 18)

NEEDLE TIPS

and the Hepatitis B Coalition News

Visit www.immunize.org for up-to-date immunization information from the Immunization Action Coalition



WHAT YOU'LL FIND INSIDE:

Ask the Experts

IAC extends thanks to our experts, William L. Atkinson, MD, MPH, and Andrew T. Kroger, MD, MPH, medical epidemiologists at the National Center for Immunization and Respiratory Diseases, Centers for Disease Control and Prevention (CDC); and Joanna Buffington, MD, MPH, medical epidemiologist, Division of Viral Hepatitis (DVH), CDC; and Linda A. Moyer, RN, who until her retirement, was an epidemiologist and chief, Education and Training Team, at DVH. Currently an IAC consultant, she maintains close professional ties with CDC.

Immunization questions?

- Call the CDC-INFO Contact Center at (800) 232-4636 or (800) CDC-INFO
- Email nipinfo@cdc.gov
- Call your state health dept. (phone numbers at www.immunize.org/coordinators)

Immunization questions

Editor's note: The answer to the last question in Ask the Experts *was corrected on April 14, 2008.*

I heard that CDC has a new website for immunization. How do I access it?

The new site can be found at www.cdc.gov/vaccines. It features a new look and many more resources.

We operate an acute care hospital and commonly give vaccinations to our employees and patients. Are we required to use Vaccine Information Statements (VISs), or does that apply only to patients seen in outpatient settings?

VISs must be given to all persons, including adults, before administering any vaccine that is routinely administered to children. This includes Td, Tdap, MMR, varicella, hepatitis A, hepatitis B, influenza, and others. Current VISs are available from the CDC's website at www.cdc.gov/vaccines/pubs/vis and from the Immunization Action Coalition's (IAC) website at www.immunize.org/vis. You'll also find many VIS translations on IAC's site.

When using VISs and providing vaccines, is a parent/guardian signature required?

No. There is no federal requirement for signed consent for any dose of vaccine. The federal requirement is to provide all adult patients or parents/legal representatives of minor children with the appropriate VIS for each dose of vaccine administered. Federal law also requires that you record the date you gave the VIS to the patient or minor child's parent/legal representative and the edition date of the VIS, among other items, in the patient's medical record. Some clinics, agencies, and/or state immunization programs may have requirements for signatures. Contact information for your state health department is available at www.immunize.org/coordinators.

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Needle Tips

Online at www.immunize.org/nt
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www.izcoalitions.org

Needle Tips is a semiannual publication of the Immunization Action Coalition (IAC) written for health professionals. All content is reviewed by the Centers for Disease Control and Prevention (CDC) for technical accuracy, with the exception of opinion pieces written by non-CDC authors. This publication is supported in part by CDC Grant Nos. 5U66IP524042 and 5U50PS523259. The content is solely the responsibility of IAC and does not necessarily represent the official views of CDC. Circulation is approximately 190,000. ISSN 1526-1816.

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IAC publishes two free email news services *(IAC Express* and *Hep Express)* and three free print periodicals *(Needle Tips, Vaccinate Adults,* and *Vaccinate Women).* To subscribe to any or all of them, go to www.immunize.org/subscribe.

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; HBsAg screening for all pregnant women; testing and vaccination for high-risk groups; and education and treatment for people chronically infected with hepatitis B.

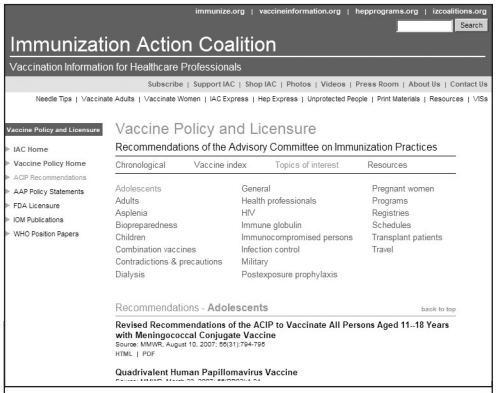
Immunization Action Coalition redesigns its online resources to benefit healthcare professionals. Visit www.immunize.org often!

With its redesign well underway, the Immunization Action Coalition's (IAC's) website for healthcare professionals offers users three new indexes of online resources:

Directory of Immunization Resources is where you'll find the practical information you need to educate patients and update staff about immunization resources. It includes everything from immunization textbooks and periodicals to telephone hotline numbers and email news services to DVDs and CD-ROMs.

Vaccine-Related Journal Articles, a chronological catalog of published articles, will link you to just the article you're looking for—in no time at all.

Vaccine Policy and Licensure is your source for vaccine recommendations and licensing information from national and international organizations such as the Centers for Disease Control and Prevention (CDC), the American Academy of Pediatrics (AAP), the World Health Organization (WHO), and the Food and Drug Administration (FDA). Details on each index follow.



www.immunize.org/vacpolicy

Directory of Immunization Resources

An online compendium, IAC's Directory of Immunization Resources brings together helpful resources from government, professional associations, nonprofit organizations, industry, and others. Directory sections include Books and Periodicals, CDC Materials, Continuing Education, Email News Services, Government Agencies, Hotlines, IAC Educational Materials, Partner Organizations, International Organizations, and Multimedia Resources. Each resource comes complete with detailed information and a live link or telephone number. To visit, go to **www.immunize.org/resources.**

We apologize for omissions to the directory. Please let us know your suggestions for additions or changes.

Vaccine-Related Journal Articles

This section offers users live links to the abstract or full text of thousands of practical, clinical, and programmatic journal articles on vaccine-related topics. Organized by topics and chronologically within topic, the section includes articles on 20 vaccine-preventable diseases; vaccination procedures and storage and handling; vaccination laws and exemptions; vaccination needs of groups such as healthcare personnel, pregnant women, and travelers; vaccine concerns such as thimerosal, autism, and MMR; and dozens of other topics. To find articles in your areas of interest go to **www.immunize.org/journalarticles.**

Vaccine Policy and Licensure

The newly expanded Vaccine Policy and Licensure web section includes vaccine recommendations, policy papers, and licensing information from CDC's Advisory Committee on Immunization Practices (ACIP), AAP, FDA, the Institute of Medicine, and WHO. To access IAC's section on policy and licensure, go to **www.immunize.org/vacpolicy.**

We urge you to take 15 minutes to check out these indexes and bookmark them. You'll find yourself returning to them often and relying on them for their easily accessible and continually updated information.

We also suggest you subscribe to our weekly email news service, ***IAC Express.*** Once you fill out the sign-up form at **www.immunize.org/subscribe**, you'll start receiving FREE email announcements about important developments related to immunization and viral hepatitis—as well as updates on IAC's latest redesigned web sections. ◆

Visit IAC's redesigned web sections!

Directory of Immunization Resources
www.immunize.org/resources

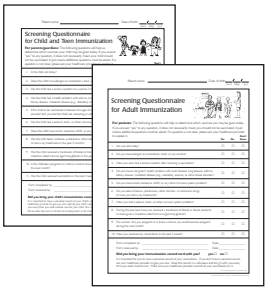
Vaccine-Related Journal Articles
www.immunize.org/journalarticles

Vaccine Policy and Licensure
www.immunize.org/vacpolicy

Stay current! Subscribe to Immunization Action Coalition's free weekly email immunization news service, IAC Express.

www.immunize.org/subscribe

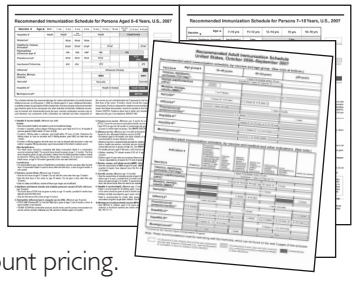
Two screening questionnaires for vaccine contraindications: Now in convenient tear-off pads of 100 sheets!



Save valuable staff time and make sure your patients are fully screened by using these simple 1-page questionnaires (one for child/teen immunization, another for adults). Patients respond to questions by checking off "yes" and "no" boxes while waiting to be seen. Staff reviews answers during the visit. These pads are priced at $16 per 100-sheet pad. Prices drop to $12 each for 2 pads, $11 each for 3 pads, $10 each for 4 pads. Keep pads at the receptionist's desk, the nurses' station, and in every exam room. To view the pads or for more details, visit IAC's website at www.immunize.org/shop.

To order, visit www.immunize.org/shop or use the order form on page 23.
For 5 or more pads, contact us for discount pricing.

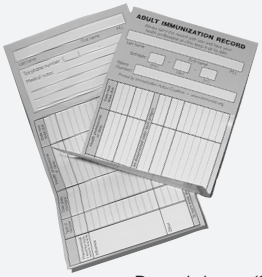
Laminated child and adult immunization schedules Order one of each for every exam room



Here are the ACIP/AAP/AAFP-approved immunization schedule for people ages 0–18 years and the ACIP/AAFP/ACOG/ACP-approved schedule for adults. Both are laminated for heavy-duty use, complete with essential footnotes, and printed in color for easy reading. The cost is $6 for each schedule and only $4 each for five or more copies. For 20 or more copies, contact us for discount pricing.

To order, visit www.immunize.org/shop, or use the order form on page 23.

Immunization record cards available for all ages— For children & teens, for adults, and for a lifetime!



Now you can give any patient a permanent vaccination record card designed specifically for their age group: child & teen, adult, or lifetime. The three cards list all vaccines recommended for each age. The cards are printed on durable rip-, smudge-, and water-proof paper. Wallet-sized when folded, the cards are brightly colored to stand out. To view the cards or for more details, go to www.immunize.org/shop and click on the images.

Buy 1 box (250 cards) for $35 (first order of a 250-card box comes with a 30-day, money-back guarantee). Discounts for larger orders: 2 boxes $32.50 each; 3 boxes $30 each; 4 boxes $27.50 each

To order, visit www.immunize.org/shop, or use the order form on page 23. To receive sample cards, email your request to admininfo@immunize.org.

Vaccine Highlights

Recommendations, schedules, and more

Editor's note: The information on these pages is current as of February 18, 2008.

The next ACIP meetings

A committee of 15 national experts, the Advisory Committee on Immunization Practices (ACIP) advises CDC on the appropriate use of vaccines. ACIP meets three times a year in Atlanta; meetings are open to the public. The next meetings will be held on June 25–26 and Oct. 22–23. For more information, including details about registration procedures, visit www.cdc.gov/vaccines/recs/acip.

ACIP recommendations

ACIP periodically issues recommendations on the use of vaccines. Clinicians who vaccinate should have a current set for reference. Published in the *Morbidity and Mortality Weekly Report (MMWR),* ACIP recommendations are easily available. Here are sources:

- Download them from links on IAC's website: www.immunize.org/acip.
- Download them from CDC's website: www.cdc.gov/vaccines/pubs/acip-list.htm.
- Call the CDC-INFO Contact Center: (800) CDC-INFO [(800) 232-4636].

Recently published ACIP recommendations:

- "Interim Recommendations for the Use of *Haemophilus influenzae* Type b (Hib) Conjugate Vaccines Related to the Recall of Certain Lots of Hib-Containing Vaccines (PedvaxHIB® and Comvax®)" (12/19/07)
- "Recommendations for Use of Quadrivalent Meningococcal Conjugate Vaccine (MCV4) in Children Aged 2–10 Years at Increased Risk for Invasive Meningococcal Disease" (12/7/07)
- "Expansion of Use of Live Attenuated Influenza Vaccine (FluMist®) to Children Aged 2–4 Years and other FluMist Changes for the 2007–08 Influenza Season" (11/23/07)
- "Update: Prevention of Hepatitis A after Exposure to Hepatitis A Virus and in International Travelers" (10/19/07)

Looking for the latest VISs and vaccine recommendations?
www.immunize.org/newreleases

Find IAC's new and updated free print materials for patients and staff.
www.immunize.org/new

Curious about recent media articles about vaccines?
www.immunize.org/vaccinenews

Immunization schedules

On Jan. 11, CDC published "Recommended Immunization Schedules for Persons Aged 0–18 Years, U.S., 2008." Issued jointly by ACIP, AAP, and AAFP, it is available in English and Spanish at www.cdc.gov/vaccines/recs/schedules/child-schedule.htm. *Needle Tips* has a reformatted English-language version on pages 11–13. To learn about or order IAC's laminated 6-page color version of the child/teen schedule, go to www.immunize.org/shop.

On Oct. 19, 2007, CDC published "Recommended Adult Immunization Schedule, U.S., Oct. 2007–Sept. 2008." Issued jointly by ACIP, AAFP, ACOG, and ACP, it is available in English and Spanish at www.cdc.gov/vaccines/recs/schedules/adult-schedule.htm. *Needle Tips* has a reformatted English-language version on pages 14–17. To learn about or order IAC's laminated 6-page color version of the adult schedule, go to www.immunize.org/shop.

VIS news

On Jan. 30, CDC published a multi-vaccine VIS. This 4-page (two pages front and back) VIS contains information on routine age 0–6 month vaccines, DTaP, hepatitis B, IPV, PCV, Hib, and rotavirus. It can be used as an alternative to the existing individual VISs when any combination of the routine vaccines is administered during the same visit, including combinations like Pediarix® or Comvax. Use of the multi-vaccine VIS is optional, and the individual VISs for these vaccines may still be used. This VIS may also be used when two or more of these vaccines are given together at other pediatric visits (e.g., 12–15 months or 4–6 years). It should not be used for vaccines given to adolescents or adults. This new VIS is available on IAC's website at www.immunize.org/vis.

CDC would appreciate hearing any feedback about the multi-vaccine VIS. Please direct your comments to nipinfo@cdc.gov.

On Jan. 28, CDC issued a revised interim meningococcal VIS to reflect the expanded recommendations and age range for which MCV4 can be used. To download the VIS, go to: www.immunize.org/vis/menin06.pdf.

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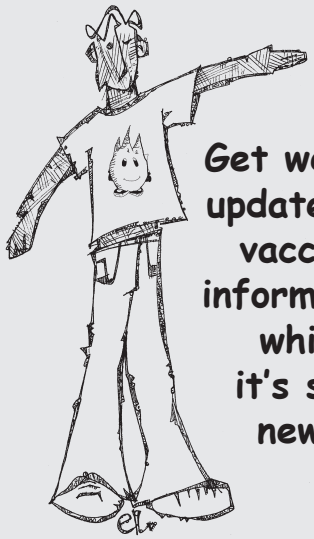

Get weekly updates on vaccine information while it's still news!

All the news we publish in "Vaccine Highlights" is sent by email to IAC Express subscribers as soon as it is released.

IAC Express is a free immunization news service. To sign up, visit

www.immunize.org/subscribe

At the same time, you can also sign up to receive other free IAC publications!

Hib news

On Dec. 19, 2007, CDC published "Interim Recommendations for the Use of *Haemophilus influenzae* Type b (Hib) Conjugate Vaccines Related to the Recall of Certain Lots of Hib-Containing Vaccines (PedvaxHIB and Comvax)." To read the complete interim recommendations for the use of Hib vaccines, go to www.cdc.gov/mmwr/PDF/wk/mm56d1219.pdf. Merck, the manufacturer of PedvaxHIB and Comvax, expects to resume distribution of these vaccines in the fourth quarter of 2008. Sanofi pasteur's Act-HIB® (monovalent Hib vaccine) and TriHIBit® (diphtheria and tetanus toxoids and acellular pertussis [DTaP]/Hib vaccine) are available and unaffected by the recall.

Influenza news

On Nov. 23, 2007, CDC published "Expansion of Use of Live Attenuated Influenza Vaccine (FluMist®) to Children Aged 2–4 Years and other FluMist Changes for the 2007–08 Influenza Season."

It includes the following information: (1) Live attenuated influenza vaccine (LAIV; nasal spray) is recommended for use in healthy children age 2 years and older. (2) LAIV should not be given to children younger than age 5 years who have a history of recurring wheezing; these children should receive trivalent inactivated influenza vaccine (TIV; injectable) instead. To read the complete recommendations, go to www.cdc.gov/mmwr/preview/mmwrhtml/mm5646a4.htm.

On Sept. 19, 2007, FDA expanded licensure for the use of FluMist to include healthy children age 2–4 years.

On Sept. 28, 2007, FDA licensed Afluria® (CSL Limited), inactivated influenza virus vaccine, for use in protecting adults age 18 years and older against influenza disease caused by influenza virus type A and type B. To view the package insert, go to www.fda.gov/cber/label/afluriaLB.pdf.

Meningococcal news

On Dec. 7, 2007, CDC published "Recommendations for Use of Quadrivalent Meningococcal Conjugate Vaccine (MCV4) in Children Aged 2–10 Years at Increased Risk for Invasive Meningococcal Disease." To read the complete recommendations, go to www.cdc.gov/mmwr/preview/mmwrhtml/mm5648a4.htm.

On Oct. 18, 2007, FDA expanded licensure for the use of Menactra® to include children ages 2–10 years. Previously, the vaccine was licensed for use in persons ages 11–55 years. To view the package insert, go to www.fda.gov/cber/label/menactraLB.pdf.

Hepatitis A and B news

On Feb.13, CDC announced that Merck & Co., Inc., are experiencing production delays for Pediatric and Adult hepatitis A vaccine (Pediatric & Adult VAQTA®). Merck has temporarily discontinued accepting orders for Pediatric VAQTA and Adult VAQTA in the vial formulation. Based on current information, it is estimated that Pediatric VAQTA will be available in early third quarter 2008 and Adult VAQTA in fourth quarter 2008. Glaxo-SmithKline (GSK) production and supply of their Pediatric and Adult hepatitis A vaccine (Pediatric & Adult Havrix®), and their Adult hepatitis A/hepatitis B combination vaccine (Twinrix®), are currently in good supply to meet demand. GSK has initiated plans to increase production of Havrix and Twinrix, to help ensure uninterrupted supply for the U.S. market. Further updates on vaccine shortages and delays can be found on www.cdc.gov/vaccines/vac-gen/shortages.

On Dec. 7, 2007, CDC published errata to the ACIP recommendations titled "A Comprehensive Immunization Strategy to Eliminate Transmission of Hepatitis B Virus Infection in the U.S.—Part 1: Immunization of Infants, Children, and Adolescents," which was published Dec. 23, 2005. To access the complete errata, go to www.cdc.gov/mmwr/preview/mmwrhtml/mm5648a6.htm.

On Oct. 19, 2007, CDC published "Update: Prevention of Hepatitis A after Exposure to Hepatitis A Virus and in International Travelers." The update delineates which age groups are recommended to receive single-antigen hepatitis A vaccine and which are to receive immune globulin in these instances: (1) for postexposure prophylaxis and (2) for international travel. To read the complete updated recommendations, go to www.cdc.gov/mmwr/preview/mmwrhtml/mm5641a3.htm. See Ask the Experts on page 22 for Q&As about these recommendations.

Varicella news

On Dec. 18, 2007, CDC announced that ProQuad® (MMRV vaccine; Oka/Merck) will not be available for shipment in 2008 because of the temporary suspension of production of varicella zoster virus (VZV) bulk, which is used to produce MMRV vaccine. For continually updated information, go to www.cdc.gov/vaccines/vac-gen/shortages.

Vaccine Storage & Handling

In Nov. 2007, CDC published a new edition of "Vaccine Management," a comprehensive document on vaccine storage and handling. To download it, go to www.cdc.gov/vaccines/pubs/downloads/bk-vac-mgt.pdf.

Current VIS dates

The use of most Vaccine Information Statements (VISs) is mandated by federal law. Listed below are the dates of the most current VISs. Check your stock of VISs against this list. If you have outdated VISs, print current ones from one of these sources: CDC's website at www.cdc.gov/vaccines/pubs/vis (has VISs in English) or IAC's website at www.immunize.org/vis (has VISs in more than 30 languages).

DTaP/DT/DTP.....5/17/07
hepatitis A.....3/21/06
hepatitis B 7/18/07
Hib 12/16/98
HPV (H. papillomavirus)...2/2/07
influenza (LAIV) ..10/4/07
influenza (TIV) 7/16/07
Japan. enceph. ..5/11/05
meningococcal.... 1/28/08
MMR.....1/15/03
Multi-vaccine VIS ...1/30/08
(for 6 vaccines given to infants/children: DTaP, IPV, Hib, Hep B, PCV, Rota)
PCV..... 9/30/02
PPV..... 7/29/97
polio 1/1/00
rabies 1/12/06
rotavirus 4/12/06
shingles..... 9/11/06
Td 6/10/94
Tdap 7/12/06
typhoid 5/19/04
varicella 1/10/07
yellow fever.....11/9/04

How's your state doing with the hepatitis B birth dose?

Editor's note: CDC, AAP, AAFP, and ACOG all recommend that the first dose of hepatitis B vaccine be administered to every newborn at birth, *prior to nursery discharge.* According to the recommendations, exceptions should only be made rarely and on a case-by-case basis*. Is your hospital following U.S. recommendations?

Estimated Vaccination Coverage for Hepatitis B Vaccine Among Children from Birth to 2 Days of Age by State, National Immunization Survey (NIS), 2006†

	% (95%CI)		% (95%CI)		% (95%CI)
Alabama	68.3 (±7.2)	Kentucky	71.5 (±6.3)	North Dakota	72.5 (±6.0)
Alaska	57.7 (±7.2)	Louisiana	57.8 (±7.2)	Ohio	63.0 (±6.3)
Arizona	67.7 (±4.6)	Maine	58.9 (±7.6)	Oklahoma	49.3 (±7.0)
Arkansas	71.8 (±8.7)	Maryland	64.8 (±6.2)	Oregon	31.9 (±6.9)
California	30.9 (±4.4)	Massachusetts	82.7 (±4.4)	Pennsylvania	55.2 (±6.3)
Colorado	39.9 (±9.0)	Michigan	78.3 (±5.0)	Rhode Island	73.5 (±5.5)
Connecticut	50.2 (±7.0)	Minnesota	14.9 (±5.1)	South Carolina	64.4 (±6.9)
Delaware	61.1 (±8.0)	Mississippi	51.9 (±7.4)	South Dakota	31.1 (±6.4)
D.C.	55.8 (±6.5)	Missouri	50.9 (±6.9)	Tennessee	31.4 (±6.2)
Florida	22.5 (±4.9)	Montana	60.6 (±6.6)	Texas	60.3 (±4.2)
Georgia	50.9 (±5.7)	Nebraska	14.2 (±4.6)	Utah	72.8 (±6.5)
Hawaii	61.2 (±7.9)	Nevada	56.3 (±7.4)	Vermont	19.4 (±6.3)
Idaho	49.9 (±8.3)	New Hampshire	61.8 (±7.5)	Virginia	26.1 (±5.9)
Illinois	50.4 (±6.3)	New Jersey	29.2 (±6.2)	Washington	70.0 (±5.1)
Indiana	64.7 (±6.4)	New Mexico	45.2 (±5.5)	West Virginia	47.2 (±7.5)
Iowa	22.0 (±6.9)	New York	27.4 (±4.8)	Wisconsin	51.1 (±6.0)
Kansas	67.0 (±5.6)	North Carolina	78.7 (±6.3)	Wyoming	38.8 (±6.6)
				U.S. Total	**48.8 (±1.1)**

*Comprehensive Immunization Strategy to Eliminate Transmission of HBV Infection in the U.S., Part 1, 12/23/05, www.cdc.gov/mmwr/PDF/rr/rr5416.pdf, page 17, column 1, bullet 1.

† Estimates presented as point estimate (%) ±95% Confidence Interval (CI). Children covered in NIS 2006 were born Jan. 2003–June 2005, www.cdc.gov/vaccines/stats-surv/nis/tables/06/tab36_hepb_birth02_2006.xls

Hepatitis B Facts: Testing and Vaccination

Who should be vaccinated?

The following persons should receive routine hepatitis B vaccination, according to the Centers for Disease Control and Prevention (CDC):

Routine vaccination:

- All newborns at birth prior to hospital discharge
- All children and teens ages 0 through 18 years
- All persons who wish to be protected from hepatitis B virus (HBV) infection. CDC states it is not necessary for the patient to disclose a risk factor to receive hepatitis B vaccine.

Persons who are at risk for sexual exposure:

- Sexually active persons who are not in long-term, mutually monogamous relationships
- Sex partners of HBsAg-positive persons
- Persons seeking evaluation or treatment for an STD
- Men who have sex with men

Persons at risk for infection by percutaneous or mucosal exposure to blood:

- Current or recent injection-drug users
- Household contacts of HBsAg-positive persons
- Residents and staff of facilities for developmentally challenged persons
- Healthcare and public safety workers with reasonably anticipated risk for exposure to blood or blood-contaminated body fluids
- Persons with end-stage renal disease and those receiving dialysis

Others:

- Travelers to areas with moderate or high rates of HBV infection
- Persons with chronic (life-long) liver disease
- Persons with HIV infection

Refugees, immigrants, and adoptees from countries where HBV infection is endemic should be screened. Adults should discuss their need or desire for hepatitis B vaccination with their healthcare providers.

For certain people at risk, postvaccination testing is recommended. Consult ACIP recommendations for details (see references).

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 (within the past 6 mos). Its presence indicates acute infection.

HBeAg: *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.

Screening before vaccination

Serologic testing prior to vaccination may be undertaken based on your assessment of your patient's level of risk and your or your patient's need for definitive information (see information in the left column). If you decide to test, draw the blood first, and then give the first dose of vaccine at the same office visit. Vaccination can then be continued, if needed, based on the results of the tests. If you are not sure who needs hepatitis B screening, consult your state or local health department.

Tests	Results	Interpretation	Vaccinate?
HBsAg anti-HBc anti-HBs	negative negative negative	susceptible	vaccinate if indicated
HBsAg anti-HBc anti-HBs	negative negative positive with ≥10mIU/mL	immune due to vaccination	no vaccination necessary
HBsAg anti-HBc anti-HBs	negative positive positive	immune due to natural infection	no vaccination necessary
HBsAg anti-HBc IgM anti-HBc anti-HBs	positive positive positive negative	acutely infected	no vaccination necessary
HBsAg anti-HBc IgM anti-HBc anti-HBs	positive positive negative negative	chronically infected	no vaccination necessary (may need treatment)
HBsAg anti-HBc anti-HBs	negative positive negative	four interpretations possible*	use clinical judgment

*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

Managing chronic HBV infection

When you identify a patient who is chronically infected with HBV, make sure you consult a specialist knowledgeable in the treatment of liver disease so your patient's care is optimized. Chronically infected persons need medical evaluation every 6–12 mos to assess the status of their liver health and their need for antiviral therapy, as well as to screen for liver cancer. In addition, persons with chronic HBV infection should be educated about their disease and how to protect others.

Household members and sex partners should be tested for HBV infection and given the first dose of hepatitis B vaccine at the same visit. (Vaccinating a person who has already been infected will do no harm). If testing indicates HBV susceptibility, complete the hepatitis B vaccination series. If testing indicates HBV infection, consultation and further care with a physician knowledgeable about chronic hepatitis B is needed.

References

1. A Comprehensive Immunization Strategy to Eliminate Transmission of Hepatitis B Virus Infection in the U.S.: Recommendations of the ACIP, Part 1: Immunization of Infants, Children and Adolescents, *MMWR,* Dec. 23, 2005, Vol. 54(RR-16)
2. A Comprehensive Immunization Strategy to Eliminate Transmission of Hepatitis B Virus Infection in the U.S.: Recommendations of the ACIP, Part II: Immunization of Adults, *MMWR,* Dec. 8, 2006, Vol. 55(RR-16)

www.immunize.org/catg.d/p2110.pdf • Item #P2110 (2/08)

Hepatitis A & B Vaccines

Be sure your patient gets the correct dose!

Recommended dosages and schedules of hepatitis A vaccines

Vaccine	Age group	Dose	Volume	# Doses	Dosing interval
Havrix (GlaxoSmithKline)	1–18 yrs	720 ELISA Units	0.5 mL	2	0, 6–12 mos
	19 yrs & older	1440 ELISA Units	1.0 mL	2	0, 6–12 mos
Vaqta (Merck)	1–18 yrs	25 Units	0.5 mL	2	0, 6–18 mos
	19 yrs & older	50 Units	1.0 mL	2	0, 6–18 mos

Recommended dosages and schedules of hepatitis B vaccines

Vaccine	Age group	Dose	Volume	# Doses	Schedule / Dosing interval
Engerix-B (GlaxoSmithKline)	0–19 yrs	10 µg	0.5 mL	3	Age: birth, 1–4, 6–18 mos Dose intervals for older children: 0, 1–2, 4 mos*
	20 yrs & older	20 µg	1.0 mL	3	Dose interval: 0, 1, 6 mos*
Recombivax HB (Merck)	0–19 yrs	5 µg	0.5 mL	3	Age: birth, 1–4, 6–18 mos Dose intervals for older children: 0, 1–2, 4 mos*
	11–15 yrs	10 µg	1.0 mL	2	Dose intervals: 0, 4–6 mos*
	20 yrs & older	10 µg	1.0 mL	3	Dose intervals: 0, 1, 6 mos*

Note: For adult dialysis patients, the Engerix-B dose required is 40µg/2.0mL (use the adult 20µg/1.0mL formulation) on a schedule of 0, 1, 2, and 6 months. For Recombivax HB, a special formulation for dialysis patients is available. The dose is 40µg/1.0mL and it is given on a schedule of 0, 1, and 6 months.

*The schedule for administering hepatitis B vaccine is flexible and can vary.

Combinations using hepatitis A and/or hepatitis B vaccines

Vaccine	Age group	Volume	# Doses	Schedule / Dosing interval
Comvax** Hib+HepB (Merck)	6 wks – 4 yrs	0.5 mL	3	Age: 2, 4, 12–15 mos
Pediarix** DTaP+HepB+IPV (GlaxoSmithKline)	6 wks – 6 yrs	0.5 mL	3	Age: 2, 4, 6 mos
Twinrix HepA+HepB (GlaxoSmithKline)	18 yrs & older	1.0 mL	3	Dose intervals: 0, 1, 6 mos
		1.0 mL	4	Dose intervals: 0, 7, 21–30 days, 12 mos.

Licensed combination vaccines may be used whenever any component of the combination is indicated and its other component(s) is not (are not) contraindicated. The use of licensed combination vaccines is preferred over separate injection of their equivalent component vaccines.

**Cannot be used for the hepatitis B vaccine birth dose and cannot be administered before age 6 weeks. Engerix-B or Recombivax HB should be used for the hepatitis B vaccine birth dose.

Sources

- Prevention of Hepatitis A Through Active or Passive Immunization: Recommendations of the ACIP, *MMWR,* May 19, 2006, Vol. 55(RR07)
- A Comprehensive Immunization Strategy to Eliminate Transmission of Hepatitis B Virus Infection in the United States: Recommendations of the ACIP, Part 1: Immunization of Infants, Children and Adolescents, *MMWR,* December 23, 2005, Vol. 54(RR-16)
- A Comprehensive Immunization Strategy to Eliminate Transmission of Hepatitis B Virus Infection in the United States: Recommendations of the ACIP, Part II: Immunization of Adults, *MMWR,* December 8, 2006, Vol. 55(RR-16)
- General Recommendations on Immunization: Recommendations of the ACIP, *MMWR,* December 1, 2006, Vol. 55(RR15)

Technical content reviewed by the Centers for Disease Control and Prevention, September 2007.

What hepatitis B vaccination question is asked over and over and over again?

Don't restart the series!

www.immunize.org/catg.d/p2081.pdf • Item #P2081 (9/07)

Vaccine Administration Record for Children and Teens

Patient name: _____

Birthdate: _____

Chart number: _____

Vaccine	Type of Vaccine[1] (generic abbreviation)	Date given (mo/day/yr)	Source (F,S,P)[2]	Site[3]	Vaccine		Vaccine Information Statement		Signature/ initials of vaccinator
					Lot #	Mfr.	Date on VIS[4]	Date given[4]	
Hepatitis B[5] (e.g., HepB, Hib-HepB, DTaP-HepB-IPV) Give IM.									
Diphtheria, Tetanus, Pertussis[5] (e.g., DTaP, DTaP-Hib, DTaP-HepB-IPV, DT, DTaP-Hib-IPV, Tdap, DTaP-IPV, Td) Give IM.									
***Haemophilus influenzae* type b[5]** (e.g., Hib, Hib-HepB, DTaP-Hib-IPV, DTaP-Hib) Give IM.									
Polio[5] (e.g., IPV, DTaP-HepB-IPV, DTaP-Hib-IPV, DTaP-IPV) Give IPV SC or IM. Give all others IM.									
Pneumococcal (e.g., PCV, conjugate; PPV, polysaccharide) Give PCV IM. Give PPV SC or IM.									
Rotavirus (Rota) Give oral (po).									
Measles, Mumps, Rubella[5] (e.g., MMR, MMRV) Give SC.									
Varicella[5] (e.g., Var, MMRV) Give SC.									
Hepatitis A (HepA) Give IM.									
Meningococcal (e.g., MCV4; MPSV4) Give MCV4 IM and MPSV4 SC.									
Human papillomavirus (e.g., HPV) Give IM.									
Influenza (e.g., TIV, inactivated; LAIV, live attenuated) Give TIV IM. Give LAIV IN.									
Other									

1. Record the generic abbreviation for the type of vaccine given (e.g., DTaP-Hib, PCV), *not* the trade name.
2. Record the source of the vaccine given as either F (Federally-supported), S (State-supported), or P (supported by Private insurance or other Private funds).
3. Record the site where vaccine was administered as either RA (Right Arm), LA (Left Arm), RT (Right Thigh), LT (Left Thigh), IN (Intranasal), or po (by mouth).
4. Record the publication date of each VIS as well as the date it is given to the patient.
5. For combination vaccines, fill in a row for each separate antigen in the combination.

Technical content reviewed by the Centers for Disease Control and Prevention, February 2008.

www.immunize.org/catg.d/p2022.pdf • Item #P2022 (2/08)

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Vaccine Administration Record for Adults

Patient name: _____

Birthdate: _____

Chart number: _____

Before administering any vaccines, give the patient copies of all pertinent Vaccine Information Statements (VISs) and make sure he/she understands the risks and benefits of the vaccine(s). Update the patient's personal record card or provide a new one whenever you administer vaccine.

Vaccine	Type of Vaccine[1] (generic abbreviation)	Date given (mo/day/yr)	Source (F,S,P)[2]	Site[3]	Vaccine		Vaccine Information Statement		Signature/ initials of vaccinator
					Lot #	Mfr.	Date on VIS[4]	Date given[4]	
Tetanus, Diphtheria, Pertussis (e.g., Td, Tdap) Give IM.									
Hepatitis A[5] (e.g., HepA, HepA-HepB) Give IM.									
Hepatitis B[5] (e.g., HepB, HepA-HepB) Give IM.									
Human papillomavirus (HPV) Give IM.									
Measles, Mumps, Rubella (MMR) Give SC.									
Varicella (Var) Give SC.									
Pneumococcal, polysaccharide (PPV) Give SC or IM.									
Meningococcal (e.g., MCV4, conjugate; MPSV4, polysaccharide) Give MCV4 IM. Give MPSV4 SC.									
Zoster (Zos) Give SC.									
Influenza (e.g., TIV, inactivated; LAIV, live, attenuated) Give TIV IM. Give LAIV IN.									
Other									
Other									

1. Record the generic abbreviation for the type of vaccine given (e.g., PPV, HepA-HepB), *not* the trade name.
2. Record the source of the vaccine given as either F (Federally-supported), S (State-supported), or P (supported by Private insurance or other Private funds).
3. Record the site where vaccine was administered as either RA (Right Arm), LA (Left Arm), RT (Right Thigh), LT (Left Thigh), IN (Intranasal).
4. Record the publication date of each VIS as well as the date it is given to the patient.
5. For combination vaccines, fill in a row for each separate antigen in the combination.

Technical content reviewed by the Centers for Disease Control and Prevention, February 2008.

www.immunize.org/catg.d/p2023.pdf • Item #P2023 (2/08)

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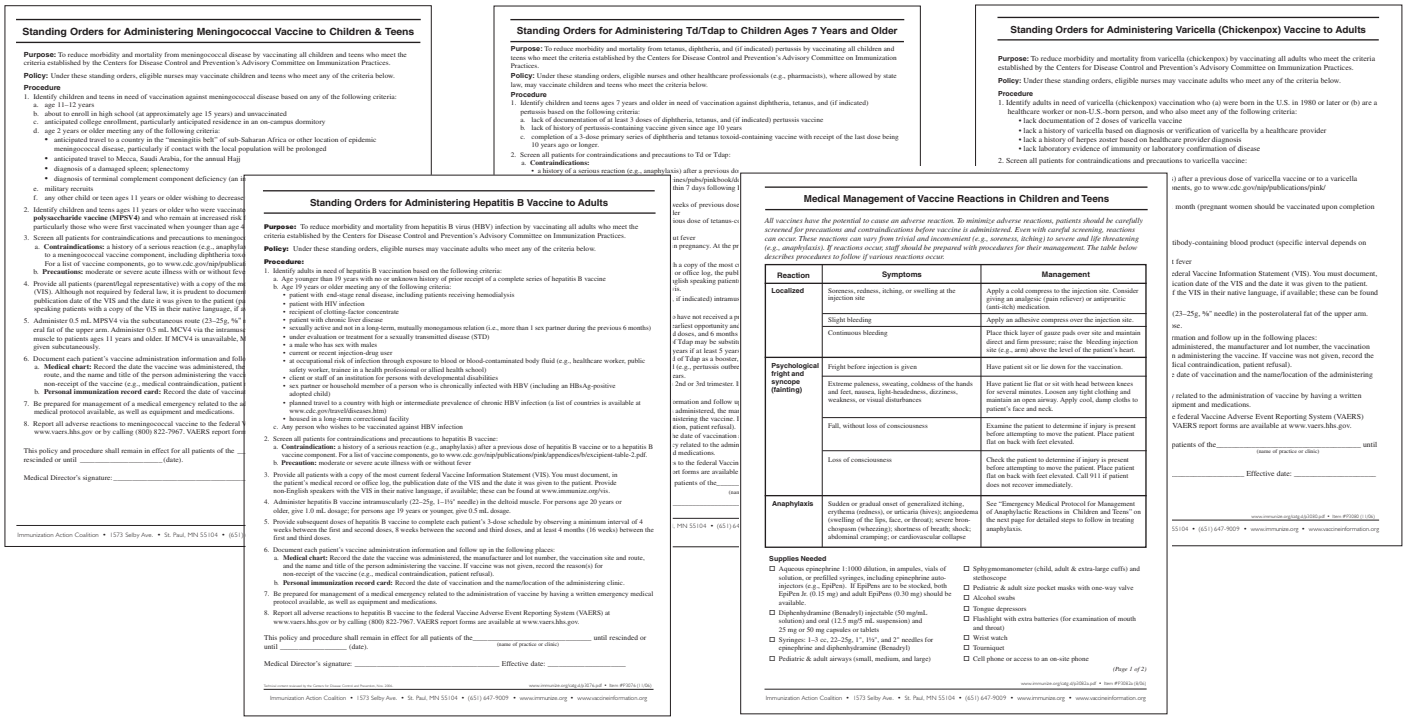
Standing orders for administering vaccines

Free and CDC-reviewed, they're ready for you to download, copy, and use!



Standing Orders for Administering Meningococcal Vaccine to Children & Teens

Purpose: To reduce morbidity and mortality from meningococcal disease by vaccinating all children and teens who meet the criteria established by the Centers for Disease Control and Prevention's Advisory Committee on Immunization Practices.

Policy: Under these standing orders, eligible nurses may vaccinate children and teens who meet any of the criteria below.

Procedure

1. Identify children and teens in need of vaccination against meningococcal disease based on any of the following criteria:
   a. age 11–12 years
   b. about to enroll in high school (at approximately age 15 years) and unvaccinated
   c. anticipated college enrollment, particularly anticipated residence in an on-campus dormitory
   d. age 2 years or older meeting any of the following criteria:
      - anticipated travel to a country in the "meningitis belt" of sub-Saharan Africa or other location of epidemic meningococcal disease, particularly if contact with the local population will be prolonged
      - anticipated travel to Mecca, Saudi Arabia, for the annual Hajj
      - diagnosis of a damaged spleen; splenectomy
      - diagnosis of terminal complement component deficiency (an i
   e. military recruits
   f. any other child or teen ages 11 years or older wishing to decrease
2. Identify children and teens ages 11 years or older who were vaccinate **polysaccharide vaccine (MPSV4)** and who remain at increased risk particularly those who were first vaccinated when younger than age
3. Screen all patients for contraindications and precautions to meningo
   a. **Contraindications:** a history of a serious reaction (e.g., anaphyla to a meningococcal vaccine component, including diphtheria toxo For a list of vaccine components, go to www.cdc.gov/nip/publica
   b. **Precautions:** moderate or severe acute illness with or without feve
4. Provide all patients (parent/legal representative) with a copy of the m (VIS). Although not required by federal law, it is prudent to documen publication date of the VIS and the date it was given to the patient (pa speaking patients with a copy of the VIS in their native language, if a
5. Administer 0.5 mL MPSV4 via the subcutaneous route (23–25g, ⅝" r eral fat of the upper arm. Administer 0.5 mL MCV4 via the intramus muscle to patients ages 11 years and older. If MCV4 is unavailable, M given subcutaneously.
6. Document each patient's vaccine administration information and follo
   a. **Medical chart:** Record the date the vaccine was administered, the route, and the name and title of the person administering the vacc non-receipt of the vaccine (e.g., medical contraindication, patient
   b. **Personal immunization record card:** Record the date of vaccina
7. Be prepared for management of a medical emergency related to the a medical protocol available, as well as equipment and medications.
8. Report all adverse reactions to meningococcal vaccine to the federal V www.vaers.hhs.gov or by calling (800) 822-7967. VAERS report form

This policy and procedure shall remain in effect for all patients of the ___ rescinded or until _____ (date).

Medical Director's signature: _____

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Standing Orders for Administering Td/Tdap to Children Ages 7 Years and Older

Purpose: To reduce morbidity and mortality from tetanus, diphtheria, and (if indicated) pertussis by vaccinating all children and teens who meet the criteria established by the Centers for Disease Control and Prevention's Advisory Committee on Immunization Practices.

Policy: Under these standing orders, eligible nurses and other healthcare professionals (e.g., pharmacists), where allowed by state law, may vaccinate children and teens who meet the criteria below.

Procedure

1. Identify children and teens ages 7 years and older in need of vaccination against diphtheria, tetanus, and (if indicated) pertussis based on the following criteria:
   a. lack of documentation of at least 3 doses of diphtheria, tetanus, and (if indicated) pertussis vaccine
   b. lack of history of pertussis-containing vaccine given since age 10 years
   c. completion of a 3-dose primary series of diphtheria and tetanus toxoid-containing vaccine with receipt of the last dose being 10 years ago or longer.
2. Screen all patients for contraindications and precautions to Td or Tdap:
   a. **Contraindications:**
      - a history of a serious reaction (e.g., anaphylaxis) after a previous do

Standing Orders for Administering Varicella (Chickenpox) Vaccine to Adults

Purpose: To reduce morbidity and mortality from varicella (chickenpox) by vaccinating all adults who meet the criteria established by the Centers for Disease Control and Prevention's Advisory Committee on Immunization Practices.

Policy: Under these standing orders, eligible nurses may vaccinate adults who meet any of the criteria below.

Procedure

1. Identify adults in need of varicella (chickenpox) vaccination who (a) were born in the U.S. in 1980 or later or (b) are a healthcare worker or non-U.S.-born person, and who also meet any of the following criteria:
   - lack documentation of 2 doses of varicella vaccine
   - lack a history of varicella based on diagnosis or verification of varicella by a healthcare provider
   - lack a history of herpes zoster based on healthcare provider diagnosis
   - lack laboratory evidence of immunity or laboratory confirmation of disease
2. Screen all patients for contraindications and precautions to varicella vaccine:

Standing Orders for Administering Hepatitis B Vaccine to Adults

Purpose: To reduce morbidity and mortality from hepatitis B virus (HBV) infection by vaccinating all adults who meet the criteria established by the Centers for Disease Control and Prevention's Advisory Committee on Immunization Practices.

Policy: Under these standing orders, eligible nurses may vaccinate adults who meet any of the criteria below.

Procedure:

1. Identify adults in need of hepatitis B vaccination based on the following criteria:
   a. Age younger than 19 years with no or unknown history of prior receipt of a complete series of hepatitis B vaccine
   b. Age 19 years or older meeting any of the following criteria:
      - patient with end–stage renal disease, including patients receiving hemodialysis
      - patient with HIV infection
      - recipient of clotting-factor concentrate
      - patient with chronic liver disease
      - sexually active and not in a long-term, mutually monogamous relation (i.e., more than 1 sex partner during the previous 6 months)
      - under evaluation or treatment for a sexually transmitted disease (STD)
      - a male who has sex with males
      - current or recent injection-drug user
      - at occupational risk of infection through exposure to blood or blood-contaminated body fluid (e.g., healthcare worker, public safety worker, trainee in a health professional or allied health school)
      - client or staff of an institution for persons with developmental disabilities
      - sex partner or household member of a person who is chronically infected with HBV (including an HBsAg-positive adopted child)
      - planned travel to a country with high or intermediate prevalence of chronic HBV infection (a list of countries is available at www.cdc.gov/travel/diseases.htm)
      - housed in a long-term correctional facility
   c. Any person who wishes to be vaccinated against HBV infection
2. Screen all patients for contraindications and precautions to hepatitis B vaccine:
   a. **Contraindication:** a history of a serious reaction (e.g., anaphylaxis) after a previous dose of hepatitis B vaccine or to a hepatitis B vaccine component. For a list of vaccine components, go to www.cdc.gov/nip/publications/pink/appendices/b/excipient-table-2.pdf.
   b. **Precaution:** moderate or severe acute illness with or without fever
3. Provide all patients with a copy of the most current federal Vaccine Information Statement (VIS). You must document, in the patient's medical record or office log, the publication date of the VIS and the date it was given to the patient. Provide non-English speakers with the VIS in their native language, if available; these can be found at www.immunize.org/vis.
4. Administer hepatitis B vaccine intramuscularly (22–25g, 1–1½" needle) in the deltoid muscle. For persons age 20 years or older, give 1.0 mL dosage; for persons age 19 years or younger, give 0.5 mL dosage.
5. Provide subsequent doses of hepatitis B vaccine to complete each patient's 3-dose schedule by observing a minimum interval of 4 weeks between the first and second doses, 8 weeks between the second and third doses, and at least 4 months (16 weeks) between the first and third doses.
6. Document each patient's vaccine administration information and follow up in the following places:
   a. **Medical chart:** Record the date the vaccine was administered, the manufacturer and lot number, the vaccination site and route, and the name and title of the person administering the vaccine. If vaccine was not given, record the reason(s) for non-receipt of the vaccine (e.g., medical contraindication, patient refusal).
   b. **Personal immunization record card:** Record the date of vaccination and the name/location of the administering clinic.
7. Be prepared for management of a medical emergency related to the administration of vaccine by having a written emergency medical protocol available, as well as equipment and medications.
8. Report all adverse reactions to hepatitis B vaccine to the federal Vaccine Adverse Event Reporting System (VAERS) at www.vaers.hhs.gov or by calling (800) 822-7967. VAERS report forms are available at www.vaers.hhs.gov.

This policy and procedure shall remain in effect for all patients of the_____ until rescinded or until _____ (date). (name of practice or clinic)

Medical Director's signature: _____ Effective date: _____

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Medical Management of Vaccine Reactions in Children and Teens

All vaccines have the potential to cause an adverse reaction. To minimize adverse reactions, patients should be carefully screened for precautions and contraindications before vaccine is administered. Even with careful screening, reactions can occur. These reactions can vary from trivial and inconvenient (e.g., soreness, itching) to severe and life threatening (e.g., anaphylaxis). If reactions occur, staff should be prepared with procedures for their management. The table below describes procedures to follow if various reactions occur.

Reaction	Symptoms	Management
Localized	Soreness, redness, itching, or swelling at the injection site	Apply a cold compress to the injection site. Consider giving an analgesic (pain reliever) or antipruritic (anti-itch) medication.
	Slight bleeding	Apply an adhesive compress over the injection site.
	Continuous bleeding	Place thick layer of gauze pads over site and maintain direct and firm pressure; raise the bleeding injection site (e.g., arm) above the level of the patient's heart.
Psychological fright and syncope (fainting)	Fright before injection is given	Have patient sit or lie down for the vaccination.
	Extreme paleness, sweating, coldness of the hands and feet, nausea, light-headedness, dizziness, weakness, or visual disturbances	Have patient lie flat or sit with head between knees for several minutes. Loosen any tight clothing and maintain an open airway. Apply cool, damp cloths to patient's face and neck.
	Fall, without loss of consciousness	Examine the patient to determine if injury is present before attempting to move the patient. Place patient flat on back with feet elevated.
	Loss of consciousness	Check the patient to determine if injury is present before attempting to move the patient. Place patient flat on back with feet elevated. Call 911 if patient does not recover immediately.
Anaphylaxis	Sudden or gradual onset of generalized itching, erythema (redness), or urticaria (hives); angioedema (swelling of the lips, face, or throat); severe bronchospasm (wheezing); shortness of breath; shock; abdominal cramping; or cardiovascular collapse	See "Emergency Medical Protocol for Management of Anaphylactic Reactions in Children and Teens" on the next page for detailed steps to follow in treating anaphylaxis.

Supplies Needed

- ☐ Aqueous epinephrine 1:1000 dilution, in ampules, vials of solution, or prefilled syringes, including epinephrine auto-injectors (e.g., EpiPen). If EpiPens are to be stocked, both EpiPen Jr. (0.15 mg) and adult EpiPens (0.30 mg) should be available.
- ☐ Diphenhydramine (Benadryl) injectable (50 mg/mL solution) and oral (12.5 mg/5 mL, suspension) and 25 mg or 50 mg capsules or tablets
- ☐ Syringes: 1–3 cc, 22–25g, 1", 1½", and 2" needles for epinephrine and diphenhydramine (Benadryl)
- ☐ Pediatric & adult airways (small, medium, and large)
- ☐ Sphygmomanometer (child, adult & extra-large cuffs) and stethoscope
- ☐ Pediatric & adult size pocket masks with one-way valve
- ☐ Alcohol swabs
- ☐ Tongue depressors
- ☐ Flashlight with extra batteries (for examination of mouth and throat)
- ☐ Wrist watch
- ☐ Tourniquet
- ☐ Cell phone or access to an on-site phone

(Page 1 of 2)

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For child and adult vaccines, visit www.immunize.org/standingorders

Vaccine	Children/Teens	Adults
Diphtheria, tetanus, acellular pertussis—DTaP	✔	
Haemophilus influenzae type b—Hib	✔	
Hepatitis A—HepA	✔	✔
Hepatitis B—HepB	✔	✔
Human papillomavirus—HPV	✔	✔
Inactivated poliovirus—IPV	✔	
Influenza, inactivated and live intranasal—TIV, LAIV	✔	✔
Measles, mumps, rubella—MMR	✔	✔
Meningococcal, conjugate and polysaccharide—MCV4, MPSV	✔	✔
Pneumococcal conjugate—PCV	✔	
Pneumococcal polysaccharide—PPV	✔	✔
Rotavirus—Rota	✔	
Tetanus-diphtheria toxoids and pertussis—Td, Tdap	✔	✔
Varicella (chickenpox)—Var	✔	✔
Zoster (shingles)—Zos		*coming soon*
Medical Management of Vaccine Reactions	✔	✔
Labor & Delivery and Nursery Orders		
Guidelines for Standing Orders in Labor & Delivery and Nursery Units to Prevent Hepatitis B Virus Transmission to Newborns	✔	

Recommended Immunization Schedule for Persons Ages 0–6 Years, U.S., 2008

For those who fall behind or start late, see the catch-up schedule.

Vaccine ▼ Age ▶	Birth	1 mo	2 mo	4 mo	6 mo	12 mo	15 mo	18 mo	19–23 mo	2–3 yrs	4–6 yrs
Hepatitis B[1]	HepB	HepB		See footnote 1	HepB						
Rotavirus[2]			Rota	Rota	Rota						
Diphtheria, Tetanus, Pertussis[3]			DTaP	DTaP	DTaP	See footnote 3	DTaP				DTaP
Haemophilus influenzae type b[4]			Hib	Hib	*Hib*[4]						
Pneumococcal[5]			PCV	PCV	PCV	PCV				PPV	
Inactivated Poliovirus			IPV	IPV	IPV						IPV
Influenza[6]					Influenza (Yearly)						
Measles, Mumps, Rubella[7]						MMR					MMR
Varicella[8]						Varicella					Vari-
Hepatitis A[9]						HepA (2 doses)				HepA Series	
Meningococcal[10]										MCV4	

Range of recommended ages

Certain high-risk groups

This schedule indicates the recommended ages for routine administration of currently licensed childhood vaccines, as of December 1, 2007, for children ages 0–6 years. Additional information is available at www.cdc.gov/vaccines/recs/schedules. Any dose not administered at the recommended age should be administered at any subsequent visit, when indicated and feasible. Additional vaccines may be licensed and recommended during the year. Licensed combination vaccines may be used whenever any components of the combination are indicated and other components of the vaccine are not contraindicated and if approved by the Food and Drug Administration for that dose of the series. Providers should consult the respective Advisory Committee on Immunization Practices statement for detailed recommendations, including for high-risk conditions: www.cdc.gov/vaccines/pubs/ACIP-list.htm. Clinically significant adverse events that follow immunization should be reported to the Vaccine Adverse Event Reporting System (VAERS). Guidance about how to obtain and complete a VAERS form is available at www.vaers.hhs.gov or by telephone, 800-822-7967.

1. Hepatitis B vaccine (HepB). *(Minimum age: birth)*

At birth:

- Give monovalent HepB to all newborns before hospital discharge.
- If mother is hepatitis B surface antigen (HBsAg)-positive, give newborn HepB and 0.5 mL of hepatitis B immune globulin (HBIG) within 12 hours of birth.
- If mother's HBsAg status is unknown, give newborn HepB within 12 hours of birth. Determine mother's HBsAg status ASAP and if HBsAg-positive, give newborn HBIG (no later than age 1 week).
- If mother is HBsAg-negative, the birth dose should only be delayed in rare cases with a provider's order and a copy of the mother's negative HBsAg laboratory report documented in the infant's medical record.

After the birth dose:

- The HepB series should be completed with either monovalent HepB or a combination vaccine containing HepB. The second dose should be given at age 1–2 months. The final dose should be given no earlier than age 24 weeks. Infants born to HBsAg-positive mothers should be tested for HBsAg and antibody to HBsAg after completion of at least 3 doses of a licensed HepB series, at age 9–18 months (generally at the next well-child visit).

4-month dose:

- It is permissible to give 4 doses of HepB when combination vaccines are given after the birth dose. If monovalent HepB is used for doses after the birth dose, a dose at age 4 months is not needed.

2. Rotavirus vaccine (Rota). *(Minimum age: 6 weeks)*

- Give the first dose at age 6–12 weeks.
- Do not start the series later than age 12 weeks.
- Give the final dose in the series by age 32 weeks. Do not give a dose later than age 32 weeks.
- Data on safety and efficacy outside of these age ranges are insufficient.

3. Diphtheria and tetanus toxoids and acellular pertussis vaccine (DTaP). *(Minimum age: 6 weeks)*

- The fourth dose of DTaP may be given as early as age 12 months, provided 6 months have elapsed since the third dose.
- Give the final dose in the series at age 4–6 years.

4. *Haemophilus influenzae* type b conjugate vaccine (Hib). *(Minimum age: 6 weeks)*

- If PRP-OMP (PedvaxHIB® or ComVax® [Merck]) is given at ages 2 and 4 months, a dose at age 6 months is not required.
- TriHIBit® (DTaP/Hib) combination products should not be used for primary immunization but can be used as boosters after any Hib vaccine in children age 12 months or older.

5. Pneumococcal vaccine. *(Minimum age: 6 weeks for pneumococcal conjugate vaccine [PCV]; 2 years for pneumococcal polysaccharide vaccine [PPV])*

- Give 1 dose of PCV to all healthy children ages 24–59 months having any incomplete schedule.
- Give PPV to children age 2 years and older with underlying medical conditions.

6. Influenza vaccine. *(Minimum age: 6 months for trivalent inactivated influenza vaccine [TIV]; 2 years for live, attenuated influenza vaccine [LAIV])*

- Give annually to children ages 6–59 months and to all eligible close contacts of children ages 0–59 months.
- Give annually to children age 5 years and older with certain risk factors, to other persons (including household members) in close contact with persons in groups at higher risk, and to any child whose parents request vaccination.
- For healthy non-pregnant persons (i.e., those who do not have underlying medical conditions that predispose them to influenza complications) ages 2–49 years, either LAIV or TIV may be used.
- Children receiving TIV should receive 0.25 mL if age 6–35 months or 0.5 mL if age 3 years or older.
- Give 2 doses (separated by 4 weeks or longer) to children younger than age 9 years who are receiving influenza vaccine for the first time or who were vaccinated for the first time last season, but only received one dose.

7. Measles, mumps, and rubella vaccine (MMR). *(Minimum age: 12 months)*

- Give the second dose of MMR at age 4–6 years. MMR may be given before age 4–6 years, provided 4 weeks or more have elapsed since the first dose and both doses are given at age 12 months or older.

8. Varicella vaccine. *(Minimum age: 12 months)*

- Give the second dose of varicella vaccine at age 4–6 years; may be given 3 months or more after first dose.
- Do not repeat second dose if given 28 days or more after first dose.

9. Hepatitis A vaccine (HepA). *(Minimum age: 12 months)*

- Give to all children age 1 year (i.e., ages 12–23 months). Give the 2 doses in the series at least 6 months apart.
- Children not fully vaccinated by age 2 years can be vaccinated at subsequent visits.
- HepA is recommended for certain other groups of children, including in areas where vaccination programs target older children.

10. Meningococcal vaccine. *(Minimum age: 2 years for meningococcal conjugate vaccine [MCV4] and for meningococcal polysaccharide vaccine[MPSV4])*

- Give MCV4 to children ages 2–10 years with terminal complement deficiencies or anatomic or functional asplenia and certain other high-risk groups. MPSV4 also is acceptable.
- Give MCV4 to persons who received MPSV4 3 or more years previously and remain at increased risk for meningococcal disease.

Recommended Immunization Schedule for Persons Ages 7–18 Years, U.S., 2008

For those who fall behind or start late, see the gray bars and the catch-up schedule.

Vaccine ▼ / Age ►	7–10 yrs	11–12 yrs	13–18 yrs
Tetanus, Diphtheria, Pertussis[1]	*See footnote 1*	Tdap	Tdap
Human Papillomavirus[2]	*See footnote 2*	HPV (3 doses)	HPV Series
Meningococcal[3]	MCV4	MCV4	MCV4
Pneumococcal[4]	PPV		
Influenza[5]	Influenza (Yearly)		
Hepatitis A[6]	HepA Series		
Hepatitis B[7]	HepB Series		
Inactivated Poliovirus[8]	IPV Series		
Measles, Mumps, Rubella[9]	MMR Series		
Varicella[10]	Varicella Series		

Range of recommended ages

Catch-up immunization

Certain high-risk groups

This schedule indicates the recommended ages for routine administration of currently licensed childhood vaccines, as of December 1, 2007, for children ages 7–18 years. Additional information is available at www.cdc.gov/vaccines/recs/schedules. Any dose not administered at the recommended age should be administered at any subsequent visit, when indicated and feasible. Additional vaccines may be licensed and recommended during the year. Licensed combination vaccines may be used whenever any components of the combination are indicated and other components of the vaccine are not contraindicated and if approved by the Food and Drug Administration for that dose of the series. Providers should consult the respective Advisory Committee on Immunization Practices statement for detailed recommendations, including for high-risk conditions: www.cdc.gov/vaccines/pubs/acip-list.htm. Clinically significant adverse events that follow immunization should be reported to the Vaccine Adverse Event Reporting System (VAERS). Guidance about how to obtain and complete a VAERS form is available at www.vaers.hhs.gov or by telephone, 800-822-7967.

1. Tetanus and diphtheria toxoids and acellular pertussis vaccine (Tdap). *(Minimum age: 10 years for BOOSTRIX® and 11 years for ADACEL™)*
- Give at age 11–12 years for those who have completed the recommended childhood DTP/DTaP vaccination series and have not received a tetanus and diphtheria toxoids (Td) booster dose.
- Adolescents ages 13–18 years who missed the 11–12 year Tdap dose or received Td only are encouraged to receive 1 dose of Tdap 5 years after the last Td/DTaP dose.

2. Human papillomavirus vaccine (HPV). *(Minimum age: 9 years)*
- Give the first dose of the HPV vaccine series to females at age 11–12 years.
- Give the second dose 2 months after the first dose and the third dose 6 months after the first dose.
- Give the HPV vaccine series to females at age 13–18 years if not previously vaccinated.

3. Meningococcal vaccine.
- Give meningococcal conjugate vaccine (MCV4) at age 11–12 years and at age 13–18 years if not previously vaccinated. Meningococcal polysaccharide vaccine (MPSV4) is an acceptable alternative.
- Give MCV4 to previously unvaccinated college freshmen living in dormitories.
- MCV4 is recommended for children ages 2–10 years with terminal complement deficiencies or anatomic or functional asplenia and certain other groups at high risk.
- Persons who received MPSV4 3 or more years previously and remain at increased risk for meningococcal disease should be vaccinated with MCV4.

4. Pneumococcal polysaccharide vaccine (PPV).
- Give PPV to certain groups at high risk.

5. Influenza vaccine.
- Give annually to all close contacts of children ages 0–59 months.
- Give annually to persons with certain risk factors, healthcare workers, and other persons (including household members) in close contact with persons in groups at higher risk.
- Give 2 doses (separated by 4 weeks or longer) to children younger than age 9 years who are receiving influenza vaccine for the first time or who were vaccinated for the first time last season but only received 1 dose.
- For healthy nonpregnant persons (i.e., those who do not have underlying medical conditions that predispose them to influenza complications) ages 2–49 years, either LAIV or TIV may be used.

6. Hepatitis A vaccine (HepA).
- Give the 2 doses in the series at least 6 months apart.
- HepA is recommended for certain other groups of children, including in areas where vaccination programs target older children.

7. Hepatitis B vaccine (HepB).
- Give the 3-dose series to those who were not previously vaccinated.
- A 2-dose series of Recombivax HB® is licensed for children ages 11–15 years.

8. Inactivated poliovirus vaccine (IPV).
- For children who received an all-IPV or all-oral poliovirus (OPV) series, a fourth dose is not necessary if the third dose was given at age 4 years or older.
- If both OPV and IPV were given as part of a series, a total of 4 doses should be given, regardless of the child's current age.

9. Measles, mumps, and rubella vaccine (MMR).
- If not previously vaccinated, give 2 doses of MMR during any visit, with 4 or more weeks between the doses.

10. Varicella vaccine.
- For persons younger than age 13 years without evidence of immunity, give 2 doses of varicella vaccine at least 3 months apart. Do not repeat the second dose, if given 28 or more days following the first dose.
- For persons age 13 years or older without evidence of immunity, give 2 doses of varicella vaccine at least 4 weeks apart.

The Recommended Immunization Schedules for Persons Ages 0–18 Years are approved by the Advisory Committee on Immunization Practices (www.cdc.gov/vaccines/recs/acip), the American Academy of Pediatrics (www.aap.org), and the American Academy of Family Physicians (www.aafp.org).

Information about reporting reactions after immunization is available online at www.vaers.hhs.gov or by telephone via the 24-hour national toll-free information line 800-822-7967. Suspected cases of vaccine-preventable diseases should be reported to the state or local health department. Additional information, including precautions and contraindications for immunization, is available from the National Center for Immunization and Respiratory Diseases at www.cdc.gov/vaccines or telephone, 800-CDC-INFO (800-232-4636).

Catch-up Immunization Schedule for Persons Ages 4 Months – 18 Years Who Start Late or Who Are More Than 1 Month Behind, United States, 2008

The table below provides catch-up schedules and minimum intervals between doses for children whose vaccinations have been delayed. A vaccine series does not need to be restarted, regardless of the time that has elapsed between doses. Use the section appropriate for the child's age.

Vaccine	Minimum Age for Dose 1	Minimum Interval Between Doses			
		Dose 1 to Dose 2	Dose 2 to Dose 3	Dose 3 to Dose 4	Dose 4 to Dose 5
Catch-up schedule for persons ages 4 months – 6 years					
Hepatitis B[1]	Birth	4 weeks	**8 weeks** (and 16 wks after first dose)		
Rotavirus[2]	6 wks	4 weeks	4 weeks		
Diphtheria, Tetanus, Pertussis[3]	6 wks	4 weeks	4 weeks	6 months	6 months[3]
Haemophilus influenzae type b[4]	6 wks	**4 weeks** if first dose given before age 12 mos **8 weeks (as final dose)** if first dose given at age 12–14 mos **No further doses needed** if first dose given at age 15 mos or older	**4 weeks**[4] if current age younger than age 12 mos **8 weeks (as final dose)**[4] if current age 12 mos or older and second dose given before age 15 mos **No further doses needed** if previous dose given at age 15 mos or older	**8 weeks (as final dose)** This dose only necessary for children age 12 mos–5 yrs who received 3 doses before age 12 mos	
Pneumococcal[5]	6 wks	**4 weeks** if first dose given before age 12 mos **8 weeks (as final dose)** if first dose given at age 12 mos or older or current age 24–59 mos **No further doses needed** for healthy children if first dose given at age 24 mos or older	**4 weeks** if current age younger than age 12 mos **8 weeks (as final dose)** if current age 12 mos or older **No further doses needed** for healthy children if previous dose given at age 24 mos or older	**8 weeks (as final dose)** This dose only necessary for children ages 12 mos–5 years who received 3 doses before age 12 mos	
Inactivated Poliovirus[6]	6 wks	4 weeks	4 weeks	4 weeks[6]	
Measles, Mumps, Rubella[7]	12 mos	4 weeks			
Varicella[8]	12 mos	3 months			
Hepatitis A[9]	12 mos	6 months			
Catch-up schedule for persons ages 7 – 18 years					
Tetanus, Diphtheria/ Tetanus, Diphtheria, Pertussis[10]	7 yrs[10]	4 weeks	**4 weeks** if first dose given at younger than age 12 mos **6 months** if first dose given at age 12 mos or older	**6 months** if first dose given at younger than age 12 mos	
Human Papillomavirus[11]	9 yrs	4 weeks	12 weeks		
Hepatitis A[9]	12 mos	6 months			
Hepatitis B[1]	Birth	4 weeks	**8 weeks** (and 16 wks after first dose)		
Inactivated Poliovirus[6]	6 wks	4 weeks	4 weeks	4 weeks[6]	
Measles, Mumps, Rubella[7]	12 mos	4 weeks			
Varicella[8]	12 mos	**4 weeks** if first dose given at age 13 yrs or older **3 months** if first dose given at younger than age 13 yrs			

1. Hepatitis B vaccine (HepB).
- Give the 3-dose series to those who were not previously vaccinated.
- A 2-dose series of Recombivax HB® is licensed for children ages 11–15 years.

2. Rotavirus vaccine (Rota).
- Do not start the series later than age 12 weeks.
- Give the final dose in the series by age 32 weeks.
- Do not give a dose later than age 32 weeks.
- Data on safety and efficacy outside of these age ranges are insufficient.

3. Diphtheria and tetanus toxoids and acellular pertussis vaccine (DTaP).
- The fifth dose is not necessary if the fourth dose was given at age 4 years or older.
- DTaP is not indicated for persons ages 7 years or older.

4. *Haemophilus influenzae* type b conjugate vaccine (Hib).
- Vaccine is not generally recommended for children age 5 years or older.
- If current age younger than 12 months and the first 2 doses were PRP-OMP (PedvaxHIB® or ComVax® [Merck]), the third (and final) dose should be given at age 12–15 months and at least 8 weeks after the second dose.
- If first dose was given at age 7–11 months, give 2 doses separated by 4 weeks plus a booster at age 12–15 months.

5. Pneumococcal conjugate vaccine (PCV).
- Give 1 dose of PCV to all healthy children ages 24–59 months having any incomplete schedule.
- For children with underlying medical conditions, give 2 doses of PCV at least 8 weeks apart if previously received less than 3 doses or, give 1 dose of PCV if previously received 3 doses.

6. Inactivated poliovirus vaccine (IPV).
- For children who received an all-IPV or all-oral poliovirus (OPV) series, a fourth dose is not necessary if third dose was given at age 4 years or older.
- If both OPV and IPV were given as part of a series, a total of 4 doses should be given, regardless of the child's current age.
- IPV is not generally recommended for persons age 18 years or older.

7. Measles, mumps, and rubella vaccine (MMR).
- The second dose of MMR is recommended routinely at age 4–6 years but may be given earlier if desired.
- If not previously vaccinated, give 2 doses of MMR during any visit with 4 or more weeks between the doses.

8. Varicella vaccine.
- The second dose of varicella vaccine is recommended routinely at age 4–6 years but may be given earlier if desired.
- Do not repeat the second dose in persons younger than age 13 years if given 28 or more days after the first dose.

9. Hepatitis A vaccine (HepA).
- HepA is recommended for certain groups of children, including in areas where vaccination programs target older children. See *MMWR* 2006;55(No. RR-7).

10. Tetanus and diphtheria toxoids (Td) and tetanus and diphtheria toxoids and acellular pertussis vaccine (Tdap).
- Tdap should be substituted for a single dose of Td in the primary catch-up series or as a booster if age appropriate; use Td for other doses.
- A 5-year interval from the last Td dose is encouraged when Tdap is used as a booster dose. A booster (fourth) dose is needed if any of the previous doses were given at younger than age 12 months. See *MMWR* 2006;55(No. RR-3).

11. Human papillomavirus vaccine (HPV).
- Give the HPV vaccine series to females at age 13–18 years if not previously vaccinated.

Recommended Adult Immunization Schedule
United States, October 2007–September 2008

Note: These recommendations must be read with the footnotes that follow.

Figure 1. Recommended adult immunization schedule, by vaccine and age group

Vaccine ▼ / Age group ▶	19–49 years	50–64 years	≥65 years
Tetanus, diphtheria, pertussis (Td/Tdap)[1,*]	1-dose Td booster every 10 yrs; Substitute 1 dose of Tdap for Td		
Human papillomavirus (HPV)[2,*]	3 doses (females) (0,2,6 mos)		
Measles, mumps, rubella (MMR)[3,*]	1 or 2 doses	1 dose	
Varicella[4,*]	2 doses (0, 4–8 wks)		
Influenza[5,*]	1 dose annually	1 dose annually	
Pneumococcal (polysaccharide)[6,7]	1–2 doses		1 dose
Hepatitis A[8,*]	2 doses (0, 6–12 mos, or 0, 6–18 mos)		
Hepatitis B[9,*]	3 doses (0, 1–2, 4–6 mos)		
Meningococcal[10,*]	1 or more doses		
Zoster[11]		1 dose	

*Covered by the Vaccine Injury Compensation Program.

Figure 2. Vaccines that might be indicated for adults based on medical and other indications

Indication ▶ / Vaccine ▼	Pregnancy	Immunocompromising conditions (excluding human immunodeficiency virus [HIV]), medications, radiation[13]	(HIV) infection[3,12,13] CD4+ T lymphocyte count <200 cells/μL	(HIV) infection[3,12,13] CD4+ T lymphocyte count ≥200 cells/μL	Diabetes, heart disease, chronic pulmonary disease, chronic alcoholism	Asplenia[12] (including elective splenectomy and terminal complement component deficiencies)	Chronic liver disease	Kidney failure, end-stage renal disease, recipients of hemodialysis	Healthcare personnel
Tetanus, diphtheria, pertussis (Td/Tdap)[1,*]	1-dose Td booster every 10 yrs; Substitute 1 dose of Tdap for Td								
Human papillomavirus (HPV)[2,*]		3 doses for females through age 26 years (0, 2, 6 mos)							
Measles, mumps, rubella (MMR)[3,*]	Contraindicated			1 or 2 doses					
Varicella[4,*]	Contraindicated			2 doses (0, 4–8 wks)					
Influenza[5,*]	1 dose TIV annually								1 dose TIV or LAIV annually
Pneumococcal (polysaccharide)[6,7]		1–2 doses							
Hepatitis A[8,*]	2 doses (0, 6–12 mos, or 0, 6–18 mos)								
Hepatitis B[9,*]				3 doses (0, 1–2, 4–6 mos)					
Meningococcal[10,*]	1 or more doses								
Zoster[11]	Contraindicated			1 dose					

*Covered by the Vaccine Injury Compensation Program.

For all persons in this category who meet the age requirements and who lack evidence of immunity (e.g., lack documentation of vaccination or have no evidence of prior infection)

Recommended if some other risk factor is present (e.g., on the basis of medical, occupational, lifestyle, or other indications)

The recommendations in this schedule were approved by the Advisory Committee on Immunization Practices, the American Academy of Family Physicians, the American College of Obstetricians and Gynecologists, and the American College of Physicians.

These schedules indicate the recommended age groups and medical indications for routine administration of currently licensed vaccines for persons aged ≥19 years, as of October 1, 2007. Licensed combination vaccines may be used whenever any components of the combination are indicated and when the vaccine's other components are not contraindicated. For detailed recommendations on all vaccines, including those used primarily for travelers or those issued during the year, consult the manufacturers' package inserts and the complete statements from the Advisory Committee on Immunization Practices (www.cdc.gov/vaccines/pubs/acip-list.htm).

Report all clinically significant postvaccination reactions to the Vaccine Adverse Event Reporting System (VAERS). Reporting forms and instructions on filing a VAERS report are available at www.vaers.hhs.gov or by telephone, 800-822-7967.

Information on how to file a Vaccine Injury Compensation Program claim is available at www.hrsa.gov/vaccinecompensation or by telephone, 800-338-2382.To file a claim for vaccine injury, contact the U.S. Court of Federal Claims, 717 Madison Place, N.W., Washington, D.C. 20005; telephone, 202-357-6400.

Additional information about the vaccines in this schedule, extent of available data, and contraindications for vaccination is also available at www.cdc.gov/vaccines or from the CDC-INFO Contact Center at 800-CDC-INFO (800-232-4636) in English and Spanish, 24 hours a day, 7 days a week.

Use of trade names and commercial sources is for identification only and does not imply endorsement by the U.S. Department of Health and Human Services.

Footnotes

Note: Immunization recommendations from ACIP are available at www.cdc.gov/vaccines/pubs/ACIP-list.htm

1. Tetanus, diphtheria, and acellular pertussis (Td/Tdap) vaccination. Tdap should replace a single dose of Td for adults aged <65 years who have not previously received a dose of Tdap. Only one of two Tdap products (Adacel® [Sanofi Pasteur]) is licensed for use in adults.

Adults with uncertain histories of a complete primary vaccination series with diphtheria and tetanus toxoid–containing vaccines should begin or complete a primary vaccination series. A primary series for adults is 3 doses of tetanus and diphtheria toxoid-containing vaccines; administer the first 2 doses at least 4 weeks apart and the third dose 6–12 months after the second. However, Tdap can substitute for any one of the doses of Td in the 3-dose primary series. The booster dose of tetanus and diphtheria toxoid–containing vaccine should be administered to adults who have completed a primary series and if the last vaccination was received ≥10 years previously. Tdap or Td vaccine may be used, as indicated.

If the person is pregnant and received the last Td vaccination ≥10 years previously, administer Td during the second or third trimester; if the person received the last Td vaccination in <10 years, administer Tdap during the immediate postpartum period. A one-time administration of 1 dose of Tdap with an interval as short as 2 years from a previous Td vaccination is recommended for postpartum women, close contacts of infants aged <12 months, and all healthcare workers with direct patient contact. In certain situations, Td can be deferred during pregnancy and Tdap substituted in the immediate postpartum period, or Tdap can be administered instead of Td to a pregnant woman after an informed discussion with the woman.

Consult the ACIP statement for recommendations for administering Td as prophylaxis in wound management.

2. Human papillomavirus (HPV) vaccination. HPV vaccination is recommended for all females aged ≤26 years who have not completed the vaccine series. History of genital warts, abnormal Papanicolaou test, or positive HPV DNA test is not evidence of prior infection with all vaccine HPV types; HPV vaccination is still recommended for these persons.

Ideally, vaccine should be administered before potential exposure to HPV through sexual activity; however, females who are sexually active should still be vaccinated. Sexually active females who have not been infected with any of the HPV vaccine types receive the full benefit of the vaccination. Vaccination is less beneficial for females who have already been infected with one or more of the HPV vaccine types.

A complete series consists of 3 doses. The second dose should be administered 2 months after the first dose; the third dose should be administered 6 months after the first dose.

Although HPV vaccination is not specifically recommended for females with the medical indications described in Figure 2, "Vaccines that might be indicated for adults based on medical and other indications," it is not a live-virus vaccine and can be administered. However, immune response and vaccine efficacy might be less than in persons who do not have the medical indications described or who are immunocompetent.

3. Measles, mumps, rubella (MMR) vaccination. *Measles component:* adults born before 1957 can be considered immune to measles. Adults born during or after 1957 should receive ≥1 dose of MMR unless they have a medical contraindication, documentation of ≥1 dose, history of measles based on healthcare provider diagnosis, or laboratory evidence of immunity.

A second dose of MMR is recommended for adults who 1) have been recently exposed to measles or in an outbreak setting; 2) have been previously vaccinated with killed measles vaccine; 3) have been vaccinated with an unknown type of measles vaccine during 1963–1967; 4) are students in postsecondary educational institutions; 5) work in a healthcare facility, or 6) plan to travel internationally.

Mumps component: adults born before 1957 can generally be considered immune to mumps. Adults born during or after 1957 should receive 1 dose of MMR unless they have a medical contraindication, history of mumps based on healthcare provider diagnosis, or laboratory evidence of immunity.

A second dose of MMR is recommended for adults who 1) are in an age group that is affected during a mumps outbreak; 2) are students in postsecondary educational institutions; 3) work in a healthcare facility; or 4) plan to travel internationally. For unvaccinated healthcare workers born before 1957 who do not have other evidence of mumps immunity, consider administering

Footnotes (continued)

Note: Immunization recommendations from ACIP are available at www.cdc.gov/vaccines/pubs/ACIP-list.htm

1 dose on a routine basis and strongly consider administering a second dose during an outbreak.

Rubella component: administer 1 dose of MMR vaccine to women whose rubella vaccination history is unreliable or who lack laboratory evidence of immunity. For women of childbearing age, regardless of birth year, routinely determine rubella immunity and counsel women regarding congenital rubella syndrome. Women who do not have evidence of immunity should receive MMR vaccine on completion or termination of pregnancy and before discharge from the healthcare facility.

4. Varicella vaccination. All adults without evidence of immunity to varicella should receive 2 doses of single-antigen varicella vaccine unless they have a medical contraindication. Special consideration should be given to those who 1) have close contact with persons at high risk for severe disease (e.g., healthcare personnel and family contacts of immunocompromised persons) or 2) are at high risk for exposure or transmission (e.g., teachers; child care employees; residents and staff members of institutional settings, including correctional institutions; college students; military personnel; adolescents and adults living in households with children; nonpregnant women of childbearing age; and international travelers).

Evidence of immunity to varicella in adults includes any of the following: 1) documentation of 2 doses of varicella vaccine at least 4 weeks apart; 2) U.S.–born before 1980 (although for healthcare personnel and pregnant women, birth before 1980 should not be considered evidence of immunity); 3) history of varicella based on diagnosis or verification of varicella by a healthcare provider (for a patient reporting a history of or presenting with an atypical case, a mild case, or both, healthcare providers should seek either an epidemiologic link with a typical varicella case or to a laboratory-confirmed case or evidence of laboratory confirmation, if it was performed at the time of acute disease); 4) history of herpes zoster based on healthcare provider diagnosis; or 5) laboratory evidence of immunity or laboratory confirmation of disease.

Assess pregnant women for evidence of varicella immunity. Women who do not have evidence of immunity should receive the first dose of varicella vaccine upon completion or termination of pregnancy and before discharge from the healthcare facility. The second dose should be administered 4–8 weeks after the first dose.

5. Influenza vaccination: *Medical indications:* chronic disorders of the cardiovascular or pulmonary systems, including asthma; chronic metabolic diseases, including diabetes mellitus, renal or hepatic dysfunction, hemoglobinopathies, or immunosuppression (including immunosuppression caused by medications or human immunodeficiency virus [HIV]); any condition that compromises respiratory function or the handling of respiratory secretions or that can increase the risk of aspiration (e.g., cognitive dysfunction, spinal cord injury, or seizure disorder or other neuromuscular disorder); and pregnancy during the influenza season. No data exist on the risk for severe or complicated influenza disease among persons with asplenia; however, influenza is a risk factor for secondary bacterial infections that can cause severe disease among persons with asplenia.

Occupational indications: healthcare personnel and employees of long-term–care and assisted-living facilities.

Other indications: residents of nursing homes and other long-term–care and assisted-living facilities; persons likely to transmit influenza to persons at high risk (e.g., in-home household contacts and caregivers of children aged 0–59 months, or persons of all ages with high-risk conditions); and anyone who would like to be vaccinated. Healthy, nonpregnant adults aged ≤49 years without high-risk medical conditions who are not contacts of severely immunocompromised persons in special care units can receive either intranasally administered live, attenuated influenza vaccine (FluMist®) or inactivated vaccine. Other persons should receive the inactivated vaccine.

6. Pneumococcal polysaccharide vaccination. *Medical indications:* chronic pulmonary disease (excluding asthma); chronic cardiovascular diseases; diabetes mellitus; chronic liver diseases, including liver disease as a result of alcohol abuse (e.g., cirrhosis); chronic alcoholism; chronic renal failure, or nephrotic syndrome; functional or anatomic asplenia (e.g., sickle cell disease or splenectomy [if elective splenectomy is planned, vaccinate at least 2 weeks before surgery]); immunosuppressive conditions; and cochlear implants and cerebrospinal fluid leaks. Vaccinate as close to HIV diagnosis as possible.

Other indications: Alaska Natives and certain American Indian populations and residents of nursing homes or other long-term–care facilities.

7. Revaccination with pneumococcal polysaccharide vaccine. One-time revaccination after 5 years for persons with chronic renal failure or nephrotic syndrome; functional or anatomic asplenia (e.g., sickle cell disease or splenectomy); or immunosuppressive conditions. For persons aged ≥65 years, one-time revaccination if they were vaccinated ≥5 years previously and were aged <65 years at the time of primary vaccination.

8. Hepatitis A vaccination. *Medical indications:* persons with chronic liver disease and persons who receive clotting factor concentrates.

Behavioral indications: men who have sex with men and persons who use illegal drugs.

Occupational indications: persons working with hepatitis A virus (HAV)–infected primates or with HAV in a research laboratory setting.

Other indications: persons traveling to or working in countries that have high or intermediate endemicity of hepatitis A (a list of countries is available at wwwn.cdc.gov/travel/contentdiseases.aspx) and any person seeking protection from HAV infection.

Single-antigen vaccine formulations should be administered in a 2-dose schedule at either 0 and 6–12 months (Havrix®), or 0 and 6–18 months (Vaqta®). If the combined hepatitis A and hepatitis B vaccine (Twinrix®) is used, administer 3 doses at 0, 1, and 6 months.

9. Hepatitis B vaccination. *Medical indications:* persons with end-stage renal disease, including patients receiving hemodialysis; persons seeking evaluation or treatment for a sexually transmitted disease (STD); persons with HIV infection; and persons with chronic liver disease.

Occupational indications: healthcare personnel and public-safety workers who are exposed to blood or other potentially infectious body fluids.

Behavioral indications: sexually active persons who are not in a long-term, mutually monogamous relationship (e.g., persons with more than one sex partner during the previous 6 months); current or recent injection-drug users; and men who have sex with men.

Other indications: household contacts and sex partners of persons with chronic hepatitis B virus (HBV) infection; clients and staff members of institu-

Footnotes (continued)

Note: Immunization recommendations from ACIP are available at www.cdc.gov/vaccines/pubs/ACIP-list.htm

tions for persons with developmental disabilities; international travelers to countries with high or intermediate prevalence of chronic HBV infection (a list of countries is available at wwwn.cdc.gov/travel/contentdiseases.aspx); and any adult seeking protection from HBV infection.

Settings where hepatitis B vaccination is recommended for all adults: STD treatment facilities; HIV testing and treatment facilities; facilities providing drug-abuse treatment and prevention services; healthcare settings targeting services to injection-drug users or men who have sex with men; correctional facilities; end-stage renal disease programs and facilities for chronic hemodialysis patients; and institutions and nonresidential day care facilities for persons with developmental disabilities.

Special formulation indications: for adult patients receiving hemodialysis and other immunocompromised adults, 1 dose of 40 µg/mL (Recombivax HB®) or 2 doses of 20 µg/mL (Engerix-B®), administered simultaneously.

10. Meningococcal vaccination. *Medical indications:* adults with anatomic or functional asplenia or terminal complement component deficiencies.

Other indications: first-year college students living in dormitories; microbiologists who are routinely exposed to isolates of *Neisseria meningitidis;* military recruits; and persons who travel to or live in countries in which meningococcal disease is hyperendemic or epidemic (e.g., the "meningitis belt" of sub-Saharan Africa during the dry season [December–June]), particularly if their contact with local populations will be prolonged. Vaccination is required by the government of Saudi Arabia for all travelers to Mecca during the annual Hajj.

Meningococcal conjugate vaccine is preferred for adults with any of the preceding indications who are aged ≤55 years, although meningococcal polysaccharide vaccine (MPSV4) is an acceptable alternative. Revaccination after 3–5 years might be indicated for adults previously vaccinated with MPSV4 who remain at increased risk for infection (e.g., persons residing in areas in which disease is epidemic).

11. Herpes zoster vaccination. A single dose of zoster vaccine is recommended for adults ≥60 years regardless of whether they report a prior episode of herpes zoster. Persons with chronic medical conditions may be vaccinated unless a contraindication or precaution exists for their condition.

12. Selected conditions for which *Haemophilus influenzae* type b (Hib) vaccine may be used. Hib conjugate vaccines are licensed for children aged 6 weeks–71 months. No efficacy data are available on which to base a recommendation concerning use of Hib vaccine for older children and adults with the chronic conditions associated with an increased risk for Hib disease. However, studies suggest good immunogenicity in patients who have sickle cell disease, leukemia, or HIV infection or who have had splenectomies; administering vaccine to these patients is not contraindicated.

13. Immunocompromising conditions. Inactivated vaccines are generally acceptable (e.g., pneumococcal, meningococcal, influenza [trivalent inactivated influenza vaccine]) and live vaccines generally are avoided in persons with immune deficiencies or immune suppressive conditions. Information on specific conditions is available at www.cdc.gov/vaccines/pubs/acip-list.htm.

The Immunization Action Coalition created this document based on the **Recommended Adult Immunization Schedule, United States, October 2007–September 2008,** published in the *Morbidity and Mortality Weekly Report* on October 19, 2007 *(MMWR* 2007;56:Q1–Q4). This document contains indications for adult immunization based on age (see Figure 1), as well as medical condition and profession (i.e., specific guidance for vaccination of healthcare personnel; see Figure 2). It is also available as a 6-page, 8½" x 11" tri-fold booklet, containing a list of contraindications and precautions for adult immunization, and is laminated and in full color (see ordering information below).

Please note that vaccination recommendations issued by Centers for Disease Control and Prevention (CDC) after the Adult Immunization Schedule's October 2007 publication date are official even though they are not reflected in this document.

To be sure you have the most current versions of vaccination recommendations, visit the following web pages:

Official ACIP recommendations
www.cdc.gov/vaccines/pubs/acip-list.htm (alphabetical order)
www.immunize.org/acip (chronological order)

Provisional ACIP recommendations
www.cdc.gov/vaccines/recs/provisional/default.htm
www.immunize.org/acip

For other versions of CDC's adult immunization schedule,
go to www.cdc.gov/vaccines/recs/schedules/adult-schedule.htm

To order copies of the laminated, full-color tri-fold booklet described above,
visit www.immunize.org/shop, call (651) 647-9009, or email admin@immunize.org.

IAC's "Ask the Experts" team

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Which vaccines are recommended to be given postpartum to mothers of newborns before hospital discharge?

The following vaccines are recommended for new mothers before they leave the hospital: (1) women who have not previously been vaccinated with Tdap need 1 dose to protect their newborn; (2) women who did not receive influenza vaccination during pregnancy need to be vaccinated if it is still influenza vaccination season (through April); (3) women who tested susceptible to rubella on prenatal testing need MMR vaccine if they don't have a documented dose of MMR in their medical record; (4) women who are not immune to chickenpox need 2 doses of varicella vaccine, dose #1 before hospital discharge and dose #2 given 4–8 weeks after dose #1.

Where can I purchase laminated copies of CDC's child and teen immunization schedules to place in exam rooms?

IAC has created laminated versions of the child and adolescent schedule (folded to 8 ½" x 11"), as well as the adult schedule. Both can be ordered online at www.immunize.org/shop.

Sometimes I have to give 3 vaccines like Tdap, HepA, and HepB at the same visit. Can I put them in the same syringe?

No. Individual vaccines should never be mixed in the same syringe unless they are approved specifically for combined use as indicated in the package insert.

Does CDC recommend that providers observe patients for a period of time after a vaccination?

CDC recommends that providers strongly consider observing patients, particularly adolescents and young adults, for 15 minutes after vaccination, if possible, because of the slight risk of syncope. This issue is discussed on page 19 of CDC's "General Recommendations on Immunization," which is available online at www.cdc.gov/mmwr/PDF/rr/rr5515.pdf.

We often need to give MMR vaccine to large adults. Is a 25-gauge needle with a length of 5/8" sufficient for a subcutaneous injection?

Yes. A 5/8" needle is recommended for subcutaneous injections for people of all sizes.

We inadvertently gave a dose of Tdap (rather than DTaP) to a 6-year-old because the two packages looked very similar and we were in a rush. Does this Tdap dose "count" or does DTaP need to be given?

If Tdap was erroneously given to a child instead of the first, second, or third dose of DTaP, the dose does not count. The child should be revaccinated with DTaP. If Tdap was given instead of the fourth or fifth dose, the Tdap dose counts as valid. You'll be glad to know that sanofi pasteur (the manufacturer whose packages were sometimes difficult to distinguish) has changed their packaging for Daptacel® (DTaP) and Adacel® (Tdap). You should notice more distinct tabs, new package colors and vial labels, and clear use-descriptions next to the package logos. And, please remind your staff to always check and double check the vaccine vial before administering any vaccine.

After an adult has either been infected with or exposed to pertussis, is vaccination with Tdap recommended, and if so when?

Yes. Adults who have a history of pertussis disease generally should receive Tdap according to the routine recommendation. In the U.S., two Tdap products are licensed for use. Adacel (sanofi pasteur) is licensed for use in persons age 11–64 years, and Boostrix® (GlaxoSmithKline), is licensed for persons age 10–18 years. This practice is recommended because the duration of protection induced by pertussis disease is unknown (waning might begin as early as 7 years after infection) and because diagnosis of pertussis can be difficult to confirm, particularly with tests other than culture for *B. pertussis.* Administering pertussis vaccine to persons with a history of pertussis presents no theoretical risk. For details, visit CDC's published recommendations on this topic at www.cdc.gov/mmwr/PDF/rr/rr5517.pdf (pages 24–25).

If a pregnant woman got a dose of Td during pregnancy, how soon after birth can she get her postpartum dose of Tdap?

The mother is taking home an infant who is susceptible to pertussis, so she should receive Tdap during the immediate postpartum period (e.g., before discharge). There is no minimum interval between Td and Tdap.

Can a booster dose of Tdap be given to persons age 65 years and older?

No brand of Tdap is approved for persons age 65 years or older. ACIP does not recommend off-label use of Tdap for this age group. However, a clinician may choose to administer Tdap to a person age 65 years or older if both patient and clinician agree that the benefit of Tdap outweighs the risk of a local adverse event.

Please discuss the Hib vaccine recall.

On December 13, 2007, Merck & Co., Inc. announced a voluntary recall of certain lots of two *Haemophilus influenzae* type b (Hib) conjugate vaccines, PedvaxHIB® (monovalent Hib vaccine) and Comvax® (Hib/hepatitis B vaccine). Merck has suspended production of its Hib conjugate vaccines and does not expect to resume distribution of them until the fourth quarter of 2008. Two other Hib conjugate vaccines, manufactured by sanofi pasteur and unaffected by the recall, are currently licensed and available for use in the United States. They are ActHIB® (monovalent Hib vaccine) and TriHIBit® (diphtheria and tetanus toxoids and acellular pertussis [DTaP]/Hib vaccine). However, sanofi pasteur likely will not be able to immediately provide adequate Hib vaccine to fully vaccinate all children for whom the vaccine is recommended.

What are the recommendations for vaccination with Hib vaccine since the Merck products (PedvaxHIB and Comvax) have been voluntarily recalled?

CDC recommends that during this time of Hib vaccine shortage, providers should. Until further notice, and only for healthy children, defer the booster dose of Hib vaccine, which is usually given to children at age 12–15 months.

• Give age-appropriate doses (doses #1, #2, and

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If you have a website, please link to the Immunization Action Coalition's websites!

www.immunize.org
www.vaccineinformation.org

Needle Tips correction policy

The Immunization Action Coalition works tirelessly to ensure the accuracy of the information we make available. At times, however, mistakes occur. If you find an error, please notify us immediately. We publish notification of significant errors in our email announcement service ***IAC Express.*** Be sure you're signed up for this service. To subscribe, visit www.immunize.org/subscribe.

#3) to children who have not completed a primary series and need to catch up.
- Continue to vaccinate children at highest risk of Hib disease according to the routinely recommended schedule, including the booster dose. Children at highest risk include those with asplenia, sickle cell disease, HIV infection, immunodeficiency syndromes, and malignant neoplasm.
- Complete the Hib series with ActHIB or TriHIBit for children age 12–15 months who started the series with PedvaxHIB or Comvax and are at highest risk for Hib disease.
- Continue to vaccinate American Indian/Alaska Native (AI/AN) children according to the routinely recommended schedule. AI/AN children, particularly those younger than age 6 months, are at highest risk of Hib disease.

How many doses of PCV vaccine should be given to unvaccinated children age 2 years and older?

Healthy unvaccinated children ages 24 through 59 months should receive 1 dose of PCV. Children who have certain health conditions (such as sickle cell disease, anatomic or functional asplenia, or HIV or other immunosuppressive conditions) should receive 2 doses separated by 8 weeks.

Can MMR be given to HIV-infected adults?

HIV-infected adults whose CD4+ T-lymphocyte counts are 200/µliter or greater, can be vaccinated with MMR vaccine.

Should a child who has had chickenpox prior to the first birthday get the first dose of varicella vaccine at age 1 year?

If the child had confirmed varicella disease or laboratory evidence of prior disease, it is not necessary to vaccinate regardless of age at infection. If there is any doubt that the illness was actually varicella, the child should be vaccinated.

What should we do if a child younger than age 13 years was erroneously given dose #2 of varicella vaccine with only a 4-week interval after dose #1?

CDC recommends a 3-month interval between 2 doses of varicella vaccine for persons younger than age 13 years. However, if dose #2 was erroneously given with only a 28-day interval after dose #1, this does can still be counted as dose #2 according to CDC.

What is the official definition of immunity to varicella? I don't want to vaccinate people who don't need it.

CDC considers evidence of immunity to varicella to be (1) documentation of 2 doses of vaccine given no earlier than age 12 months, with at least 4 weeks between doses, (2) U.S.-born before 1980, (3) healthcare-provider diagnosis of varicella disease or verification of disease history, (4) healthcare-provider diagnosis of herpes zoster, or (5) laboratory evidence of immunity or laboratory confirmation of disease. Year of birth is not considered as evidence of immunity for healthcare personnel, immunosuppressed persons, and pregnant women.

Should I test women for varicella immunity at their first prenatal visit?

Test pregnant women who lack either (1) documentation of receipt of 2 doses of varicella vaccine or (2) healthcare-provider diagnosis or verification of varicella or herpes zoster disease. Women who are not immune should begin the 2-dose vaccination series immediately postpartum.

Do all states have varicella vaccination requirements before school entry?

No. To find out which states have laws regarding varicella vaccine requirements, go to IAC's website at www.immunize.org/laws. In 2005, CDC recommended expanding the requirements to cover students in all grade levels. Government health agencies at the state level should take necessary steps, including developing and enforcing school immunization requirements, to ensure that students at all grade levels (including college) and children in child care centers are protected against varicella and other vaccine-preventable diseases.

How is varicella transmitted and for how long is it contagious?

Chickenpox spreads from person to person by direct contact or through the air by coughing or sneezing. It is highly contagious. It can also be spread through direct contact with fluid from a blister of a person infected with chickenpox, or from direct contact with a sore from a person with shingles. People with chickenpox are infectious for at least 6–7 days after the appearance of spots and until all lesions are crusted over.

Concerning the new recommendation for a second dose of varicella vaccine, does CDC recommend that children who received 1 varicella vaccine dose 10 years ago (when they were preschool age) get a second dose now?

Yes. The current recommendation is for 2 doses regardless of age, for anyone school age and older without evidence of immunity. For everyone whose varicella immunity is based on vaccination, 2 doses of varicella vaccine are recommended.

After receiving varicella vaccine, should healthcare personnel avoid contact with immunocompromised patients?

No. This is not necessary unless the person who was vaccinated develops a rash.

Should a child or teen who received Menactra® at age 12 years receive a second dose if they will be a freshman in a college dorm?

No, at this time only 1 dose of Menactra (MCV4) is recommended. More data will likely become available within the next few years to guide recommendations on revaccination for persons who were previously vaccinated with MCV4.

A patient received human papillomavirus (HPV) vaccine before she knew she was pregnant. What should I tell her?

HPV vaccine has not been causally associated with adverse outcomes of pregnancy or adverse events to the developing fetus. However, data on vaccination during pregnancy are limited. If a woman is found to be pregnant after initiating the vaccination series, delay completion of the series until after the pregnancy. If a dose is administered during pregnancy, there is no indication for intervention. Merck, the vaccine's manufacturer, has established a registry of women who were vaccinated with HPV during pregnancy. You or your pregnant patients should report an exposure to HPV vaccine; call (800) 986-8999. More information on HPV vaccination during pregnancy is available in the package insert at www.merck.com/product/usa/pi_circulars/g/gardasil/gardasil_pi.pdf.

Can a woman who is breastfeeding receive HPV vaccine?

Yes.

Are pap smears still necessary for women who receive HPV vaccine?

Yes. Vaccinated women still need to see their healthcare provider for periodic cervical cancer screening. The vaccine does NOT provide protection against all types of HPV that cause cervical cancer, so even vaccinated women will still be at risk for some cancers from HPV.

Can HPV vaccine be co-administered with any of the other vaccines? The package insert says HPV vaccine has been studied only with hepatitis B vaccine.

HPV vaccine can be administered at the same time as any other vaccine. There are no restrictions regarding simultaneous vaccine administration.

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Correction to Ask the Experts

Originally published in *Needle Tips,* October 2007

The October 2007 issue of *Needle Tips* included an Ask the Experts Q&A about which children need 2 doses of influenza vaccine. IAC received some questions from readers about the answer. Drs. Atkinson and Kroger issued a corrected answer, which was published electronically in *IAC Express* on Nov 5, 2007. It's reprinted below.

(To make sure you always received *Needle Tips* corrections as soon as they are issued, subscribe to *IAC Express.* It's free. To sign up, go to www.immunize.org/subscribe.)

Which children need 2 doses of influenza vaccine this season?

Children age 8 years and younger who are receiving influenza vaccine (TIV or LAIV) for the first time should receive 2 vaccine doses given with a minimum interval of 4 weeks. If the child fails to get the second dose during that season, he should be given 2 doses in the next influenza vaccination season. If he fails to receive those 2 doses, he should only get 1 dose per year from that point on.

Previously, the incorrect answer read as follows:
Children age 6 months through 8 years who are receiving influenza vaccine for the first time should receive 2 vaccine doses at a 4-to-6 week interval (depending on the type of vaccine). A child younger than age 9 years who received influenza vaccine in only 1 previous season, and received only 1 dose, should receive 2 doses this season. A child who has received a total of 2 doses of influenza vaccine, either in the same or different years, should receive only 1 dose.

Is there a problem if a dose of HPV vaccine is not given within the recommended time frame? Do I need to start the series over?
No, do not restart the series. Just pick up where the patient left off and complete the series. You must observe the minimum intervals in dosing (4 weeks between HPV#1 and HPV#2, and 3 months between HPV#2 and HPV#3). There are no maximum intervals between doses in the series. The series should be completed by the woman's 27th birthday.

Is the history of an abnormal pap a contraindication to the HPV vaccine series?
No. Even a woman found to be infected with a strain of HPV that is present in the vaccine could receive protection from the other 3 strains in the vaccine.

Do women whose sexual preference is women need HPV vaccine?
Eligibility for HPV vaccine is not determined by sexual preference. The vaccine is recommended for all females age 11–12 years, and catch-up vaccination for all females age 13–26 years as long as there are no contraindications (e.g., pregnancy). Though most HPV transmission occurs with sexual intercourse, the virus can be transmitted through sexual activity that does not involve penetration. It rarely can be transmitted through non-sexual routes, e.g., mother to newborn at time of birth.

If a woman starts the series at age 26 years and will turn 27 before completing the series, should the series be accelerated, or can the vaccine be given off-label after the 27th birthday?
The series may be accelerated to be completed within 4 months using the minimal dosing intervals. In any case, the series should be completed, using either recommended or minimum intervals, even if this means that the series is completed after a woman turns 27. Doses given after the 27th birthday are off-label doses, as there are no data on efficacy for this age.

What are the recommendations for use of RotaTeq®?
RotaTeq, the rotavirus vaccine (Rota) manufactured by Merck, is recommended for routine oral administration for all infants as a 3-dose series. The usual schedule is at ages 2, 4, and 6 months. The first dose may be given as early as age 6 weeks but no later than age 12 weeks. The vaccine should not be administered to infants older than age 32 weeks, even if the 3-dose series has not been completed. A minimum interval of 4 weeks should be observed between each dose.

Would you please clarify the definition of the maximum ages for doses of rotavirus vaccine?
A child is 12 weeks old until his or her 13th-week birthday. A child is 32 weeks old until the 33rd-week birthday.

If the first dose of rotavirus vaccine is inadvertently given to a child older than age 13 weeks, should the series be continued?
Infants for whom the first dose of rotavirus vaccine was inadvertently administered off-label at age 13 weeks or older may receive the remaining 2 doses of the series at the routinely recommended intervals. Timing of the first dose should not affect the safety and efficacy of the second and third doses. Rotavirus vaccine should not be given after age 32 weeks even if the series is incomplete.

If a child has received 2 doses of rotavirus vaccine on schedule but doesn't get dose #3 by age 32 weeks, should we vaccinate or not?
An infant should not receive any rotavirus vaccine once she or he is age 33 weeks.

Our experience has been that many babies who receive RotaTeq spit a lot of it out. We know not to give them more. But how can we be sure that the little they ingest is enough?
Try to follow general guidelines for oral administration of liquid vaccines. First, give this vaccine at the beginning of the office visit, while the baby is still happy, and before you administer injections or perform other procedures. Second, make every effort to aim the dropper containing the vaccine down one side and toward the back of the child's mouth. Don't put the dropper so far back that you gag the child. You may find the following resource helpful: www.merckvaccines.com/rotateqProductPage_frmst.html. Click on "Dosage and Administration," and scroll down for an educational video on administration.

If we inadvertently give a 12-year-old child Zostavax® instead of Varivax®, what should we do?
This is a serious vaccine administration error. The event should be documented, reported to VAERS, and procedures put in place to prevent this from happening again. Zostavax vaccine contains about 14 times as much varicella vaccine virus as Varivax.

Should people who haven't had chickenpox be vaccinated with zoster vaccine?
Serologic surveys indicate that almost everyone born in the United States before 1980 has had chickenpox. As a result, there is no need to ask patients age 60 years and older for their varicella disease history or to conduct lab tests for serologic evidence of prior varicella disease. A person age 60 years or older who has no medical contraindications, is eligible for zoster vaccine regardless of their memory of having had chickenpox.

Can someone who has experienced an episode of shingles be vaccinated with the zoster vaccine?
Yes. Shingles vaccine is routinely recommended for all persons age 60 years and older who do not have contraindications.

How soon after experiencing a case of shingles can a person age 60 years or older receive zoster vaccine?
The general guideline for any vaccine is to wait until the acute stage of the illness is over and symptoms abate.

Can you give zoster vaccine to persons younger than age 60?
FDA has licensed the vaccine only for persons age 60 years and older. CDC does not recommend off-label use of zoster vaccine among persons younger than 60 years.

When reconstituted, the volume of zoster vaccine is 0.65 mL. Should 0.65 mL or 0.5 mL be administered to the patient?
The recommended dose for zoster vaccine is the fully reconstituted amount, 0.65 mL.

Is there an upper age limit for receipt of the zoster vaccine? Local providers are reluctant to give zoster vaccine to persons age 80-plus years. What educational resource do you suggest using to encourage use of zoster vaccine with older adults?
There is no upper age limit for zoster vaccine. The incidence of herpes zoster increases with age. It is known that about 50% of persons living until age 85 years will develop zoster. When the CDC recommendations are published, there will most likely be more information about the risks and incidence of zoster.

People are picking up zoster vaccine at local pharmacies and transporting it to the physician's office to be given. Should this vaccine be given?
Zoster vaccine must be stored at freezer temperature at all times. If the vaccine has been out of the freezer for more than 30 minutes, it should not be used unless a state health department or Merck has authorized its use.

What do you think about giving zoster vaccine to nursing home patients? Should healthcare personnel in nursing homes be tested to see if they have had chickenpox before taking care of someone who has received zoster vaccine?
Zoster vaccine can be administered to anyone age 60 years and older regardless of where they reside, unless they have a contraindication to vaccination. All healthcare personnel should ensure they are immune to varicella regardless of the setting in which they work and regardless of their patients' receipt of zoster vaccine.

Hepatitis B and A

I'm using a hepatitis B combination vaccine for infants. Why is a birth dose of vaccine (a total of 4 doses) recommended by ACIP, AAP, and AAFP? These infants are already receiving 3 doses of hepatitis B vaccine.

The birth dose of hepatitis B vaccine is recommended for ALL newborns according to official CDC recommendations, which became an AAP-endorsed policy statement in February 2006. According to the recommendations, delaying the first dose of hepatitis B vaccine until a time after newborn nursery discharge should only be done "on a case-by-case basis and only in rare circumstances . . ." (see www.cdc.gov/mmwr/PDF/rr/rr5416.pdf, page 17, column 1, first bullet).

The birth dose of hepatitis B vaccine is an important tool in the prevention of perinatal and early-infancy hepatitis B virus (HBV) infection. Combination vaccines containing hepatitis B antigen cannot be administered to infants prior to age 6 weeks so delaying vaccination until age 6–8 weeks or later would leave infants at risk for early exposure. Moreover, HBsAg testing of mothers does not identify all newborns who require postexposure immunoprophylaxis, as even those born to HBsAg-negative mothers may have HBsAg-positive household contacts. In addition, errors are sometimes made in ordering tests and in transcribing and interpreting test results, leading to failure to vaccinate infants born to HBsAg-positive mothers. Furthermore, reports show that even when the mother's test results were accurately recorded on the medical record, infants born to HBsAg-positive mothers are sometimes not vaccinated in the newborn nursery because the test results were not noted or acted upon.

The birth dose for every infant serves as a "safety net," preventing perinatal HBV infection among infants born to mothers who are HBsAg positive and ensures early protection beyond the perinatal period for all infants.

Infants who are HBV infected at birth have a 90% chance of becoming chronically infected, and chronically infected persons have a 25% risk of dying prematurely from liver cancer or cirrhosis.

Implementing the Hepatitis B Vaccine Birth Dose

Your views and experience are important!

Please take Immunization Action Coalition's survey at

www.immunize.org/surveybd

What is the recommended time for post-vaccination testing for infants born to HBsAg-positive mothers?

CDC published a change to its recommendations in the timing of postvaccination testing for infants born to HBsAg-positive women in the Recommended Immunization Schedule for Children and Adolescents. This recommendation appears in the footnotes of the 2008 immunization schedule and reads as follows: "Infants born to HBsAg-positive mothers should be tested for HBsAg and antibody to HBsAg after completion of at least 3 doses of a licensed HepB series, at age 9–18 months (generally at the next well-child visit)." Previously, the recommendation was to wait until after the "last" HepB dose was given to carry out postvaccination testing.

Please review the hepatitis B vaccination recommendations for preterm infants who weigh less than 2 kg, as well as for those premature infants who weigh more.

Preterm infants weighing less than 2 kg (4.4 lb) at birth have a decreased response to hepatitis B vaccine administered before age 1 month. (By age 1 month, medically stable preterm infants, regardless of initial birth weight or gestational age, have an immunologic response to hepatitis B vaccination that is comparable to that of full-term infants.)

For preterm infants weighing less than 2 kg at birth

- **If maternal HBsAg status is positive:** Give hepatitis B immune globulin (HBIG) plus hepatitis B vaccine within 12 hours of birth. Give 3 additional hepatitis B vaccine doses (with single-antigen vaccine at ages 1, 2–3, and 6 months, or hepatitis B-containing combination vaccine at ages 2, 4, and 6 months [Pediarix] or 2, 4, and 12–15 months [Comvax]. Test for HBsAg and antibody to HBsAg 1–2 months after completion of at least 3 doses of a licensed hepatitis B vaccine series (i.e., at age 9–18 months, generally at the next well-child visit). Testing should not be performed before age 9 months nor within 4 weeks of the most recent vaccine dose.
- **If maternal HBsAg status is unknown:** Give HBIG plus hepatitis B vaccine within 12 hours of birth. Be sure to test the mother's blood for HBsAg. Give 3 additional hepatitis B vaccine doses (with single-antigen vaccine at ages 1, 2–3, and 6 months, or hepatitis B-containing combination vaccine at ages 2, 4, and 6 months [Pediarix] or 2, 4, and 12–15 months [Comvax].
- **If the maternal HBsAg status is negative:** If you are certain that appropriate testing was done and the mother's test result is negative, delay the first dose of hepatitis B vaccine until age 1 month or hospital discharge. Complete the vaccine series per the recommended schedule.

For preterm infants weighing 2 kg or more at birth

For these preterm infants, follow the recommendations for full-term infants including the birth dose for all, keeping in mind the special needs of newborns whose mother's HBsAg status is positive or unknown.

In December 2007, CDC published corrections to its childhood hepatitis B vaccination recommendations; clarifications were made to the recommendations for vaccination of preterm infants. The published clarifications, which include a link to a useful table on this topic, are available at www.cdc.gov/mmwr/preview/mmwrhtml/mm5648a6.htm. The original CDC hepatitis B vaccination recommendations (which do not include the clarifications) are available at www.cdc.gov/mmwr/PDF/rr/rr5416.pdf.

It takes our hospital more than 24 hours for the lab to return the HBsAg test result on our labor and delivery patients. How should we manage infants if we don't know the HBsAg status of their mothers?

There are EIA-licensed HBsAg assays that do have a rapid turn-around; however, if you are unable to convince your lab to use such assays or if you cannot switch labs to do so, you should do the following:

- Order an HBsAg assay stat. Verify when the test result will be available and that it will be reported to the newborn nursery ASAP. If the nursery doesn't receive the report at the expected time, call the lab for the result.
- Follow the perinatal recommendations based on a mother with unknown HBsAg status. Make sure you give the first dose of single-antigen hepatitis B vaccine to infants of mothers of unknown status within 12 hours of birth. For preterm infants weighing less than 2 kg, give HBIG plus hepatitis B vaccine within 12 hours of birth. Don't wait for the HBsAg test result before proceeding with hepatitis B vaccination since ALL newborns are recommended to receive hepatitis B vaccine at birth.
- If you get a positive maternal HBsAg test result from the laboratory, give the infant HBIG as soon as possible (no later than age 7 days) and complete the vaccine series according to the schedule for infants born to HBsAg-positive mothers. If the mother's HBsAg test result is negative, follow the routine vaccination recommendations for subsequent doses.
- Communicate the infant's vaccination record (and HBIG record, if any) and the mother's HBsAg status to both the infant's and mother's healthcare professionals. Follow-up case management is critical for an infant whose mother's HBsAg test result was unknown or positive.
- Contact the perinatal hepatitis B program at your local or state health department immediately when your hospital identifies an HBsAg-positive mother or when an infant is born to an HBsAg-positive mother or a mother whose status is unknown at the time of discharge.

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I understood that the final dose of hepatitis B vaccine was to be given to infants at age 6 months or older, but now I've heard the 6 months has been changed to 24 weeks. Which is correct?

The final dose of the hepatitis B vaccine series for infants is generally recommended at age 6 months or older, but CDC considers 24 weeks to be an acceptable minimum age for the last dose.

I have some Asian and African children and teens in my practice who were born abroad. Should I test them all for hepatitis B, or just make sure they are all vaccinated?

All foreign-born persons (including immigrants, refugees, asylum seekers, and internationally adopted children) born in Asia, the Pacific Islands, Africa, and other regions with high endemicity of HBV infection should be tested for HBsAg, regardless of vaccination status. Initiating vaccination of immigrant children should not be delayed while awaiting hepatitis B test results. All persons found to be HBsAg positive should have ongoing medical management by a physician knowledgeable about hepatitis B and its complications.

When I see a patient in my practice with an STD such as chlamydia, trichomonas, or genital warts, do I need to administer hepatitis B vaccine? What if it's a pregnant woman?

Vaccinate without fail. Hepatitis B vaccine is recommended for all previously unvaccinated persons with a current or recent history of an STD. Pregnancy is not a contraindication for hepatitis B vaccination.

I understand that the hepatitis B vaccination recommendations for travel outside the U.S. changed in 2006. Would you please review what has changed?

Hepatitis B vaccination is recommended for international travel of any duration to areas that have high or intermediate levels of HBV endemicity. The previous recommendation qualified the length of stay. For specific CDC information about the travel destinations for which hepatitis B vaccination is recommended, go to wwwn.cdc.gov/travel/yellowBookCh4-HepB.aspx.

Do you have patients who are HBsAg-positive?

They need medical monitoring, including liver cancer screening; many can benefit from treatment.

The FDA licenses several medications for treatment in the United States.

Consult a liver specialist experienced in the treatment of viral hepatitis for appropriate monitoring guidelines and for help in determining which of your patients might benefit from treatment.

Who should receive hepatitis B postvaccination testing after receiving hepatitis B vaccination?

Postvaccination testing is recommended for the following groups: healthcare and public safety workers at increased risk of continued exposure to blood on the job; immune compromised persons; and needle-sharing and sex partners of HBsAg-positive persons. Testing should be performed 1–2 months after the last dose of vaccine. For infants born to HBsAg-positive mothers, postvaccination testing is recommended 1–2 months after completion of at least 3 doses of a licensed hepatitis B vaccine series (i.e., at age 9–18 months, generally at the next well-child visit). Testing should not be performed before age 9 months or within 4 weeks of the most recent vaccine dose.

What are the new recommendations for postexposure prophylaxis for hepatitis A?

The new CDC recommendations published in October 2007 (www.cdc.gov/mmwr/preview/mmwrhtml/mm5641a3.htm), state that hepatitis A vaccine is preferred over immune globulin (IG) for postexposure prophylaxis for persons age 12 months–40 years who have recently been exposed to hepatitis A virus (HAV) and who have not previously received hepatitis A vaccine. Previously, IG was preferred. Persons age 12 months–40 years should receive a single dose of single-antigen hepatitis A vaccine or immune globulin (0.02 mL/kg) as soon as possible after exposure. For persons older than 40 years, IG is preferred, although vaccine can be used if IG is unavailable. It is important to note that IG should be given within 2 weeks of exposure to HAV. IG should also be used for children younger than age 12 months, immunocompromised persons, persons who have chronic liver disease or other chronic medical conditions, and persons for whom vaccine is contraindicated. The following are situations in which postexposure treatment is indicated:

- Having close, ongoing personal contact with an HAV-infected person
- Working in or attending a child care center where hepatitis A cases are occurring
- Having common-source exposure (e.g., eating HAV-infected food in a restaurant)
- Having close contact with index patients in schools, hospitals, and work settings when an epidemiological investigation indicates that a common-source exposure has occurred.

Persons who have received a dose of hepatitis A vaccine before exposure to HAV do not need to receive a second dose of vaccine until at least 6 months following the first dose.

Because HAV infection cannot be reliably diagnosed on clinical presentation alone, serologic confirmation of HAV infection in the index patient is recommended using the IgM anti-HAV serologic test. If the index patient tests positive, postexposure treatment of sex and household contacts is recommended (as described above). Serologic screening of contacts for HAV immunity before administering postexposure prophylaxis is not recommended because screening results in delayed prophylaxis.

It is critical that you contact your local or state health department to get guidance on when or if postexposure treatment is recommended.

What are the new recommendations for vaccination of travelers to protect them from HAV infection?

Editor's note: The following answer replaces the originally published incorrect answer. The new answer was posted online August 5, 2008.

The new recommendations (www.cdc.gov/mmwr/preview/mmwrhtml/mm5641a3.htm) state that (1) hepatitis A vaccine is recommended for healthy susceptible persons ages 1 through 40 years who travel to or work in regions where hepatitis A is endemic and (2) hepatitis A vaccine should be given as soon as travel is considered, but it can be given any time prior to departure. For optimal protection, persons older than age 40 years, immunocompromised persons, and persons with diagnosed chronic liver disease or other chronic medical conditions, if departure will take place within two weeks, should also receive IG simultaneously with the first dose of hepatitis A vaccine but at a different anatomic injection site. For travelers younger than age 1 year, IG alone is recommended because hepatitis A vaccine is not licensed for use in this age group. Hepatitis A is endemic in all regions except the United States, Western Europe, New Zealand, Australia, Canada, and Japan.

How do I complete the hepatitis A vaccine series after 1 or 2 doses of Twinrix® have already been given?

Twinrix is licensed as a 3-dose series for persons age 18 years and older. If Twinrix is not available or if you choose not to use Twinrix to complete the Twinrix series, you should do the following: If 1 dose of Twinrix was given, complete the series with 2 adult doses of hepatitis B vaccine and 2 adult doses of hepatitis A vaccine. If 2 doses of Twinrix were given, complete the schedule with 1 adult dose of hepatitis A vaccine and 1 adult dose of hepatitis B vaccine.

Some of my patients who are now age 2 years never received hepatitis A vaccine. Should I vaccinate them now?

Yes. It is recommended that all children receive hepatitis A vaccine starting at age 1 year. If not administered at this time, start the vaccine at the next well-child visit.

One of our staff gave a dose of pediatric hepatitis A vaccine to an adult patient by mistake. How do we remedy this error?

Editor's note: The following answer replaces the originally published incorrect answer. The new answer was posted online April 14, 2008.

If less than a full age-appropriate dose of any vaccine is given, the dose should not be counted. The person should be revaccinated with the appropriate dose as soon as possible. ◆

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New! IAC's popular screening questionnaires for vaccine contraindications—now in convenient tear-off pads!

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250 cards/box; 1 box–$35; 2 boxes–$32.50 each; 3 boxes–$30 each; 4 boxes–$27.50 each

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Latest U.S. hepatitis B birth dose rate is less than 50%

How to increase it? Needle Tips *readers may hold the answers.*

Deborah L. Wexler, MD
IAC Executive Director

Dear Colleagues,

Many of you are intimately involved in implementing CDC's hepatitis B (hepB) birth dose recommendations. You write orders, create standing orders, develop hospital policies, administer vaccines, document vaccines given in a hospital or practice, order lab tests, provide care to newborns and postpartum women, and make sure written orders are carried out. You are the key players in the complex decision-making process that results in a newborn receiving—or not receiving—hepatitis B vaccine before hospital discharge. You are best positioned, therefore, to shed light on how it is that the U.S. birth dose rate is so low and how it might be increased.

For that reason, we have prepared a survey aimed at gathering your views on and experiences with the hepB birth dose. Our goal is to provide the immunization community with an assessment of the following: how aware you

Please fill out IAC's hepB birth dose survey at www.immunize.org/surveybd

and your colleagues are about CDC's most recent (December 2005) hepB birth dose recommendations, obstacles you have encountered in implementing them, any reasons you have for not implementing them, and actions taken in your work setting aimed at implementing or not implementing them. The survey is completely anonymous. I am hopeful that your input to this survey will help better define factors that have enabled successful implementation of the 2005 hepB birth dose recommendations and factors that present obstacles to ensuring that all newborns receive this life-protecting vaccine.

Please consider taking a few minutes to fill out the online survey at www.immunize.org/surveybd

As always, thank you so much for all you do in pursuit of widespread and effective immunization.

Deborah L. Wexler, MD

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Executive Director
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Note: If you are interested in comparing how your state ranks in delivering the birth dose, please see the table at the bottom of page 5. It shows the birth dose rates for children born between 2003 and 2005, for all 50 states, excluding CDC's major local immunization project locations. The table shows rates varying from approximately 83% to 14%. This wide span tells us, on the one hand, that high birth dose rates can be achieved, and on the other, that major impediments exist to implementing the recommendations in many places. Note that the table includes statistics gathered before the publication of the latest hepatitis B vaccination recommendations, which stress the importance of giving the birth dose before hospital discharge. Measurements of birth dose rates for the years 2006 and 2007 have not yet been published.

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