



ADULT IMMUNIZATION SCHEDULE-2011

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Each year, updated recommendations for adult immunization protocols are approved by a group of organizations that includes The Centers for Disease Control and Prevention's (CDC's) Advisory Committee on Immunization Practices (ACIP), The American Academy of Family Physicians, The American College of Obstetricians and Gynecologists, and The American College of Physicians. Figure 1 provides the recommended adult immunization schedule listed by vaccine and age group. Figure 2 includes vaccines that might be indicated for adults based on medical and other indications. Following those Figures are footnotes which should be read for each of the immunizations depicted in the Figures.

The changes in the 2011 adult immunization schedule, which I discuss below individually, are as follows:

- Recommendation for seasonal influenza vaccine for all persons 6 months and older.
- Use of Tdap (Tetanus, Diphtheria and acellular Pertussis) among persons 65 years and older.
- Removal of the reference to a specified interval between Td and Tdap vaccination.
- Addition of a routine 2-dose schedule of MCV4 (meningococcal conjugated vaccine) for certain persons at high risk for meningococcal disease.
- Clarifications in footnotes for HPV (Human Papilloma Virus), MMR (Measles, Mumps, Rubella), PPSV (Pneumococcal polysaccharide vaccine) and Hib (Haemophilus influenza type B).

SEASONAL INFLUENZA VACCINE FOR ALL PERSONS 6 MONTHS AND OLDER

Last year was the first year that the annual vaccination against influenza was recommended for all those aged 6 months and older. It is now indicated for all adults: for those under age 50 in certain categories of health, an intranasal live vaccine is available; for those over 65 a high-dose influenza vaccine is available which provides a higher level of antibody production. It is

not known yet whether this decreases the risk of flu in those who receive it, and there is an increased incidence of minor side effects such as a sore arm after that dose. Several professional societies have recently published mandatory influenza vaccine policies for healthcare workers. These societies include The American College of Physicians, The Infectious Diseases Society of America, The Society for Healthcare Epidemiology of America, and The American Academy of Pediatrics. The nearly 100 healthcare settings across the nation that have implemented mandatory influenza vaccination for healthcare workers can be found at www.immunize.org/honor-roll.

USE OF TDAP AMONG PERSONS 65 AND OLDER

In response to an increased incidence of pertussis (whooping cough) in the United States, the ACIP voted on the following new recommendations for the use of Tdap vaccine:

- Tdap can be given regardless of the interval since the last tetanus booster was given. There is NO need to wait the previous 2-5 years to administer Tdap following a dose of Td.
- Adolescents should receive a 1-time dose of Tdap (instead of Td) at the 11-12 year old visit.
- Adolescents and adults younger than age 65 years who have not received a dose of Tdap, or for whom vaccines status is unknown, should be immunized as soon as feasible (as stated above, Tdap can be administered regardless of the interval since the previous tetanus dose.)
- Adults age 65 years and older who have not previously received a dose of Tdap, and who have, or anticipate having, close contact with children younger than 12 months of age (e.g. grandparents, other relatives, child care providers, and healthcare personnel), should receive a one-time dose to protect infants as well as themselves. This again can be administered regardless of the interval since the previous Td dose.
- Other adults 65 years and older who are not in contact with an infant, and who have not previously

Recommended Adult Immunization Schedule

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Note: These recommendations *must* be read with the footnotes that follow containing number of doses, intervals between doses, and other important information.

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

VACCINE ▼	AGE GROUP▶	19–26 years	27–49 years	50–59 years	60–64 years	>65 years
Influenza ^{1,*}				1 dose annually		
Tetanus, diphtheria, pertussis (Td/Tdap) ^{2,*}				Substitute 1-time dose of Tdap for Td booster; then boost with Td every 10 yrs		Td booster every 10 yrs
Varicella ^{3,*}				2 doses		
Human papillomavirus (HPV) ^{4,*}		3 doses (females)				
Zoster ⁵					1 dose	
Measles, mumps, rubella (MMR) ^{6,*}		1 or 2 doses			1 dose	
Pneumococcal (polysaccharide) ^{7,8}			1 or 2 doses			1 dose
Meningococcal ^{9,*}			1 or more doses			
Hepatitis A ^{10,*}		2 doses				
Hepatitis B ^{11,*}		3 doses				

*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 previous infection)

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

No recommendation

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 <http://www.vaers.hhs.gov> or by telephone, 800-822-7967. Information on how to file a Vaccine Injury Compensation Program claim is available at <http://www.hrsa.gov/vaccinecompensation> or by telephone, 800-338-2382. Information about filing a claim for vaccine injury is available through 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 also is available at <http://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.

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

VACCINE ▼	INDICATION ▶	Pregnancy	Immuno-compromising conditions (excluding human immunodeficiency virus [HIV]) ^{3,5,6,13}	HIV CD4+ T lymphocyte count cells/μL	Diabetes, heart disease, chronic lung disease, chronic alcoholism	Asplenia ¹² (including elective splenectomy) and persistent complement deficiencies	Chronic liver disease	Kidney failure, end-stage renal disease, receipt of hemodialysis	Healthcare personnel
Influenza ^{1,*}				<200 cells/μL					1 dose TIV or LAIV annually
Tetanus, diphtheria, pertussis (Td/Tdap) ^{2,*}		Td	Substitute 1-time dose of Tdap for Td booster; then boost with Td every 10 yrs	≥200 cells/μL					
Varicella ^{3,*}		Contraindicated							2 doses
Human papillomavirus (HPV) ^{4,*}									3 doses through age 26 yrs
Zoster ⁵		Contraindicated							1 dose
Measles, mumps, rubella (MMR) ^{6,*}		Contraindicated							1 or 2 doses
Pneumococcal (polysaccharide) ^{7,8}									1 or 2 doses
Meningococcal ^{9,*}					1 or more doses				
Hepatitis A ^{10,*}						2 doses			
Hepatitis B ^{11,*}						3 doses			

*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 previous infection)

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

No recommendation

These schedules indicate the recommended age groups and medical indications for which administration of currently licensed vaccines is commonly indicated for adults ages 19 years and older as of February 4, 2011. For all vaccines being recommended on the adult immunization schedule, a vaccine series does not need to be restarted, regardless of the time that has elapsed between doses. 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 that are issued during the year, consult the manufacturers' package inserts and the complete statements from the Advisory Committee on Immunization Practices (<http://www.cdc.gov/vaccines/pubs/acip-list.htm>).

The recommendations in this schedule were approved by the Centers for Disease Control and Prevention's (CDC) Advisory Committee on Immunization Practices (ACIP), the American Academy of Family Physicians (AAFP), the American College of Obstetricians and Gynecologists (ACOG), and the American College of Physicians (ACP).



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received a dose of Tdap, may receive a single dose of Tdap in place of a dose of Td.

- Children ages 7-10 years who are not fully immunized against pertussis (i.e., did not complete a series of pertussis-containing vaccine before their 7th birthday) should receive a one-time dose of Tdap.

ADDITION OF A ROUTINE 2-DOSE SCHEDULE OF MCV4 FOR CERTAIN PERSONS AT HIGH RISK FOR MENINGOCOCCAL DISEASE

The ACIP also voted in October 2010 to recommend providers administer the initial dose of MCV4 to all adolescents at age 11-12 years with a booster dose at age 16 years. The peak age for meningococcal disease is 16-21 years. In 2005, the ACIP reasoned that higher MCV4 vaccination rates could be achieved if administering the dose were coupled with giving the Tdap booster dose at the 11-12 year old visit. Current data now indicate that the protection by the MCV4 wanes within five years following vaccination. For this reason, the ACIP is now recommending the booster dose at age 16 to provide protection during the peak years of vulnerability. MCV4 (meningococcal conjugated vaccine) is not approved by the FDA for people 56 years of age and older, who should instead receive meningococcal polysaccharide vaccine (MPSV4). Persons aged 2-54 years with persistent complement component deficiency or asplenia, and adolescents with HIV, should receive 2 doses of MCV4 given 2 months apart.

CLARIFICATIONS IN THE FOOTNOTES FOR HPV, MMR, PPSV, AND HIB

The human papillomavirus (HPV) vaccination with either quadrivalent vaccine (HPV4) or bivalent vaccine (HPV2) is recommended for females at age 11 or 12 years, with catch-up vaccination recommended for females age 13-26 years. Females who have not been infected with any of the virus types in the HPV vaccine should receive the full benefit of the vaccination. Those with a history of genital warts, abnormal Papanicolaou (Pap) test, or positive HPV DNA test, should still receive the vaccine because these conditions are not evidence of previous infection with ALL HPV types in the vaccine. The HPV4 vaccine may also be administered to males age 9 through 26 years of age to reduce their likelihood of genital warts and decrease spread to females. A complete series consists of three doses of vaccine. A second dose should be given one to two months after the first dose; the third dose should

be administered six months after the first dose. The HPV vaccine is not a live-virus vaccine.

MEASLES, MUMPS, RUBELLA (MMR) VACCINATION

Adults born before 1957 are considered immune to measles and mumps. All those born in 1957 or later should have documentation of one or more doses of MMR vaccine. For rubella, documentation of provider-diagnosed disease is not considered acceptable evidence of immunity. Healthcare personnel born before 1957 that were unvaccinated and lack laboratory evidence of measles, mumps and/or rubella immunity should be considered for routine immunization with two doses of MMR vaccine at the appropriate interval for measles and mumps and 1 dose of MMR vaccine for rubella. It is recommended that those not previously immunized nor with laboratory evidence of the disease receive two doses of MMR vaccine during an outbreak of measles or mumps, and one during an outbreak of rubella.

PNEUMOCOCCAL POLYSACCHARIDE (PPSV) VACCINATION

Medical indications now include chronic lung disease (including asthma), chronic cardiovascular diseases, diabetes mellitus, chronic liver diseases, cirrhosis, chronic alcoholism, functional or anatomic asplenia, immunocompromising conditions (including chronic renal failure or nephrotic syndrome), cochlear implants and cerebrospinal fluid leaks. It is also recommended to promptly vaccinate those who become HIV positive. Others who should be vaccinated with PPSV include residents of nursing homes and persons who smoke. Revaccination with PPSV is recommended for those age 65 and older if they were vaccinated five or more years previously and were aged less than 65 years at the time of the primary vaccination.

HIB VACCINE

One dose of Hib vaccine should be given to persons who have sickle cell disease, leukemia, or HIV infection or who have had a splenectomy, if they have not had previous Hib vaccine.

ZOSTER (SHINGLES) VACCINE

The official ACIP recommendation is for a single dose of Zoster vaccine for those 60 years of age or older, whether or not they have had a prior episode of Herpes zoster. Recurrent cases of shingles can occur, although many times this is felt to be confused with

the diagnosis of Herpes simplex virus-mediated zosteriform simplex. This can be confirmed by laboratory testing but is infrequently done. Pneumococcal vaccine should not be administered at the same time as zoster vaccine, as the response may be blunted.

It is estimated that one episode of Herpes zoster would be prevented for every 71 patients vaccinated. From 10% to 30% of people develop shingles during their lifetime, and as many as 50% of people who live to age 85 will have shingles at some point in their life. Twenty percent of patients with shingles develop post herpetic neuralgia. Anti-viral therapy reduces the

severity and duration of an episode of shingles but does not prevent post herpetic neuralgia.

Other general recommendation updates by the ACIP have been published recently in the *Morbidity and Mortality Weekly Report*. Major revisions since 2006 include: new tables of precautions and contraindications to vaccination; conditions that may be mistaken for contraindications (e.g., diarrhea, minor upper respiratory-tract illness with or without fever, and current antibiotic therapy); new advice for vaccinating patients who have received a hematopoietic cell transplant; and updated storage recommendations.

NOTES

1. INFLUENZA VACCINATION

Annual vaccination against influenza is recommended for all persons aged 6 months and older, including all adults. Healthy, nonpregnant adults aged less than 50 years without high-risk medical conditions can receive either intranasally administered live, attenuated influenza vaccine (FluMist), or inactivated vaccine. Other persons should receive the inactivated vaccine. Adults aged 65 years and older can receive the standard influenza vaccine or the high-dose (Fluzone) influenza vaccine. Additional information about influenza vaccination is available at <http://www.cdc.gov/vaccines/vpd-vac/flu/default.htm>.

2. TETANUS, DIPHTHERIA, AND ACCELLULAR PERTUSSIS (TD/TDAP) VACCINATION

Administer a one-time dose of Tdap to adults aged less than 65 years who have not received Tdap previously or for whom vaccine status is unknown to replace one of the 10-year Td boosters, and as soon as feasible to all 1) postpartum women, 2) close contacts of infants younger than 12 months (e.g., grandparents and child-care providers), and 3) healthcare personnel with direct patient contact. Adults aged 65 years and older who have not previously received Tdap and who have close contact with an infant aged less than 12 months also should be vaccinated. Other adults aged 65 years and older may receive Tdap. Tdap can be administered regardless of interval since the most recent tetanus or diphtheria-containing vaccine.

Adults with uncertain or incomplete history of completing a 3-dose primary vaccination series with Td-containing vaccines should begin or complete a primary vaccination series. For unvaccinated adults, administer the first 2 doses at least 4 weeks apart and the third dose 6–12 months after the second. If incompletely vaccinated (i.e., less than 3 doses), administer remaining doses. Substitute a one-time dose of Tdap for one of the doses of Td, either in the primary series or for the routine booster, whichever comes first.

If a woman is pregnant and received the most recent Td vaccination 10 or more years previously, administer Td during the second or third trimester. If the woman received the most recent Td vaccination less than 10 years previously, administer Tdap during the immediate postpartum period. At the clinician's discretion, Td may be deferred during pregnancy and Tdap substituted in the immediate postpartum period, or Tdap may be administered instead of Td to a pregnant woman after an informed discussion with the woman.

The ACIP statement for recommendations for administering Td as prophylaxis in wound management is available at <http://www.cdc.gov/vaccines/pubs/acip-list.htm>.

3. VARICELLA VACCINATION

All adults without evidence of immunity to varicella should receive 2 doses of single-antigen varicella vaccine if not previously vaccinated or a second dose if they have received only 1 dose, 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 persons with immunocompromising conditions) 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 having 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 diagnosis or verification of herpes zoster by a healthcare provider; or 5) laboratory evidence of immunity or laboratory confirmation of disease.

Pregnant women should be assessed 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.

4. HUMAN PAPILLOMAVIRUS (HPV) VACCINATION

HPV vaccination with either quadrivalent (HPV4) vaccine or bivalent vaccine (HPV2) is recommended for females at age 11 or 12 years and catch-up vaccination for females aged 13 through 26 years.

Ideally, vaccine should be administered before potential exposure to HPV through sexual activity; however, females who are sexually active should still be vaccinated consistent with age-based recommendations. Sexually active females who have not been infected with any of the four HPV vaccine types (types 6, 11, 16, and 18, all of which HPV4 prevents) or any of the two HPV vaccine types (types 16 and 18, both of which HPV2 prevents) 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.

HPV4 or HPV2 can be administered to persons with a history of genital warts, abnormal Papanicolaou test, or positive HPV DNA test, because these conditions are not evidence of previous infection with all vaccine HPV types.

HPV4 may be administered to males aged 9 through 26 years to reduce their likelihood of genital warts. HPV4 would be most effective when administered before exposure to HPV through sexual contact.

A complete series for either HPV4 or HPV2 consists of 3 doses. The second dose should be administered 1–2 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 persons with the medical indications described in Figure 2, “Vaccines that might be indicated for adults based on medical and other indications,” it may be administered to these persons because the HPV vaccine is not a live-virus vaccine. However, the immune response and vaccine efficacy might be less for persons with the medical indications described in Figure 2 than in persons who do not have the medical indications described or who are immunocompetent.

5. HERPES ZOSTER VACCINATION

A single dose of zoster vaccine is recommended for adults aged 60 years and older regardless of whether they report a previous episode of herpes zoster. Persons with chronic medical conditions may be vaccinated unless their condition constitutes a contraindication.

6. MEASLES, MUMPS, RUBELLA (MMR) VACCINATION

Adults born before 1957 generally are considered immune to measles and mumps. All adults born in 1957 or later should have documentation of 1 or more doses of MMR vaccine unless they have a medical contraindication to the vaccine, laboratory evidence of immunity to each of the three diseases, or documentation of provider-diagnosed measles or mumps disease. For rubella, documentation of provider-diagnosed disease is not considered acceptable evidence of immunity.

Measles component: A second dose of MMR vaccine, administered a minimum of 28 days after the first dose, is recommended for adults who 1) have been recently exposed to measles or are in an outbreak setting; 2) are students in postsecondary educational institutions; 3) work in a healthcare facility; or 4) plan to travel internationally. Persons who received inactivated (killed) measles vaccine or measles vaccine of unknown type during 1963–1967 should be revaccinated with 2 doses of MMR vaccine.

Mumps component: A second dose of MMR vaccine, administered a minimum of 28 days after the first dose, is recommended for adults who 1) live in a community experiencing a mumps outbreak and are in an affected age group; 2) are students in postsecondary educational institutions; 3) work in a healthcare facility; or 4) plan to travel internationally. Persons vaccinated before 1979 with either killed mumps vaccine or mumps vaccine of unknown type who are at high risk for mumps infection (e.g. persons who are working in a healthcare facility) should be revaccinated with 2 doses of MMR vaccine.

Rubella component: For women of childbearing age, regardless of birth year, rubella immunity should be determined. If there is no evidence of immunity, women who are not pregnant should be vaccinated. Pregnant women who do not have evidence of immunity should receive MMR vaccine upon completion or termination of pregnancy and before discharge from the healthcare facility.

Healthcare personnel born before 1957: For unvaccinated healthcare personnel born before 1957 who lack laboratory evidence of measles, mumps, and/or rubella immunity or laboratory confirmation of disease, healthcare facilities should 1) consider routinely vaccinating personnel with 2 doses of MMR vaccine at the appropriate interval (for measles and mumps) and 1 dose of MMR vaccine (for rubella), and 2) recommend 2 doses of MMR vaccine at the appropriate interval during an outbreak of measles or mumps, and 1 dose during an outbreak of rubella. Complete information about evidence of immunity is available at <http://www.cdc.gov/vaccines/recs/provisional/default.htm>.

7. PNEUMOCOCCAL POLYSACCHARIDE (PPSV) VACCINATION

Vaccinate all persons with the following indications:

Medical: Chronic lung disease (including asthma); chronic cardiovascular diseases; diabetes mellitus; chronic liver diseases; cirrhosis; chronic alcoholism; functional or anatomic asplenia (e.g., sickle cell disease or splenectomy [if elective splenectomy is planned, vaccinate at least 2 weeks before surgery]); immunocompromising conditions (including chronic renal failure or nephrotic syndrome); and cochlear implants and cerebrospinal fluid leaks. Vaccinate as close to HIV diagnosis as possible.

Other: Residents of nursing homes or long-term care facilities and persons who smoke cigarettes. Routine use of PPSV is not recommended for American Indians/Alaska Natives or persons aged less than 65 years unless they have underlying medical conditions that are PPSV indications. However, public health authorities may consider recommending PPSV for American Indians/Alaska Natives and persons aged 50 through 64 years who are living in areas where the risk for invasive pneumococcal disease is increased.

8. REVACCINATION WITH PPSV

One-time revaccination after 5 years is recommended for persons aged 19 through 64 years with chronic renal failure or nephrotic syndrome; functional or anatomic asplenia (e.g., sickle cell disease or splenectomy); and for persons with immunocompromising conditions. For persons aged 65 years and older, one-time revaccination is recommended if they were vaccinated 5 or more years previously and were aged less than 65 years at the time of primary vaccination.

9. MENINGOCOCCAL VACCINATION

Meningococcal vaccine should be administered to persons with the following indications:

Medical: A 2-dose series of this vaccine is recommended for adults with anatomic or functional asplenia, or persistent complement component deficiencies. Adults with HIV infection who are vaccinated should also receive a routine 2-dose series. The 2 doses should be administered at 0 and 2 months.

Other: A single dose of meningococcal vaccine is recommended for unvaccinated first-year college students living in dormitories; microbiologists 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 through 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, quadrivalent (MCV4) is preferred for adults with any of the preceding indications who are aged 55 years and younger; meningococcal polysaccharide vaccine (MPSV4) is preferred for adults aged 56 years and older. Revaccination with MCV4 every 5 years is recommended for adults previously vaccinated with MCV4 or MPSV4 who remain at increased risk for infection (e.g., adults with anatomic or functional asplenia, or persistent complement component deficiencies).

10. HEPATITIS A VACCINATION

Vaccinate persons with any of the following indications and any person seeking protection from hepatitis A virus (HAV) infection:

Behavioral: Men who have sex with men and persons who use injection drugs.

Occupational: Persons working with HAV-infected primates or with HAV in a research laboratory setting.

Medical: Persons with chronic liver disease and persons who receive clotting factor concentrates.

Other: Persons traveling to or working in countries that have high or intermediate endemicity of hepatitis A (a list of countries is available at <http://www.cdc.gov/travel/content/diseases.aspx>).

Unvaccinated persons who anticipate close personal contact (e.g., household or regular babysitting) with an international adoptee during the first 60 days after arrival in the United States from a country with high or intermediate endemicity should be vaccinated. The first dose of the 2-dose hepatitis A vaccine series should be administered as soon as adoption is planned, ideally 2 or more weeks before the arrival of the adoptee.

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; alternatively, a 4-dose schedule may be used, administered on days 0, 7, and 21–30, followed by a booster dose at month 12.

11. HEPATITIS B VACCINATION

Vaccinate persons with any of the following indications and any person seeking protection from hepatitis B virus (HBV) infection:

Behavioral: 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); persons seeking evaluation or treatment for a sexually transmitted disease (STD); current or recent injection-drug users; and men who have sex with men.

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

Medical: Persons with end-stage renal disease, including patients receiving hemodialysis; persons with HIV infection; and persons with chronic liver disease.

Other: Household contacts and sex partners of persons with chronic HBV infection; clients and staff members of institutions for persons with developmental disabilities; and international travelers to countries with high or intermediate prevalence of chronic HBV infection (a list of countries is available at <http://wwwn.cdc.gov/travel/content/diseases.aspx>).

Hepatitis B vaccination is recommended for all adults in the following settings: 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.

Administer missing doses to complete a 3-dose series of hepatitis B vaccine to those persons not vaccinated or not completely vaccinated. The second dose should be administered 1 month after the first dose; the third dose should be given at least 2 months after the second dose (and at least 4 months after the first dose). If the combined hepatitis A and hepatitis B vaccine (Twinrix) is used, administer 3 doses at 0, 1, and 6 months; alternatively, a 4-dose Twinrix schedule, administered on days 0, 7, and 21 to 30, followed by a booster dose at month 12 may be used.

Adult patients receiving hemodialysis or with other immunocompromising conditions should receive 1 dose of 40 µg/mL (Recombivax HB) administered on a 3-dose schedule or 2 doses of 20 µg/mL (Engerix-B) administered simultaneously on a 4-dose schedule at 0, 1, 2, and 6 months.

12. SELECTED CONDITIONS FOR WHICH HAEMOPHILUS INFLUENZAE TYPE B (HIB) VACCINE MAY BE USED

1 dose of Hib vaccine should be considered for persons who have sickle cell disease, leukemia, or HIV infection, or who have had a splenectomy, if they have not previously received Hib vaccine.

13. IMMUNOCOMPROMISING CONDITIONS

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

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