

AMERICAN ACADEMY OF PEDIATRICS

Committee on Infectious Diseases

Recommended Childhood Immunization Schedule—United States, January–December 1999

ABBREVIATIONS. AAP, American Academy of Pediatrics; ACIP, Advisory Committee on Immunization Practices; CDC, Centers for Disease Control and Prevention; AAFP, American Academy of Family Physicians; Rv, rotavirus vaccine; IPV, Inactivated poliovirus vaccine; OPV, oral poliovirus vaccine; DTaP, acellular pertussis vaccines combined with diphtheria and tetanus toxoids; DTP, whole-cell pertussis-containing vaccines; FDA, Food and Drug Administration; Hib, *Haemophilus influenzae*; MMR, measles–mumps–rubella vaccine.

The annual *Recommended Childhood Immunization Schedule* of the American Academy of Pediatrics (AAP), the Advisory Committee on Immunization Practices (ACIP) of the Centers for Disease Control and Prevention (CDC), and the American Academy of Family Physicians (AAFP) is issued in January of each year. Several significant changes for the 1999 *Schedule* have been made since publication of the 1998 *Schedule*.¹ This report provides the 1999 *Schedule* and delineates the changes, including those in the footnotes, as follows:

1. Rotavirus vaccine (Rv) at 2, 4, and 6 months of age is recommended. Details of the AAP recommendations for rotavirus vaccination were published in the December 1998 issue of *Pediatrics*.² Rv is shaded in the *Schedule* to indicate that implementation of the recommendation for routine use will require reconciliation of related economic issues, as noted in the AAP statement.
2. Inactivated poliovirus vaccine (IPV) is recommended at 2 and 4 months of age. For the third and fourth doses of poliovirus vaccine, either IPV or oral poliovirus vaccine (OPV) can be administered. Details of the AAP recommendations regarding this change are given in the statement in this issue of *Pediatrics*.³
3. The manufacturer of Recombivax HB (Merck and Co, Inc, West Point, PA) has standardized the dose of this hepatitis vaccine to 5 μg for children from birth through 19 years of age regardless of maternal hepatitis B surface antigen carrier status. The change was made to avoid the confusion that occasionally occurred due to the availability of multiple dose formulations of this vaccine product. Children who have received a 2.5- μg dose of Recombivax for any or all the recommended

doses are considered adequately immunized and no additional doses need to be administered. The other available hepatitis B vaccine, Engerix B (SmithKline Beecham, Pittsburgh, PA), also has a standard dose (10 μg) for all children from birth through 19 years of age. The vaccines are interchangeable when given in the doses recommended by the manufacturers.

4. Acellular pertussis vaccines combined with diphtheria and tetanus toxoids (DTaP) are listed on the *Schedule* as the recommended product for pertussis vaccination. Whole-cell pertussis-containing vaccines (DTP) remain acceptable, as noted in the footnote.

A fourth acellular pertussis-containing vaccine (Cervitax [North American Vaccines, Beltsville, MD]) has been approved by the Food and Drug Administration (FDA) for immunization of infants and children. Clinical data to support the superiority of one DTaP product in comparison to the others are not available, and therefore the four approved DTaP products are considered equally acceptable. Additional questions regarding acellular pertussis vaccines have been addressed in a recent article in *AAP News*.⁴

5. The footnote in the *Schedule* pertaining to *Haemophilus influenzae* type b (Hib) vaccine has been modified to indicate that currently available DTaP/Hib combination products should not be used for the primary immunization series of infants unless approved by the FDA for the specific ages. The use of one such product in infants has resulted in suboptimal antibody responses.⁵
6. Minor changes to clarify recommendations have been made in the measles–mumps–rubella vaccine (MMR) and varicella footnotes, and the numbers (1, 2, and 3) for the respective doses of hepatitis B vaccine in the *Schedule* have been omitted to make the information consistent with that for other vaccines.

Detailed recommendations for the use of the vaccines routinely indicated during infancy, childhood, and adolescence are given in the 1997 *Red Book*,⁶ AAP statements (www.aap.org), and ACIP statements (www.cdc.gov/nip) on specific vaccines, and the respective manufacturers' package inserts.

COMMITTEE ON INFECTIOUS DISEASES, 1998–1999

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The recommendations in this statement do not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate.

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¹ Vaccines are listed under routinely recommended ages. [Bars] indicate range of recommended ages for immunization. Any dose not given at the recommended age should be given as a "catch-up" immunization at any subsequent visit when indicated and feasible. [Ovals] indicate vaccines to be given if previously recommended doses were missed or given earlier than the recommended minimum age.

Age Vaccine	Birth	1 mo	2 mos	4 mos	6 mos	12 mos	15 mos	18 mos	4-6 yrs	11-12 yrs	14-16 yrs
Hepatitis B ²	Hep B	Hep B	Hep B	Hep B	Hep B					Hep B	
Diphtheria, Tetanus, Pertussis ³			DTaP	DTaP	DTaP		DTaP ³		DTaP	Td	
<i>H. influenzae</i> type b ⁴			Hib	Hib	Hib		Hib				
Polio ⁵			IPV	IPV		Polio ⁵			Polio		
Rotavirus ⁶			Rv ⁶	Rv ⁶	Rv ⁶						
Measles, Mumps, Rubella ⁷						MMR			MMR ⁷	MMR	
Varicella ⁸							Var			Var ⁸	

Approved by the Advisory Committee on Immunization Practices (ACIP), the American Academy of Pediatrics (AAP),
and the American Academy of Family Physicians (AAFP).

- 1 This schedule indicates the recommended ages for routine administration of currently licensed childhood vaccines. Combination vaccines may be used whenever any components of the combination are indicated and its other components are not contraindicated. Providers should consult the manufacturers' package inserts for detailed recommendations.
- 2 **Infants born to HBsAg-negative mothers** should receive the 2nd dose of hepatitis B vaccine at least 1 month after the 1st dose. The 3rd dose should be administered at least 4 months after the 1st dose and at least 2 months after the 2nd dose, but not before 6 months of age for infants. **Infants born to HBsAg-positive mothers** should receive hepatitis B vaccine and 0.5 mL hepatitis B immune globulin (HBIG) within 12 hours of birth at separate sites. The 2nd dose is recommended at 1-2 months of age and the 3rd dose at 6 months of age. **Infants born to mothers whose HBsAg status is unknown** should receive hepatitis B vaccine within 12 hours of birth. Maternal blood should be drawn at the time of delivery to determine the mother's HBsAg status; if the HBsAg test is positive, the infant should receive HBIG as soon as possible (no later than 1 week of age). All children and adolescents (through 18 years of age) who have not been immunized against hepatitis B may begin the series during any visit. Special efforts should be made to immunize children who were born in or whose parents were born in areas of the world with moderate or high endemicity of HBV infection.
- 3 DTaP (diphtheria and tetanus toxoids and acellular pertussis vaccine) is the preferred vaccine for all doses in the immunization series, including completion of the series in children who have received 1 or more doses of whole-cell DTP vaccine. Whole-cell DTP is an acceptable alternative to DTaP. The 4th dose (DTP or DTaP) may be administered as early as 12 months of age, provided 6 months have elapsed since the 3rd dose and if the child is unlikely to return at age 15-18 months. Td (tetanus and diphtheria toxoids) is recommended at 11-12 years of age if at least 5 years have elapsed since the last dose of DTP, DTaP, or DT. Subsequent routine Td boosters are recommended every 10 years.
- 4 Three *H. influenzae* type b (Hib) conjugate vaccines are licensed for infant use. If PRP-OMP (PedvaxHIB and COMVAX [Merck]) is administered at 2 and 4 months of age, a dose at 6 months is not required. Because clinical studies in infants have demonstrated that using some combination products may induce a lower immune response to the Hib vaccine component, DTaP/Hib combination products should not be used for primary immunization in infants at 2, 4, or 6 months of age, unless FDA-approved for these ages.
- 5 Two poliovirus vaccines currently are licensed in the United States: inactivated poliovirus vaccine (IPV) and oral poliovirus vaccine (OPV). The ACIP, AAP, and AAFP now recommend that the first two doses of poliovirus vaccine should be IPV. The ACIP continues to recommend a sequential schedule of two doses of IPV administered at ages 2 and 4 months, followed by two doses of OPV at 12-18 months and 4-6 years. Use of IPV for all doses also is acceptable and is recommended for immunocompromised persons and their household contacts. OPV is no longer recommended for the first two doses of the schedule and is acceptable only for special circumstances such as: children of parents who do not accept the recommended number of injections; late initiation of immunization which would require an unacceptable number of injections, and imminent travel to polio-endemic areas. OPV remains the vaccine of choice for mass immunization campaigns to control outbreaks due to wild poliovirus.
- 6 Rotavirus (Rv) vaccine is shaded and italicized to indicate: 1) health care providers may require time and resources to incorporate this new vaccine into practice; and 2) the AAFP feels that the decision to use rotavirus vaccine should be made by the parent or guardian in consultation with their physician or other health care provider. The first dose of Rv vaccine should not be administered before 6 weeks of age, and the minimum interval between doses is 3 weeks. The Rv vaccine series should not be initiated at 7 months of age or older, and all doses should be completed by the first birthday.
- 7 The 2nd dose of measles, mumps, and rubella vaccine (MMR) is recommended routinely at 4-6 years of age but may be administered during any visit, provided at least 4 weeks have elapsed since receipt of the 1st dose and that both doses are administered beginning at or after 12 months of age. Those who have not previously received the second dose should complete the schedule by the 11- to 12-year-old visit.
- 8 Varicella vaccine is recommended at any visit on or after the first birthday for susceptible children, i.e., those who lack a reliable history of chickenpox (as judged by a health care provider) and who have not been immunized. Susceptible persons 13 years of age or older should receive 2 doses, given at least 4 weeks apart.

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Pediatrics 1999;103;182

DOI: 10.1542/peds.103.1.182

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OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

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