This schedule summarizes recommendations for routine administration of vaccines for HIV-infected children 0–6yrs and indicates the recommended ages for vaccine administration in this population for childhood vaccines licensed in the United States. 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 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.

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1. Hepatitis B vaccine (Hep B). *(Minimum age: birth)*

- **At birth:**
  - Administer monovalent Hep B to all newborns within 24hrs of birth.
  - If mother is hepatitis B surface antigen (HBsAg)-positive, administer Hep B and 0.5mL of hepatitis B immune globulin (HBig) within 12hrs after birth.
  - If mother’s HBsAg status is unknown, within 12hrs of birth administer HepB vaccine regardless of birth weight. For infants weighing <2,000g, administer HBIG in addition to HepB within 12hrs of birth. Determine mother’s HBsAg status as soon as possible and, if she is HBsAg-positive, also administer HBIG for infants weighing ≥2,000g (no later than age 1wk).

2. Rotavirus vaccine (RV). *(Minimum age: 6wks)*

- 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 disease specialist is advised. Limited safety and efficacy data are available for the administration of rotavirus vaccines to infants who are potentially immunocompromised, including those who are HIV infected. 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 U.S. will eventually be determined to be HIV-infected), and b) Vaccine strains of rotavirus are considerably attenuated.

3. Diphtheria and tetanus toxoids and acellular pertussis vaccine (DTaP). *(Minimum age: 6wks)*

- Post-vaccination:
  - Infants born to HBsAg+ mothers should be tested for HBsAg and the antibody to HBs (anti-HBs) after completion of at least 3 doses of a licensed Hep B series, at 9–18mos (at next well-child visit).
  - Testing is recommended for HIV-infected children and should be performed 1–2mos after administration of the last dose of the vaccine series using a method that allows determination of a protective level of anti-HBs (≥10 mIU/mL).

- 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 <10 mIU/mL should be considered in persons with ongoing risk for exposure. See MMWR 2005:54(No. RR-16).

- Certain high-risk groups:
  - Children with anti-HBs <10 mIU/mL after the primary schedule should receive a second series, followed by anti-HBs testing 1–2mos after the third dose, which usually is more practical than serologic testing after one or more doses of vaccine.

- The max age for the first dose in the series is 14wks and 6 days; for the final dose in the series, it is 8mos and 0 days. Vaccination should not be initiated for infants ≥15wks old.

- If Rotarix is administered at ages 2 and 4mos, a dose at age 4mos is not indicated.

- The 4th dose of DTaP need not be repeated if given at least 4mos after the 3rd dose of DTaP and the child was ≥12mos of age.

(continued)
5. Pneumococcal vaccine.

(Minimum age: 6wks for PCV13, 2yrs for PPSV23)

- Administer a 4-dose series of PCV13 vaccine at ages 2, 4, 6mos and at age 12–15mos.
- Administer 1 dose of PCV13 in HIV-infected children age 2–5yrs if any incomplete schedule of 3 doses of PCV13 was received previously; if unvaccinated or any incomplete schedule of less than 3 doses of PCV13 was received previously, administer 2 doses at least 8wks apart.
- For children age 2–5yrs with no history of PPSV23 vaccination, administer PPSV23 at least 8wks after the last PCV13 dose.


- Administer a 4-dose series of IPV at ages 2, 4, 6–18mos and 4–6yrs.
- The final dose in the series should be administered on or after the fourth birthday and at least 6mos after the previous dose.

7. Inactivated Influenza Vaccine (IIV). (Minimum age: 6mos for inactivated influenza vaccine [IIV])

- Administer annually to HIV-infected children beginning at age 6mos. Either trivalent or quadrivalent IIV can be used.
- Administer 2 doses (separated by at least 4wks) to children <9yrs old per current influenza vaccine recommendations.

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

(Minimum age: 12mos)

- Two doses of MMR vaccine for all HIV-infected individuals ≥12mos old who do not have evidence of current severe immunosuppression (eg, individuals aged ≤5yrs must have CD4 T-lymphocyte percentages ≥15% for ≥6mos; and individuals aged >5yrs must have 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 cell counts or only CD4 percent-ages are available for those >5yrs, the assessment of severe immunosuppression can be based on the CD4 values (count or percentage) that are available. In cases when CD4 percentages are not available for those ≤5yrs old, the assessment of severe immunosuppression can be based on age-specific CD4 counts at the time CD4 counts were measured; eg, absence of severe immunosuppression is defined as ≥6mos above age-specific CD4 count criteria: CD4 count >750 lymphocytes/mm³ while aged ≤12mos and CD4 count ≥500 lymphocytes/mm³ while aged 1–5yrs.
- The first dose should be administered at ages 12–15mos and the second dose at ages 4–6yrs, or as early as 28 days after the first dose.

- Individuals with perinatal HIV infection who were vaccinated prior to establishment of effective combination antiretroviral therapy (cART) should receive 2 appropriately spaced doses of MMR vaccine once effective cART has been established (for individuals aged ≤5yrs: must have CD4 percentages ≥15% for ≥6mos; and for 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.

9. Varicella vaccine. (Minimum age: 12mos)

- Limited data are available on safety and immunogenicity of varicella vaccine in HIV-infected children aged 1yr–8yrs in CDC immunologic categories 1 and 2 (CD4+ T-lymphocyte percentage ≥15% or greater) and clinical categories A, B, and C.
- Single-antigen varicella vaccine should be considered for HIV-infected children who have CD4+ percentages ≥15%.
- Eligible children should receive a 2-dose series of VAR vaccine at ages 12-15mos and 4–6yrs. The 2nd dose may be given before age 4yrs if at least 3mos have elapsed since the 1st dose. If the 2nd dose was given ≥4wks after the 1st dose, it can be accepted as valid.
- Varicella vaccine is not recommended for HIV-infected children who have evidence of severe immunosuppression (CD4 percentages ≥15% at any age; for those >5yrs, 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.

10. Hepatitis A vaccine (Hep A). (Minimum age: 12mos)

- Administer to all children aged 12–23mos; separate the 2 doses by 6–18mos.
- Children who have received 1 dose of HepA vaccine before age 24mos, should receive a 2nd dose 6–18mos after the 1st dose.
- For unvaccinated children ≥2yrs, may give 2 doses of HepA vaccine separated by 6–18mos if immunity against hepatitis A virus infection is desired.
- Hep A is also recommended for children 24mos and older who live in areas where vaccination programs target older children, who are at increased risk of infection. See ACIP 2017 Recommended Immunization Schedule for Children and Adolescents Aged 18 Years or Younger.

11. Meningococcal vaccine. (Minimum age: 6wks for Hib-MenCY [MenHibrix], 2mos for MenACYW-CRM [Menveo], 9mos for MenACYW-D [Menactra])

- MenHibrix: If initiated vaccination at 6wks, administer doses at ages 2, 4, 6 and 12–15mos. If the first dose is given at or after age 12mos, give a total of 2 doses ≥8wks apart.
- Menveo: If initiated vaccination at 8wks, administer doses at ages 2, 4, 6 and 12mos. Unvaccinated children who initiate at 7–23mos should get 2 primary doses, with the 2nd dose ≥12wks after the 1st dose AND after the 1st birthday. Children ≥24mos who have not received a complete series should get 2 primary doses ≥8wks apart.
- Menactra: Administer 2 primary doses ≥8wks apart in children ≥24mos who have not received a complete series. Do not give until age 2yrs and ≥4wks after completion of all PCV13 doses. Give Menactra either before or at the same time as DTaP.

REFERENCES
