

Recommended immunization schedule for HIV-infected* children aged 0-6 years — United States, 2009

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

This schedule summarizes recommendations for routine administration of vaccines for HIV-infected children 0-6 years and indicates the recommended ages for vaccine administration in this population for childhood vaccines licensed in the United States as of December 1, 2008. Any dose not administered at the recommended age should be administered at a subsequent visit, when indicated and feasible. Licensed combination vaccines may be used whenever any component of the combination is indicated and other components of the vaccine are not contraindicated and if approved by the Food and Drug Administration for that dose of the series. Providers should consult the relevant Advisory Committee on Immunization Practices statement for detailed recommendations. Clinically significant adverse events that follow immunization should be reported to the Vaccine Adverse Event Reporting System (VAERS). Guidance about how to obtain and complete a VAERS form is available at <http://www.vaers.hhs.gov> or telephone 800-822-7967.

*These recommendations should also be used for perinatally HIV-exposed children who are awaiting laboratory confirmation that they are HIV-uninfected.

VACCINE	AGE	Range of recommended ages for vaccination										Certain high-risk groups				
		Birth	1 month	2 months	4 months	6 months	12 months	13 months	15 months	18 months	19-23 months	2-3 years	4-6 years			
Hepatitis B ¹	HepB	HepB														
Rotavirus ²				RV	RV	RV ²										
Diphtheria, Tetanus, Pertussis ³				DTaP	DTaP	DTaP	<small>see footnote 3</small>			DTaP						DTaP
<i>Haemophilus influenzae</i> type b ⁴				Hib	Hib	Hib ⁴			Hib							
Pneumococcal ⁵				PCV	PCV	PCV			PCV							PPSV
Inactivated Poliovirus				IPV	IPV				IPV							IPV
Influenza ⁶									TIV (Yearly)							
Measles, Mumps, Rubella ⁷								MMR	MMR							
								Do not administer to severely immunosuppressed (CD4 ⁺ T-lymphocyte percentages <15%) children								
Varicella ⁸								Varicella		Varicella						
								Do not administer to severely immunosuppressed (CD4 ⁺ age specific T-lymphocyte percentages <15%) children								
Hepatitis A ⁹									HepA (2 doses)							HepA Series
Meningococcal ¹⁰																MCV

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 0.5mL of hepatitis B immune globulin (HBIG) within 12 hours after birth.
- If mother's HBsAg status is unknown, administer HepB within 12 hours after birth. Determine mother's HBsAg status as soon as possible and if HBsAg-positive, administer HBIG (at 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 through 2 months. 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 (anti-HBs) after completion of at least 3 doses of a licensed HepB series, at age 9 through 18 months (generally at the next well-child visit).

4-month dose:

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

Post-vaccination:

- Testing is recommended for HIV-infected children and should be performed 1 to 2 months after administration of the last dose of the vaccine series using a method that allows determination of a protective level of anti-HBs (greater than or equal to 10 mIU/mL).
- Children with anti-HBs levels of less than 10 mIU/mL after the primary series should be revaccinated. Administering 3 doses on an appropriate schedule, followed by anti-HBs testing 1 to 2 months after the third dose, usually is more practical than serologic testing after one or more doses of vaccine.

Booster dose:

- In HIV-infected children, the need for booster doses has not been determined. Annual anti-HBs testing and booster doses when anti-HBs levels decline to less than 10 mIU/mL should be considered in persons with ongoing risk for exposure. See *MMWR* 2005;54(No. RR-16).

2. Rotavirus vaccine (RV). (Minimum age: 6 weeks)

- Practitioners should consider the potential risks and benefits of administering rotavirus vaccine to infants with known or suspected altered immunocompetence; consultation with an immunologist or infectious diseases specialist is advised. No safety or efficacy data are available for the administration of rotavirus vaccines to infants who are potentially immunocompromised, including those who are HIV-positive.

However, the following considerations support vaccination of HIV-exposed or HIV-infected infants: a) in infants born to HIV-positive mothers, the HIV diagnosis may not be established before the age of the first rotavirus vaccine dose (only 1.5%–3% of HIV-exposed infants in the United States will eventually be determined to be HIV infected); and b) vaccine strains of rotavirus are considerably attenuated.

- 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 or older.

- Administer the final dose in the series by age 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) should not be used for doses at 2, 4, or 6 months of age but can be used as the final dose in children aged 12 months or older.

- Clinicians and other health-care providers might consider use of Hib among HIV-infected children aged 60 months and older who did not receive an age-appropriate Hib vaccination series by 60 months of age. See *MMWR* 2006;55(No. RR-15).

5. Pneumococcal vaccine.

(Minimum age: 6 weeks for pneumococcal conjugate vaccine [PCV]; 2 years for pneumococcal polysaccharide vaccine [PPSV])

- PCV is recommended for all HIV-infected children aged younger than 5 years. Children less than or equal to 23 months should be vaccinated according to the routine PCV schedule. For dosing intervals of children starting the vaccination schedule after age 2 months, see *MMWR* 2000;49(No. RR-9). For incompletely vaccinated children aged 24 through 59 months, administer 2 doses of PCV at least 8 weeks apart. Children who have previously received 3 PCV doses need only 1 dose.
- Administering PCV to HIV-infected children 5 years or older is not contraindicated.
- Children aged 2 years or older also should receive PPSV 2 or more months after their last PCV dose.

(continued)

6. Influenza vaccine.

- (*Minimum age: 6 months for trivalent inactivated influenza vaccine [TIV]*)
- Administer annually to HIV-infected children aged 6 months through 6 years and to all their eligible close contacts (including household members). Only TIV should be used for HIV-infected children.
- For healthy nonpregnant close contacts aged 2 through 49 years, either live, attenuated influenza vaccine (LAIV) or TIV may be used.
- 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 received only 1 dose. See 2008;57(No. RR-7).

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

- (*Minimum age: 12 months*)
- MMR is recommended for all asymptomatic HIV-infected children who are not severely immunosuppressed and who lack evidence of measles immunity.
- MMR for symptomatic HIV-infected children should be considered if they do not have evidence of severe immunosuppression and lack evidence of measles immunity.
- The first dose of MMR should be administered as soon as possible after the first birthday. Consideration should be given to administering the second dose 1 month (i.e., a minimum of 28 days) after the first dose rather than waiting until age 4 through 6 years.
- MMR and other measles-containing vaccines are not recommended for HIV-infected children who have evidence of severe immunosuppression (CD4⁺ T-lymphocyte percentages less than 15%). See 1998;47(No. RR-8), "TABLE 2. Age-specific CD4⁺ T-lymphocyte count and percent of total lymphocytes as criteria for severe immunosuppression in persons infected with human immunodeficiency virus (HIV)."
- Measles-mumps-rubella-varicella (MMRV) vaccine has not been studied in HIV-infected children and should not be substituted for MMR.

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

- Limited data are available on safety and immunogenicity of varicella vaccine in HIV-infected children aged 1 through 8 years in CDC immu-

nologic categories 1 and 2 (CD4⁺ age-specific T-lymphocyte percentages 15% or greater) and clinical categories N, A, and B.

- Single-antigen varicella vaccine should be considered for HIV-infected children who have CD4⁺ age-specific T-lymphocyte percentages 15% or greater. Eligible children should receive 2 doses 3 months apart, with the first dose administered as soon as possible after the first birthday.
 - Varicella vaccine is not recommended for HIV-infected children who have evidence of severe immunosuppression (CD4⁺ T-lymphocyte percentages less than 15%). See 2007;56(No. RR-4).
 - MMRV vaccine has not been studied in HIV-infected children and should not be substituted for single-antigen varicella vaccine.
- 9. Hepatitis A vaccine (HepA).** (*Minimum age: 12 months*)
- Administer to all children aged 12 through 23 months. The 2 doses in the series should be administered at least 6 months apart.
 - Children not fully vaccinated by age 2 years can be vaccinated at subsequent visits.
 - HepA is also recommended for children 24 months and older who live in areas where vaccination programs target older children or who are at increased risk for infection See 2006;55(No. RR-7).

10. Meningococcal vaccine.

- (*Minimum age: 2 years for meningococcal conjugate vaccine [MCV] and for meningococcal polysaccharide vaccine [MPSV]*)
- Administer MCV to children aged 2 through 6 years who have terminal complement component deficiency, anatomic or functional asplenia and certain other high-risk groups. See 2007;56(48):1265–6.
- Children who received MPSV 3 or more years previously and remain at increased risk for meningococcal disease should be revaccinated with MCV.
- Children with HIV most likely are at increased risk for meningococcal disease but not to the extent as for invasive *S. pneumoniae* infection. Although the efficacy of MCV among HIV-infected children is unknown, providers may elect to vaccinate HIV-infected children.

For more information, see the catch-up schedule (<http://www.cdc.gov/vaccines/schedules/hcp/child-adolescent.html>)

NOTES

Source: Guidelines for Prevention and Treatment of Opportunistic Infections among HIV-Exposed and HIV-Infected Children. 2009 Sept. Available at: http://aidsinfo.nih.gov/contentfiles/Pediatric_OI.pdf