Advisory Committee on Immunization Practices Recommended Immunization Schedule for Adults Aged 19 Years or Older: United States, 2015*

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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 follows the 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 nonbacteremic 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).

The ACIP has recommended PPSV23 for adults with certain high-risk conditions and for all adults aged ≥65 years (8).
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 PPSV23 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

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**Figure 2.** Vaccines that might be indicated for adults aged 19 years or older, based on medical and other indications: 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.*
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 is 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 www.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.
   • 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 IIV 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/protect/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 Td 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 unvaccinated 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 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 health care 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 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 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 who
  - Have received PCV13 or PPSV23: Administer PCV13 followed by PPSV23 in 6 to 12 months.
  - Have not received PCV13 but have received 2 doses of PPSV23: Administer PCV13 at least 8 weeks after PCV13.
  - Have not received PCV13 but have received 1 dose of PPSV23: Administer PCV13 at least 1 year after the dose of PPSV23 received at age 65 years or older.
- 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.
  - Have not received PCV13 but have received 2 doses of PPSV23: Administer PCV13 at least 1 year 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 first 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 65 years or older who
  - Have received PCV13 and 1 dose of PPSV23: Administer a second dose of PPSV23.
  - Have received PCV13 and 2 doses of PPSV23: Administer a second dose of PPSV23 at least 5 years after the first dose of PPSV23.
  - 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.

**General information**
- Adults aged 19 through 64 years with cerebellar ataxia, deafness, 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.
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.
### Table 1. Contraindications and Precautions for Commonly Used Vaccines in Adults*†‡

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Contraindications</th>
<th>Precautions</th>
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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.</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.</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>
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<td></td>
<td>In addition, ACIP recommends that LAIV not be used in the following populations:</td>
<td>History in persons aged 5 years or older.</td>
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<td></td>
<td>– pregnant women;</td>
<td>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>
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<td>– immunosuppressed adults;</td>
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<td></td>
<td>– adults with egg allergy of any severity; or</td>
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<td></td>
<td>– 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>
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<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. History of Guillain-Barré syndrome within 6 weeks after a previous dose of tetanus toxoid-containing vaccine.</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,§ or patients with HIV infection who are severely immunocompromised).</td>
<td>Recent (within 11 months) receipt of antibody-containing blood product (specific interval depends on product).**</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,§ or patients with HIV infection who are severely immunocompromised).</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,§ or patients with HIV infection who are severely immunocompromised).</td>
<td>Moderate or severe acute illness with or without fever. Receipt of specific antivirals (i.e., acyclovir, famiciclovir, 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,§ or patients with HIV infection who are severely immunocompromised).</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>
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</tbody>
</table>

*Adapted from references 2 and 3. **Adapted from references 11 and 14. ††Adapted from references 12 and 13.
Table 1—Continued

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Contraindications</th>
<th>Precautions</th>
</tr>
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<tbody>
<tr>
<td>Hepatitis B</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>Haemophilus influenzae type b (Hib)</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>

† Regarding latex allergy, consult the package insert for any vaccine a patient administered.
‡ Vaccine package inserts and the full ACIP recommendations for these vaccines should be consulted for additional information on vaccine-related contraindications and precautions and for more information on vaccine excipients. Events or conditions listed as precautions should be reviewed carefully. Benefits and risks of administering a specific vaccine to a person under these circumstances should be considered. If the risk from the vaccine is believed to outweigh the benefit, the vaccine should not be administered. If the benefit of vaccination is believed to outweigh the risk, the vaccine should be administered. A contraindication is a condition in a recipient that increases the chance of a serious adverse reaction. Therefore, a vaccine should not be administered when a contraindication is present.
¶ LAIV, MMR, varicella, or zoster vaccines can be administered on the same day. If not administered on the same day, live vaccines should be separated by at least 28 days.
†† Immunosuppressive steroid dose is considered to be ≥2 weeks of daily receipt of 20 mg of prednisone or the equivalent. Vaccination should be deferred for at least 1 month after discontinuation of such therapy. Providers should consult ACIP recommendations for complete information on the use of specific live vaccines among persons on immune-suppressing medications or with immune suppression because of other reasons.
** Vaccine should be deferred for the appropriate interval if replacement immune globulin products are being administered. See General recommendations on immunization: recommendations of the Advisory Committee on Immunization Practices (ACIP): MMWR Recomm Rep. 2011;60:1-64 (available at www.cdc.gov/vaccines/pubs/pinkbook/index.html).
††† Measles vaccination might suppress tuberculin reactivity temporarily. Measles-containing vaccine may be administered on the same day as tuberculin skin testing. If testing cannot be performed until after the day of MMR vaccination, the test should be postponed for at least 4 weeks after the vaccination. If an urgent need exists to skin test, do so with the understanding that reactivity might be reduced by the vaccine.

** 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, hospitalization, and death due to preventable diseases.

The dashed line represents the interval between the two PPSV23 doses. PCV13 = 13-valent pneumococcal conjugate vaccine; PPSV23 = 23-valent pneumococcal polysaccharide vaccine.

* 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.

† 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.

§ Administer PPSV23 as soon as possible if the 6- to 12-month time window has passed.

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**Figure 3. Recommended pneumococcal vaccination schedule and intervals, by age, health condition, and other risks.**

<table>
<thead>
<tr>
<th>Health Condition</th>
<th>Vaccination Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>No health condition or other risk</td>
<td>PCV13 ≥ 5 years, PPSV23 ≥ 6–12 months §</td>
</tr>
<tr>
<td>Chronic health condition*</td>
<td>PCV13 ≥ 8 weeks, PPSV23 ≥ 6–12 months §</td>
</tr>
<tr>
<td>Smoker or resident of long-term care facility</td>
<td>PCV13 ≥ 5 years, PPSV23 ≥ 6–12 months §</td>
</tr>
<tr>
<td>Immunocompromising condition†</td>
<td>PCV13 ≥ 8 weeks, PPSV23 ≥ 6–12 months §</td>
</tr>
<tr>
<td>Anatomical or functional asplenia‡</td>
<td>PCV13 ≥ 8 weeks, PPSV23 ≥ 6–12 months §</td>
</tr>
<tr>
<td>Cerebrospinal fluid leak or cochlear implant</td>
<td>PCV13 ≥ 8 weeks, PPSV23 ≥ 6–12 months §</td>
</tr>
</tbody>
</table>

PCV13 = 13-valent pneumococcal conjugate vaccine; PPSV23 = 23-valent pneumococcal polysaccharide vaccine.

* 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.

† 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.
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 19–64 years</td>
<td>PCV13†, then 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>
</tbody>
</table>

| Adults aged 19–64 years who:                                               | Administer:     |
| Have not received PCV13 or PPSV23, or have unknown vaccination history     | PCV13, then PPSV23†| |
| Have not received PCV13 but received 1 dose of PPSV23                      | PCV13†, then PPSV23¶ |
| Have not received PCV13 but received 2 doses of PPSV23                     | PCV13†          |
| Have received PCV13 but not PPSV23                                         | PPSV23†‡        |
| Have received PCV13 and 1 dose of PPSV23                                    | PPSV23†¶        |

| Adults aged 19–64 years who:                                               | Administer:     |
| Have cerebrospinal fluid leak or cochlear implant                          | PCV13, then PPSV23†| |
| Have chronic health conditions**                                            | PPSV23          |
| Smoke cigarettes or reside in long-term facility                            | PPSV23          |

* 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 Harriman authored this work. Authors have disclosed no conflicts of interest. Forms can be viewed at www.acponline.org/authors/icmje/ConflictOfInterestForms.do?msNum=M14-2755.

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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/committee/members.html.

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