

AN EPIDEMIOLOGY PUBLICATION OF THE OREGON DEPARTMENT OF HUMAN SERVICES

THE 2010 CHILD AND ADOLESCENT IMMUNIZATION SCHEDULES

Table 1 Recommended Immunization Schedule for Persons Aged 0 Through 6 Years
United States, 2010

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		see footnote 1		HepB						Range of recommended ages
Rotavirus ²				RV	RV	RV ²							
Diphtheria, Tetanus, Pertussis ³				DTaP	DTaP	DTaP	see footnote 3	DTaP				DTaP	Certain high-risk groups
<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		see footnote 8		MMR	
Varicella ⁹								Varicella		see footnote 9		Varicella	
Hepatitis A ¹⁰								HepA (2 doses)				HepA Series	
Meningococcal ¹¹												MCV	

Table 2 Recommended Immunization Schedule for Persons Aged 7 Through 18 Years
United States, 2010

Vaccine ▼	Age ►	7-10 years	11-12 years	13-18 years	
Tetanus, Diphtheria, Pertussis ¹			Tdap	Tdap	Range of recommended ages
Human Papillomavirus ²		see footnote 2	HPV (3 doses)	HPV Series	
Meningococcal ³		MCV	MCV	MCV	Range of recommended ages for catch-up immunization
Influenza ⁴			Influenza (Yearly)		
Pneumococcal ⁵			PPSV		Certain high-risk groups
Hepatitis A ⁶			HepA Series		
Hepatitis B ⁷			HepB Series		
Inactivated Poliovirus ⁸			IPV Series		
Measles, Mumps, Rubella ⁹			MMR Series		
Varicella ¹⁰			Varicella Series		

HIGHLIGHTS OF THIS YEAR'S SCHEDULES

Immunization recommendations for children and adolescents in the United States have been updated by the Advisory Committee on Immunization Practices (ACIP) and endorsed by the American Academy of Pediatrics and the American Academy of Family Physicians.¹ This issue of the *CD Summary* presents the 2010 schedules in all their footnoted glory, and highlights five major changes that they incorporate.

Polio. To ensure long-term protection against polio, the last dose in the series for inactivated poliovirus vaccine now has a minimum age of 4 years and a minimum interval of at least 6 months from the previous dose. If 4 doses are administered at <4 years of age, an additional (5th) dose should be administered at 4–6 years of age.²

HPV. On October 16, 2009, the Food and Drug Administration (FDA) approved Cervarix® for prevention of cervical cancer and precancerous lesions caused by types HPV types 16 and 18; ACIP expressed no preference

for use of this vaccine as opposed to the quadrivalent vaccine Gardasil®, which in addition protects against genital warts caused by HPV types 6 and 11.

On the same date, FDA expanded the indication for Gardasil®: it is now also approved for the prevention of genital warts in males. ACIP's recommendation for males is less forceful than for females: "the three-dose series may be given to males to reduce their likelihood of acquiring genital warts."³

Meningococcal Revax. High-risk kids who received their first dose of meningococcal vaccine at 2–6 years of age and remain at increased risk should receive a booster dose of quadrivalent meningococcal conjugate vaccine (MCV4) three years after their first dose. High-risk kids who received their first meningococcal vaccine at ≥7 years of age and remain at high risk should receive a booster dose of MCV4 five years after their first dose.⁴

Hepatitis A. The footnote was revised to endorse vaccination of children >23 months of age for whom immunity against hepatitis A is desired.

Combination Vaccines. The general footnote to both tables reflects the more nuanced ACIP endorsement of combination vaccines: they are now "generally" preferred over separate injections of their equivalent component vaccines, with provider assessment, patient preference and adverse events to be considered.⁵

REFERENCES

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2. CDC. Updated recommendations of the Advisory Committee on Immunization Practices (ACIP) regarding routine poliovirus vaccination. *MMWR* 2009;58:829–30.
3. CDC. ACIP provisional recommendations for HPV vaccine, Atlanta, GA: US Department of Health and Human Services, CDC; 2009. Available at www.cdc.gov/vaccines/recs/provisional/downloads/hpv-vac-dec2009-508.pdf.
4. 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.
5. CDC. ACIP provisional recommendations for the use of combination vaccines. Atlanta, GA: US Department of Health and Human Services, CDC; 2009. Available at www.cdc.gov/vaccines/recs/provisional/downloads/combo-vax-aug2009-508.pdf.

Footnotes to Table 1 (verso)

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 the 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. The monovalent HepB vaccine should be used for doses administered 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 the HepB series, at age 9–18 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 6–14 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 4–6 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 one dose of PCV to all healthy children aged 24–59 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 of 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, a fifth dose should be administered at age 4–6 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–18 years.

- For healthy children aged 2–6 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 2–4 years who have had wheezing in the past 12 months.
- Children receiving TIV should receive 0.25 ml if aged 6–35 months or 0.5 ml if aged ≥3 years.
- 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 one 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 4–6 years. However, the second dose may be administered before age 4, provided at least 28 days have elapsed since the first dose.
- Administer the second dose routinely at age 4–6 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 12–23 months). Administer 2 doses at least 6 months apart.
- Children not fully vaccinated by age 2 years can be vaccinated at subsequent visits.
- HepA is also recommended for older children who live in areas where vaccination programs target older children or who are at increased risk of 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 2–10 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 2–6 years. See *MMWR* 2009;58:1042–3.

Footnotes to Table 2 (page 1)

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 toxoids (Td) booster dose.
- Persons aged 13–18 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 1–2 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 13–18 years if not previously vaccinated.
- HPV4 may be administered in a 3-dose series to males aged 9–18 years to reduce their likelihood of acquiring genital warts.

3. Meningococcal vaccine (MCV4).

- Administer at age 11–12 years, or at age 13–18 if not previously vaccinated.
- Administer to previously unvaccinated college freshmen living in a dormitory.
- Administer MCV4 to children aged 2–10 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 2–6 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, non-pregnant persons aged 7–18 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:[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 of 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 11–15 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 7–18 years without evidence of immunity (see *MMWR* 2007;56 [RR-4]), administer 2 doses if not previously vaccinated or the second dose if only 1 dose has been administered.
- For persons aged 7–12 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.

Footnotes to Table 3 (verso)

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 11–15 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 with sickle cell disease, leukemia, or HIV infection, or who have had a splenectomy; ad-

ministering 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 12–15 months and at least 8 weeks after the second dose.

- If first dose was administered at age 7–11 months, administer the second dose at least 4 weeks later and a final dose at age 12–15 months.

5. Pneumococcal vaccine.

- Administer one dose of pneumococcal conjugate vaccine (PCV) to all healthy children aged 24–59 months who have not received at least 1 dose of PCV on or after age 12 months.
- For children aged 24–59 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 [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 4–6 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 4–6 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 or older, the minimum interval between doses is 28 days.

9. Hepatitis A vaccine (HepA).

- HepA is recommended for children 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 10–18 years; use Td for other doses.

11. Human papillomavirus vaccine (HPV).

- Administer the series to females at age 13–18 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 given at least 24 weeks after the first dose.

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Table 3 Catch-up Immunization Schedule, 4 Months Through 18 Years
 starting late or more than one month behind—United States, 2010

PERSONS AGED 4 MONTHS–6 YEARS					
Vaccine	Min. 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 16 weeks after first dose)		
Rotavirus ²	6 wks	4 weeks	4 weeks ²		
Diphtheria, Tetanus, Pertussis ³	6 wks	4 weeks	4 weeks	6 months	6 months ³
<i>Haemophilus influenzae</i> type b ⁴	6 wks	4 weeks if first dose administered at 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.	4 weeks ⁴ if current age <12 months. 8 weeks (as final dose) ⁴ if current age ≥12 months and first dose administered at age <12 months and second dose administered at age <15 months. No further doses needed if previous dose administered at age ≥15 months.	8 weeks (as final dose) This dose only necessary for children aged 12–59 months who received 3 doses before age 12 months.	
Pneumococcal ⁵	6 wks	4 weeks if first dose administered at age <12 months. 8 weeks (as final dose for healthy children) if first dose administered at age ≥12 months or current age 24–59 months. No further doses needed for healthy children if first dose administered at age ≥24 months.	4 weeks if current age <12 months. 8 weeks (as final dose for healthy children) if current age ≥12 months. No further doses needed for healthy children if previous dose administered at age ≥24 months.	8 weeks (as final dose) This dose only necessary for children aged 12–59 months who received 3 doses age <12 months or high risk children who received 3 doses at any age.	
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 7–18 YEARS					
Tetanus, Diphtheria/ Tetanus, Diphtheria, Pertussis ¹⁰	7 yrs ¹⁰	4 weeks	4 weeks if first dose administered at age <12 months. 6 months if first dose administered at age ≥12 months.	6 months if first dose administered at age <12 months.	
Human Papillomavirus ¹¹	9 yrs	Routine dosing intervals are recommended ¹¹			
Hepatitis A ⁹	12 mos	6 months			
Hepatitis B ¹	Birth	4 weeks	8 weeks (and 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 first dose administered at age <13 years. 4 weeks if person is aged ≥13 years.			