Recommended Childhood Immunization Schedule—United States, 2002

**MMWR. 2002;51:31-33**

**EACH YEAR, CDC’S ADVISORY COMMITTEE ON IMMUNIZATION PRACTICES (ACIP) reviews the recommended childhood immunization schedule to ensure that it is current with changes in manufacturers’ vaccine formulations, has revised recommendations for the use of licensed vaccines, and has recommendations for newly licensed vaccines. This report presents the recommended childhood immunization schedule for 2002, which has remained the same in content since January 2001 but has a redesigned format (Figure 1).**

The format of the 2002 schedule is based on a design developed by the Minnesota Department of Health immunization program; the recommendations and format have been approved by ACIP, the American Academy of Family Physicians, and the American Academy of Pediatrics. The new design highlights the importance of catch-up vaccination, the preadolescent visit, the preference for administering the first dose of the hepatitis B vaccine series at birth, and three vaccines for selected at-risk groups. The importance of assessing whether children aged 24 months–18 years require any catch-up vaccination is emphasized by the use of hatched bars. The schedule also underscores the visit at age 11-12 years when immunization status should be reviewed and all necessary vaccines administered.

**Hepatitis B Vaccine**

The schedule indicates a preference for administering the first dose of hepatitis B vaccine to all newborns soon after birth and before hospital discharge. Administering the first dose of hepatitis B vaccine soon after birth should minimize the risk for infection because of errors in maternal hepatitis B surface antigen (HBsAg) testing or reporting, or from exposure to persons with chronic hepatitis B virus (HBV) infection in the household, and can increase the likelihood of completing the vaccine series. Only monovalent hepatitis B vaccine can be used for the birth dose. Either monovalent or combination vaccine can be used to complete the series. Four doses of hepatitis B vaccine, including the birth dose, may be administered if a combination vaccine is used to complete the series. In addition to receiving hepatitis B immune globulin (HBIG) and the hepatitis B vaccine series, infants born to HBsAg-positive mothers should be tested for HBsAg and antibody to HBsAg (anti-HBs) at age 9-15 months to identify those with chronic HBV infection or those who may require revaccination.

**Vaccines for Selected Populations**

The area below the dashed line (Figure 1) displays certain vaccines recommended for use in selected populations. High-risk children aged 24-59 months should receive catch-up pneumococcal conjugate vaccine (PCV) doses, if indicated. Pneumococcal polysaccharide vaccine (PPV) is recommended in addition to PCV for certain high-risk groups. The recommendation to administer annual influenza vaccine to high-risk children also appears on the schedule.

**Vaccine Supply**

As a result of the vaccine supply shortage, deferment of some doses of tetanus and diphtheria toxoids (Td), diphtheria and tetanus toxoids and acellular pertussis vaccine (DTaP), and pneumococcal conjugate vaccine (PCV) has been recommended; health-care providers should record patients for whom vaccination has been deferred and should contact them once the supply has been restored.

**Vaccine Information Statements**

The National Childhood Vaccine Injury Act requires that all health-care providers give parents or patients copies of Vaccine Information Statements before administering each dose of the vaccines listed in the schedule. Additional information about Vaccine Information Statements is available from state health departments and at [http://www.cdc.gov/nip/publications/VIS](http://www.cdc.gov/nip/publications/VIS). Detailed recommendations for using vaccines are available from the manufacturers’ package inserts, ACIP statements on specific vaccines, and the 2000 Red Book. ACIP statements for each recommended childhood vaccine can be viewed, downloaded, and printed from the CDC National Immunization Program at [http://www.cdc.gov/nip/publications/ACIP-list.htm](http://www.cdc.gov/nip/publications/ACIP-list.htm); instructions on the use of the Vaccine Information Statements are available at [http://www.cdc.gov/nip/publications/VIS/vis-Instructions.pdf](http://www.cdc.gov/nip/publications/VIS/vis-Instructions.pdf).

**REFERENCES**

5. CDC. Deferral of routine booster doses of tetanus and diphtheria toxoids for adolescents and adults. MMWR 2001;50:418-27.

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**FIGURE 1. Recommended childhood immunization schedule** — United States, 2002

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Range of recommended ages</th>
<th>Catchup vaccination</th>
<th>Preadolescent assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatitis B</td>
<td>Birth</td>
<td>1 mo, 2 mos, 4 mos</td>
<td>6 mos, 12 mos, 15 mos</td>
</tr>
<tr>
<td>Diphtheria, Tetanus, Pertussis</td>
<td>DTaP</td>
<td>DTaP, DTaP, DTaP</td>
<td>DTaP, Td</td>
</tr>
<tr>
<td>Haemophilus influenzae Type b</td>
<td>Hib</td>
<td>Hib</td>
<td>Hib</td>
</tr>
<tr>
<td>Inactivated Polio</td>
<td>IPV</td>
<td>IPV</td>
<td>IPV</td>
</tr>
<tr>
<td>Measles, Mumps, Rubella</td>
<td>PCV</td>
<td>PCV</td>
<td>PCV</td>
</tr>
<tr>
<td>Varicella</td>
<td>Varicella</td>
<td>Varicella</td>
<td>Varicella</td>
</tr>
<tr>
<td>Pneumococcal</td>
<td>MMR #1</td>
<td>MMR #2</td>
<td>MMR #2</td>
</tr>
<tr>
<td>Hepatitis A</td>
<td>Influenza (yearly)</td>
<td>Hepatitis A series</td>
<td></td>
</tr>
</tbody>
</table>

Vaccines below this line are for selected populations.

* Indicates the recommended ages for routine administration of currently licensed childhood vaccines, as of December 1, 2001, for children through age 18 years. Any dose not given at the recommended age should be given at any subsequent visit when indicated and feasible. ** Indicates age groups that warrant special effort to administer those vaccines not given previously. Additional vaccines may be licensed and recommended during the year. Licensed combination vaccines may be used whenever any components of the combination are indicated and the vaccine’s other components are not contraindicated. Providers should consult the manufacturers’ package inserts for detailed recommendations.

1. Hepatitis B vaccine (Hep B). All infants should receive the first dose of hepatitis B vaccine soon after birth and before hospital discharge; the first dose may also be given by age 2 months if the infant’s mother is HBSAg-negative. Only nonvalent hepatitis B vaccine can be used for the birth dose. Monovalent or combination vaccine containing Hep B may be used to complete the series; 4 doses of vaccine may be administered if combination vaccine is used. The second dose should be given at least 4 weeks after the first dose except for Hep-containing vaccine, which cannot be administered before age 6 weeks. The third dose should be given at least 16 weeks after the first dose and at least 12 weeks after the second dose. The last dose in the vaccination sequence (third or fourth dose) should not be administered before age 12 months. 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 second dose is recommended at age 1–2 months and the vaccination series should be completed (third or fourth dose) at age 6 months. Infants born to mothers whose HBSAg status is unknown should receive the first dose of the hepatitis B vaccine series 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 age 1 week).

2. Diphtheria and tetanus toxoids and acellular pertussis vaccine (DTaP). The fourth dose of DTaP may be administered as early as age 12 months provided that 6 months have elapsed since the third dose and the child is unlikely to return at age 15–18 months. Tetanus and diphtheria toxoids (Td) is recommended at age 11–12 years if at least 5 years have elapsed since the last dose of tetanus and diphtheria toxoid-containing vaccine. Subsequent routine Td boosters are recommended every 10 years.

3. Haemophilus influenzae type b (Hib) conjugate vaccine. Three Hib conjugate vaccines are licensed for infant use. If PRP-OMP (PedvaxHib) or Comvax (Merck) is administered at age 2 and 4 months, a dose at age 6 months is not required. DTaP/Hib combination products should not be used for primary immunization in infants at age 2, 4, or 6 months but can be used as boosters following any Hib vaccine.

4. Inactivated poliovirus vaccine (IPV). An all-IPV schedule is recommended for routine childhood poliovirus vaccination in the United States. All children should receive 4 doses of IPV at age 2, 4, and 6–18 months, and 4–6 years.

5. Measles, mumps, and rubella vaccine (MMR). The second dose of MMR is recommended routinely at age 4–6 years but may be administered at any visit provided at least 4 weeks have elapsed since the first dose and that both doses are administered beginning at or after age 12 months. Those who have not previously received the second dose should complete the schedule by the visit at age 11–12 years.

6. Varicella vaccine. Varicella vaccine is recommended at any visit at or after age 12 months for susceptible children (i.e., those who lack a reliable history of chickenpox). Susceptible persons aged ≥13 years should receive 2 doses given at least 4 weeks apart.

7. Pneumococcal vaccine. The heptavalent pneumococcal conjugate vaccine (PCV) is recommended for all children aged 2–23 months and for certain children aged 24–59 months. Pneumococcal polysaccharide vaccine (PPV) is recommended in addition to PCV for certain high-risk groups. See MMWR 2000;49(RR-9):1–37.


9. Influenza vaccine. Influenza vaccine is recommended annually for children aged ≥6 months with certain risk factors (including but not limited to asthma, cardiac disease, sickle cell disease, HIV, and diabetes; see MMWR 2001;50(No. RR-4):1–44), and can be administered to all others wishing to obtain immunity. Children aged ≥12 years should receive influenza vaccine in a dosage appropriate for their age (0.25 mL if 6–35 months or 0.5 mL if ≥3 years). Children aged ≥8 years who are receiving influenza vaccine for the first time should receive 2 doses separated by at least 4 weeks.

Progress Toward Interrupting Indigenous Measles Transmission—Region of the Americas, January-November 2001

MMWR. 2001;50:1133-1137
2 figures omitted

In 1994, COUNTRIES IN THE REGION OF the Americas set a goal of interrupting indigenous measles transmission by the end of 2000.1 During 1990-2000, measles cases declined 99.3%, from approximately 250,000 to 1,754. During 2000, transmission occurred in five of 41 countries that report to the Pan American Health Organization (PAHO) (Argentina, Bolivia, Brazil, the Dominican Republic, and Haiti), and confirmed cases were reported in 16 (<1%) of 12,010 municipalities.2-4 During 2001, measles transmission occurred in the Dominican Republic, Haiti, and Venezuela; no outbreaks were reported in Argentina, Bolivia, or Brazil. This report summarizes measles circulation patterns and efforts to interrupt measles transmission in the Americas during 2001.

The measles vaccination strategy recommended by PAHO includes a one-time national “catch-up” campaign for all children aged 1-14 years, routine “keep-up” vaccination for infants aged 1 year, and national “follow-up” campaigns every 3-5 years for all children aged 1-4 years, regardless of measles vaccination history.5 Thirty-nine (95%) of the 41 countries that report to PAHO conducted catch-up campaigns during 1989-1995 and follow-up campaigns since 1994. Routine coverage increased from 80% in 1994 to 94% in 2000 but varied by country from 75% to 99%; coverage was lowest in Colombia (75%), Haiti (80%), Belize (82%), Venezuela and Costa Rica (84%), Guyana (86%), Jamaica (88%), and the Dominican Republic (88%). Vaccination efforts also have been focused on populations at high risk for measles transmission (e.g., health-care workers, military personnel, teachers, university students, workers in the tourist industry, persons living or working in prisons and large factories, and young adults from rural areas who have moved to cities) in Argentina, Bolivia, Chile, the Dominican Republic, Haiti, Peru, Uruguay, and Venezuela.6

During January-mid-November 2001, a total of 423 confirmed measles cases were reported in the Americas, the lowest number of cases for the first 46 weeks of any year since implementation of the eradication program in 1996 and a 65% decrease compared with the 1,202 cases reported during the same period in 2000 (Figure 2). The number of cases reported annually has decreased substantially since the resurgence that occurred in Argentina and Brazil during 1997.7 In 1998, a total of 14,332 confirmed cases were reported from 17 (41%) of the 41 PAHO-reporting countries. In 1999, a total of 3,209 confirmed cases were reported from 11 countries, 78% fewer cases than in 1998 and 94% fewer than in 1997.7 The 1,754 cases reported during 2000 was the lowest number since the goal to interrupt measles transmission was set in 1994 (Figure 1).7

During 1999-2000, a total of 528 confirmed measles cases were reported in the Dominican Republic. During January-mid-November 2001, a total of 113 (27%) of the 423 confirmed cases in the region were reported from 18 provinces. The highest attack rates occurred among children aged <5 years: range: from two cases per 100,000 children aged 1-4 years to 18 cases per 100,000 children aged 6-11 months), children aged 5-9 years (one case per 100,000), and adults aged 20-29 years (two cases per 100,000). As of November 17, 2001, a total of 1,097 suspected cases of measles have been investigated; the last patient with a confirmed case of illness had symptom onset during May 2001.8

In Haiti, no confirmed cases were reported during 1998-1999. In 2000, an outbreak probably caused by measles imported from the Dominican Republic began in Artibonite; 992 (57%) of 1,754 confirmed cases in the region were reported. From January 2000 to April 2001, fixed-post vaccination campaigns for all vaccines were conducted nationwide; coverage ranged from 45% to 65%. A house-to-house vaccination campaign was conducted in the most affected neighborhood of the country, Delmas, Port au Prince, interrupting transmission in that municipality. During January 1-mid-November 2001, Haiti reported 158 (37%) of the 423 confirmed cases in the region; 49% of the cases occurred among children aged <5 years. A nationwide house-to-house poliomyelitis and measles vaccination campaign began in September 2001. Active case finding is under way, including house-to-house surveillance in all municipalities and a $100 reward for identifying laboratory-confirmed cases. No confirmed measles cases have been reported since the end of September 2001.9

In Venezuela during 2000, an outbreak of 22 confirmed cases among preschool and school-aged children occurred in Zulia, the most populous state, which borders Colombia. During January-June 2001, eight cases were classified as clinically confirmed, and during August-mid-November, 30 confirmed cases linked to an importation from Europe were confirmed (Figure 2). Of these 30 cases, 19 occurred in two municipalities in Falcon and 11 occurred in two municipalities in Zulia. Seventeen (57%) occurred among children aged <5 years, 12 (40%) among persons aged 22-45 years, and one among a child aged 8 years. Among children aged <5 years, two (12%) had received measles vaccine.

Following the recommendations of a PAHO-sponsored evaluation of Venezuela’s National Immunization Program, the government is implementing a nationwide, house- to-house,
follow-up measles and rubella vaccination campaign among children aged 1-4 years. The campaign started in November 2001 and will end in January 2002. In the campaign’s first week, 878,000 children (39% of the target population of approximately 2.3 million) were vaccinated.


CDC Editorial Note: The World Health Organization (WHO) has estimated that 777,000 children died as a result of measles during 2000. During 1997-1998, approximately 100 measles-related deaths were reported in Argentina and Brazil, most among unvaccinated infants and preschool-aged children. Vaccinating poor children against measles substantially improves their long-term chances for survival.\(^\text{10}\) During 1990-2000, implementation of national vaccination and surveillance programs reduced measles incidence by 99%.\(^\text{2}\) Haiti and Venezuela are the last countries in the Americas where measles is endemic.

Surveillance data and results of molecular testing by PAHO’s measles laboratory network demonstrate that measles can be imported to measles-free countries from countries where measles is endemic; therefore, all countries in the region must continue to implement vaccination and surveillance strategies. All countries in the Americas must maintain the highest possible population immunity (i.e., \(\geq95\%\) among infants and children) and must strengthen surveillance to detect importations. In addition, countries must target vaccination efforts to susceptible adolescents and young adults who are at risk for exposure to measles. In all countries of the Americas, the elimination of measles will require improving technical and managerial capabilities such as maintaining the cold chain and the local capacity to plan and conduct vaccination campaigns on a regular basis (once every 3-5 years). In countries that report adequate routine coverage, local data need to be verified to identify areas where coverage persists at low levels. Even so, ongoing transmission of measles probably would be detected in the Americas as a result of intense surveillance and active case finding at health-care centers in high-risk communities. PAHO is implementing standard supervisory instruments for monitoring vaccination coverage, investigating measles outbreaks, and validating routine surveillance. In addition, experience in the Americas has demonstrated that house-to-house vaccination is the most efficient method of vaccinating persons living in high-risk and hard-to-reach areas. During measles outbreaks in Haiti and Bolivia, door-to-door vaccination was essential in reaching target coverage levels.

The importations of measles virus in the Americas during 2001 underscore the importance of controlling measles in other regions of the world; therefore, PAHO has encouraged other WHO regions to accelerate their measles control programs. In March 2001, WHO and United Nations Children’s Fund (UNICEF) announced a joint initiative to decrease by 50% the number of global measles deaths by 2005. This is an important step toward a concerted effort to accelerate global measles control.

REFERENCES

10 available

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**Evaluation of Postexposure Antibiotic Prophylaxis to Prevent Anthrax**

**MMWR. 2002;51:59**

In response to the recent bioterrorist attacks associated with intentional release of *Bacillus anthracis*, approximately 10,000 persons potentially exposed to anthrax in Connecticut, Florida, New Jersey, New York City, and Washington, D.C., were recommended to take at least 60 days of postexposure antibiotic prophylaxis. Surveillance for adverse events and adherence to antibiotics has been conducted through surveillance and cross-sectional studies. CDC is evaluating the program to distribute antimicrobial agents and assessing adverse events and adherence.

The objectives of this evaluation are to assess the provision of antimicrobial agents and educational materials to affected persons, to determine adverse events associated with the antimicrobial agents, and to characterize adherence to the recommended regimen. The information from this evaluation will be critical to CDC’s effort to improve the technical assistance and supplies needed with future anthrax postexposure prophylaxis campaigns and to comply with Food and Drug Administration regulations for monitoring for adverse events.

CDC has contracted RTI International to conduct brief telephone interviews of all persons for whom postexposure antibiotic prophylaxis was recommended. Interviews were scheduled to begin in late January 2002 and will continue for approximately 8 weeks. Additional information about the program evaluation is available from CDC, telephone 404-639-3158.