In October 2014, the Advisory Committee on Immunization Practices (ACIP) approved the Recommended Adult Immunization Schedule, United States, 2015. This schedule provides a summary of ACIP recommendations for the use of vaccines routinely recommended for adults in 2 figures (Figures 1 and 2), footnotes for each vaccine, and a table that describes primary contraindications and precautions for commonly used vaccines for adults (Table 1). Changes in the 2015 adult immunization schedule from the 2014 schedule include the September 2014 recommendation for routine administration of the 13-valent pneumococcal conjugate vaccine (PCV13) in series with the 23-valent pneumococcal polysaccharide vaccine (PPSV23) for all adults aged 65 years or older (1), the August 2014 revision on contraindications and precautions for the live attenuated influenza vaccine (LAIV) (2), and the October 2014 approval by the U.S. Food and Drug Administration (FDA) to expand the approved age for use of recombinant influenza vaccine (RIV) (3). The 2015 adult immunization schedule was also reviewed and approved by the American College of Physicians, American Academy of Family Physicians, American College of Obstetricians and Gynecologists, and American College of Nurse-Midwives.

The 2015 adult immunization schedule contains the following changes from 2014:

- Figure 1, the recommended adult immunization schedule by vaccine and age group, has been revised to designate PCV13 for adults aged 65 years or older as “recommended” (from the previous “recommended if some other risk is present”). Figure 2, showing vaccines that might be indicated for adults on the basis of medical and other indications, is unchanged.
- The footnotes for pneumococcal vaccination have been revised to provide algorithmic, patient-based guidance for the health care provider to arrive at appropriate vaccination decisions for individual patients.
- The footnote for influenza vaccination has been updated to indicate that adults aged 18 years or older (changed from adults aged 18 through 49 years) can receive RIV. A list of updated available influenza vaccines can be found at www.cdc.gov/flu/protect/vaccine/vaccines.htm.
- Table 1, showing contraindications and precautions to commonly used vaccines in adults, has been revised to update the section on LAIV to reflect the changes in the ACIP recommendations for the 2014–2015 influenza season. These changes include moving “influenza antiviral use within the last 48 hours” from the precautions column to the contraindications column, and moving asthma and chronic lung diseases; cardiovascular, renal, and hepatic diseases; and diabetes and other conditions from the contraindications column to the precautions column. Immune suppression, egg allergy, and pregnancy remain contraindications for LAIV.

Details on these updates and information on other vaccines recommended for adults can be found in the Recommended Adult Immunization Schedule, United States, 2015 at www.cdc.gov/vaccines/schedules. The full ACIP recommendations for each vaccine are not included in the schedule owing to space limitations but can be found at www.cdc.gov/vaccines/hcp/acip-recs/index.html.

In the United States, despite extensive and targeted recommendations for use of PCV13 and PPSV23 for age and risk groups, Streptococcus pneumoniae (pneumococcus) infection continues to be a major
cause of morbidity, including bacteremia, meningitis, and pneumonia. Approximately 40,000 cases of invasive pneumococcal disease (IPD) occur annually, 13,500 of which occur among adults aged 65 years or older (4; Centers for Disease Control and Prevention. Active Bacterial Core Surveillance: Emerging Infections Program Network. Unpublished data, 2013). Although the incidence of IPD caused by serotypes unique to PCV13 among adults aged 65 years or older in 2013 had declined by approximately 50% compared with 2010 owing to indirect effects of the pediatric pneumococcal vaccination program, approximately 20% to 25% of IPD cases (4; Centers for Disease Control and Prevention. Active Bacterial Core Surveillance: Emerging Infections Program Network. Unpublished data, 2013) and 10% of community-acquired pneumonia cases (5) are caused by PCV13 serotypes and are potentially preventable with the use of PCV13. PCV13 has shown 45.6% efficacy against vaccine-type pneumococcal pneumonia, 45.0% efficacy against vaccine-type non-bacteremic pneumococcal pneumonia, and 75.0% efficacy against vaccine-type IPD (5). In addition, 2 randomized, multicenter immunogenicity studies conducted in the United States and Europe among older adults showed that PCV13 induced an immune response similar to that of PPSV23 (6).

Figure 1. Recommended adult immunization schedule, by vaccine and age group, for adults aged 19 years or older: United States, 2015.

**Recommended Adult Immunization Schedule—United States • 2015**

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

<table>
<thead>
<tr>
<th>VACCINE ▼</th>
<th>AGE GROUP ▲</th>
<th>19–21 years</th>
<th>22–26 years</th>
<th>27–49 years</th>
<th>50–59 years</th>
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<tr>
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<td></td>
</tr>
<tr>
<td>Tetanus, diphtheria, pertussis (Td/Tdap) ▲</td>
<td>▲</td>
<td>Substitute 1-time dose of Tdap for Td booster; then boost with Td every 10 yrs</td>
<td></td>
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<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Zoster ▲</td>
<td>▲</td>
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<td></td>
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<tr>
<td>Measles, mumps, rubella (MMR) ▲</td>
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<td>1 or 2 doses</td>
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</tr>
<tr>
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<td>▲</td>
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<tr>
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<td>▲</td>
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<tr>
<td>Haemophilus influenzae type b (Hib) ▲</td>
<td>▲</td>
<td>1 or 3 doses</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*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; zoster vaccine recommended regardless of prior episode of zoster

Recommended if some other risk factor is present (e.g., on the basis of medical, occupational, lifestyle, or other indication)

No recommendation

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, NW, Washington, DC 20001; 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.

The recommendations in this schedule were approved by the Centers for Disease Control and Prevention’s (CDC) Advisory Committee on Immunization Practices (ACIP), American Academy of Family Physicians (AAFP), American College of Physicians (ACP), American College of Obstetricians and Gynecologists (ACOG), and American College of Nurse-Midwives (ACNM).
65 years or older since 1997. In 2010, the ACIP added smoking and asthma as indications for PPSV23 among adults (7). Adults aged 19 through 64 years with certain high-risk conditions, including cochlear implant, cerebrospinal fluid leak, diabetes, and chronic heart or lung disease, are recommended to receive 1 dose of PPSV23 at the time of diagnosis. A second dose of PPSV23 is then recommended at age 65 years if at least 5 years have passed since the first dose.

In 2012, the ACIP recommended a routine use of PCV13 for adults aged 19 years or older with immunocompromising conditions, anatomical or functional asplenia, cochlear implant, or cerebrospinal fluid leak (8). These adults are then recommended to receive a dose of PCV13 at least 8 weeks later, followed by a second dose of PPSV23 at least 5 years after the first PPSV23 dose. A third dose of PPSV23 is recommended for them at age 65 years or older if the second dose was received at age younger than 65 years and at least 5 years have passed since the second dose. Definitions of immunocompromising conditions, anatomical or functional asplenia, and chronic health conditions are as follows:

- Immunocompromising conditions that are indications for PCV13 and PPSV23 are congenital or acquired immunodeficiency (including B- or T-lymphocyte deficiency, complement deficiencies, and phagocytic disorders excluding chronic granulomatous disease), HIV infection, chronic renal failure, nephrotic syndrome, severe combined immunodeficiency, and congenital heart disease.
Footnotes to the recommended adult immunization schedule for adults aged 19 years or older: United States, 2015.

1. Additional information
- Additional guidance for the use of the vaccines described in this supplement are available at www.cdc.gov/vaccines/hcp/acip-recs/index.html.
- Information on vaccination recommendations when vaccination status is unknown and other general immunization information can be found in the General Recommendations on Immunization at www.cdc.gov/mmwr/preview/mmwrhtml/rr6002a1.htm.
- Information on travel vaccine requirements and recommendations (e.g., for hepatitis A and B, meningococcal, and other vaccines) is available at wwwnc.cdc.gov/travel/destinations/list.
- Additional information and resources regarding vaccination of pregnant women can be found at www.cdc.gov/vaccines/adults/rec-vac/pregnant.html.

2. Influenza vaccination
- Annual vaccination against influenza is recommended for all persons aged 6 months or older.
- For persons aged 6 months or older, including pregnant women and persons with hives-only allergy to eggs, can receive the inactivated influenza vaccine (IIV). An age-appropriate IIV formulation should be used.
- Adults aged 18 years or older can receive the recombinant influenza vaccine (RIV) (FluBlok). RIV does not contain any egg protein and can be given to age-appropriate persons with egg allergy of any severity.
- Healthy, nonpregnant persons aged 2 to 49 years without high-risk medical conditions can receive either intranasally administered live, attenuated influenza vaccine (LAIV) (FluMist), or IIV.
- Health care personnel who care for severely immunocompromised persons who require care in a protected environment should receive IV or RIV; health care personnel who receive LAIV should avoid providing care for severely immunosuppressed persons for 7 days after vaccination.
- The intramuscularly or intradermally administered IIV are options for adults aged 18 through 64 years.
- Adults aged 65 years or older can receive the standard-dose IIV or the high-dose IIV (Fluzone High-Dose).
- A list of currently available influenza vaccines can be found at www.cdc.gov/flu/protection/vaccine/vaccines.htm.

3. Tetanus, diphtheria, and acellular pertussis (Td/Tdap) vaccination
- Administer 1 dose of Tdap vaccine to pregnant women during each pregnancy (preferably during 27 to 36 weeks’ gestation) regardless of interval since prior Td or Tdap vaccination.
- Persons aged 11 years or older who have not received Tdap vaccine or for whom vaccine status is unknown should receive a dose of Tdap followed by tetanus and diphtheria toxoids (Td) booster doses every 10 years thereafter. Tdap can be administered regardless of interval since the most recent tetanus or diphtheria-toxoid containing vaccine.
- Adults with an unknown or incomplete history of completing a 3-dose primary vaccination series with Td-containing vaccines should begin or complete a primary vaccination series including a Tdap dose.
- For incompletely vaccinated adults, administer the first 2 doses at least 4 weeks apart and the third dose 6 to 12 months after the second.
- For incompletely vaccinated (i.e., less than 3 doses) adults, 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.
- Vaccination should be emphasized for 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 to 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, except health care personnel and pregnant women;
  - history of varicella based on diagnosis or verification of varicella disease by a health care provider;
  - history of herpes zoster based on diagnosis or verification of herpes zoster disease 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 age 11 or 12 years and for those aged 13 through 26 years, if not previously vaccinated.
- For males, HPV4 is recommended in a 3-dose series for routine vaccination at age 11 or 12 years and for those aged 13 through 21 years, if not previously vaccinated. Males aged 22 through 26 years may be vaccinated.
- HPV4 is recommended for men who have sex with men through age 26 years for those who did not get any or all doses when they were younger.
- Vaccination is recommended for immunocompromised persons (including those with HIV infection) through age 26 years for those who did not get any or all doses when they were younger.
- A complete series for either HPV4 or HPV2 consists of 3 doses. The second dose should be administered 4 to 8 weeks (minimum interval of 4 weeks) after the first dose; the third dose should be administered 24 weeks after the first dose and 16 weeks after the second dose (minimum interval of at least 12 weeks).
- HPV vaccines are not recommended for use in pregnant women. However, pregnancy testing is not needed before vaccination. If a woman is found to be pregnant after initiating the vaccination series, no intervention is needed; the remainder of the 3-dose series should be delayed until completion or termination of pregnancy.

Continued on following page
6. Zoster vaccination
   • A single dose of zoster vaccine is recommended for adults aged 60 years or older regardless of whether they report a prior episode of herpes zoster. Although the vaccine is licensed by the U.S. Food and Drug Administration for use among and can be administered to persons aged 50 years or older, ACIP recommends that vaccination begin at age 60 years.
   • Persons aged 60 years or older with chronic medical conditions may be vaccinated unless their condition constitutes a contraindication, such as pregnancy or severe immunodeficiency.

7. Measles, mumps, rubella (MMR) vaccination
   • Adults born before 1957 are generally 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 or laboratory evidence of immunity to each of the three diseases. Documentation of provider-diagnosed disease is not considered acceptable evidence of immunity for measles, mumps, or rubella.

   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 during 1963–1967 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 a postsecondary educational institution,
     • 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 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 vaccinating personnel with 2 doses of MMR vaccine at the appropriate interval for measles and mumps or 1 dose of MMR vaccine for rubella.

   • Persons aged 60 years or older with chronic medical conditions may be vaccinated unless their condition constitutes a contraindication, such as pregnancy or before discharge from the health care facility.

8. Pneumococcal vaccination (13-valent pneumococcal conjugate vaccine [PCV13] and 23-valent pneumococcal polysaccharide vaccine [PPSV23])
   • General information
     • When indicated, only a single dose of PCV13 is recommended for adults.
     • No additional dose of PPSV23 is indicated for adults vaccinated with PPSV23 at or after age 65 years.
     • When both PCV13 and PPSV23 are indicated, PCV13 should be administered first; PCV13 and PPSV23 should not be administered during the same visit.
     • When indicated, PCV13 and PPSV23 should be administered to adults whose pneumococcal vaccination history is incomplete or unknown.

   • Adults aged 65 years or older:
     • Have not received PCV13 or PPSV23: Administer PCV13 followed by PPSV23 in 6 to 12 months.
     • Have not received PCV13 but have received a dose of PPSV23 at age 65 years or older: Administer PCV13 at least 1 year after the dose of PPSV23 received at age 65 years or older.
     • Have not received PCV13 but have received 1 or more doses of PPSV23 before age 65: Administer PCV13 at least 1 year after the most recent dose of PPSV23; administer a dose of PPSV23 6 to 12 months after PCV13, or as soon as possible if this time window has passed, and at least 5 years after the most recent dose of PPSV23.
     • Have received PCV13 but not PPSV23 before age 65 years: Administer PPSV23 6 to 12 months after PCV13 or as soon as possible if this time window has passed.
     • Have received PCV13 and 1 or more doses of PPSV23 before age 65 years: Administer PPSV23 6 to 12 months after PCV13, or as soon as possible if this time window has passed, and at least 5 years after the most recent dose of PPSV23.

   • Adults aged 19 through 64 years with immunocompromising conditions or anatomical or functional asplenia (defined below) who:
     • Have not received PCV13 or PPSV23: Administer PCV13 followed by PPSV23 at least 8 weeks after PCV13; administer a second dose of PPSV23 at least 5 years after the first dose of PPSV23.
     • Have not received PCV13 but have received 1 dose of PPSV23: Administer PCV13 at least 1 year after the PPSV23; administer a second dose of PPSV23 at least 8 weeks after PCV13 and at least 5 years after the first dose of PPSV23.
     • Have received PCV13 but not PPSV23: Administer PCV13 at least 1 year after the most recent dose of PPSV23.
     • Have received PCV13 but not PPSV23: Administer PPSV23 at least 8 weeks after PCV13; administer a second dose of PPSV23 at least 5 years after the first dose of PPSV23.

   • Adults aged 19 through 64 years with cerebrospinal fluid leak or cochlear implant: Administer PCV13 followed by PPSV23 at least 8 weeks after PCV13.

   • Adults aged 19 through 64 years with chronic heart disease (including congestive heart failure and cardiomyopathies, excluding hypertension), chronic lung disease (including chronic obstructive lung disease, emphysema, and asthma), chronic liver disease (including cirrhosis), alcoholism, or diabetes mellitus: Administer PPSV23.

   • Adults aged 19 through 64 years who smoke cigarettes or reside in nursing home or long-term care facilities: Administer PPSV23.
Footnotes—Continued

9. Meningococcal vaccination

- Administer 2 doses of quadrivalent meningococcal conjugate vaccine (MenACWY [Menactra, Menveo]) at least 2 months apart to adults of all ages with anatomical or functional asplenia or persistent complement component deficiencies. HIV infection is not an indication for routine vaccination with MenACWY. If an HIV-infected person of any age is vaccinated, 2 doses of MenACWY should be administered at least 2 months apart.
- Administer a single dose of meningococcal vaccine to microbiologists routinely exposed to isolates of Neisseria meningitidis, military recruits, persons at risk during an outbreak attributable to a vaccine serogroup, 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.
- MenACWY is preferred for adults with any of the preceding indications who are aged 55 years or younger as well as for adults aged 56 years or older who a) were vaccinated previously with MenACWY and are recommended for revaccination, or b) for whom multiple doses are anticipated. Meningococcal polysaccharide vaccine (MPSV4 [Menomune]) is preferred for adults aged 56 years or older who have not received MenACWY previously and who require a single dose only (e.g., travelers).
- Revaccination with MenACWY every 5 years is recommended for adults previously vaccinated with MenACWY or MPSV4 who remain at increased risk for infection (e.g., men with anatomical or functional asplenia, persistent complement component deficiencies, or microbiologists).

10. 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 or noninjection illicit 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 12 months (Havrix), or 0 and 6 to 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 to 30 followed by a booster dose at month 12.

11. 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, monogamous relationship (e.g., sex partners during the previous 6 months); persons seeking evaluation or treatment for a sexually transmitted disease (STD); and persons who have sex with men;
  - health care personnel and public safety workers who are potentially exposed to blood or other infectious body fluids;
  - persons with diabetes who are younger than age 60 years as soon as feasible after diagnosis; persons with diabetes who are age 60 years or older at the discretion of the treating clinician based on the likelihood of acquiring HBV infection, including the risk posed by an increased need for assisted blood glucose monitoring in long-term care facilities, the likelihood of experiencing chronic sequelae if infected with HBV, and the 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 hepatitis B surface antigen–positive persons, 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, health care 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 day care 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 to 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 mcg/mL (Recombivax HB) administered on a 3-dose schedule at 0, 1, and 6 months or 2 doses of 20 mcg/mL (Engerix-B) administered simultaneously on a 4-dose schedule at 0, 1, 2, and 6 months.

12. Haemophilus influenzae type b (Hib) vaccination

- One dose of Hib vaccine should be administered to persons who have functional or anatomical asplenia or sickle cell disease or are undergoing elective splenectomy if they have not previously received Hib vaccine. Hib vaccination 14 or more days before splenectomy is suggested.
- Recipients of a hematopoietic stem cell transplant (HSCT) should be vaccinated with a 3-dose regimen 6 to 12 months after a successful transplant, regardless of vaccination history; at least 4 weeks should separate doses.
- Hib vaccine is not recommended for adults with HIV infection since their risk for Hib infection is low.

13. Immunocompromising conditions

- Inactivated vaccines generally are acceptable (e.g., pneumococcal, meningococcal, and inactivated influenza vaccine) and live vaccines generally are avoided in persons with immune deficiencies or immunocompromising conditions. Information on specific conditions is available at www.cdc.gov/vaccines/hcp/acip-recs/index.html.

- Routine pneumococcal vaccination is not recommended for American Indian/Alaska Native or other adults unless they have the indications as above; however, public health authorities may consider recommending the use of pneumococcal vaccines for American Indians/Alaska Natives or other adults who live in areas with increased risk for invasive pneumococcal disease.
- Immunocompromising conditions that are indications for pneumococcal vaccination are congenital or acquired immunodeficiency (including B- or T-lymphocyte deficiency, complement deficiencies, and phagocytic disorders including chronic granulomatous disease), HIV infection, chronic renal failure, nephrotic syndrome, leukemia, lymphoma, Hodgkin disease, generalized malignancy, multiple myeloma, solid-organ transplant, and iatrogenic immunosuppression (including long-term systemic corticosteroids and radiation therapy).
- Anatomical or functional asplenia that are indications for pneumococcal vaccination are sickle cell disease and other hemoglobinopathies, congenital or acquired asplenia, splenic dysfunction, and splenectomy. Administer pneumococcal vaccines at least 2 weeks before immunosuppressive therapy or an elective splenectomy, and as soon as possible to adults who are newly diagnosed with asymptomatic or symptomatic HIV infection.

14. Haemophilus influenzae type b (Hib) vaccination

- One dose of Hib vaccine should be administered to persons who have functional or anatomical asplenia or sickle cell disease or are undergoing elective splenectomy if they have not previously received Hib vaccine. Hib vaccination 14 or more days before splenectomy is suggested.
- Recipients of a hematopoietic stem cell transplant (HSCT) should be vaccinated with a 3-dose regimen 6 to 12 months after a successful transplant, regardless of vaccination history; at least 4 weeks should separate doses.
- Hib vaccine is not recommended for adults with HIV infection since their risk for Hib infection is low.

15. Immunocompromising conditions

- Inactivated vaccines generally are acceptable (e.g., pneumococcal, meningococcal, and inactivated influenza vaccine) and live vaccines generally are avoided in persons with immune deficiencies or immunocompromising conditions. Information on specific conditions is available at www.cdc.gov/vaccines/hcp/acip-recs/index.html.
**Recommended Adult Immunization Schedule: United States, 2015**

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**Table 1. Contraindications and Precautions for Commonly Used Vaccines in Adults**

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Contraindications</th>
<th>Precautions</th>
</tr>
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<tbody>
<tr>
<td>Influenza, inactivated (IV)§</td>
<td>Severe allergic reaction (e.g., anaphylaxis) after previous dose of any influenza vaccine; or to a vaccine component, including egg protein.</td>
<td>Moderate or severe acute illness with or without fever. History of Guillain–Barré syndrome within 6 weeks of previous influenza vaccination. Adults who experience only hives with exposure to eggs may receive RIV or, with additional safety precautions, IV. §</td>
</tr>
<tr>
<td>Influenza, recombinant (RIV)</td>
<td>Severe allergic reaction (e.g., anaphylaxis) after previous dose of RIV or to a vaccine component. RIV does not contain any egg protein. §</td>
<td>Moderate or severe acute illness with or without fever. History of Guillain–Barré syndrome within 6 weeks of previous influenza vaccination.</td>
</tr>
<tr>
<td>Influenza, live attenuated (LAIV)§</td>
<td>Severe allergic reaction (e.g., anaphylaxis) to any component of the vaccine, or to a previous dose of any influenza vaccine. In addition, ACIP recommends that LAIV not be used in the following populations: – pregnant women; – immunosuppressed adults; – adults with egg allergy of any severity; or – adults who have taken influenza antiviral medications (amantadine, rimantadine, zanamivir, or oseltamivir) within the previous 48 hours; avoid use of these antiviral drugs for 14 days after vaccination.</td>
<td>Moderate or severe acute illness with or without fever. History of Guillain–Barré syndrome within 6 weeks of previous influenza vaccination. Asthma in persons aged 5 years or older. Other chronic medical conditions (e.g., other chronic lung diseases, chronic cardiovascular disease [excluding isolated hypertension], diabetes, chronic renal or hepatic disease, hematologic disease, neurologic disease, and metabolic disorders).</td>
</tr>
<tr>
<td>Tetanus, diphtheria, pertussis (Tdap); tetanus, diphtheria (Td)</td>
<td>Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component. For pertussis-containing vaccines: encephalopathy (e.g., coma, decreased level of consciousness, or prolonged seizures) not attributable to another identifiable cause within 7 days of administration of a previous dose of Tdap, diphtheria and tetanus toxoids and pertussis (DTP), or diphtheria and tetanus toxoids and acellular pertussis (DTaP) vaccine.</td>
<td>Moderate or severe acute illness with or without fever. Guillain–Barré syndrome within 6 weeks after a previous dose of tetanus toxoid-containing vaccine. History of Arthus-type hypersensitivity reactions after a previous dose of tetanus or diphtheria toxoid-containing vaccine; defer vaccination until at least 10 years have elapsed since the last tetanus toxoid-containing vaccine. For pertussis-containing vaccines: progressive or unstable neurologic disorder, uncontrolled seizures, or progressive encephalopathy until a treatment regimen has been established and the condition has stabilized.</td>
</tr>
<tr>
<td>Varicella</td>
<td>Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component. Known severe immunodeficiency (e.g., from hematologic and solid tumors, receipt of chemotherapy, congenital immunodeficiency, or long-term immunosuppressive therapy, if or patients with HIV infection who are severely immunocompromised). Pregnancy.</td>
<td>Recent (within 11 months) receipt of antibody-containing blood product (specific interval depends on product). ** Receipt of specific antivirals (i.e., acyclovir, famciclovir, or valacyclovir) 24 hours before vaccination; avoid use of these antiviral drugs for 14 days after vaccination.</td>
</tr>
<tr>
<td>Human papillomavirus (HPV)</td>
<td>Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component. Known severe immunodeficiency (e.g., from hematologic and solid tumors, receipt of chemotherapy, or long-term immunosuppressive therapy, if or patients with HIV infection who are severely immunocompromised). Pregnancy.</td>
<td>Moderate or severe acute illness with or without fever. Pregnancy.</td>
</tr>
<tr>
<td>Zoster</td>
<td>Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component. Known severe immunodeficiency (e.g., from hematologic and solid tumors, receipt of chemotherapy, or long-term immunosuppressive therapy, if or patients with HIV infection who are severely immunocompromised). Pregnancy.</td>
<td>Moderate or severe acute illness with or without fever. Receipt of specific antivirals (i.e., acyclovir, famciclovir, or valacyclovir) 24 hours before vaccination; avoid use of these antiviral drugs for 14 days after vaccination.</td>
</tr>
<tr>
<td>Measles, mumps, rubella (MMR)</td>
<td>Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component. Known severe immunodeficiency (e.g., from hematologic and solid tumors, receipt of chemotherapy, congenital immunodeficiency, or long-term immunosuppressive therapy, if or patients with HIV infection who are severely immunocompromised). Pregnancy.</td>
<td>Moderate or severe acute illness with or without fever. Recent (within 11 months) receipt of antibody-containing blood product (specific interval depends on product). ** History of thrombocytopenia or thrombocytopenic purpura. Need for tuberculin skin testing. ††</td>
</tr>
<tr>
<td>Pneumococcal conjugate (PCV13)</td>
<td>Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component, including to any vaccine containing diphtheria toxoid.</td>
<td>Moderate or severe acute illness with or without fever.</td>
</tr>
<tr>
<td>Pneumococcal polysaccharide (PPSV23)</td>
<td>Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component.</td>
<td>Moderate or severe acute illness with or without fever.</td>
</tr>
<tr>
<td>Meningococcal, conjugate (MenACWY); meningococcal, polysaccharide (MPSV4)</td>
<td>Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component.</td>
<td>Moderate or severe acute illness with or without fever.</td>
</tr>
<tr>
<td>Hepatitis A</td>
<td>Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component.</td>
<td>Moderate or severe acute illness with or without fever.</td>
</tr>
</tbody>
</table>

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*†‡ Contraindications and precautions for vaccines should be interpreted in the context of the patient's health status and the clinical circumstances. ** Specific antiviral prophylaxis (e.g., zidovudine, lamivudine, or abacavir) 24 hours before vaccination; avoid use of these antiviral drugs for 14 days after vaccination. †† Need for tuberculin skin testing. Continued on following page*
syndrome, leukemia, lymphoma, Hodgkin disease, generalized malignancy, multiple myeloma, solid-organ transplant, and iatrogenic immunosuppression (including long-term systemic corticosteroids and radiation therapy). If indicated, administer pneumococcal vaccines at least 2 weeks before immunosuppressive therapy, and as soon as possible to adults who are newly diagnosed with asymptomatic or symptomatic HIV infection.

- Anatomical or functional asplenia conditions that are indications for PCV13 and PPSV23 are sickle cell disease and other hemoglobinopathies, congenital or acquired asplenia, splenic dysfunction, and splenectomy. If indicated, administer pneumococcal vaccines at least 2 weeks before an elective splenectomy.

- Chronic health conditions that are indications for PPSV23 for adults aged 19 through 64 years are chronic heart disease (including congestive heart failure and cardiomyopathies, excluding hypertension), chronic lung disease (including chronic obstructive lung disease, emphysema, and asthma), chronic liver disease (including cirrhosis), alcoholism, and diabetes mellitus.

In August 2014, the ACIP recommended a routine use of PCV13 in series with PPSV23 for all adults aged 65 years or older (1). Adults aged 65 years or older who were not previously vaccinated with PCV13 are recommended to receive PCV13, followed by PPSV23 6 to 12 months later.

Vaccinating adults with PCV13 and PPSV23 can be challenging because of complexities in the timing of the 2 vaccines, frequency, and intervals between doses depending on a patient’s age, health conditions, vaccination history, and other factors. Figure 3 contains a schematic schedule that describes when PCV13 and PPSV23 should be administered for adults. Table 2 contains a summary of the recommended pneumococcal vaccination schedule as determined by the patient’s age, health conditions, vaccination history, and other factors. In administering pneumococcal vaccines to adult patients, health care providers should be aware of the following:

- One dose of PCV13 is indicated for all adults; the timing of PCV13 is dependent on their age and health conditions.
- The maximum number of doses of PPSV23 that an adult should receive is:
  - Three, if he or she has an immunocompromising condition or anatomical or functional asplenia: 2 doses at age 19 through 64 years, and 1 dose at age 65 years or older.
  - Two, if he or she has chronic health conditions, is a smoker or a resident of a long-term care or nursing home facility, or has cerebrospinal fluid leak or cochlear transplant: 1 dose at age 19 through 64 years and 1 dose at age 65 years or older.
- One, if he or she has none of the indicated health condition or risk: at age 65 years or older.
- No additional doses of PPSV23 are indicated for adults who were vaccinated with PPSV23 at or after age 65 years.
- When both PCV13 and PPSV23 are indicated, PCV13 should be administered first; PCV13 and
PPSV23 should not be administered during the same visit.

For adults whose pneumococcal vaccination history is incomplete or unknown, both PCV13 and PPSV23 should be administered when indicated (but not during the same visit).

Note that PPSV23 should be administered 6 to 12 months after PCV13 for adults aged 65 years or older; but for adults aged 19 through 64 years with immunocompromising conditions, anatomical or functional asplenia, or cerebrospinal fluid leak or cochlear implant, PPSV23 should be administered at least 8 weeks after PCV13.

In 2013, pneumococcal vaccination coverage rates for adults aged 65 years or older and for adults aged 19 through 64 years at high risk were 59.7% and 21.2%, respectively, similar to 2012 (9). These pneumococcal vaccination coverage rates remain well below the Healthy People 2020 target levels of 90% for adults aged 65 years or older and 60% for adults aged 18 through 64 years who are at high risk. At the intersection of these low pneumococcal vaccination coverage rates and the availability of safe and effective pneumococcal vaccines, health care providers have an opportunity to make a significant impact in reducing the morbidity of pneumococcal disease among adults by ensuring that their patients are up to date on their pneumococcal vaccinations.

Vaccination coverage rates for other vaccines for adults are also low; for example, only 24% of adults aged 60 years or older have received the herpes zoster vaccine, and 26% of adults aged 19 through 59 years who have diabetes have received the hepatitis B vaccine (9). In addition to pneumococcal vaccines, health care providers should ensure that their adult patients are aware of and receive recommendations for other vaccines they need. A recommendation by a patient’s health care provider for needed vaccines is a strong predictor of the patient receiving recommended vaccines (10). Health care providers should implement the adult immunization practice standards (11) and routinely assess their patients’ immunization status, strongly recommend the vaccines patients need, administer the vaccines or refer patients to a vaccinating provider, and document vaccinations administered in state immunization information systems (commonly known as “vaccine registries”) to increase vaccination rates among adults and reduce illness, hospi-
Table 2. Pneumococcal Vaccination Recommendations, by Patient Age, Health Condition, Pneumococcal Vaccination History, and Other Risks

<table>
<thead>
<tr>
<th>Population</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adults aged ≥65 years who:</td>
<td>Administer:</td>
</tr>
<tr>
<td>Have not received PCV13 or PPSV23, or have unknown vaccination history</td>
<td>PCV13, then PPSV23*</td>
</tr>
<tr>
<td>Have not received PCV13 but received PPSV23 at age ≥65 years</td>
<td>PCV13†</td>
</tr>
<tr>
<td>Have not received PCV13 but received 1 or more doses of PPSV23 at age 19–64 years</td>
<td>PPSV23*‡</td>
</tr>
<tr>
<td>Have received PCV13 but not PPSV23 at age 19–64 years</td>
<td>PPSV23†</td>
</tr>
<tr>
<td>Have received PCV13 and 1 or more doses of PPSV23 at age 19–64 years</td>
<td>PPSV23*‡</td>
</tr>
<tr>
<td>Adults aged 19–64 years with immunocompromising conditions§ or asplenia</td>
<td>Administer:</td>
</tr>
<tr>
<td>Have not received PCV13 or PPSV23, or have unknown vaccination history</td>
<td>PCV13, then PPSV23§</td>
</tr>
<tr>
<td>Have not received PCV13 but received 1 dose of PPSV23</td>
<td>PCV13†</td>
</tr>
<tr>
<td>Have not received PCV13 but received 2 doses of PPSV23</td>
<td>PPSV23‡</td>
</tr>
<tr>
<td>Have received PCV13 but not PPSV23</td>
<td>PPSV23§</td>
</tr>
<tr>
<td>Have received PCV13 and 1 dose of PPSV23</td>
<td>PPSV23‡</td>
</tr>
<tr>
<td>Adults aged 19–64 years who:</td>
<td>Administer:</td>
</tr>
<tr>
<td>Have cerebrospinal fluid leak or cochlear implant</td>
<td>PCV13, then PPSV23§</td>
</tr>
<tr>
<td>Have chronic health conditions**</td>
<td>PPSV23</td>
</tr>
<tr>
<td>Smoke cigarettes or reside in long-term facility</td>
<td>PPSV23</td>
</tr>
</tbody>
</table>

* ≥6-12 months after PCV13. † ≥1 year after the most recent dose of PPSV23. ‡ ≥5 years after the most recent dose of PPSV23. § Immunocompromising conditions are defined as congenital or acquired immunodeficiency (including B- or T-lymphocyte deficiency, complement deficiencies, and phagocytic disorders excluding chronic granulomatous disease), HIV infection, chronic renal failure, nephrotic syndrome, leukemia, lymphoma, Hodgkin disease, generalized malignancy, multiple myeloma, solid-organ transplant, and iatrogenic immunosuppression (including long-term systemic corticosteroids and radiation therapy). ¶ Anatomical or functional asplenia is defined as sickle cell disease and other hemoglobinopathies, congenital or acquired asplenia, splenic dysfunction, and splenectomy. †† ≥8 weeks after PCV13. ** Chronic health conditions are defined as chronic heart disease (including congestive heart failure and cardiomyopathies, excluding hypertension), chronic lung disease (including chronic obstructive lung disease, emphysema, and asthma), chronic liver disease (including cirrhosis), alcoholism, or diabetes mellitus.

divest or forgo certain vaccine-related activities. In addition, at the beginning of each ACIP meeting, each member is asked to declare his or her conflicts. Members with conflicts are not permitted to vote if the conflict involves the vaccine or biological being voted on. Details can be found at www.cdc.gov/vaccines/acip/committee/structure-role.html. Drs. Kim, Bridges, and Herriman authored this work. Authors have disclosed no conflicts of interest. Forms can be viewed at www.acponline.org/authors/icmje/ConflictOfInterestForms.do?msNum=M114-2755.

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References
APPENDIX

About the ACIP

Recommendations for routine use of vaccines in children, adolescents, and adults are developed by the Advisory Committee on Immunization Practices (ACIP). ACIP is chartered as a federal advisory committee to provide expert external advice and guidance to the Director of the Centers for Disease Control and Prevention (CDC) on use of vaccines and related agents for the control of vaccine-preventable diseases in the civilian population of the United States. Recommendations for routine use of vaccines in children and adolescents are harmonized to the greatest extent possible with recommendations made by the American Academy of Pediatrics (AAP), the American Academy of Family Physicians (AAFP), and the American College of Obstetricians and Gynecologists (ACOG). Recommendations for routine use of vaccines in adults are harmonized with recommendations of AAFP, ACOG, and the American College of Physicians (ACP). ACIP recommendations adopted by the CDC Director become agency guidelines on the date published in the Morbidity and Mortality Weekly Report (MMWR). Additional information on ACIP is available at www.cdc.gov/vaccines/acip.

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