# VACCINATION SCHEDULE: HIV-INFECTED 7–18 YEARS OF AGE (Part 1 of 2)

This schedule summarizes recommendations for routine administration of vaccines for HIV-infected children and adolescents aged 7–18yrs and indicates the recommended ages for vaccine administration for vaccines licensed in the U.S. in 2013. 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 FDA for that dose of the series, unless otherwise specified. 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 [www.vaers.hhs.gov](http://www.vaers.hhs.gov) or call (800) 822-7967.

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## 1. Tetanus and diphtheria toxoids and acellular pertussis vaccine (Tdap).

*(Minimum age: 7yrs)*
- Individuals aged 11–18yrs who have not received Tdap should receive a dose followed by Tetanus Diphtheria (Td) booster doses every 10yrs thereafter.
- Individuals aged 7–10yrs who are not fully immunized against pertussis (including those never vaccinated or with unknown pertussis status) should receive a single dose of Tdap. Refer to the catch-up schedule if additional doses of tetanus and diphtheria toxoid-containing vaccine are needed.
- Tdap can be administered regardless of the interval since the last tetanus dose.

## 2. Human papillomavirus vaccine (HPV).

*(Minimum age: 9yrs)*

**Note:** Two HPV vaccines are licensed. A quadrivalent vaccine (HPV4) is licensed for use in females and males; a bivalent vaccine (HPV2) is licensed for use in females. Because these are not live virus vaccines, they can be administered to individuals who are immunosuppressed because of disease or medication, including those who are HIV-infected. However, the immune response and vaccine efficacy may be less than in immunocompetent individuals.

- HPV vaccines are most effective for both males and females when given before exposure to HPV through sexual contact.
- Administer the first dose at ages 11 or 12yrs.
- Administer the second dose 1–2mos after the first dose and the third dose 6mos after the first dose (at least 24wks after the first dose).
- Administer the series at ages 13–18yrs if not previously vaccinated.
- HPV4 can be administered in a 3-dose series to individuals aged 9–10yrs.

## 3. Meningococcal vaccine.

*(meningococcal conjugate vaccine [MCV4])*

- Individuals who receive the second dose of the primary series at or before age 11–12yrs should receive a booster dose at age 16yrs. Although the efficacy of MCV4 among HIV-infected patients is unknown, HIV-infected patients aged 7–10yrs may elect vaccination.

## 4. Influenza vaccine.

*(trivalent inactivated influenza vaccine [TIV])*

- Administer annually to HIV-infected children and adolescents. Only TIV should be used in HIV-infected individuals. For healthy non-pregnant close contacts aged 2–49yrs, either live, attenuated influenza vaccine (LAIV) or TIV can be used.
- Administer 2 doses (separated by at least 4wks) to children aged younger than 9yrs who are receiving influenza vaccine for the first time or based on previous influenza vaccine history, per current influenza vaccine recommendations.

## 5. Pneumococcal vaccine.

*(pneumococcal conjugate vaccine [PCV]; pneumococcal polysaccharide vaccine [PPSV])*

- A single dose of 13-valent pneumococcal conjugate vaccine (PCV13) should be routinely administered to HIV-infected children aged 6–18yrs who did not previously receive a dose of PCV13 before age 6yrs. The dose should be administered at least 8wks after the previous dose of PCV.
- Administer 23-valent pneumococcal polysaccharide vaccine (PPSV23) at least 8wks after the last dose of PCV13 to children aged ≥2yrs. A single revaccination dose should be administered 5yrs thereafter.
- HIV-infected children who have already received a dose or doses of PPSV23 should receive a dose of PCV13 a minimum of 8wks after the dose of PPSV23. A second dose of PPSV23 is recommended 5yrs later.

## 6. Hepatitis A vaccine (Hep A).

- Hep A is recommended for children ≥23mos 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. See *MMWR* 2006;55(No. RR-7).

## 7. Hepatitis B vaccine (Hep B).

- Administer the 3-dose series to those who were not previously vaccinated.
- Post-vaccination testing is recommended for HIV-infected individuals. Testing should be performed 1–2mos after administration of the final dose. Persons found to have anti-HBs levels <10 mIU/mL after the primary series should be revaccinated. Administration of 3 doses on an appropriate schedule, followed by anti-HBs testing 1–2mos after the third dose, is usually more practical than serologic testing after 1 or 2 doses of vaccine. Modified dosing regimens, including doubling of the standard antigen dose, may increase response rates. However, data are limited on response to these alternative vaccination schedules.

(continued)
7. Hepatitis B vaccine (Hep B). (continued)
   • In HIV-infected individuals, the need for booster doses has not been determined. Annual anti-HBs testing and booster doses when anti-HBs levels decline to <10 mIU/mL should be considered in individuals with ongoing risk of exposure. See MMWR 2005;54(No. RR-16).

8. Inactivated poliovirus vaccine (IPV).
   • The final dose in the series should be administered on or after the fourth birthday and at least 6mos after the previous dose.
   • 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 ≥4yrs.
   • If both OPV and IPV were administered as part of a series, a total of 4 doses should be administered, regardless of a child’s current age.

   • If eligible and not previously vaccinated, administer 2 doses with the second dose at least 28 days after the first dose, or administer the second dose for those who received only 1 dose, with at least 28 days between doses.
   • Two doses of MMR vaccine are recommended for all HIV-infected individuals aged ≥12mos who do not have evidence of current severe immunosuppression (i.e., individuals aged >5yrs must have CD4 T lymphocyte [CD4] percentages ≥15% and CD4 ≥200 lymphocytes/mm³ for ≥6mos) or other current evidence of measles, rubella, and mumps immunity. In cases when only CD4 counts or only CD4 percentages are available for those >5yrs, assessment of severe immunosuppression can be based on the CD4 values (count or percentage) that are available.
   • Individuals with perinatal HIV infection who were vaccinated prior to establishment of effective combination antiretroviral therapy (cART) should receive two appropriately spaced doses of MMR vaccine once effective cART has been established (individuals aged >5yrs: must have CD4 percentages ≥15% and CD4 ≥200 lymphocytes/mm³ for ≥6mos) unless they have other acceptable current evidence of measles, rubella, and mumps immunity.

10. Varicella vaccine.
    • Limited data are available on safety and immunogenicity of varicella vaccine in HIV-infected children 1–8yrs old in CDC immunologic categories 1 and 2 (CD4+ percentages ≥15%) and clinical categories N, A, and B. Varicella vaccine should be considered for HIV-infected children aged 1–8yrs with CD4 percentages ≥15%. Eligible children should receive 2 doses at least 3mos apart.
    • Data are lacking on use of varicella vaccine in HIV-infected children >8yrs old. However, on the basis of expert opinion, the safety of varicella vaccine in HIV-infected individuals >8yrs with similar levels of immune function (CD4+ age-specific percentages ≥15% or count ≥200cells/mm³) is likely to be similar to that for children aged ≤8yrs. Immunogenicity may be lower in HIV-infected adolescents (and adults). However, weighing the risk of severe disease from wild varicella zoster virus and the potential benefit of vaccination, vaccination (2 doses administered 3mos apart) can be considered for children and adolescents 9–18yrs old who lack evidence of immunity.
    • Varicella vaccine is not recommended for HIV-infected children or adolescents who have evidence of severe immunosuppression (CD4+ percentage <15% at any age; for those >5yrs old, CD4 count <200 cells/mm³).
    • 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 59mos. One dose of Hib vaccine should be administered to unvaccinated or partially vaccinated individuals ≥5yrs old who have leukemia, malignant neoplasms, anatomic or functional asplenia (including sickle cell disease), are HIV-infected, or who have other immunocompromising conditions.

REFERENCES