Recommended immunization schedule for HIV-infected children aged 7–18 years — United States, 2009

This schedule summarizes recommendations for routine administration of vaccines for HIV-infected children and adolescents aged 7 through 18 years and indicates the recommended ages for vaccine administration for vaccines licensed in the United States as of December 1, 2008. Additional vaccines may be licensed and recommended after this immunization schedule is published. Licensed combination vaccines may be used whenever a 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.

Range of recommended ages for vaccination | Certain high-risk groups | Catch-up immunization

VACCINE \ AGE	7–10 years	11–12 years	13–14 years	15 years	16–18 years
Diphtheria, Tetanus, Pertussis[1]	see footnote 1	Tdap	Tdap		
Human Papillomavirus[2]	see footnote 2	HPV (3 doses)	HPV Series		
Meningococcal[3]	MCV	MCV	MCV		
Influenza[4]	TIV (Yearly)				
Pneumococcal[5]	PPSV				
Hepatitis A[6]	HepA Series				
Hepatitis B[7]	HepB Series				
Inactivated Poliovirus[8]	IPV Series				
Measles, Mumps, Rubella[9]	MMR Series				
	Do not administer to severely immunosupressed (CD4+ T-lymphocyte percentages <15% or T-lymphocyte count <200 cells/μL) children or adolescents				
Varicella[10]	Varicella Series				
	Do not administer to severely immunosupressed (CD4+ age specific T-lymphocyte percentages <15% or T-lymphocyte count <200 cells/μL) children or adolescents				

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.
- Adolescents 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, females only)

- No data are available on immunogenicity, safety, and efficacy of HPV vaccine in HIV-infected females. However, because quadrivalent HPV vaccine is a noninfectious vaccine, it can be administered to females who are immunosuppressed because of disease or medications, including HIV-infected females. However, the immune response and vaccine efficacy might be less than that in immunocompetent persons. See *MMWR* 2007;56(No. RR-2) and *MMWR* 2006;55(No. RR-15). Studies are ongoing in HIV-infected females.
- Administer the first dose to females at age 11 or 12 years.
- Administer the second dose 2 months after the first dose and the third dose 6 months (at least 24 weeks) after the first dose.
- Administer the series to females at age 13 through 18 years if not previously vaccinated.

3. Meningococcal vaccine.
(meningococcal conjugate vaccine [MCV])

- 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.
- MCV is recommended for children aged 1 through 10 years who have complement component deficiency, anatomic or functional asplenia, and certain other groups at high risk. See *MMWR* 2007; 56(48);1265–6.
- Persons who received *meningococcal polysaccharide vaccine (MPSV)* 5 or more years previously and remain at increased risk for meningococcal disease should be revaccinated with MCV. See *MMWR* 2005;54(No. RR-7).
- HIV-infected patients likely are at increased risk for meningococcal disease but not to the extent as for invasive Streptococcus pneumoniae infection. Although the efficacy of MCV among HIV-infected patients is unknown, HIV-infected patients aged 7 through 10 years who do not fit into the above groups may elect vaccination.

4. Influenza vaccine.
(trivalent inactivated influenza vaccine [TIV])

- Administer annually to HIV-infected children and adolescents aged 6 months through 18 years and to all eligible close contacts (including household members). Only TIV should be used for HIV-infected persons.
- For healthy nonpregnant close contacts aged 2 through 49 years, either live, attenuated influenza vaccine (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 received only 1 dose. All other children aged 6 months through 18 years should receive 1 dose, See *MMWR* 2008;57(No. RR-7).

5. Pneumococcal vaccine.
(pneumococcal conjugate vaccine [PCV]; pneumococcal polysaccharide vaccine [PPSV])

- If not previously vaccinated with PPSV, children and adolescents aged 7 through 18 years should receive 1 dose of PPSV.
- If previously vaccinated with PPSV, a single revaccination should be administered after 5 years. See *MMWR* 1997;46(No. RR-8) and *MMWR* 2000;49(No. RR-9).
- Administering PCV to HIV-infected children 5 years or older is not contraindicated.

6. Hepatitis A vaccine (HepA).

- Administer 2 doses at least 6 months apart.
- HepA is recommended for children older than I year who live in areas where vaccination programs target older children or who are at increased risk for infection. See *MMWR* 2006;55(No. RR-7).

(continued)

7. Hepatitis B vaccine (HepB).

- Administer the 3-dose series to those who were not previously vaccinated.
- Postvaccination testing is recommended for HIV-infected persons. Testing 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 antibody to hepatitis B surface antigen (anti-HBs) (greater than or equal to 10 mIU/mL). Persons found to have anti-HBs levels of less than 10 mIU/mL after the primary series should be revaccinated. Administration of 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 1 or more doses of vaccine. Modified dosing regimens, including doubling of the standard antigen dose, might increase response rates. However, data are limited on response to these alternative vaccination schedules.
- In HIV-infected persons, the need for booster doses has not been determined. Annual anti-HB 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).

8. Inactivated poliovirus vaccine (IPV).

- For children who received an all-IPV or all-oral poliovirus (OPV) series, a fourth dose is not necessary if the third dose was administered at age 4 years or older.
- 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 and eligible, administer 2 doses, or administer the second dose for those who received only 1 dose, with at least 4 weeks between doses.
- MMR is recommended for all asymptomatic HIV-infected children and adolescents who do not have evidence of severe immunosuppression and who lack evidence of measles immunity.
- MMR should be considered for symptomatic HIV-infected children and adolescents who do not have evidence of severe immunosuppression and who lack evidence of measles immunity.
- 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% or T-lymphocyte count less than 200 cells/μL). See *MMWR* 1998;47(No. RR-8), "TABLE 2. Age-specific $CD4^+$ T-lymphocye 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.

10. Varicella vaccine.

- Limited data are available on safety and immunogenicity of varicella vaccine in HIV-infected children aged 1 through 8 years in CDC immunologic categories 1 and 2 ($CD4^+$ T-lymphocyte percentages greater than or equal to 15%) and clinical categories N, A, and B. Single-antigen varicella vaccine should be considered for HIV-infected children aged 7 through 8 years with $CD4^+$ T-lymphocyte percentages greater than or equal to 15% or age-specific T-lymphocyte count greater than or equal to 200 cells/μL and who lack evidence of immunity. Eligible children should receive 2 doses 3 months apart.
- Data are lacking on use of varicella vaccine in HIV-infected children 8 years or older. However, on the basis of expert opinion, the safety of varicella vaccine in HIV-infected persons aged 8 years or older with similar levels of immune function ($CD4^+$ age-specific T-lymphocyte percentages greater than or equal to 15% or T-lymphocyte count greater than or equal to 200 cells/μL) is likely to be similar to that of children aged less than 8 years. Immunogenicity might be lower in HIV-infected adolescents (and adults). However, weighing the risk for severe disease from wild varicella zoster virus and the potential benefit of vaccination, vaccination (2 doses administered 3 months apart) can be considered for children and adolescents aged 9 through 18 years who lack evidence of immunity.
- Varicella vaccine is not recommended for HIV-infected children or adolescents who have evidence of severe immunosuppression (CD4+ age-specific T-lymphocyte percentages less than 15% or T-lymphocyte count less than 200 cells/μL).
- MMRV vaccine has not been studied in HIV-infected children and should not be substituted for single-antigen varicella vaccine.
- For evidence of immunity guidance and other details, see *MMWR* 2007;56(No.RR-4).

Note: Haemophilus influenzae type b conjugate vaccine (Hib)

Hib conjugate vaccines are available in single- or combined-antigen preparations. Hib is recommended routinely for all children through age 59 months. Clinicians and other health-care providers might consider use of Hib among HIV-infected children 60 months and older who did not receive an age-appropriate vaccine series before age 59 months. See *MMWR* 2006:55(No. RR-15).

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