

Adult and Pediatric Immunization Guideline

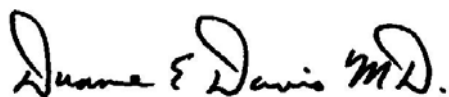
These clinical guidelines are designed to assist clinicians by providing an analytical framework for the evaluation and treatment of patients. They are not intended to replace a clinician’s judgment or to establish a protocol for all patients with a particular condition. A guideline will rarely establish the only approach to a problem.

GUIDELINE HISTORY and APPROVAL

ACTION	SEED GUIDELINE and/or MAIN INFORMATION & GROUP SOURCE(S)	DATE	ORGANIZATION
Guideline developed, reviewed and approved	1. Centers for Disease Control, Advisory Committee on Immunization Practices (ACIP) 2. American Academy of Family Practice, Recommended Adult Immunization Schedule 3. American Academy of Family Practice, Recommended Childhood Immunization Schedule 4. American Academy of Pediatrics Recommended Childhood and Adolescent Immunization Schedule--United States, 2006.	Oct. 3-13, 2006	Specialty Physician Advisory group
Guideline reviewed and approved	Same as above	Oct. 13- 27, 2006	Geisinger Health Plan Medical Directors
Guideline reviewed and approved	Same as above	Nov. 1, 2006	Geisinger Health Plan Guideline Committee
Guideline reviewed and approved	Same as above	Nov. 20, 2006	Geisinger Health plan Medical Management Committee
Guideline reviewed and approved	Same as above	Jan 24, 2007	Geisinger Health Plan Quality Improvement Committee
Guideline reviewed and approved	Same as above MMWR Recommended Adult Immunization Schedule- United States, October 2008-September 2008. MMWR Recommended Immunization Schedules for Persons Aged 0-18 Years – United States, 2008	Jan. 21, 2008	Geisinger Health Plan Guideline Committee
Guideline reviewed and approved	Same as above	Jan. 23, 2008	Geisinger Health Plan Quality Improvement Committee
Guideline reviewed and approved	MMWR Recommended Adult Immunization Schedule- United States, October 2009-September 2009. MMWR Recommended Immunization Schedules for Persons Aged 0-18 Years – United States, 2009 MMWR Recommended Adult Immunization Schedule – United States 2009	Feb 16, 2009	Geisinger Health Plan Guideline Committee

Adult and Pediatric Immunization Clinical Guideline

Guideline reviewed and approved	Same as above	Feb. 11-13, 2009	Geisinger health Plan Pharmacy Dept
Guideline reviewed and approved	Same as above	Mar. 9-13, 2009	Geisinger Health Plan Medical Directors
Guideline reviewed and approved	Same as above	Mar. 16, 2009	Geisinger Health Plan Medical Management Committee
Guideline reviewed and approved	Same as above	Apr. 22, 2009	Geisinger Health Plan Quality Improvement Committee
Guideline reviewed and approved	MMWR Recommended Adult Immunization Schedule- United States, 2010. MMWR Recommended Immunization Schedules for Persons Aged 0-18 Years – United States, 2010 MMWR Recommended Adult Immunization Schedule – United States 2010	Apr. 28,2010	Geisinger Health Plan Quality Improvement Committee



Duane E. Davis, M.D.
Vice President, Chief Medical Officer
Geisinger Health Plan

SEED GUIDELINE(S)

Centers for Disease Control, Advisory Committee on Immunization Practices (ACIP),
<http://www.cdc.gov/nip/publications/acip-list.htm>

American Academy of Family Practice, Recommended Adult Immunization Schedule
<http://www.aafp.org/online/en/home/clinical/clinicalrecs.html>

American Academy of Family Practice, Recommended Childhood Immunization Schedule
<http://www.aafp.org/online/en/home/clinical/clinicalrecs.html>

RECOMMENDATIONS

Note: Coverage of preventive health services is dependent upon individual benefit design may include cost sharing and/or coinsurance. Member eligibility and line of business contract specific benefit limitations and/or exclusions may apply. Vaccines required solely for the purpose of international travel or employment are generally excluded from most insurance coverage.

FIGURE 1. Recommended immunization schedule for persons aged 0 through 6 years --- United States, 2010 (for those who fall behind or start late, see the catch-up schedule [Table])

Vaccine ▼	Age ►	Birth	1 month	2 months	4 months	6 months	12 months	15 months	18 months	19-23 months	2-3 years	4-6 years
Hepatitis B ¹	HepB	HepB	HepB			HepB						
Rotavirus ²			RV	RV	RV ²							
Diphtheria, Tetanus, Pertussis ³			DTaP	DTaP	DTaP	<i>see footnote³</i>	DTaP					DTaP
<i>Haemophilus influenzae</i> type b ⁴			Hib	Hib	Hib ⁴		Hib					
Pneumococcal ⁵			PCV	PCV	PCV		PCV				PPSV	
Inactivated Poliovirus ⁶			IPV	IPV			IPV					IPV
Influenza ⁷							Influenza (Yearly)					
Measles, Mumps, Rubella ⁸							MMR		<i>see footnote⁸</i>			MMR
Varicella ⁹							Varicella		<i>see footnote⁹</i>			Varicella
Hepatitis A ¹⁰							HepA (2 doses)					HepA Series
Meningococcal ¹¹												MCV

Range of recommended ages for all children except certain high-risk groups

Range of recommended ages for certain high-risk groups

This schedule includes recommendations in effect as of December 15, 2009. Any dose not administered at the recommended age should be administered at a subsequent visit, when indicated and feasible. The use of a combination vaccine generally is preferred over separate injections of its equivalent component vaccines. Considerations should include provider assessment, patient preference, and the potential for adverse events. Providers should consult the relevant Advisory Committee on Immunization Practices statement for detailed recommendations: <http://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) at <http://www.vaers.hhs.gov> or by telephone, 800-822-7967.

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

- Administer monovalent HepB to all newborns before hospital discharge.
- If mother is hepatitis B surface antigen (HBsAg)-positive, administer HepB and 0.5 mL of hepatitis B immune globulin (HBIG) within 12 hours of birth.
- If mother's HBsAg status is unknown, administer HepB within 12 hours of birth. Determine mother's HBsAg status as soon as possible and, if HBsAg-positive, administer HBIG (no later than age 1 week).

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 administered at age 1 or 2 months. Monovalent HepB vaccine should be used for doses administered before age 6 weeks. The final dose should be administered no earlier than age 24 weeks.
- Infants born to HBsAg-positive mothers should be tested for HBsAg and antibody to HBsAg 1 to 2 months after completion of at least 3 doses of the HepB series, at age 9 through 18 months (generally at the next well-child visit).
- Administration of 4 doses of HepB to infants is permissible when a combination vaccine containing HepB is administered after the birth dose. The fourth dose should be administered no earlier than age 24 weeks.

2. **Rotavirus vaccine (RV).** (Minimum age: 6 weeks)
 - Administer the first dose at age 6 through 14 weeks (maximum age: 14 weeks 6 days). Vaccination should not be initiated for infants aged 15 weeks 0 days or older.
 - The maximum age for the final dose in the series is 8 months 0 days
 - If Rotarix is administered at ages 2 and 4 months, a dose at 6 months is not indicated.
3. **Diphtheria and tetanus toxoids and acellular pertussis vaccine (DTaP).**
(Minimum age: 6 weeks)
 - The fourth dose may be administered as early as age 12 months, provided at least 6 months have elapsed since the third dose.
 - Administer the final dose in the series at age 4 through 6 years.
4. **Haemophilus influenzae type b conjugate vaccine (Hib).**
(Minimum age: 6 weeks)
 - If PRP-OMP (PedvaxHIB or Comvax [HepB-Hib]) is administered at ages 2 and 4 months, a dose at age 6 months is not indicated.
 - TriHiBit (DTaP/Hib) and Hiberix (PRP-T) should not be used for doses at ages 2, 4, or 6 months for the primary series but can be used as the final dose in children aged 12 months through 4 years.
5. **Pneumococcal vaccine.** (Minimum age: 6 weeks for pneumococcal conjugate vaccine [PCV]; 2 years for pneumococcal polysaccharide vaccine [PPSV])
 - PCV is recommended for all children aged younger than 5 years. Administer 1 dose of PCV to all healthy children aged 24 through 59 months who are not completely vaccinated for their age.
 - Administer PPSV 2 or more months after last dose of PCV to children aged 2 years or older with certain underlying medical conditions, including a cochlear implant. See *MMWR* 1997;46(No. RR-8).
6. **Inactivated poliovirus vaccine (IPV)** (Minimum age: 6 weeks)
 - The final dose in the series should be administered on or after the fourth birthday and at least 6 months following the previous dose.
 - If 4 doses are administered prior to age 4 years a fifth dose should be administered at age 4 through 6 years. See *MMWR* 2009;58(30):829--30.
7. **Influenza vaccine (seasonal).** (Minimum age: 6 months for trivalent inactivated influenza vaccine [TIV]; 2 years for live, attenuated influenza vaccine [LAIV])
 - Administer annually to children aged 6 months through 18 years.
 - For healthy children aged 2 through 6 years (i.e., those who do not have underlying medical conditions that predispose them to influenza complications), either LAIV or TIV may be used, except LAIV should not be given to children aged 2 through 4 years who have had wheezing in the past 12 months.
 - Children receiving TIV should receive 0.25 mL if aged 6 through 35 months or 0.5 mL if aged 3 years or older.
 - Administer 2 doses (separated by at least 4 weeks) to children aged younger than 9 years who are receiving influenza vaccine for the first time or who were vaccinated for the first time during the previous influenza season but only received 1 dose.

- For recommendations for use of influenza A (H1N1) 2009 monovalent vaccine see MMWR 2009;58(No. RR-10).

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

- Administer the second dose routinely at age 4 through 6 years. However, the second dose may be administered before age 4, provided at least 28 days have elapsed since the first dose.

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

- Administer the second dose routinely at age 4 through 6 years. However, the second dose may be administered before age 4, provided at least 3 months have elapsed since the first dose.
- For children aged 12 months through 12 years the minimum interval between doses is 3 months. However, if the second dose was administered at least 28 days after the first dose, it can be accepted as valid.

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

- Administer to all children aged 1 year (i.e., aged 12 through 23 months). Administer 2 doses at least 6 months apart.
- Children not fully vaccinated by age 2 years can be vaccinated at subsequent visits
- HepA also is recommended for older children who live in areas where vaccination programs target older children, who are at increased risk for infection, or for whom immunity against hepatitis A is desired.

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

- Administer MCV4 to children aged 2 through 10 years with persistent complement component deficiency, anatomic or functional asplenia, and certain other conditions placing them at high risk.
- Administer MCV4 to children previously vaccinated with MCV4 or MPSV4 after 3 years if first dose administered at age 2 through 6 years. See MMWR 2009;58:1042--3.

The Recommended Immunization Schedules for Persons Aged 0 through 18 Years are approved by the Advisory Committee on Immunization Practices (<http://www.cdc.gov/vaccines/recs/acip>), the American Academy of Pediatrics (<http://www.aap.org>), and the American Academy of Family Physicians (<http://www.aafp.org>). Department of Health and Human Services • Centers for Disease Control and Prevention

FIGURE 2. Recommended immunization schedule for persons aged 7 through 18 years --- United States, 2010 (for those who fall behind or start late, see the schedule below and the catch-up schedule [Table])

Vaccine ▼	Age ►	7–10 years	11–12 years	13–18 years
Tetanus, Diphtheria, Pertussis ¹			Tdap	Tdap
Human Papillomavirus ²		see footnote 2	HPV (3 doses)	HPV series
Meningococcal ³		MCV	MCV	MCV
Influenza ⁴		Influenza (Yearly)		
Pneumococcal ⁵		PPSV		
Hepatitis A ⁶		Hep A Series		
Hepatitis B ⁷		Hep B Series		
Inactivated Poliovirus ⁸		IPV Series		
Measles, Mumps, Rubella ⁹		MMR Series		
Varicella ¹⁰		Varicella Series		

Range of recommended ages for all children except certain high-risk groups

Range of recommended ages for catch-up immunization

Range of recommended ages for certain high-risk groups

This schedule includes recommendations in effect as of December 15, 2009. Any dose not administered at the recommended age should be administered at a subsequent visit, when indicated and feasible. The use of a combination vaccine generally is preferred over separate injections of its equivalent component vaccines. Considerations should include provider assessment, patient preference, and the potential for adverse events. Providers should consult the relevant Advisory Committee on Immunization Practices statement for detailed recommendations: <http://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) at <http://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)
 - Administer at age 11 or 12 years for those who have completed the recommended childhood DTP/DTaP vaccination series and have not received a tetanus and diphtheria toxoid (Td) booster dose.
 - Persons aged 13 through 18 years who have not received Tdap should receive a dose.
 - A 5-year interval from the last Td dose is encouraged when Tdap is used as a booster dose; however, a shorter interval may be used if pertussis immunity is needed.

2. **Human papillomavirus vaccine (HPV).** (Minimum age: 9 years)
 - Two HPV vaccines are licensed: a quadrivalent vaccine (HPV4) for the prevention of cervical, vaginal and vulvar cancers (in females) and genital warts (in females and males), and a bivalent vaccine (HPV2) for the prevention of cervical cancers in females.
 - HPV vaccines are most effective for both males and females when given before exposure to HPV through sexual contact.
 - HPV4 or HPV2 is recommended for the prevention of cervical precancers and cancers in females.
 - HPV4 is recommended for the prevention of cervical, vaginal and vulvar precancers and cancers and genital warts in females.

- Administer the first dose to females at age 11 or 12 years.
- Administer the second dose 1 to 2 months after the first dose and the third dose 6 months after the first dose (at least 24 weeks after the first dose).
- Administer the series to females at age 13 through 18 years if not previously vaccinated.
- HPV4 may be administered in a 3-dose series to males aged 9 through 18 years to reduce their likelihood of acquiring genital warts.

3. Meningococcal conjugate vaccine (MCV4).

- Administer at age 11 or 12 years, or at age 13 through 18 years if not previously vaccinated.
- Administer to previously unvaccinated college freshmen living in a dormitory.
- Administer MCV4 to children aged 2 through 10 years with persistent complement component deficiency, anatomic or functional asplenia, or certain other conditions placing them at high risk.
- Administer to children previously vaccinated with MCV4 or MPSV4 who remain at increased risk after 3 years (if first dose administered at age 2 through 6 years) or after 5 years (if first dose administered at age 7 years or older). Persons whose only risk factor is living in on-campus housing are not recommended to receive an additional dose. See *MMWR* 2009;58:1042--3.

4. Influenza vaccine (seasonal).

- Administer annually to children aged 6 months through 18 years.
- For healthy nonpregnant persons aged 7 through 18 years (i.e., those who do not have underlying medical conditions that predispose them to influenza complications), either LAIV or TIV may be used.
- Administer 2 doses (separated by at least 4 weeks) to children aged younger than 9 years who are receiving influenza vaccine for the first time or who were vaccinated for the first time during the previous influenza season but only received 1 dose.
- For recommendations for use of influenza A (H1N1) 2009 monovalent vaccine. See *MMWR* 2009;58(No. RR-10)

5. Pneumococcal polysaccharide vaccine (PPSV).

- Administer to children with certain underlying medical conditions, including a cochlear implant. A single revaccination should be administered after 5 years to children with functional or anatomic asplenia or an immunocompromising condition. See *MMWR* 1997;46(No. RR-8).

6. Hepatitis A vaccine (HepA).

- Administer 2 doses at least 6 months apart.
- HepA is recommended for children aged older than 23 months who live in areas where vaccination programs target older children, who are at increased risk for infection, or for whom immunity against hepatitis A is desired.

7. Hepatitis B vaccine (HepB).

- Administer the 3-dose series to those not previously vaccinated.
- A 2-dose series (separated by at least 4 months) of adult formulation Recombivax HB is licensed for children aged 11 through 15 years.

8. Inactivated poliovirus vaccine (IPV).

- The final dose in the series should be administered on or after the fourth birthday and at least 6 months following the previous dose.
- If both OPV and IPV were administered as part of a series, a total of 4 doses should be administered, regardless of the child's current age.

9. Measles, mumps, and rubella vaccine (MMR).

- If not previously vaccinated, administer 2 doses or the second dose for those who have received only 1 dose, with at least 28 days between doses.

10. Varicella vaccine.

- For persons aged 7 through 18 years without evidence of immunity (see *MMWR* 2007;56[No. RR-4]), administer 2 doses if not previously vaccinated or the second dose if only 1 dose has been administered.
- For persons aged 7 through 12 years, the minimum interval between doses is 3 months. However, if the second dose was administered at least 28 days after the first dose, it can be accepted as valid.
- For persons aged 13 years and older, the minimum interval between doses is 28 days.

The Recommended Immunization Schedules for Persons Aged 0 through 18 Years are approved by the Advisory Committee on Immunization Practices (<http://www.cdc.gov/vaccines/recs/acip>), the American Academy of Pediatrics (<http://www.aap.org>), and the American Academy of Family Physicians (<http://www.aafp.org>). Department of Health and Human Services • Centers for Disease Control and Prevention

TABLE. Catch-up immunization schedule for persons aged 4 months through 18 years who start late or who are more than 1 month behind --- United States, 2010

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.

PERSONS AGED 4 MONTHS THROUGH 6 YEARS					
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
Hepatitis B ¹	Birth	4 weeks	8 weeks (and at least 16 weeks after first dose)		
Rotavirus ²	6 wks	4 weeks	4 weeks²		
Diphtheria, Tetanus, Pertussis ³	6 wks	4 weeks	4 weeks	6 months	6 months³
<i>Haemophilus influenzae</i> type b ⁴	6 wks	4 weeks if first dose administered at younger than age 12 months 8 weeks (as final dose) if first dose administered at age 12--14 months No further doses needed if first dose administered at age 15 months or older	4 weeks⁴ if current age is younger than 12 months 8 weeks (as final dose)⁴ if current age is 12 months or older and first dose administered at younger than age 12 months and second dose administered at younger than 15 months No further doses needed if previous dose administered at age 15 months or older	8 weeks (as final dose) This dose only necessary for children aged 12 months through 59 months who received 3 doses before age 12 months	
Pneumococcal ⁵	6 wks	4 weeks if first dose administered at	4 weeks if current age is younger than 12	8 weeks (as final dose) This dose only	

Adult and Pediatric Immunization Clinical Guideline

PERSONS AGED 4 MONTHS THROUGH 6 YEARS					
		<p>younger than age 12 months</p> <p>8 weeks (as final dose for healthy children)</p> <p>if first dose administered at age 12 months or older or current age 24 through 59 months</p> <p>No further doses needed</p> <p>for healthy children if first dose administered at age 24 months or older</p>	<p>months</p> <p>8 weeks (as final dose for healthy children)</p> <p>if current age is 12 months or older</p> <p>No further doses needed</p> <p>for healthy children if previous dose administered at age 24 months or older</p>	<p>necessary for children aged 12 months through 59 months who received 3 doses before age 12 months or for high-risk children who received 3 doses at any age</p>	
Inactivated Poliovirus ⁶	6 wks	4 weeks	4 weeks	6 months	
Measles, Mumps, Rubella ⁷	12 mos	4 weeks			
Varicella ⁸	12 mos	3 months			
Hepatitis A ⁹	12 mos	6 months			
PERSONS AGED 7 THROUGH 18 YEARS					
Tetanus, Diphtheria/ Tetanus, Diphtheria, Pertussis ¹⁰	7 yrs ¹⁰	4 weeks	<p>4 weeks</p> <p>if first dose administered at younger than age 12 months</p> <p>6 months</p> <p>if first dose administered at 12 months or older</p>	<p>6 months</p> <p>if first dose administered at younger than age 12 months</p>	
Human Papillomavirus ¹¹	9 yrs	Routine dosing intervals are recommended¹¹			
Hepatitis A ⁹	12 mos	6 months			
Hepatitis B ¹	Birth	4 weeks	8 weeks		

PERSONS AGED 4 MONTHS THROUGH 6 YEARS					
			(and at least 16 weeks after first dose)		
Inactivated Poliovirus ⁶	6 wks	4 weeks	4 weeks	6 months	
Measles, Mumps, Rubella ⁷	12 mos	4 weeks			
Varicella ⁸	12 mos	3 months if person is younger than age 13 years 4 weeks if person is aged 13 years or older			

1. **Hepatitis B vaccine (HepB).**

- Administer the 3-dose series to those not previously vaccinated.
- A 2-dose series (separated by at least 4 months) of adult formulation Recombivax HB is licensed for children aged 11 through 15 years.

2. **Rotavirus vaccine (RV).**

- The maximum age for the first dose is 14 weeks 6 days. Vaccination should not be initiated for infants aged 15 weeks 0 days or older.
- The maximum age for the final dose in the series is 8 months 0 days.
- If Rotarix was administered for the first and second doses, a third dose is not indicated.

3. **Diphtheria and tetanus toxoids and acellular pertussis vaccine (DTaP).**

- The fifth dose is not necessary if the fourth dose was administered at age 4 years or older.

4. **Haemophilus influenzae type b conjugate vaccine (Hib).**

- Hib vaccine is not generally recommended for persons aged 5 years or older. No efficacy data are available on which to base a recommendation concerning use of Hib vaccine for older children and adults. However, studies suggest good immunogenicity in persons who have sickle cell disease, leukemia, or HIV infection, or who have had a splenectomy; administering 1 dose of Hib vaccine to these persons who have not previously received Hib vaccine is not contraindicated.
- If the first 2 doses were PRP-OMP (PedvaxHIB or Comvax), and administered at age 11 months or younger, the third (and final) dose should be administered at age 12 through 15 months and at least 8 weeks after the second dose.
- If the first dose was administered at age 7 through 11 months, administer the second dose at least 4 weeks later and a final dose at age 12 through 15 months.

5. Pneumococcal vaccine.

- Administer 1 dose of pneumococcal conjugate vaccine (PCV) to all healthy children aged 24 through 59 months who have not received at least 1 dose of PCV on or after age 12 months.
- For children aged 24 through 59 months with underlying medical conditions, administer 1 dose of PCV if 3 doses were received previously or administer 2 doses of PCV at least 8 weeks apart if fewer than 3 doses were received previously.
- Administer pneumococcal polysaccharide vaccine (PPSV) to children aged 2 years or older with certain underlying medical conditions, including a cochlear implant, at least 8 weeks after the last dose of PCV. See *MMWR* 1997;46(No. RR-8).

6. Inactivated poliovirus vaccine (IPV).

- The final dose in the series should be administered on or after the fourth birthday and at least 6 months following the previous dose.
- A fourth dose is not necessary if the third dose was administered at age 4 years or older and at least 6 months following the previous dose.
- In the first 6 months of life, minimum age and minimum intervals are only recommended if the person is at risk for imminent exposure to circulating poliovirus (i.e., travel to a polio-endemic region or during an outbreak).

7. Measles, mumps, and rubella vaccine (MMR).

- Administer the second dose routinely at age 4 through 6 years. However, the second dose may be administered before age 4, provided at least 28 days have elapsed since the first dose.
- If not previously vaccinated, administer 2 doses with at least 28 days between doses.

8. Varicella vaccine.

- Administer the second dose routinely at age 4 through 6 years. However, the second dose may be administered before age 4, provided at least 3 months have elapsed since the first dose.
- For persons aged 12 months through 12 years, the minimum interval between doses is 3 months. However, if the second dose was administered at least 28 days after the first dose, it can be accepted as valid.
- For persons aged 13 years and older, the minimum interval between doses is 28 days.

9. Hepatitis A vaccine (HepA).

- HepA is recommended for children aged older than 23 months who live in areas where vaccination programs target older children, who are at increased risk for infection, or for whom immunity against hepatitis A is desired.

10. Tetanus and diphtheria toxoids vaccine (Td) and tetanus and diphtheria toxoids and acellular pertussis vaccine (Tdap).

- Doses of DTaP are counted as part of the Td/Tdap series
- Tdap should be substituted for a single dose of Td in the catch-up series or as a booster for children aged 10 through 18 years; use Td for other doses.

11. Human papillomavirus vaccine (HPV).

Adult and Pediatric Immunization Clinical Guideline

- Administer the series to females at age 13 through 18 years if not previously vaccinated.
- Use recommended routine dosing intervals for series catch-up (i.e., the second and third doses should be administered at 1 to 2 and 6 months after the first dose). The minimum interval between the first and second doses is 4 weeks. The minimum interval between the second and third doses is 12 weeks, and the third dose should be administered at least 24 weeks after the first dose.

Recommended adult immunization schedule, by vaccine and age group - United States, 2010

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

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

No recommendation

Alternative Text: The figure above shows the recommended adult immunization schedule, by vaccine and age group for the United States in 2010.

FIGURE 2. Vaccines that might be indicated for adults, based on medical and other indications - United States, 2010

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

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

No recommendation

Varicella Virus Vaccine

12–18 Months of Age.

Varicella virus vaccine has been approved for use among healthy children 12 months–12 years of age. Children in this age group should receive one 0.5-mL dose of vaccine subcutaneously at age 12-15 months and another at age 4-6 yrs. Children who have a reliable history of varicella are considered immune, and those who do not have such a history or who have an uncertain history of varicella are considered susceptible. Serologic testing of children before vaccination is not warranted because:

- a) Most children 12 months–12 years of age who do not have a clinical history of varicella are susceptible and
- b) The vaccine is well tolerated in seropositive persons.

All children should be routinely vaccinated with the first dose at 12–15 months of age and with the second dose at age 4-6 years. Varicella virus vaccine may be administered to all children at this age regardless of a history of varicella; however, vaccination is not necessary for children who have reliable histories of varicella. Varicella virus vaccine preferably should be administered routinely to children at the same time as measles-mumps-rubella (MMR) vaccine. Varicella virus vaccine is safe and effective in healthy children 12 months of age when administered at the same time as MMR vaccine at separate sites and with separate syringes or when administered separately 30 days apart. The number and types of adverse events in children who have received VARIVAX and MMR concurrently have not differed from those in children who have been administered the vaccines at different visits.

Data concerning the effect of simultaneous administration of VARIVAX with various combinations of MMR, diphtheria and tetanus toxoids and pertussis (DTP), and Haemophilus influenzae type b (Hib)-containing vaccines have not yet been published. However, data regarding simultaneous administration of an investigational quadrivalent vaccine containing varicella with diphtheria and tetanus toxoids and acellular pertussis (DTaP) and Hib vaccines suggest that no notable interactions exist between varicella and any other vaccines that are routinely administered to young children (e.g., measles, mumps, rubella, diphtheria, tetanus, pertussis, and Haemophilus influenzae type b vaccines). Furthermore, the simultaneous administration of most widely used live, attenuated and inactivated vaccines has not resulted in impaired antibody response or an increased rate of adverse events. Therefore, varicella virus vaccine may be administered simultaneously with all of the vaccines recommended for children 12–18 months of age. Simultaneous administration is particularly important when health-care providers anticipate that, because of certain factors (e.g., previously missed vaccination opportunities), a child may not return for subsequent vaccination.

19 Months–12 Years of Age. Varicella vaccine is recommended for all susceptible children by their 13th birthday. After 12 years of age, natural varicella is more severe and complications are more frequent. Recently, ACIP recommended establishing a routine immunization visit at 11–12 years of age to review immunization status and to administer necessary vaccinations. Although vaccine may be administered at any time after 18 months of age, varicella virus vaccine should be administered to susceptible children during this routine visit.

Persons 13 Years of Age and Older

Varicella vaccine is approved for use among healthy adolescents and adults. Because natural VZV infection can be severe in older adolescents and adults, varicella immunity is desirable in these age groups. Persons 13 years of age should be administered two 0.5-mL doses of vaccine, subcutaneously, at least 4 weeks apart. If >8 weeks elapse following the first dose, the second dose can be administered without restarting the schedule. Persons 13 years of age who have reliable histories of varicella are considered immune. Those

who do not have such histories are considered susceptible and can be tested to determine immune status or can be vaccinated without testing. Because 71%–93% of adults who do not have a reliable history of varicella are actually immune, serologic testing before vaccination is likely to be cost effective for both adults and adolescents.

Adolescents and adults should be assessed for varicella immune status, and those who are susceptible should be vaccinated. Priority should be given to vaccination of susceptible adolescents and adults who are at high risk for exposure and for transmitting disease; specific assessment efforts are targeted to these persons:

- Vaccination is recommended for susceptible persons who have close contact with persons at high risk for serious complications (e.g., health-care workers and family contacts of immunocompromised persons).
- Vaccination should be considered for susceptible persons in the following groups who are at high risk for exposure:
 - a) Persons who live or work in environments in which transmission of VZV is likely (e.g., teachers of young children, day-care employees, and residents and staff in institutional settings).
 - b) Persons who live or work in environments in which varicella transmission can occur (e.g., college students, inmates and staff of correctional institutions, and military personnel).
 - c) Nonpregnant women of childbearing age. Vaccination of women who are not pregnant—but who may become pregnant in the future—will reduce the risk for VZV transmission to the fetus. Varicella immunity may be ascertained at any routine health-care visit or in any setting in which vaccination history may be reviewed (e.g., upon college entry). Women should be asked if they are pregnant and advised to avoid pregnancy for 1 month following each dose of vaccine.
 - d) International travelers. Vaccination should be considered for international travelers who do not have evidence of immunity to VZV (e.g., serologic tests), especially if the traveler expects to have close personal contact with local populations, because varicella is endemic in most countries.
- Vaccination of other susceptible adolescents and adults is desirable and may be offered during routine health-care visits.

Pneumococcal Vaccine

Pneumococcal conjugate vaccine (PCV) - minimum age 6 weeks. Recommended between 2-18 months. One dose of PCV is recommended for all health children aged 24-59 months having any incomplete schedule.

Standard 23-valent pneumococcal polysaccharide vaccine (PPV) (PPV23, e.g., Pneumovax, Pnu-immune) is considered medically necessary for all individuals aged 65 years or older.

Standard pneumococcal vaccine is also considered medically necessary for persons over 2 years of age with *any* of the following conditions:

1. Chronic cardiovascular disease
2. Chronic pulmonary disease
3. Diabetes mellitus
4. Asthma
5. Asplenia (functional or anatomic)
6. Persons living in special environments or social settings with an identified increased risk of pneumococcal disease (e.g., certain Native American and Alaska Native populations)
7. Alcoholism (adults)
8. Cigarette smoking
9. Chronic liver disease (including cirrhosis)
10. Chronic renal failure or nephrotic syndrome
11. Sickle cell disease
12. Multiple myeloma (adults)
13. Metastatic or hematologic malignancies
14. Acquired or congenital immunodeficiency (including HIV infection)
15. Other conditions associated with immunosuppression (such as organ transplantation, bone marrow transplantation, and persons on immunosuppressive chemotherapy (including corticosteroids))
16. Cerebrospinal fluid leaks
17. Persons who have or are planning to receive a cochlear implant.

Routine re-vaccination is *not* recommended by the CDC. In accordance with the CDC's recommendations, re-vaccination is medically necessary *only* for the following groups:

- Persons aged 65 years or older if they received vaccine 5 or more years previously and was less than 65 years of age at the time of vaccination,
- Persons aged 2-64 years with asplenia. If member is more than 10 years of age, a single re-vaccination is considered medically necessary 5 or more years after previous dose; if member is aged 10 or younger, re-vaccination is considered medically necessary 3 years after previous dose,
- Immunocompromised persons 2 years of age or older. A single re-vaccination is considered medically necessary if 5 or more years have elapsed since receipt of the first dose; if the member is 10 years of age or younger, re-vaccination is considered medically necessary 3 years after previous dose.
- In addition, re-vaccination with the 23-valent pneumococcal polysaccharide vaccine is considered medically necessary for high-risk individuals who received the 14-valent polysaccharide vaccine, which was in use prior to 1983.

Heptavalent Vaccine

The American Academy of Pediatrics (AAP) and the CDC Advisory Committee on Immunization Practices (ACIP) recommended pneumococcal polyvalent vaccine for routine use in all children 2 and under, and for black, Alaskan Native, and Native American toddlers up to age five, as well as for those with sickle-cell anemia, HIV infection, or other immunodeficiency diseases. For infants, the AAP and ACIP recommends that the vaccine be given in four doses at 2, 4, 6, and 12 to 15 months; for children who are 7 to 11 months, three doses; for children who are 12 to 23 months, two doses; and for children 2 years or older, only one dose is needed. See table below.

Table: Numbers of doses of Prevnar recommended by the ACIP for average risk children in each age range:

Age in Months	Number of Doses
0 to 6	4
7 to 11	3
12 to 23	2
24 to 59	1

According to the recommendations of the CDC's Advisory Committee on Immunization Practices, heptavalent pneumococcal conjugate vaccine (PCV7, e.g., Prevnar, Prevenar) is medically necessary for all children under 2 years of age, and high-risk children between the ages of 2 and 5 years. High-risk groups include children with:

- Sickle-cell disease and other sickle cell hemoglobinopathies, congenital or acquired asplenia, or splenic dysfunction
- Infection with human immunodeficiency virus
- Immunocompromising conditions, including
 - Congenital immunodeficiencies: B- (humoral) or T-lymphocyte deficiency; complement deficiencies, particularly c1, c2, c3, and c4 deficiency; and phagocytic disorders, excluding chronic granulomatous disease
 - Renal failure and nephrotic syndrome
 - Diseases associated with immunosuppressive therapy or radiation therapy, including malignant neoplasms, leukemias, lymphomas, and Hodgkin's disease; or solid organ transplantation,
- Chronic illnesses, including:
 - Chronic cardiac disease, particularly cyanotic congenital heart disease and cardiac failure
 - Chronic pulmonary disease, excluding asthma unless on high dose corticosteroid therapy

- Cerebrospinal fluid leaks
- Diabetes mellitus
- Children who have or are planning to receive a cochlear implant.

Based on the ACIP's recommendations, heptavalent pneumococcal conjugate vaccination is medically necessary for all other children aged 24-59 months, including the following populations identified by ACIP as a priority:

- Children aged 24-35 months
- Children of Alaska Native or American Indian descent
- Children of African-American descent
- Children who attend group day care centers (defined as a setting outside the home where a child regularly spends over 4 hours per week with more than 2 unrelated children under adult supervision).

Influenza Vaccine

The Centers for Disease Control and Prevention's (CDC) Advisory Committee on Immunization Practices (ACIP) recommends annual influenza immunization for:

- All persons aged > 50 years;
 - All children and adolescents aged 6 months through 18 years
- Note: Administer 2 doses (separated by 4 wks) to children aged younger than 9 yrs who are receiving influenza vaccine for the first time or who were vaccinated for the first time during the previous influenza season but only received one dose.
- Close contacts of children through age 4 years;
 - Close contacts of high risk children ages 5 years through 18 years;
 - All persons including school aged children, who want to reduce the risk of becoming ill with influenza or of transmitting influenza to others;
 - Women who will be pregnant during the influenza season;
 - Adults and children who have chronic pulmonary (including asthma), cardiovascular (except hypertension), renal, hepatic, hematological or metabolic disorders (including diabetes mellitus);
 - Adults and children who have immunosuppression (including immunosuppression caused by medications or by human immunodeficiency virus);
 - Adults and children who have any condition (e.g., cognitive dysfunction, spinal cord injuries, seizure disorders, or other neuromuscular disorders) that can compromise respiratory function or the handling of respiratory secretions or that can increase the risk for aspiration;
 - Residents of nursing homes and other chronic-care facilities;
 - Health-care personnel;
 - Healthy household contacts (including children) and caregivers of children aged <5 years and adults aged >50 years, with particular emphasis on vaccinating contacts of children aged <6 months; and
 - Healthy household contacts (including children) and caregivers of persons with medical conditions that put them at higher risk for severe complications from influenza.

Diphtheria, Tetanus and Pertussis Vaccine (DTap, Tdap, DTP)

The routine diphtheria, tetanus, and pertussis vaccination schedule for children aged < 7 years comprises five doses of vaccine containing diphtheria, tetanus, and pertussis antigens. Three (primary) doses should be administered during the first year of life, generally at ages 2, 4, and 6 months. To maintain adequate immunity during preschool years, ACIP recommends the fourth (first booster) dose for children aged 15 to 18 months. ACIP recommends the fifth (second booster) dose for children aged 4-6 years to confer continued protection against disease during the early years of schooling. A tetanus toxoid booster is recommended by ACIP at 11-12 years of age, with additional boosters every 10 years.

Because local reactions, fever, and other systemic events occur substantially less often after diphtheria, tetanus and acellular pertussis (DTaP) administration than after administration of whole-cell diphtheria,

tetanus, and pertussis (DTP), diphtheria, tetanus and acellular pertussis (DTaP) vaccines are recommended by ACIP for all five doses in the vaccination schedule.

Adolescents 11 through 18 years of age should get one booster dose of Tdap.

- A dose of Tdap is recommended for adolescents who got DTaP or DTP as children but have not yet gotten a dose of Td. The preferred age is 11-12.
- Adolescents who have already gotten a booster dose of Td are encouraged to get a dose of Tdap as well, for protection against pertussis. Waiting at least 5 years between Td and Tdap is encouraged, but not required.
- Adolescents who did not get all their scheduled doses of DTaP or DTP as children should complete the series using a combination of Td and Tdap.

Adults 19 through 64 years of age should substitute Tdap for one booster dose of Td. Td should be used for later booster doses.

- Adults who expect to have close contact with an infant younger than 12 months of age should get a dose of Tdap. Waiting at least 2 years since the last dose of Td is suggested, but not required.
- Healthcare workers who have direct patient contact in hospitals or clinics should get a dose of Tdap. A 2-year interval since the last Td is suggested, but not required.

Diphtheria and Tetanus Vaccine (Td)

According to the CDC recommendations, Td should be used rather than Tdap:

- If Tdap is not available
- For anybody who has already gotten Tdap
- Adults 65 years of age and older
- Children 7 through 9 years of age
- If vaccination is needed during pregnancy, Td usually is preferred over Tdap.

Tetanus and diphtheria vaccine (Td) is approved for use in people 7 years of age and older. People who have not gotten at least 3 doses of any tetanus and diphtheria vaccine (DTaP, DTP or DT) during their lifetime should do so using Td. After a person gets the third dose, a Td booster should be administered every ten years throughout their life unless specifically indicated because of a tetanus-prone injury (i.e., persons who sustain a tetanus-prone injury should be administered a Td booster immediately if > 5 years have elapsed since their last Td booster).

Meningococcal Vaccine

The Centers for Disease Control and Prevention's (CDC) Advisory Committee on Immunization Practices (ACIP) recommends meningococcal immunization of all persons 2-18 yrs of age, at the earliest opportunity.

The ACIP also recommends meningococcal immunization for persons with one or more of the following risk factors:

1. Functional asplenia (sickle-cell disease);
2. Anatomic asplenia (surgical or congenital);
3. Persons with terminal complement component deficiencies;
4. Persons who are infected with HIV;
5. Persons (19-55 years old) who are traveling to countries in which *N. meningitidis* is hyperendemic or epidemic, particularly if contact with the local population will be prolonged.*
6. Revaccination with MCV after 5 years might be indicated for adults previously vaccinated with MPSV who remain at increased risk for infection.

Rotavirus Vaccine

RotaTeq is indicated for the prevention of rotavirus gastroenteritis in infants and children caused by the serotypes G1, G2, G3, and G4 when administered as a 3-dose series to infants between the ages of 6 to 32 weeks. According to the FDA-approved labeling of RotaTeq, the first dose of vaccine should be administered between 6 and 12 weeks of age with subsequent doses administered at 4 to 10 week intervals. The labeling states that the efficacy of RotaTeq beyond the second season after vaccination was not evaluated. According to the FDA-approved labeling, Rotateq should not be used in infants that are allergic to any component of the vaccine. Rotavirus vaccine should not be started later than age 12 weeks. RotaTeq is an oral vaccine, and is given in three doses administered to infants between the ages of six to 32 weeks. Rotavirus vaccine can be given during the routine well baby visits at two, four, and six months of age.

Rotarix is indicated for the prevention of rotavirus gastroenteritis caused by G1 and non-G1 types (G3, G4, and G9) in infants and children. The vaccination series consists of two 1-mL doses administered orally. The first dose should be administered to infants beginning at 6 weeks of age. There should be an interval of at least 4 weeks between the first and second dose. The 2-dose series should be completed by 24 weeks of age.

Human Papillomavirus Vaccine

Gardasil (HPV vaccine) is approved by the FDA for use in girls and young women ages 9 to 26 years. The FDA approved Gardasil for the prevention of cervical cancer, cervical precancers (cervical intraepithelial neoplasia (CIN) 2/3 and adenocarcinoma in situ (AIS)), vulvar precancers (vulvar intraepithelial neoplasia (VIN) 2/3), and vaginal precancers (vaginal intraepithelial neoplasia (VaIN) 2/3)) caused by HPV types 16 and 18. Gardasil is also approved for the prevention of genital warts and low-grade cervical lesions (CIN 1) caused by HPV types 6, 11, 16 and 18.

Gardasil is administered in three separate intramuscular injections in the upper arm over a six-month period. HPV vaccine should be initiated in females between 11-12 years of age if possible, although it may be started at any time after. It is recommended that the second dose be administered two months after the first dose and the third dose six months after the first dose.

Polio Vaccine

The ACIP recommends an injectable polio vaccine (IPV) schedule (as opposed to an oral vaccine schedule) for routine childhood polio vaccination in the United States to eliminate the risk for vaccine-associated paralytic polio (VAPP). The schedule recommends that all children should receive four doses of IPV at ages 2 months, 4 months, 6-18 months, and 4-6 years. They recommend the use of oral polio vaccine (OPV) only for the following special circumstances:

- Mass vaccination campaigns to control outbreaks of paralytic polio; or
- Unvaccinated children who will be traveling in less than 4 weeks to areas where polio is endemic; or Children of parents who are not willing to have their child have the recommended injectable form of vaccine. These children may be given OPV only for the third or fourth dose or both. In this situation, health-care providers should administer OPV only after discussing the risk of VAPP with parents or caregivers.

Polio vaccine is also recommended for adults (greater than 18 years of age) who are at increased risk of exposure to poliovirus including:

- Travelers to areas where poliomyelitis is endemic or epidemic *
- Laboratory workers handling specimens which may contain polioviruses,*
- Health-care workers in close contact with individuals who may be excreting wild polioviruses,* and
- Individuals who are members of specific population groups currently supervening an outbreak of polio caused by wild polioviruses.

For adults at increased risk of exposure to poliomyelitis, primary immunization with IPV is recommended. The recommended schedule for adults is two doses given at 1-2 month intervals, and a third dose given 6-12 months later.

Hepatitis B Vaccine

The Advisory Committee on Immunization Practices (ACIP), the American Academy of Pediatrics (AAP), and the American Academy of Family Physicians (AAFP) recommend Hepatitis B vaccination for:

1. Infants, regardless of hepatitis B surface antigen (HBsAg) status of the mother; or
2. Children and adolescents (0-18 years) who have not been vaccinated previously; or
3. Adults (over 18 years of age) at increased risk for hepatitis B infection, including:
 - hemophiliacs
 - injecting-drug users
 - persons with a history of multiple sex partners
 - persons with a recent sexually transmitted disease
 - men who have sex with men
 - international travelers to geographic areas of high endemicity *
 - household and sexual contacts of hepatitis B virus carriers
 - persons who undergo hemodialysis
 - health-care workers - see Notes
 - inmates of long-term correctional facilities - see Notes
 - hepatitis C virus positive persons
 - persons with chronic liver disease, or
 - Transplant candidates of any age

*** Vaccines required solely for the purpose of travel or employment are generally excluded from most insurance coverage**

Three doses of hepatitis B vaccine are required for complete immunization. For infants, the Centers for Disease Control and Prevention (CDC) and the Advisory Committee on Immunization Practices (ACIP) recommend hepatitis B vaccine be incorporated into the routine vaccination schedules for children.

Hepatitis A

The Centers for Disease Control's (CDC) Advisory Committee on Immunization Practices (ACIP) and the American Academy of Pediatrics (AAP) recommend vaccination for hepatitis A for the following at-risk groups:

- Ethnic and geographic populations with high endemic rates or periodic outbreaks of hepatitis A infection, such as Native Americans and Alaskan Natives
- Homosexual and bisexual men
- Injection and illicit drug users
- Individuals with chronic liver disease
- Hemophiliacs
- Children 12 - 23 months of age. Children who are not vaccinated by age 2 years can be vaccinated at subsequent visits.
- Migrant Hispanics.
- Travelers to areas where hepatitis A is endemic*
- Military personnel*
- Individuals with occupational risk of exposure, such as child-care and institutional workers, as well as primate-animal handlers*
- Laboratory workers who handle live hepatitis A virus*.

*** Vaccines required solely for the purpose of travel or employment are generally excluded from most insurance coverage.**

Hepatitis A vaccine is approved for people 12 months of age and older and is given in a 2-dose schedule at least six months apart (AAP, 2003). Currently licensed vaccines are given intramuscularly. A combination hepatitis A/hepatitis B vaccine (Twinrix, GlaxoSmithKline Biologicals, Rixensart, Belgium) is approved for people 18 years of age and older and given in a 3-dose schedule.

The annual recommended childhood and adolescent immunization schedule for January-December 2006 approved by the American Academy of Pediatrics, the Advisory Committee on Immunization Practices of the Centers for Disease Control and Prevention, and the American Academy of Family Physicians (Fiore et al, 2006) recommends universal administration to all children at 1 to year (12 to 23 months) of age. Furthermore, the 2 doses in the series should be separated by at least 6 months.

Measles, Mumps, Rubella vaccine

Children:

- Give dose #1 at age 12–15m.
- Give dose #2 at age 4–6yrs. Dose #2 may be given earlier if at least 4wks since dose #1.
- Give a second dose to all older children and teens with history of only 1 dose.
- MMRV may be used in children age 12m through 12yrs.
- If MMR and either Var, LAIV, and/or yellow fever vaccine are not given on the same day, space them at least 28d apart.
- When using MMR for both doses, minimum interval is 4wks.
- When using MMRV for both doses, minimum interval is 3m.
- Within 72hrs of measles exposure, give 1 dose of MMR as postexposure prophylaxis to susceptible healthy children age 12m and older.

Contraindications

Previous anaphylaxis to this vaccine or to any of its components.

Pregnancy or possibility of pregnancy within 4wks.

Severe immunodeficiency (e.g., hematologic and solid tumors; receiving chemotherapy; congenital immunodeficiency; long-term immunosuppressive therapy, or severely symptomatic HIV). Note: HIV infection is NOT a contraindication to MMR for children who are not severely immunocompromised (con-

Precautions

Moderate or severe acute illness.

If blood, plasma, or immune globulin given in past 11m, see ACIP statement *General Recommendations on Immunization** regarding time to wait before vaccinating.

History of thrombocytopenia or thrombocytopenic purpura.

Adults

- Persons born in 1957 or later (especially those born outside the U.S.) should receive at least 1 dose of MMR if there is no serologic proof of immunity or documentation of a dose given on or after the first birthday.
- Persons in high-risk groups, such as healthcare personnel (paid, unpaid, or volunteer), students entering college and other post–high school educational institutions, and international travelers, should receive a total of 2 doses.
- Persons born before 1957 are usually considered immune, but proof of immunity (serology or vaccination) may be desirable for healthcare personnel.
- Women of childbearing age who do not have acceptable evidence of rubella immunity or vaccination
- Give 1 or 2 doses
- If dose #2 is recommended, give it no sooner than 4wks after dose #1.
- If a pregnant woman is found to be rubella susceptible, give 1 dose of MMR postpartum.
- If 2 or more of the following live virus vaccines are to be given—LAIV, MMR, Var, and/or yellow fever vaccine— they should be given on the same day. If they are not, space them by at least 28d.
- Within 72hrs of measles exposure, give 1 dose as postexposure prophylaxis to susceptible adults.

Contraindications

- Previous anaphylactic reaction to this vaccine or to any of its components.
- Pregnancy or possibility of pregnancy within 4wks.
- Severe immunodeficiency (e.g., hematologic and solid tumors; receiving chemotherapy; congenital

- immunodeficiency; long-term immunosuppressive therapy; or severely symptomatic HIV.)
- **Note:** HIV infection is NOT a contraindication to MMR for those who are not severely immunocompromised (i.e., CD4+ T-lymphocyte counts are greater than or equal to 200 cells/ μ L).

Precautions

- Moderate or severe acute illness.
- If blood, plasma, and/or immune globulin were given in past 11m, see ACIP statement *General Recommendations on Immunization** regarding time to wait before vaccinating.
- History of thrombocytopenia or thrombocytopenic purpura.

Note: If TST (tuberculosis skin test) and MMR are both needed but not given on same day, delay TST for 4–6wks after MMR.

Zoster

A single dose of zoster vaccine is recommended for adults 60 years of age and older whether or not 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 including:

- allergy to neomycin, or any component of the vaccine; or
- a weakened immune system caused by treatments that they are taking such as radiation, a class of drugs called corticosteroids, or due to conditions such as AIDS, cancer of the lymph, bone or blood; or
- women who are or may be pregnant
- People who are in close contact with pregnant women who have not had chickenpox should talk to their healthcare provider to decide if using Zostavax is right for them.
- Children. Zostavax is not a substitute for Varivax, the vaccine to prevent chicken pox.

REFERENCES

Centers for Disease Control and Prevention (CDC), Office of Communications. CDC's Advisory Committee on Immunization Practices expands hepatitis A vaccination for children. Press Release. Atlanta, GA: CDC; October 28, 2005. Available at: <http://www.cdc.gov/od/oc/media/pressrel/r051028.htm>.

[American Academy of Pediatrics Committee on Infectious Diseases](#). Recommended childhood and adolescent immunization schedule--United States, 2006. *Pediatrics*. 2006;117(1):239-240.

Fiore AE, Wasley A, Bell BP. Prevention of hepatitis A through active or passive immunization. Recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR Recomm Rep*. 2006;55(RR-7):1-23. Available at:

http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5507a1.htm?s_cid=rr5507a1_e

No authors listed. Recommendations of the Advisory Committee on Immunization Practices: Revised recommendations for routine poliomyelitis vaccination. *MMWR Morb Mortal Wkly Rep*. 1999;48(27):590.

No authors listed. Prevention of poliomyelitis: Recommendations for use of only inactivated poliovirus vaccine for routine immunization. Committee on Infectious Diseases. *American Academy of Pediatrics*. *Pediatrics*. 1999;104(6):1404-1406.

American Academy of Pediatrics, Committee on Infectious Diseases. 2003 Red Book: Report of the Committee on Infectious Diseases. 26th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2003.

Centers for Disease Control and Prevention (CDC). General recommendations on immunization: Recommendations of the Advisory Committee on Immunization Practices (ACIP) and the American Academy of Family Physicians (AAFP). *MMWR Morbid Mortal Wkly Rep*. 2002;51(RR-2):1-35.

Merck & Co., Inc. Gardasil (quadrivalent human papillomavirus (types 6, 11, 16, 18) recombinant vaccine). Prescribing Information. 9682300. White House Station, NJ: Merck; June 2006. Available at: <http://www.gardasil.com/>.

Centers for Disease Control and Prevention (CDC), Advisory Committee on Immunization Practices (ACIP), Vaccines for Children Program. Meningococcus. Vaccines to prevent meningococcal disease. Resolution No. 2/05-2. Atlanta, GA: CDC; February 10, 2005.

Centers for Disease Control and Prevention (CDC), National Immunization Program (NIP). ACIP recommends meningococcal vaccine for adolescents and college freshman. Meningococcal conjugate vaccine. Meningococcal (groups A, C, Y and W-135) conjugate vaccine (MCV-4). In the Spotlight for the Public. NIP Public Home. Atlanta, GA: CDC; February 10, 2005. Available at: http://www.cdc.gov/nip/vaccine/meningitis/mcv4/mcv4_acip.htm. Accessed February 24, 2005.

Centers for Disease Control and Prevention (CDC). Prevention and control of meningococcal disease: Recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR Recomm Rep. 2000;49(RR-7):1-10.

Centers for Disease Control and Prevention. Meningococcal disease and college students. Recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR Recomm Rep. 2000;49(RR-7):13-20.

No authors listed. Recommended adult immunization schedule --- United States, 2002--2003. MMWR Morbid Mortal Wkly Rep. 2002;51(40):904-908.

Committee in Infectious Diseases, American Academy of Pediatrics. Advisory Committee on Immunization Practices of the Centers for Disease Control and Prevention; American Academy of Family Physicians. Recommended childhood immunization schedule -- United States, 2002. Pediatrics. 2002;109(1):162.

Centers for Disease Control and Prevention (CDC), National Immunization Program (NIP). ACIP recommends adolescent vaccination for tetanus, diphtheria and pertussis vaccine. Press Release. Atlanta, GA: CDC; June 30, 2005. Available at: http://www.cdc.gov/nip/pr/pr_tdap_jun2005.htm.

No authors listed. Recommended childhood immunization schedule -- United States, 2002. MMWR Morb Mortal Wkly Rep. 2002;51(2):31-33.

No authors listed. Pertussis vaccination: Use of acellular pertussis vaccines among infants and young children. Recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR Recomm Rep. 1997;46(RR-7):1-25.

No authors listed. Use of diphtheria toxoid-tetanus toxoid-acellular pertussis vaccine as a five-dose series. Supplemental recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR Recomm Rep. 2000;49(RR-13):1-8.

No authors listed. Centers for Disease Control and Prevention. Prevention of varicella: Recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR. 1996;45(RR-11):1-36.

No authors listed. Centers for Disease Control and Prevention. Prevention of varicella. Updated recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR. 1999;48(RR6):1-5.

Centers for Disease Control and Prevention (CDC). CDC's Advisory Committee recommends changes in varicella vaccinations. Second dose of varicella vaccine to offer more protection for children, adolescents, and adults. CDC Press Release. Atlanta, GA: CDC; June 29, 2006.

Bridges CB, Fukuda K, Cox NJ, et al. Prevention and control of influenza: Recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR Recomm Rep. 2001;50(RR-4):1-44.

Bridges CB, Fukuda K, Uyeki TM, et al. Prevention and control of influenza. Recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR Recomm Rep. 2002;51(RR-3):1-31.

Centers for Disease Control and Prevention. Using live, attenuated influenza vaccine for prevention and control of influenza. Supplemental recommendations from the Advisory Committee on Immunization Practices. Morbid Mortal Wkly Rep. 2003;52(RR-13):1-8. Available at: <http://www.cdc.gov/mmwr/PDF/rr/rr5213.pdf>.

No authors listed. American Academy of Pediatrics. Joint Statement of the American Academy of Pediatrics (AAP) and the United States Public Health Service (USPHS) (RE9937). AAP Policy Statement. Pediatrics. 1999;104(3 Pt 1):568-569. Available at: <http://www.aap.org/policy/re9937.html>.

Centers for Disease Control and Prevention (CDC), Office of Communication. CDC's advisory committee recommends expanded influenza vaccinations for children. Press Release. Atlanta, GA: CDC; February 23, 2006. Available at: <http://www.cdc.gov/od/oc/media/pressrel/r060223.htm>.

Reefhuis J, Honein MA, Whitney CG, et al. Risk of bacterial meningitis in children with cochlear implants, USA 1997--2002. N Engl J Med. 2003;349(5):435--445.

Centers for Disease Control and Prevention (CDC). Use of vaccines for the prevention of meningitis in persons with cochlear implants. Fact Sheet for Health Care Professionals. Atlanta, GA: CDC; July 31, 2003. Available at: <http://www.cdc.gov/nip/issues/cochlear/cochlear-hcp.htm>. Accessed January 9, 2004.

Centers for Disease Control and Prevention (CDC), Advisory Committee on Immunization Practices. Pneumococcal vaccination for cochlear implant candidates and recipients: Updated recommendations of the Advisory Committee on Immunization Practices. MMWR Morb Mortal Wkly Rep. 2003;52(31):739-740.

Centers for Disease Control and Prevention (CDC). Preventing pneumococcal disease among infants and young children. Recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR Recomm Rep. 2000;49(RR-9):1-35.

Centers for Disease Control and Prevention (CDC). Prevention of pneumococcal disease: Recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR Recomm Rep. 1997;46(RR-8):1-12.

Centers for Disease Control and Prevention (CDC). National Immunization Program. <http://www.cdc.gov/nip/> Accessed December 12, 2006.

Centers for Disease Control and Prevention. Recommended immunization schedules for persons aged 0 through 18 years---United States, 2010. MMWR 2010;58(51&52).

[CDC. Recommended immunization schedules for persons aged 0--18 years---United States 2009. MMWR 2009;57\(51&52\).](#)

CDC. ACIP Provisional recommendations for the use of combination vaccines. Atlanta, GA: US Department of Health and Human Services, CDC; 2009. Available at <http://www.cdc.gov/vaccines/recs/provisional/downloads/combo-vax-aug2009-508.pdf>. Accessed November 18, 2009.

[CDC. Updated recommendations of the Advisory Committee on Immunization Practices \(ACIP\) regarding routine poliovirus vaccination. MMWR 2009;58:829--30.](#)

[CDC. Updated recommendation from the Advisory Committee on Immunization Practices \(ACIP\) for revaccination of persons at prolonged increased risk for meningococcal disease MMWR 2009;58:1042--3.](#)

CDC. ACIP provisional recommendations for HPV vaccine. Atlanta, GA: US Department of Health and Human Services, CDC; 2009. Available at <http://www.cdc.gov/vaccines/recs/provisional/downloads/hpv-vac-dec2009-508.pdf>. Accessed December 23, 2009.

American Academy of Pediatrics. Active and passive immunization. In: Pickering LK, Baker CJ, Kimberlin DW, Long SS, eds. 2009 red book: report of the Committee on Infectious Diseases. 28th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2009

Centers for Disease Control and Prevention. Recommended adult immunization schedule---United States, 2010. MMWR 2010;59(1).

MEASURES

- Percent of children who have had 4 DTaP/DT immunizations by their second birthday.
- Percent of children who have had 3 IPV immunizations by their second birthday.
- Percent of children who have had 3 Hep B immunizations, or evidence of disease by their second birthday.
- Percent of children who have had 1 MMR immunization, or evidence of disease by their second birthday.
- Percent of children who have had 3 H influenza type B immunizations by their second birthday.
- Percent of children who have had 1 chicken pox vaccine (VZV) immunization, or evidence of disease by their second birthday.
- Percent of children who have had 4 pneumococcal conjugate vaccine immunizations by their second birthday.
- Percent of children who have had 2 hepatitis A immunizations by their second birthday
- Percent of children who have had 3 rotavirus immunizations by their second birthday
- Percent of children who have had 2 influenza immunizations by their second birthday
- Percent of adolescents 13 years of age who have had 1 meningitis immunization by their 13th birthday
- Percent of adolescents 13 years of age who have had 1 Tdap or 1 Td by their 13th birthday

- Percent of Medicare members 65 years of age and older as of January 1 of the measurement year who have ever received a pneumococcal vaccine.
- Percentage of commercial members 50-64 years of age as of September 1 of the measurement year who received an influenza vaccination between September 1 and March 31.
- Percentage of Medicare members 65 years of age and older as of January 1 of the measurement year who received an influenza vaccination between September 1 and March 31

