

This Issue

- 1 Universal TB Testing of School-Aged Children Not Required
- 3 Pediatric TB Risk Assessment Questionnaire
- 4 New Immunization Schedules and Updates for 2012
- 6 Immunization Schedule: Ages 0 through 6 years
- 7 Immunization Schedule: Ages 7 through 18 years
- 8 Catch-up Immunization Schedule
- 9 Immunization Schedule for Adults
- 10 Footnotes – Immunization Schedule for Adults
- 12 Save the Date
Prevention Symposium: How the New Health Care Paradigm Supports Healthy Aging
- 12 Index of Disease Reporting Forms

Universal TB Testing of School-Aged Children Not Required Targeted Testing Recommended

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Beginning July 1, universal testing for tuberculosis (TB) will no longer be required for children entering grades K-12 in Los Angeles County, according to a new policy by the LA County Department of Public Health. Instead, it will be replaced with a universal screening and targeted testing approach for TB. Universal TB screening, which is a risk-based assessment, will be incorporated into the existing California physical examination requirement for children entering first grade.

As part of a routine health assessment, health providers will screen students for TB and test only those who have one of the risk factors recognized by the American Academy of Pediatrics:

- Birth in a region of the world with endemic TB (e.g., Asia, Middle East, Africa, Latin America, and countries of the former Soviet Union)

- Travel to a high-incidence country for an extended period (i.e., at least one week)
- Exposure to persons with confirmed or suspected TB disease
- Close contact with someone who has had a positive test for TB infection.

This policy change **will not** affect California's TB screening requirements for preschool children, teachers, or volunteers, as these requirements are not subject to local discretionary changes.

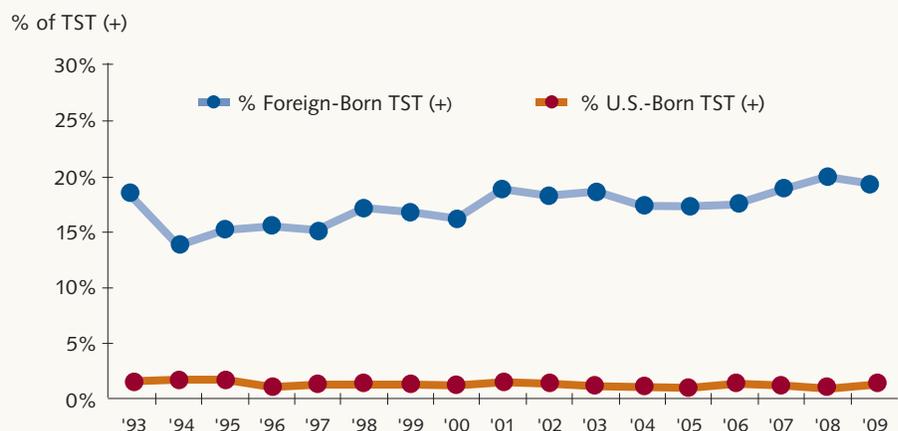
Benefits of the Policy Change

Replacing the *universal testing* approach with the *universal screening and targeted testing* approach offers many benefits, including the following: Children at lower risk will avoid the potential for false positive tests, exposure to unnecessary chest X-rays, and lengthy preventive treatment regimens that may have harmful side effects.

The new policy promotes efficiency by folding a universal TB screening and targeted testing protocol into the exist-

continued on page 2 >

Figure 1. TB Skin Test Results Among New School Entrants (K-12) in LA County, 1993-2009



ing first-grade school entry physical examination. This allows the Department of Public Health to shift its attention to populations at higher risk for TB, such as the homeless and HIV positive, and to interventions better-suited to finding TB cases, such as contact investigations.

Rationale for the New Policy

School-aged children are a low-risk population for TB; the infection rates among these children have not changed significantly during the years of mandated testing (Figure 1). Only 25 (3.7%) of the 674 TB cases in LA County in 2010 were among children under age 15, a case rate (1.2 per 100,000) that is far below the overall case rate (6.9 per 100,000) for that year. Of the 251 TB cases among children aged 4-18 from 2003 to 2009, only 21 (8.4%) were identified through the school mandate and, of those, only 2 were sputum smear-positive.

Policy Requirements

Health care providers will assess children for risk of exposure to TB at each annual physical examination (see Pediatric TB Risk Assessment Questionnaire). Providers will only administer TB testing for children at increased risk of acquiring TB infection, which is indicated in the “Health Care Provider Follow-up” section of the questionnaire.

Providers will continue to complete and sign the “Report of Health Examination for School Entry” (PM 171 A), and schools will continue to require this documentation of the physical exam prior to a child’s enrollment in school. This form is available at www.publichealth.lacounty.gov/tb.

Testing Methods

A Mantoux tuberculin skin test (TST) or an Interferon Gamma Release Assay (IGRA) should be used to test those at increased risk.

TB Skin Test

Read the TST 48-72 hours after placement. Record the results in millimeters (mm) of induration, not erythema. Measure the diameter of the induration transversely to the long axis of the forearm. Trained personnel, not parents, must read the skin test.

If the child fails to return for the scheduled reading:

1. Remember that *only* a positive reaction can still be measured up to one week after the TST.
2. Repeat the TST if no positive reaction can be measured when the child does return.

For questions about the reading of a TST, call the Department of Public Health’s TB Control and Prevention Nurse Line at (213) 744-6160.

Interferon Gamma Release Assay Test

In 2010, the Centers for Disease Control and Prevention made recommendations for use of IGRAs, such as the QuantiFERON Gold-In Tube and T-Spot. Additionally, Medi-Cal updated its guidelines and instructions for IGRA testing. IGRAs are acceptable alternatives to TSTs for targeted testing of latent TB infection among individuals aged 5 and older.

IGRAs may be preferred in some settings, as the test requires only a single patient visit to draw a blood sample and does not boost responses to subsequent testing, which can occur with TSTs. Further, test results may be available within 24 hours, are not subject to the reader bias that can occur with the TST, and are not affected by prior Bacille Calmette-Guérin (BCG) vaccination.

The CDC recommends IGRA testing for the following:

- Populations with low return rates to have the TST read.
- Patients who have received BCG as a vaccine or for cancer therapy.

Check with the reference laboratory about the proper tubes for blood collection, special handling, and to assure that results will be available in a timely manner.

Referral, Treatment, and Follow-up of Children with Positive TB Tests

- All children with positive test results should have a medical evaluation, including a chest X-ray and laboratory studies needed for the diagnosis of TB disease.
- Report any confirmed or suspected case of TB disease to the TB Control Program within 1 day of identification. Call (213) 744-6160.
- If TB disease is not found, treat children and adolescents with a positive TST or IGRA result with therapy for latent TB infection.
- For management and treatment guidelines for latent TB infection, refer to www.cdc.gov/tb/publications/LTBI/.

Conclusion

The LA County Department of Public Health’s policy change from universal TB testing of school-aged children to risk-based, targeted testing, when indicated, simplifies and aligns LA County’s recommendations with those of all major public health and medical associations in the United States. Overall, the results of this revision create greater efficiencies and benefits by preventing unnecessary testing and treatment in many low-risk children and allowing the department to better focus its attention and resources on populations at elevated risk for TB infection and disease.

More information and resources are available on the Tuberculosis Control Program website at www.publichealth.lacounty.gov/tb.

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Pediatric TB Risk Assessment Questionnaire

The following questions are designed to determine whether a TB test is indicated for your pediatric patient.

Name of Child _____ Child's Date of Birth _____ Date of Screening _____

Questions for Parent/Guardian

Health Care Provider Follow-up

1. Were you or was your child born outside of the United States?

Yes No

If Yes: Where were you and/or your child born?

If the parent or child was born in Africa, Asia, Latin America, or Eastern Europe, a TST or IGRA should be placed.

2. Has your child traveled outside of the United States?

Yes No

If Yes: Where did your child travel?

How long was your child outside the United States?

If the child has been in Africa, Asia, Latin America, or Eastern Europe for 1 week cumulatively, a TST or IGRA should be placed.

3. To your knowledge, has your child been exposed to anyone with TB disease?

Yes No

If Yes: Did the person have TB disease or latent TB infection?

Yes No

When did the exposure occur?

What was the nature of the contact?

If confirmed that the child has been exposed to an individual with suspected or known TB disease, a TST or IGRA should be placed.

4. To your knowledge, has your child had close contact with a person who has had a positive TB skin test?

Yes No

If Yes: Did the person have TB disease or latent TB infection?

Yes No

When did the exposure occur?

What was the nature of the contact?

If confirmed that the child has had close contact with an individual with a positive skin test, a TST or IGRA should be placed.

New Immunization Schedules and Updates for 2012

A. Nelson El Amin, MD, MPH

In February, the U.S. Advisory Committee on Immunization Practices (ACIP) published the recommended immunization schedules for children, adolescents, and adults for 2012.^{1,2} These schedules were revised to reflect current recommendations for licensed vaccines used in the United States. Physicians and other health care providers are encouraged to review each schedule, along with the footnotes, to stay up-to-date with the latest recommendations. These schedules, which are printed on the following pages, can be accessed at www.cdc.gov/vaccines/recs/schedules/default.htm.

In addition to the new immunization recommendations, this article also discusses other important vaccination-related information, including the new CDC storage and handling guide, hepatitis B revisions to the list of reportable diseases, and the new law regarding human papillomavirus vaccination consent for minors.

2012 Immunization Schedule Updates and Changes

Child and Adolescent Immunization Schedule Changes

The following updates were made to the child and adolescent schedule to provide additional guidance and clarification.

- **Hepatitis B (HepB):** Recommendations have been clarified for post-exposure prophylaxis for infants born to women whose HepB surface antigen (HBsAg) status is unknown.
 - Infants weighing <2,000 gm should receive HepB vaccine and HepB immune globulin (HBIG) within 12 hours of birth.
 - Infants weighing ≥2,000 gm should receive HepB vaccine within 12 hours of birth. If it is determined that the mother is HBsAg-positive, administer HBIG no later than 7 days after birth. Details of perinatal management of HBsAg-positive women and their infants can be found at www.cdc.gov/vaccines/pubs/ACIP-list.htm.
- **Haemophilus influenzae type B (Hib):** Hiberix should be used only as the booster (final) dose for children aged 12 months–4 years. In addition, Hib vaccination is now recommended for persons aged ≥5 years who have sickle cell disease, leukemia, human immunodeficiency virus (HIV) infection, or anatomic/functional asplenia.
- **Measles, mumps, rubella (MMR):** Recommendations for infants aged 6–11 months who are traveling internationally have been added:
 - One dose of MMR *prior* to travel.
 - Revaccination with 2 doses of MMR beginning at age 12–15 months (at least 4 weeks after the previous travel dose). The second and final dose should be given at age 4–6 years.

Adult Immunization Schedule Changes

Many footnotes have been updated to further define or clarify adult immunization recommendations.

- **Tetanus, diphtheria, and acellular pertussis (Tdap):** Tdap vaccination is recommended for persons aged ≥65 years if they have close contact with an infant <12 months of age. Those aged ≥65 years who do not have contact with infants

may receive either Tdap or Td. *Note:* In March 2012, ACIP released a provisional recommendation to vaccinate all adults aged >65 years, with Tdap rather than Td, regardless of whether they have close contact with an infant (www.cdc.gov/vaccines/recs/provisional/Tdap-feb2012.htm).

- **Meningococcal conjugate vaccine, quadrivalent (MCV4):** New vaccination recommendations for certain populations have been added.
 - A single dose of MCV4 should be given to military recruits who have not been previously vaccinated.
 - A single dose of MCV4 should be given to first-year college students through age 21 years who are living in residence halls and did not receive a dose on or after their 16th birthday.
- **Zoster:** While zoster vaccine is not specifically recommended for health care personnel (HCP), ACIP recommends that HCP be vaccinated if they are age 60 years and older.
- **Pneumococcal polysaccharide vaccine (PPSV):**
 - Vaccinate persons with functional/anatomic asplenia (sickle cell disease and other hemoglobinopathies, congenital or acquired asplenia, splenic dysfunction, or splenectomy [if elective splenectomy is planned, vaccinate at least 2 weeks before surgery]).
 - All persons diagnosed with HIV should be vaccinated with PPSV.
 - Persons who received one previous dose of PPSV before age 65 *and* it has been at least 5 years since that dose should receive an additional dose at age 65 years or later.

Certain Populations

HPV Vaccinations for Males

In December 2011, ACIP published new recommendations for HPV4 (Gardasil)³ vaccine for use in males:

- *Routine* vaccination for males aged 11–12 years, and catch-up vaccination for males aged 13–21 years not previously vaccinated or who did not complete the series. The 3-dose series can be started as early as 9 years of age.
- HPV4 vaccine is also indicated for men who have sex with men (MSM) or who have HIV through 26 years of age. However, men who do not fall in either of these categories should be vaccinated through 21 years of age.
- Gardasil is the only HPV vaccine licensed for use in males.

Hepatitis B Vaccine for Diabetics

The new ACIP recommendation, released in December 2011, includes people with diabetes as one of the high-risk groups requiring hepatitis B vaccination.⁴

- Hepatitis B vaccine should be given to unvaccinated adult diabetics aged 19–59 years.
- Hepatitis B vaccine may be administered to unvaccinated adult diabetics aged ≥60 years at the discretion of the physician.
- The 3-dose series should be administered at 0, 1, and 6 months, depending on the type of vaccine used. Either formulation—single-antigen hepatitis B vaccine or combination hepatitis B and hepatitis A vaccine—may be used.

Recommendations for Health Care Personnel

In November 2011, ACIP released the following new immunization recommendations for health care personnel.

- **HepB:** HCP and trainees born in areas with high rates of hepatitis B should be tested for HBsAg and hepatitis B core antibody/hepatitis B surface antibody to determine infection status.
- **Influenza:** Influenza vaccine should be administered to *all* HCP, including those who do not have direct patient contact.
- **MMR:** History of disease is no longer adequate as presumptive evidence of immunity for measles or mumps; laboratory confirmation of immunity or documentation of 2 doses is required.
- **Tdap:** All HCP regardless of age should receive a dose of Tdap if they have not been previously vaccinated.
- **Varicella:** Evidence of immunity should include one of the following:
 - Written documentation of 2 doses of varicella vaccine
 - Laboratory evidence of immunity or confirmation of disease
 - Previous diagnosis of varicella or herpes zoster by a health care provider.
- **MCV4:** HCP with anatomic/functional asplenia, HIV, or complement deficiencies should receive a 2-dose series. HCP who remain at high risk should be revaccinated every 5 years.

ACIP statements regarding recommendations for health care personnel and specific vaccines can be found at www.cdc.gov/vaccines/pubs/ACIP-list.htm.

New CDC Storage and Handling Guidelines

The Centers for Disease Control and Prevention recently released new vaccine storage and handling guidelines.

A few important changes have been made to these guidelines:

- **Varicella.** Varicella should be stored at -58°F through +5°F (-50°C through -15°C). *Do not store below -58°F (-50°C)*, as recent studies by Merck & Co., Inc. suggest that the potency of the vaccine may be damaged below that temperature.
- **Transporting varicella.** Merck & Co., Inc., issued new guidelines for transporting varicella vaccine. When transporting varicella vaccine, the vaccine should be placed on frozen or refrigerated gel packs and not *dry ice* as previously recommended.
- **Storage bins.** Uncovered storage bins with solid sides can now be used to store vaccine. This is a change from the previous recommendation to use uncovered storage bins with slotted or open sides. Recent studies by the National Institute of Standards and Technology demonstrated that uncovered bins with solid sides are also effective.

The complete storage and handling guidelines can be accessed at www.cdc.gov/vaccines/recs/storage/guide/default.htm.

Physicians are encouraged to maintain a copy of these guidelines in their office and to review them with staff.

Hepatitis B Revisions to the List of Reportable Diseases

In July 2011, the California Department of Public Health revised its list of reportable diseases. The new regulations satisfy the most recent communicable disease surveillance case definitions established by the CDC.

Laboratory criteria for the diagnosis of chronic hepatitis B now include

- A negative result for IgM antibodies to hepatitis B core antigen (IgM anti-HBc) and a positive result on one of the following tests: hepatitis B surface antigen (HBsAg), hepatitis B e antigen (HBeAg) or hepatitis B virus (HBV) DNA, *or*
- HBsAg-positive or HBV DNA-positive or HBeAg-positive two times at least 6 months apart. (Any combination of these tests performed 6 months apart is acceptable).

For more information on hepatitis B testing requirements, go to www.cdc.gov/osels/ph_surveillance/nndss/phs/infdis2011.htm.

HPV Vaccination Consent for Minors

In January 2012, a new California law (AB 499) went into effect allowing minors 12 years and older to consent to confidential medical services for the prevention of sexually transmitted diseases (STDs) without permission or consent from their parents. Although the law previously allowed minors 12 years and older to consent for diagnosis and treatment of STD services (i.e., hepatitis B and HIV), the law has been updated to include other preventive services, such as HPV vaccination.

More information on the new law can be found at www.cdph.ca.gov/programs/std/Pages/default.aspx.

For additional information on the immunization schedules or topics covered in this article, visit the Immunization Program website at www.publichealth.lacounty.gov/ip, or call (213) 351-7800.

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REFERENCES

1. Recommended Immunization Schedules for Persons Aged 0 Through 18 Years – United States. *MMWR Quick Guide*. 2012;61(5):1-4.
2. Recommended Adult Immunization Schedule– United States, 2012. *MMWR Quick Guide*. 2012;61(4):1-7.
3. Recommendations on the Use of Quadrivalent Human Papillomavirus Vaccine in Males — Advisory Committee on Immunization Practices (ACIP), 2011. *MMWR*. 2011;60(50):1705-1708.
4. Recommendations on the Use of Quadrivalent Human Papillomavirus Vaccine in Males — Advisory Committee on Immunization Practices (ACIP), 2011; *MMWR*. 2011.60(50):1709-1711.

Recommended Immunization Schedule for Persons Aged 0 Through 6 Years — United States • 2012

For those who fall behind or start late, see the catch-up schedule

Vaccine ▼	Age ►	Birth	1 month	2 months	4 months	6 months	9 months	12 months	15 months	18 months	19–23 months	2–3 years	4–6 years	
Hepatitis B ¹		HepB	HepB			HepB		HepB						Range of recommended ages for all children
Rotavirus ²				RV	RV	RV ²								
Diphtheria, tetanus, pertussis ³				DTaP	DTaP	DTaP	See footnote ⁷		DTaP				DTaP	Range of recommended ages for certain high-risk groups
<i>Haemophilus influenzae</i> type b ⁴				Hib	Hib	Hib ⁴		Hib						
Pneumococcal ⁵				PCV	PCV	PCV		PCV				PPSV		Range of recommended ages for all children and certain high-risk groups
Inactivated poliovirus ⁶				IPV	IPV			IPV					IPV	
Influenza ⁷								Influenza (yearly)						
Measles, mumps, rubella ⁸								MMR		See footnote ⁸			MMR	
Varicella ⁹								VAR		See footnote ⁹			VAR	
Hepatitis A ¹⁰								Dose 1 ¹⁰				HepA series		
Meningococcal ¹¹								MCV4 — See footnote ¹¹						

This schedule includes recommendations in effect as of December 23, 2011. Any dose not administered at the recommended age should be administered at a subsequent visit, when indicated and feasible. The use of a combination vaccine generally is preferred over separate injections of its equivalent component vaccines. Vaccination providers should consult the relevant Advisory Committee on Immunization Practices (ACIP) statement for detailed recommendations, available online at <http://www.cdc.gov/vaccines/pubs/acip-list.htm>. Clinically significant adverse events that follow vaccination should be reported to the Vaccine Adverse Event Reporting System (VAERS) online (<http://www.vaers.hhs.gov>) or by telephone (800-822-7967).

1. Hepatitis B (HepB) vaccine. (Minimum age: birth)

At birth:

- Administer monovalent HepB vaccine to all newborns before hospital discharge.
- For infants born to hepatitis B surface antigen (HBsAg)-positive mothers, administer HepB vaccine and 0.5 mL of hepatitis B immune globulin (HBIG) within 12 hours of birth. These infants should be tested for HBsAg and antibody to HBsAg (anti-HBs) 1 to 2 months after receiving the last dose of the series.
- If mother's HBsAg status is unknown, within 12 hours of birth administer HepB vaccine for infants weighing ≥2,000 grams, and HepB vaccine plus HBIG for infants weighing <2,000 grams. Determine mother's HBsAg status as soon as possible and, if she is HBsAg-positive, administer HBIG for infants weighing ≥2,000 grams (no later than age 1 week).

Doses after the birth dose:

- The second dose should be administered at age 1 to 2 months. Monovalent HepB vaccine should be used for doses administered before age 6 weeks.
- Administration of a total of 4 doses of HepB vaccine is permissible when a combination vaccine containing HepB is administered after the birth dose.
- Infants who did not receive a birth dose should receive 3 doses of a HepB-containing vaccine starting as soon as feasible.
- The minimum interval between dose 1 and dose 2 is 4 weeks, and between dose 2 and 3 is 8 weeks. The final (third or fourth) dose in the HepB vaccine series should be administered no earlier than age 24 weeks and at least 16 weeks after the first dose.

2. Rotavirus (RV) vaccines. (Minimum age: 6 weeks for both RV-1 [Rotarix] and RV-5 [Rota Teq])

- The maximum age for the first dose in the series is 14 weeks, 6 days; and 8 months, 0 days for the final dose in the series. Vaccination should not be initiated for infants aged 15 weeks, 0 days or older.
- If RV-1 (Rotarix) is administered at ages 2 and 4 months, a dose at 6 months is not indicated.

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

- The fourth dose may be administered as early as age 12 months, provided at least 6 months have elapsed since the third dose.

4. *Haemophilus influenzae* type b (Hib) conjugate vaccine. (Minimum age: 6 weeks)

- If PRP-OMP (PedvaxHIB or Comvax [HepB-Hib]) is administered at ages 2 and 4 months, a dose at age 6 months is not indicated.
- Hiberix should only be used for the booster (final) dose in children aged 12 months through 4 years.

5. Pneumococcal vaccines. (Minimum age: 6 weeks for pneumococcal conjugate vaccine [PCV]; 2 years for pneumococcal polysaccharide vaccine [PPSV])

- Administer 1 dose of PCV to all healthy children aged 24 through 59 months who are not completely vaccinated for their age.
- For children who have received an age-appropriate series of 7-valent PCV (PCV7), a single supplemental dose of 13-valent PCV (PCV13) is recommended for:
 - All children aged 14 through 59 months
 - Children aged 60 through 71 months with underlying medical conditions.
- Administer PPSV at least 8 weeks after last dose of PCV to children aged 2 years or older with certain underlying medical conditions, including a cochlear implant. See *MMWR* 2010;59(No. RR-11), available at <http://www.cdc.gov/mmwr/pdf/rr/rr5911.pdf>.

6. Inactivated poliovirus vaccine (IPV). (Minimum age: 6 weeks)

- If 4 or more doses are administered before age 4 years, an additional dose should be administered at age 4 through 6 years.
- The final dose in the series should be administered on or after the fourth birthday and at least 6 months after the previous dose.

7. Influenza vaccines. (Minimum age: 6 months for trivalent inactivated influenza vaccine [TIV]; 2 years for live, attenuated influenza vaccine [LAIV])

- For most healthy children aged 2 years and older, either LAIV or TIV may be used. However, LAIV should not be administered to some children, including 1) children with asthma, 2) children 2 through 4 years who had wheezing in the past 12 months, or 3) children who have any other underlying medical conditions that predispose them to influenza complications. For all other contraindications to use of LAIV, see *MMWR* 2010;59(No. RR-8), available at <http://www.cdc.gov/mmwr/pdf/rr/rr5908.pdf>.
- For children aged 6 months through 8 years:
 - For the 2011–12 season, administer 2 doses (separated by at least 4 weeks) to those who did not receive at least 1 dose of the 2010–11 vaccine. Those who received at least 1 dose of the 2010–11 vaccine require 1 dose for the 2011–12 season.
 - For the 2012–13 season, follow dosing guidelines in the 2012 ACIP influenza vaccine recommendations.

8. Measles, mumps, and rubella (MMR) vaccine. (Minimum age: 12 months)

- The second dose may be administered before age 4 years, provided at least 4 weeks have elapsed since the first dose.
- Administer MMR vaccine to infants aged 6 through 11 months who are traveling internationally. These children should be revaccinated with 2 doses of MMR vaccine, the first at ages 12 through 15 months and at least 4 weeks after the previous dose, and the second at ages 4 through 6 years.

9. Varicella (VAR) vaccine. (Minimum age: 12 months)

- The second dose may be administered before age 4 years, provided at least 3 months have elapsed since the first dose.
- For children aged 12 months through 12 years, the recommended minimum interval between doses is 3 months. However, if the second dose was administered at least 4 weeks after the first dose, it can be accepted as valid.

10. Hepatitis A (HepA) vaccine. (Minimum age: 12 months)

- Administer the second (final) dose 6 to 18 months after the first.
- Unvaccinated children 24 months and older at high risk should be vaccinated. See *MMWR* 2006;55(No. RR-7), available at <http://www.cdc.gov/mmwr/pdf/rr/rr5507.pdf>.
- A 2-dose HepA vaccine series is recommended for anyone aged 24 months and older, previously unvaccinated, for whom immunity against hepatitis A virus infection is desired.

11. Meningococcal conjugate vaccines, quadrivalent (MCV4). (Minimum age: 9 months for Menactra [MCV4-D], 2 years for Menveo [MCV4-CRM])

- For children aged 9 through 23 months 1) with persistent complement component deficiency; 2) who are residents of or travelers to countries with hyperendemic or epidemic disease; or 3) who are present during outbreaks caused by a vaccine serogroup, administer 2 primary doses of MCV4-D, ideally at ages 9 months and 12 months or at least 8 weeks apart.
- For children aged 24 months and older with 1) persistent complement component deficiency who have not been previously vaccinated; or 2) anatomic/functional asplenia, administer 2 primary doses of either MCV4 at least 8 weeks apart.
- For children with anatomic/functional asplenia, if MCV4-D (Menactra) is used, administer at a minimum age of 2 years and at least 4 weeks after completion of all PCV doses.
- See *MMWR* 2011;60:72–6, available at <http://www.cdc.gov/mmwr/pdf/wk/mm6003.pdf>, and Vaccines for Children Program resolution No. 6/11-1, available at <http://www.cdc.gov/vaccines/programs/vfc/downloads/resolutions/06-11mening-mcv.pdf>, and *MMWR* 2011;60:1391–2, available at <http://www.cdc.gov/mmwr/pdf/wk/mm6040.pdf>, for further guidance, including revaccination guidelines.

This schedule is approved by the Advisory Committee on Immunization Practices (<http://www.cdc.gov/vaccines/recs/acip>), the American Academy of Pediatrics (<http://www.aap.org>), and the American Academy of Family Physicians (<http://www.aafp.org>).

Recommended Immunization Schedule for Persons Aged 7 Through 18 Years – United States • 2012

For those who fall behind or start late, see the schedule below and the catch-up schedule

Vaccine ▼	Age ►	7–10 years	11–12 years	13–18 years	
Tetanus, diphtheria, pertussis ¹		1 dose (if indicated)	1 dose	1 dose (if indicated)	Range of recommended ages for all children
Human papillomavirus ²		See footnote ²	3 doses	Complete 3-dose series	
Meningococcal ³		See footnote ³	Dose 1	Booster at age 16 years	Range of recommended ages for catch-up immunization
Influenza ⁴		Influenza (yearly)			
Pneumococcal ⁵		See footnote ⁵			Range of recommended ages for certain high-risk groups
Hepatitis A ⁶		Complete 2-dose series			
Hepatitis B ⁷		Complete 3-dose series			
Inactivated poliovirus ⁸		Complete 3-dose series			
Measles, mumps, rubella ⁹		Complete 2-dose series			
Varicella ¹⁰		Complete 2-dose series			

This schedule includes recommendations in effect as of December 23, 2011. Any dose not administered at the recommended age should be administered at a subsequent visit, when indicated and feasible. The use of a combination vaccine generally is preferred over separate injections of its equivalent component vaccines. Vaccination providers should consult the relevant Advisory Committee on Immunization Practices (ACIP) statement for detailed recommendations, available online at <http://www.cdc.gov/vaccines/pubs/acip-list.htm>. Clinically significant adverse events that follow vaccination should be reported to the Vaccine Adverse Event Reporting System (VAERS) online (<http://www.vaers.hhs.gov>) or by telephone (800-822-7967).

- Tetanus and diphtheria toxoids and acellular pertussis (Tdap) vaccine.** (Minimum age: 10 years for Boostrix and 11 years for Adacel)
 - Persons aged 11 through 18 years who have not received Tdap vaccine should receive a dose followed by tetanus and diphtheria toxoids (Td) booster doses every 10 years thereafter.
 - Tdap vaccine should be substituted for a single dose of Td in the catch-up series for children aged 7 through 10 years. Refer to the catch-up schedule if additional doses of tetanus and diphtheria toxoid-containing vaccine are needed.
 - Tdap vaccine can be administered regardless of the interval since the last tetanus and diphtheria toxoid-containing vaccine.
- Human papillomavirus (HPV) vaccines (HPV4 [Gardasil] and HPV2 [Cervarix]).** (Minimum age: 9 years)
 - Either HPV4 or HPV2 is recommended in a 3-dose series for females aged 11 or 12 years. HPV4 is recommended in a 3-dose series for males aged 11 or 12 years.
 - The vaccine series can be started beginning at age 9 years.
 - Administer the second dose 1 to 2 months after the first dose and the third dose 6 months after the first dose (at least 24 weeks after the first dose).
 - See *MMWR* 2010;59:626–32, available at <http://www.cdc.gov/mmwr/pdf/wk/mm5920.pdf>.
- Meningococcal conjugate vaccines, quadrivalent (MCV4).**
 - Administer MCV4 at age 11 through 12 years with a booster dose at age 16 years.
 - Administer MCV4 at age 13 through 18 years if patient is not previously vaccinated.
 - If the first dose is administered at age 13 through 15 years, a booster dose should be administered at age 16 through 18 years with a minimum interval of at least 8 weeks after the preceding dose.
 - If the first dose is administered at age 16 years or older, a booster dose is not needed.
 - Administer 2 primary doses at least 8 weeks apart to previously unvaccinated persons with persistent complement component deficiency or anatomic/functional asplenia, and 1 dose every 5 years thereafter.
 - Adolescents aged 11 through 18 years with human immunodeficiency virus (HIV) infection should receive a 2-dose primary series of MCV4, at least 8 weeks apart.
 - See *MMWR* 2011;60:72–76, available at <http://www.cdc.gov/mmwr/pdf/wk/mm6003.pdf>, and Vaccines for Children Program resolution No. 6/11-1, available at <http://www.cdc.gov/vaccines/programs/vfc/downloads/resolutions/06-11mening-mcv.pdf>, for further guidelines.
- Influenza vaccines (trivalent inactivated influenza vaccine [TIV] and live, attenuated influenza vaccine [LAIV]).**
 - For most healthy, nonpregnant persons, either LAIV or TIV may be used, except LAIV should not be used for some persons, including those with asthma or any other underlying medical conditions that predispose them to influenza complications. For all other contraindications to use of LAIV, see *MMWR* 2010;59(No. RR-8), available at <http://www.cdc.gov/mmwr/pdf/rr/rr5908.pdf>.
 - Administer 1 dose to persons aged 9 years and older.
 - For children aged 6 months through 8 years:
 - For the 2011–12 season, administer 2 doses (separated by at least 4 weeks) to those who did not receive at least 1 dose of the 2010–11 vaccine. Those who received at least 1 dose of the 2010–11 vaccine require 1 dose for the 2011–12 season.
 - For the 2012–13 season, follow dosing guidelines in the 2012 ACIP influenza vaccine recommendations.
- Pneumococcal vaccines (pneumococcal conjugate vaccine [PCV] and pneumococcal polysaccharide vaccine [PPSV]).**
 - A single dose of PCV may be administered to children aged 6 through 18 years who have anatomic/functional asplenia, HIV infection or other immunocompromising condition, cochlear implant, or cerebral spinal fluid leak. See *MMWR* 2010;59(No. RR-11), available at <http://www.cdc.gov/mmwr/pdf/rr/rr5911.pdf>.
 - Administer PPSV at least 8 weeks after the last dose of PCV to children aged 2 years or older with certain underlying medical conditions, including a cochlear implant. A single revaccination should be administered after 5 years to children with anatomic/functional asplenia or an immunocompromising condition.
- Hepatitis A (HepA) vaccine.**
 - HepA vaccine is recommended for children older than 23 months who live in areas where vaccination programs target older children, who are at increased risk for infection, or for whom immunity against hepatitis A virus infection is desired. See *MMWR* 2006;55(No. RR-7), available at <http://www.cdc.gov/mmwr/pdf/rr/rr5507.pdf>.
 - Administer 2 doses at least 6 months apart to unvaccinated persons.
- Hepatitis B (HepB) vaccine.**
 - Administer the 3-dose series to those not previously vaccinated.
 - For those with incomplete vaccination, follow the catch-up recommendations.
 - A 2-dose series (doses separated by at least 4 months) of adult formulation Recombivax HB is licensed for use in children aged 11 through 15 years.
- Inactivated poliovirus vaccine (IPV).**
 - The final dose in the series should be administered at least 6 months after the previous dose.
 - 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.
 - IPV is not routinely recommended for U.S. residents aged 18 years or older.
- Measles, mumps, and rubella (MMR) vaccine.**
 - The minimum interval between the 2 doses of MMR vaccine is 4 weeks.
- Varicella (VAR) vaccine.**
 - For persons without evidence of immunity (see *MMWR* 2007;56(No. RR-4), available at <http://www.cdc.gov/mmwr/pdf/rr/rr5604.pdf>), administer 2 doses if not previously vaccinated or the second dose if only 1 dose has been administered.
 - For persons aged 7 through 12 years, the recommended minimum interval between doses is 3 months. However, if the second dose was administered at least 4 weeks after the first dose, it can be accepted as valid.
 - For persons aged 13 years and older, the minimum interval between doses is 4 weeks.

This schedule is approved by the Advisory Committee on Immunization Practices (<http://www.cdc.gov/vaccines/recs/acip>), the American Academy of Pediatrics (<http://www.aap.org>), and the American Academy of Family Physicians (<http://www.aafp.org>).

Catch-up Immunization Schedule for Persons Aged 4 Months Through 18 Years Who Start Late or Who Are More Than 1 Month Behind —United States • 2012

The figure below provides catch-up schedules and minimum intervals between doses for children whose vaccinations have been delayed. A vaccine series does not need to be restarted, regardless of the time that has elapsed between doses. Use the section appropriate for the child's age. Always use this table in conjunction with the accompanying childhood and adolescent immunization schedules and their respective footnotes.

Persons aged 4 months through 6 years					
Vaccine	Minimum Age for Dose 1	Minimum Interval Between Doses			
		Dose 1 to dose 2	Dose 2 to dose 3	Dose 3 to dose 4	Dose 4 to dose 5
Hepatitis B	Birth	4 weeks	8 weeks and at least 16 weeks after first dose; minimum age for the final dose is 24 weeks		
Rotavirus ¹	6 weeks	4 weeks	4 weeks ¹		
Diphtheria, tetanus, pertussis ²	6 weeks	4 weeks	4 weeks	6 months	6 months ²
<i>Haemophilus influenzae</i> type b ³	6 weeks	4 weeks if first dose administered at younger than age 12 months 8 weeks (as final dose) if first dose administered at age 12–14 months No further doses needed if first dose administered at age 15 months or older	4 weeks ³ if current age is younger than 12 months 8 weeks (as final dose) ³ if current age is 12 months or older and first dose administered at younger than age 12 months and second dose administered at younger than 15 months No further doses needed if previous dose administered at age 15 months or older	8 weeks (as final dose) This dose only necessary for children aged 12 months through 59 months who received 3 doses before age 12 months	
Pneumococcal ⁴	6 weeks	4 weeks if first dose administered at younger than age 12 months 8 weeks (as final dose for healthy children) if first dose administered at age 12 months or older or current age 24 through 59 months No further doses needed for healthy children if first dose administered at age 24 months or older	4 weeks if current age is younger than 12 months 8 weeks (as final dose for healthy children) if current age is 12 months or older No further doses needed for healthy children if previous dose administered at age 24 months or older	8 weeks (as final dose) This dose only necessary for children aged 12 months through 59 months who received 3 doses before age 12 months or for children at high risk who received 3 doses at any age	
Inactivated poliovirus ⁵	6 weeks	4 weeks	4 weeks	6 months ⁵ minimum age 4 years for final dose	
Meningococcal ⁶	9 months	8 weeks ⁶			
Measles, mumps, rubella ⁷	12 months	4 weeks			
Varicella ⁸	12 months	3 months			
Hepatitis A	12 months	6 months			
Persons aged 7 through 18 years					
Tetanus, diphtheria/ tetanus, diphtheria, pertussis ⁹	7 years ⁹	4 weeks	4 weeks if first dose administered at younger than age 12 months 6 months if first dose administered at 12 months or older	6 months if first dose administered at younger than age 12 months	
Human papillomavirus ¹⁰	9 years		Routine dosing intervals are recommended ¹⁰		
Hepatitis A	12 months	6 months			
Hepatitis B	Birth	4 weeks	8 weeks (and at least 16 weeks after first dose)		
Inactivated poliovirus ⁵	6 weeks	4 weeks	4 weeks ⁵	6 months ⁵	
Meningococcal ⁶	9 months	8 weeks ⁶			
Measles, mumps, rubella ⁷	12 months	4 weeks			
Varicella ⁸	12 months	3 months if person is younger than age 13 years 4 weeks if person is aged 13 years or older			

- Rotavirus (RV) vaccines (RV-1 [Rotarix] and RV-5 [Rota Teq]).**
 - The maximum age for the first dose in the series is 14 weeks, 6 days; and 8 months, 0 days for the final dose in the series. Vaccination should not be initiated for infants aged 15 weeks, 0 days or older.
 - If RV-1 was administered for the first and second doses, a third dose is not indicated.
- Diphtheria and tetanus toxoids and acellular pertussis (DTaP) vaccine.**
 - The fifth dose is not necessary if the fourth dose was administered at age 4 years or older.
- Haemophilus influenzae* type b (Hib) conjugate vaccine.**
 - Hib vaccine should be considered for unvaccinated persons aged 5 years or older who have sickle cell disease, leukemia, human immunodeficiency virus (HIV) infection, or anatomic/functional asplenia.
 - If the first 2 doses were PRP-OMP (PedvaxHIB or Comvax) and were administered at age 11 months or younger, the third (and final) dose should be administered at age 12 through 15 months and at least 8 weeks after the second dose.
 - If the first dose was administered at age 7 through 11 months, administer the second dose at least 4 weeks later and a final dose at age 12 through 15 months.
- Pneumococcal vaccines.** (Minimum age: 6 weeks for pneumococcal conjugate vaccine [PCV]; 2 years for pneumococcal polysaccharide vaccine [PPSV])
 - For children aged 24 through 71 months with underlying medical conditions, administer 1 dose of PCV if 3 doses of PCV were received previously, or administer 2 doses of PCV at least 8 weeks apart if fewer than 3 doses of PCV were received previously.
 - A single dose of PCV may be administered to certain children aged 6 through 18 years with underlying medical conditions. See age-specific schedules for details.
 - Administer PPSV to children aged 2 years or older with certain underlying medical conditions. See *MMWR* 2010;59(No. RR-11), available at <http://www.cdc.gov/mmwr/pdf/rr/r5911.pdf>.
- Inactivated poliovirus vaccine (IPV).**
 - A fourth dose is not necessary if the third dose was administered at age 4 years or older and at least 6 months after the previous dose.
 - In the first 6 months of life, minimum age and minimum intervals are only recommended if the person is at risk for imminent exposure to circulating poliovirus (i.e., travel to a polio-endemic region or during an outbreak).
 - IPV is not routinely recommended for U.S. residents aged 18 years or older.
- Meningococcal conjugate vaccines, quadrivalent (MCV4).** (Minimum age: 9 months for Menactra [MCV4-D]; 2 years for Menveo [MCV4-CRM])
 - See "Recommended immunization schedule for persons aged 0 through 6 years" and "Recommended immunization schedule for persons aged 7 through 18 years" for further guidance.
- Measles, mumps, and rubella (MMR) vaccine.**
 - Administer the second dose routinely at age 4 through 6 years.
- Varicella (VAR) vaccine.**
 - Administer the second dose routinely at age 4 through 6 years. If the second dose was administered at least 4 weeks after the first dose, it can be accepted as valid.
- Tetanus and diphtheria toxoids (Td) and tetanus and diphtheria toxoids and acellular pertussis (Tdap) vaccines.**
 - For children aged 7 through 10 years who are not fully immunized with the childhood DTaP vaccine series, Tdap vaccine should be substituted for a single dose of Td vaccine in the catch-up series; if additional doses are needed, use Td vaccine. For these children, an adolescent Tdap vaccine dose should not be given.
 - An inadvertent dose of DTaP vaccine administered to children aged 7 through 10 years can count as part of the catch-up series. This dose can count as the adolescent Tdap dose, or the child can later receive a Tdap booster dose at age 11–12 years.
- Human papillomavirus (HPV) vaccines (HPV4 [Gardasil] and HPV2 [Cervarix]).**
 - Administer the vaccine series to females (either HPV2 or HPV4) and males (HPV4) at age 13 through 18 years if patient is not previously vaccinated.
 - Use recommended routine dosing intervals for vaccine series catch-up; see "Recommended immunization schedule for persons aged 7 through 18 years".

Clinically significant adverse events that follow vaccination should be reported to the Vaccine Adverse Event Reporting System (VAERS) online (<http://www.vaers.hhs.gov>) or by telephone (800-822-7967). Suspected cases of vaccine-preventable diseases should be reported to the state or local health department. Additional information, including precautions and contraindications for vaccination, is available from CDC online (<http://www.cdc.gov/vaccines>) or by telephone (800-CDC-INFO [800-232-4636]).

Recommended Adult Immunization Schedule—United States - 2012

Note: These recommendations must be read with the footnotes that follow containing number of doses, intervals between doses, and other important information.

Recommended adult immunization schedule, by vaccine and age group¹

VACCINE ▼	AGE GROUP ►	19-21 years	22-26 years	27-49 years	50-59 years	60-64 years	≥ 65 years	
Influenza ²		1 dose annually						
Tetanus, diphtheria, pertussis (Td/Tdap) ^{3,*}		Substitute 1-time dose of Tdap for Td booster; then boost with Td every 10 yrs						Td/Tdap ³
Varicella ^{4,*}		2 Doses						
Human papillomavirus (HPV) Female ^{5,*}		3 doses						
Human papillomavirus (HPV) Male ^{5,*}		3 doses						
Zoster ⁶						1 dose		
Measles, mumps, rubella (MMR) ^{7,*}		1 or 2 doses			1 dose			
Pneumococcal (polysaccharide) ^{8,9}		1 or 2 doses					1 dose	
Meningococcal ^{10,*}		1 or more doses						
Hepatitis A ^{11,*}		2 doses						
Hepatitis B ^{12,*}		3 doses						

^{*}Covered by the Vaccine Injury Compensation Program

For all persons in this category who meet the age requirements and who lack documentation of vaccination or have no evidence of previous infection	Recommended if some other risk factor is present (e.g., on the basis of medical, occupational, lifestyle, or other indications)	Tdap recommended for ≥65 if contact with <12 month old child. Either Td or Tdap can be used if no infant contact	No recommendation
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Report all clinically significant postvaccination reactions to the Vaccine Adverse Event Reporting System (VAERS). Reporting forms and instructions on filing a VAERS report are available at www.vaers.hhs.gov or by telephone, 800-822-7967.

Information on how to file a Vaccine Injury Compensation Program claim is available at www.hrsa.gov/vaccinecompensation or by telephone, 800-338-2382. To file a claim for vaccine injury, contact the U.S. Court of Federal Claims, 717 Madison Place, N.W., Washington, D.C. 20005; telephone, 202-357-6400.

Additional information about the vaccines in this schedule, extent of available data, and contraindications for vaccination is also available at www.cdc.gov/vaccines or from the CDC-INFO Contact Center at 800-CDC-INFO (800-232-4636) in English and Spanish, 8:00 a.m. - 8:00 p.m. Eastern Time, Monday - Friday, excluding holidays.

Use of trade names and commercial sources is for identification only and does not imply endorsement by the U.S. Department of Health and Human Services.

Vaccines that might be indicated for adults based on medical and other indications¹

VACCINE ▼	INDICATION ►	Pregnancy	Immunocompromising conditions (excluding human immunodeficiency virus [HIV]) ^{4,5,7,14}	HIV infection ^{4,7,13,14} CD4+ T lymphocyte count <200 cells/ μL >200 cells/ μL	Men who have sex with men (MSM)	Heart disease, chronic lung disease, chronic alcoholism	Asplenia ¹³ (including elective splenectomy and persistent complement component deficiencies)	Chronic liver disease	Diabetes, kidney failure, end-stage renal disease, receipt of hemodialysis	Health-care personnel
Influenza ²			1 dose TIV annually		1 dose TIV or LAIV annually	1 dose TIV annually			1 dose TIV or LAIV annually	
Tetanus, diphtheria, pertussis (Td/Tdap) ^{3,*}		Substitute 1-time dose of Tdap for Td booster; then boost with Td every 10 yrs								
Varicella ^{4,*}		Contraindicated		2 doses						
Human papillomavirus (HPV) Female ^{5,*}		3 doses through age 26 yrs			3 doses through age 26 yrs					
Human papillomavirus (HPV) Male ^{5,*}		3 doses through age 26 yrs			3 doses through age 21 yrs					
Zoster ⁶		Contraindicated		1 dose						
Measles, mumps, rubella (MMR) ^{7,*}		Contraindicated		1 or 2 doses						
Pneumococcal (polysaccharide) ^{8,9}		1 or 2 doses								
Meningococcal ^{10,*}		1 or more doses								
Hepatitis A ^{11,*}		2 doses								
Hepatitis B ^{12,*}		3 doses								

^{*}Covered by the Vaccine Injury Compensation Program

For all persons in this category who meet the age requirements and who lack documentation of vaccination or have no evidence of previous infection	Recommended if some other risk factor is present (e.g., on the basis of medical, occupational, lifestyle, or other indications)	Contraindicated	No recommendation
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These schedules indicate the recommended age groups and medical indications for which administration of currently licensed vaccines is commonly indicated for adults ages 19 years and older, as of January 1, 2012. For all vaccines being recommended on the Adult Immunization Schedule: a vaccine series does not need to be restarted, regardless of the time that has elapsed between doses. Licensed combination vaccines may be used whenever any components of the combination are indicated and when the vaccine's other components are not contraindicated. For detailed recommendations on all vaccines, including those used primarily for travelers or that are issued during the year, consult the manufacturers' package inserts and the complete statements from the Advisory Committee on Immunization Practices (www.cdc.gov/vaccines/pubs/acip-list.htm). Use of trade names and commercial sources is for identification only and does not imply endorsement by the U.S. Department of Health and Human Services.

The recommendations in this schedule were approved by the Centers for Disease Control and Prevention's (CDC) Advisory Committee on Immunization Practices (ACIP), the American Academy of Family Physicians (AAFP), the American College of Physicians (ACP), American College of Obstetricians and Gynecologists (ACOG) and American College of Nurse-Midwives (ACNM).

Footnotes

Recommended Adult Immunization Schedule—United States • 2012

1. Additional information

- Advisory Committee on Immunization Practices (ACIP) vaccine recommendations and additional information are available at: <http://www.cdc.gov/vaccines/pubs/acip-list.htm>.
- Information on travel vaccine requirements and recommendations (e.g., for hepatitis A and B, meningococcal, and other vaccines) available at <http://wwwnc.cdc.gov/travel/page/vaccinations.htm>.

2. Influenza vaccination

- Annual vaccination against influenza is recommended for all persons 6 months of age and older.
- Persons 6 months of age and older, including pregnant women, can receive the trivalent inactivated vaccine (TIV).
- Healthy, nonpregnant adults younger than age 50 years without high-risk medical conditions can receive either intranasally administered live, attenuated influenza vaccine (LAIV) (FluMist), or TIV. Health-care personnel who care for severely immunocompromised persons (i.e., those who require care in a protected environment) should receive TIV rather than LAIV. Other persons should receive TIV.
- The intramuscular or intradermal administered TIV are options for adults aged 18–64 years.
- Adults aged 65 years and older can receive the standard dose TIV or the high-dose TIV (Fluzone High-Dose).

3. Tetanus, diphtheria, and acellular pertussis (Td/Tdap) vaccination

- Administer a one-time dose of Tdap to adults younger than age 65 years who have not received Tdap previously or for whom vaccine status is unknown to replace one of the 10-year Td boosters.
- Tdap is specifically recommended for the following persons:
 - pregnant women more than 20 weeks' gestation,
 - adults, regardless of age, who are close contacts of infants younger than age 12 months (e.g., parents, grandparents, or child care providers), and
 - health-care personnel.
- Tdap can be administered regardless of interval since the most recent tetanus or diphtheria-containing vaccine.
- Pregnant women not vaccinated during pregnancy should receive Tdap immediately postpartum.
- Adults 65 years and older may receive Tdap.
- Adults with unknown or incomplete history of completing a 3-dose primary vaccination series with Td-containing vaccines should begin or complete a primary vaccination series. Tdap should be substituted for a single dose of Td in the vaccination series with Tdap preferred as the first dose.
- For unvaccinated adults, administer the first 2 doses at least 4 weeks apart and the third dose 6–12 months after the second.
- If incompletely vaccinated (i.e., less than 3 doses), administer remaining doses. Refer to the ACIP statement for recommendations for administering Td/Tdap as prophylaxis in wound management (See footnote 1).

4. Varicella vaccination

- All adults without evidence of immunity to varicella (as defined below) should receive 2 doses of single-antigen varicella vaccine or a second dose if they have received only 1 dose.
- Special consideration for vaccination should be given to those who
 - have close contact with persons at high risk for severe disease (e.g., health-care personnel and family contacts of persons with immunocompromising conditions) or
 - are at high risk for exposure or transmission (e.g., teachers; child care employees; residents and staff members of institutional settings, including correctional institutions; college students; military personnel; adolescents and adults living in households with children; nonpregnant women of childbearing age; and international travelers).
- Pregnant women should be assessed for evidence of varicella immunity. Women who do not have evidence of immunity should receive the first dose of varicella vaccine upon completion or termination of pregnancy and before discharge from the health-care facility. The second dose should be administered 4–8 weeks after the first dose.
- Evidence of immunity to varicella in adults includes any of the following:
 - documentation of 2 doses of varicella vaccine at least 4 weeks apart;
 - U.S.-born before 1980 (although for health-care personnel and pregnant women, birth before 1980 should not be considered evidence of immunity);
 - history of varicella based on diagnosis or verification of varicella by a health-care provider (for a patient reporting a history of or having an atypical case, a mild case, or both, health-care providers should seek either an epidemiologic link to a typical varicella case or to a
 - laboratory-confirmed case or evidence of laboratory confirmation, if it was performed at the time of acute disease);

- history of herpes zoster based on diagnosis or verification of herpes zoster by a health-care provider; or
- laboratory evidence of immunity or laboratory confirmation of disease.

5. Human papillomavirus (HPV) vaccination

- Two vaccines are licensed for use in females, bivalent HPV vaccine (HPV2) and quadrivalent HPV vaccine (HPV4), and one HPV vaccine for use in males (HPV4).
- For females, either HPV4 or HPV2 is recommended in a 3-dose series for routine vaccination at 11 or 12 years of age, and for those 13 through 26 years of age, if not previously vaccinated.
- For males, HPV4 is recommended in a 3-dose series for routine vaccination at 11 or 12 years of age, and for those 13 through 21 years of age, if not previously vaccinated. Males 22 through 26 years of age may be vaccinated.
- HPV vaccines are not live vaccines and can be administered to persons who are immunocompromised as a result of infection (including HIV infection), disease, or medications. Vaccine is recommended for immunocompromised persons through age 26 years who did not get any or all doses when they were younger. The immune response and vaccine efficacy might be less than that in immunocompetent persons.
- Men who have sex with men (MSM) might especially benefit from vaccination to prevent condyloma and anal cancer. HPV4 is recommended for MSM through age 26 years who did not get any or all doses when they were younger.
- Ideally, vaccine should be administered before potential exposure to HPV through sexual activity; however, persons who are sexually active should still be vaccinated consistent with age-based recommendations. HPV vaccine can be administered to persons with a history of genital warts, abnormal Papanicolaou test, or positive HPV DNA test.
- A complete series for either HPV4 or HPV2 consists of 3 doses. The second dose should be administered 1–2 months after the first dose; the third dose should be administered 6 months after the first dose (at least 24 weeks after the first dose).
- Although HPV vaccination is not specifically recommended for health-care personnel (HCP) based on their occupation, HCP should receive the HPV vaccine if they are in the recommended age group.

6. Zoster vaccination

- A single dose of zoster vaccine is recommended for adults 60 years of age and older regardless of whether they report a prior episode of herpes zoster. Although the vaccine is licensed by the Food and Drug Administration (FDA) for use among and can be administered to persons 50 years and older, ACIP recommends that vaccination begins at 60 years of age.
- Persons with chronic medical conditions may be vaccinated unless their condition constitutes a contraindication, such as pregnancy or severe immunodeficiency.
- Although zoster vaccination is not specifically recommended for health-care personnel (HCP), HCP should receive the vaccine if they are in the recommended age group.

7. Measles, mumps, rubella (MMR) vaccination

- Adults born before 1957 generally are considered immune to measles and mumps. All adults born in 1957 or later should have documentation of 1 or more doses of MMR vaccine unless they have a medical contraindication to the vaccine, laboratory evidence of immunity to each of the three diseases, or documentation of provider-diagnosed measles or mumps disease. For rubella, documentation of provider-diagnosed disease is not considered acceptable evidence of immunity.

Measles component:

- A routine second dose of MMR vaccine, administered a minimum of 28 days after the first dose, is recommended for adults who
 - are students in postsecondary educational institutions;
 - work in a health-care facility; or
 - plan to travel internationally.

- Persons who received inactivated (killed) measles vaccine or measles vaccine of unknown type from 1963 to 1967 should be revaccinated with 2 doses of MMR vaccine.

Mumps component:

- A routine second dose of MMR vaccine, administered a minimum of 28 days after the first dose, is recommended for adults who
 - are students in postsecondary educational institutions;
 - work in a health-care facility; or
 - plan to travel internationally.

- Persons vaccinated before 1979 with either killed mumps vaccine or mumps vaccine of unknown type who are at high risk for mumps infection (e.g., persons who are working in a health-care facility) should be considered for revaccination with 2 doses of MMR vaccine.

Rubella component:

- For women of childbearing age, regardless of birth year, rubella immunity should be determined. If there is no evidence of immunity, women who are not pregnant should be vaccinated. Pregnant women who do not have evidence of immunity should receive MMR vaccine upon completion or termination of pregnancy and before discharge from the healthcare facility.

Health-care personnel born before 1957:

- For unvaccinated health-care personnel born before 1957 who lack laboratory evidence of measles, mumps, and/or rubella immunity or laboratory confirmation of disease, health-care facilities should consider routinely vaccinating personnel with 2 doses of MMR vaccine at the appropriate interval for measles and mumps or 1 dose of MMR vaccine for rubella.

8. Pneumococcal polysaccharide (PPSV) vaccination

- Vaccinate all persons with the following indications:
 - age 65 years and older without a history of PPSV vaccination;
 - adults younger than 65 years with chronic lung disease (including chronic obstructive pulmonary disease, emphysema, and asthma); chronic cardiovascular diseases; diabetes mellitus; chronic liver disease (including cirrhosis); alcoholism; cochlear implants; cerebrospinal fluid leaks; immunocompromising conditions; and functional or anatomic asplenia (e.g., sickle cell disease and other hemoglobinopathies, congenital or acquired asplenia, splenic dysfunction, or splenectomy [if elective splenectomy is planned, vaccinate at least 2 weeks before surgery]);
 - residents of nursing homes or long-term care facilities; and
 - adults who smoke cigarettes.
- Persons with asymptomatic or symptomatic HIV infection should be vaccinated as soon as possible after their diagnosis.
- When cancer chemotherapy or other immunosuppressive therapy is being considered, the interval between vaccination and initiation of immunosuppressive therapy should be at least 2 weeks. Vaccination during chemotherapy or radiation therapy should be avoided.
- Routine use of PPSV is not recommended for American Indians/Alaska Natives or other persons younger than 65 years of age unless they have underlying medical conditions that are PPSV indications. However, public health authorities may consider recommending PPSV for American Indians/Alaska Natives who are living in areas where the risk for invasive pneumococcal disease is increased.

9. Revaccination with PPSV

- One-time revaccination 5 years after the first dose is recommended for persons 19 through 64 years of age with chronic renal failure or nephrotic syndrome; functional or anatomic asplenia (e.g., sickle cell disease or splenectomy); and for persons with immunocompromising conditions.
- Persons who received PPSV before age 65 years for any indication should receive another dose of the vaccine at age 65 years or later if at least 5 years have passed since their previous dose.
- No further doses are needed for persons vaccinated with PPSV at or after age 65 years.

10. Meningococcal vaccination

- Administer 2 doses of meningococcal conjugate vaccine quadrivalent (MCV4) at least 2 months apart to adults with functional asplenia or persistent complement component deficiencies.
- HIV-infected persons who are vaccinated should also receive 2 doses.
- Administer a single dose of meningococcal vaccine to microbiologists routinely exposed to isolates of *Neisseria meningitidis*, military recruits, and persons who travel to or live in countries in which meningococcal disease is hyperendemic or epidemic.
- First-year college students up through age 21 years who are living in residence halls should be vaccinated if they have not received a dose on or after their 16th birthday.
- MCV4 is preferred for adults with any of the preceding indications who are 55 years old and younger; meningococcal polysaccharide vaccine (MPSV4) is preferred for adults 56 years and older.
- Revaccination with MCV4 every 5 years is recommended for adults previously vaccinated with MCV4 or MPSV4 who remain at increased risk for infection (e.g., adults with anatomic or functional asplenia or persistent complement component deficiencies).

11. Hepatitis A vaccination

- Vaccinate any person seeking protection from hepatitis A virus (HAV) infection and persons with any of the following indications:
 - men who have sex with men and persons who use injection drugs;

- persons working with HAV-infected primates or with HAV in a research laboratory setting;
- persons with chronic liver disease and persons who receive clotting factor concentrates;
- persons traveling to or working in countries that have high or intermediate endemicity of hepatitis A; and
- unvaccinated persons who anticipate close personal contact (e.g., household or regular babysitting) with an international adoptee during the first 60 days after arrival in the United States from a country with high or intermediate endemicity. (See footnote 1 for more information on travel recommendations). The first dose of the 2-dose hepatitis A vaccine series should be administered as soon as adoption is planned, ideally 2 or more weeks before the arrival of the adoptee.
- Single-antigen vaccine formulations should be administered in a 2-dose schedule at either 0 and 6–12 months (Havrix), or 0 and 6–18 months (Vaqta). If the combined hepatitis A and hepatitis B vaccine (Twinrix) is used, administer 3 doses at 0, 1, and 6 months; alternatively, a 4-dose schedule may be used, administered on days 0, 7, and 21–30 followed by a booster dose at month 12.

12. Hepatitis B vaccination

- Vaccinate persons with any of the following indications and any person seeking protection from hepatitis B virus (HBV) infection:
 - sexually active persons who are not in a long-term, mutually monogamous relationship (e.g., persons with more than one sex partner during the previous 6 months); persons seeking evaluation or treatment for a sexually transmitted disease (STD); current or recent injection-drug users; and men who have sex with men;
 - health-care personnel and public-safety workers who are exposed to blood or other potentially infectious body fluids;
 - persons with diabetes younger than 60 years as soon as feasible after diagnosis; persons with diabetes who are 60 years or older at the discretion of the treating clinician based on increased need for assisted blood glucose monitoring in long-term care facilities, likelihood of acquiring hepatitis B infection, its complications or chronic sequelae, and likelihood of immune response to vaccination;
 - persons with end-stage renal disease, including patients receiving hemodialysis; persons with HIV infection; and persons with chronic liver disease;
 - household contacts and sex partners of persons with chronic HBV infection; clients and staff members of institutions for persons with developmental disabilities; and international travelers to countries with high or intermediate prevalence of chronic HBV infection; and
 - all adults in the following settings: STD treatment facilities; HIV testing and treatment facilities; facilities providing drug-abuse treatment and prevention services; healthcare settings targeting services to injection-drug users or men who have sex with men; correctional facilities; end-stage renal disease programs and facilities for chronic hemodialysis patients; and institutions and nonresidential daycare facilities for persons with developmental disabilities.
- Administer missing doses to complete a 3-dose series of hepatitis B vaccine to those persons not vaccinated or not completely vaccinated. The second dose should be administered 1 month after the first dose; the third dose should be given at least 2 months after the second dose (and at least 4 months after the first dose). If the combined hepatitis A and hepatitis B vaccine (Twinrix) is used, give 3 doses at 0, 1, and 6 months; alternatively, a 4-dose Twinrix schedule, administered on days 0, 7, and 21–30 followed by a booster dose at month 12 may be used.
- Adult patients receiving hemodialysis or with other immunocompromising conditions should receive 1 dose of 40 µg/mL (Recombivax HB) administered on a 3-dose schedule or 2 doses of 20 µg/mL (Engerix-B) administered simultaneously on a 4-dose schedule at 0, 1, 2, and 6 months.

13. Selected conditions for which *Haemophilus influenzae* type b (Hib) vaccine may be used

- 1 dose of Hib vaccine should be considered for persons who have sickle cell disease, leukemia, or HIV infection, or who have anatomic or functional asplenia if they have not previously received Hib vaccine.

14. Immunocompromising conditions

- Inactivated vaccines generally are acceptable (e.g., pneumococcal, meningococcal, and influenza [inactivated influenza vaccine]), and live vaccines generally are avoided in persons with immune deficiencies or immunocompromising conditions. Information on specific conditions is available at <http://www.cdc.gov/vaccines/pubs/acip-list.htm>.

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Rx for Prevention

Promoting health through prevention in Los Angeles County

Save the Date

Prevention Symposium: How the New Health Care Paradigm Supports Healthy Aging

June 5, 2012 • 1 pm-5 pm

The Los Angeles County Department of Public Health hosts this symposium, which is designed to engage local medical providers in active discussions with a variety of experts on healthy aging. The session will also highlight evidence-based strategies that protect health and promote positive health outcomes through the integration of clinical and community-based care for elderly patients.

Registration information will be available soon.

For details, contact
medicalaffairs@ph.lacounty.gov



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Comments or Suggestions? If so, or if you would like to suggest a topic for a future issue, e-mail Dr. Jeffrey Gunzenhauser, co-editor, at jgunzenhauser@ph.lacounty.gov.

Index of Disease Reporting Forms

All case reporting forms from the LA County Department of Public Health are available by telephone or Internet.

**Reportable Diseases & Conditions
Confidential Morbidity Report**
Morbidity Unit (888) 397-3993
Acute Communicable Disease Control
(213) 240-7941
www.publichealth.lacounty.gov/acd/reports/CMR-H-794.pdf

**Sexually Transmitted Disease
Confidential Morbidity Report**
(213) 744-3070
www.publichealth.lacounty.gov/std/providers.htm (web page)
www.publichealth.lacounty.gov/std/docs/STD_CMV.pdf (form)

Adult HIV/AIDS Case Report Form
For patients over 13 years of age at time of diagnosis
HIV Epidemiology Program
(213) 351-8196
www.publichealth.lacounty.gov/HIV/hivreporting.htm

Pediatric HIV/AIDS Case Report Form
For patients less than 13 years of age at time of diagnosis

Pediatric AIDS Surveillance Program
(213) 351-8153
Must first call program before reporting
www.publichealth.lacounty.gov/HIV/hivreporting.htm

**Tuberculosis Suspects & Cases
Confidential Morbidity Report**
Tuberculosis Control (213) 744-6160
www.publichealth.lacounty.gov/tb/forms/cmrv.pdf

Lead Reporting
No reporting form. Reports are taken over the phone.
Lead Program (323) 869-7195

Animal Bite Report Form
Veterinary Public Health (877) 747-2243
www.publichealth.lacounty.gov/vet/biteintro.htm

**Animal Diseases and Syndrome
Report Form**
Veterinary Public Health (877) 747-2243
www.publichealth.lacounty.gov/vet/disintro.htm

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