2018 Adult Immunization Schedule

National Adult Immunization Coordinators’ Partnership Quarterly Meeting
February 13, 2017

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Immunization Services Division
National Center for Immunization and Respiratory Diseases
2018 Adult Immunization Schedule Updates

- Recommended use of recombinant zoster vaccine
- Recommended use of MMR in mumps outbreak setting
- Updated ACIP recommendations in prevention of hepatitis B
- FDA licensure of conjugate 1018-adjuvanted hepatitis B vaccine
Recommnend Immunisation Schedule for Adults Aged 19 Years or Older, United States, 2018

In February 2018, the Recommended Immunisation Schedule for Adults Aged 19 Years or Older, United States, 2018 became effective, as recommended by the Advisory Committee on Immunisation Practices (ACIP) and approved by the Centers for Disease Control and Prevention (CDC). The adult immunisation schedule was also approved by the American College of Physicians, the American Academy of Family Physicians, the American College of Obstetricians and Gynecologists, and the American College of Nurse-Midwives.

CDC announced the availability of the 2018 adult immunisation schedule in the Morbidity and Mortality Weekly Report (MMWR). The schedule is published in its entirety in the journal of the American Medical Association.

The adult immunisation schedule consists of figures that summarise routinely recommended vaccines for adults by age groups and medical conditions and other indications, footnotes for the figures, and a table of vaccine contraindications and precautions. Note the following when reviewing the adult immunisation schedule:

- The figures in the adult immunisation schedule should be reviewed with the accompanying footnotes.
- The figures and footnotes display indications for which vaccines, if not previously administered, should be administered unless noted otherwise.
- The table of contraindications and precautions identifies populations and situations for which vaccines should not be used or should be used with caution.
- When indicated, administer recommended vaccines to adults whose vaccination history is incomplete or unknown.
- Increased interval between doses of a multidose vaccine series does not diminish vaccine effectiveness; it is not necessary to restart the vaccine series or add doses to the series because of an extended interval between doses.
- Combination vaccines may be used when any component of the combination is indicated and when the other components of the combination are not contraindicated.
- The use of trade names in the adult immunisation schedule is for identification purposes only and does not imply endorsement by the ACIP or CDC.

Special populations that need additional considerations include:

- Pregnant women. Pregnant women should receive the tetanus, diphtheria, and acellular pertussis vaccine (Tdap) during pregnancy and the influenza vaccine during or before pregnancy. Live vaccines (e.g., measles, mumps, and rubella vaccine [MMR]) are contraindicated.
- Asplenia. Adults with asplenia have specific vaccination recommendations because of their increased risk for infection by encapsulated bacteria. Anatomical or functional asplenia includes congenital or acquired asplenia, splenic dysfunction, sickle cell disease and other hemoglobinopathies, and splenectomy.
- Immunocompromising conditions. Adults with immunosuppression should generally avoid live vaccines. Inactivated vaccines (e.g., pneumococcal vaccine) are generally contraindicated. High-level immunosuppression include HIV infection with a CD4 cell count <200 cells/μL, receipt of daily corticosteroid therapy with ≥20 mg of prednisone or equivalent for ≥14 days, primary immunodeficiency disorder (e.g., severe combined immunodeficiency or complement component deficiency), and receipt of cancer chemotherapy. Other immunocompromising conditions and immunosuppressive medications to consider when vaccinating adults can be found in the Adult Immunisation Schedule for Adults Aged 19 Years or Older, United States, 2018, for additional information on vaccinating immunocompromised adults is in General Practice Guidelines for Immunisation. 4

Additional resources for health care providers include:

- Details on vaccines recommended for adults and complete ACIP statements at cdc.gov/vaccines/hcp/adult-recs/index.html
- Vaccine Information Statements that explain benefits and risks of vaccines at cdc.gov/vaccines/hcp/vs/h/index.html
- Information and resources on vaccinating pregnant women at cdc.gov/vaccines/adults/rec/vacc.html
- Information on travel vaccine requirements and recommendations at cdc.gov/travel/destinations/list
- CDC Vaccine Schedules App for immunisation service providers to download at cdc.gov/vaccines/schedules/hcp/schedule-app.html
- Adult Vaccination Quiz for self-assessment of vaccination needs based on age, health conditions, and other indications at mmwr.cdc.gov/mmwr/nd/2015/mm6402.pdf
- Recommended Immunisation Schedule for Children and Adolescents Aged 18 Years or Younger at cdc.gov/vaccines/schedules/hcp/child-adolescent.html

Report suspected cases of reportable vaccine-preventable diseases to the local or state health department, and report all clinically significant post-vaccination events to the Vaccine Adverse Event Reporting System at www.vaers.hhs.gov or by telephone, 800-822-7967. All vaccines included in the adult immunisation schedule except 23-valent pneumococcal polysaccharide and zoster vaccines are covered by the Vaccine Injury Compensation Program. Information on how to file a vaccine injury claim is available at www.hrsa.gov/vaccine-compensation or by telephone, 800-338-2382. Submit questions and comments to CDC through www.cdc.gov/cdc-info or by telephone, 800-CDC-INFO (800-232-4636), in English and Spanish, 8:00am pr 5:00pm ET, Monday-Friday, excluding holidays.

The following abbreviations are used for vaccines in the adult immunisation schedule (in the order of their appearance):

- IBV: inactivated influenza vaccine
- RIV: recombinant influenza vaccine
- Tdap: tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis vaccine
- Td: tetanus and diphtheria toxoids
- MMR: measles, mumps, and rubella vaccine
- VAR: varicella vaccine
- RSV: recombinant zoster vaccine
- ZVL: zoster vaccine live
- HPV: human papillomavirus vaccine
- PCCV3: 13-valent pneumococcal conjugate vaccine
- PPSV23: 23-valent pneumococcal polysaccharide vaccine
- HepA: hepatitis A vaccine
- HepA-HepB: hepatitis A vaccine and hepatitis B vaccine
- HepB: hepatitis B vaccine
- Meningococcal W: serogroups A, C, W, and Y meningococcal vaccine
- MeningC: serogroup B meningococcal vaccine
- Hib: Haemophilus influenzae type b vaccine

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>19–21 years</th>
<th>22–26 years</th>
<th>27–49 years</th>
<th>50–64 years</th>
<th>≥65 years</th>
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<tbody>
<tr>
<td>Influenza&lt;sup&gt;1&lt;/sup&gt;</td>
<td>1 dose annually</td>
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<tr>
<td>Tdap&lt;sup&gt;2&lt;/sup&gt; or Td&lt;sup&gt;3&lt;/sup&gt;</td>
<td>1 dose Tdap, then Td booster every 10 yrs</td>
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<tr>
<td>MMR&lt;sup&gt;4&lt;/sup&gt;</td>
<td>1 or 2 doses depending on indication (if born in 1957 or later)</td>
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<tr>
<td>VAR&lt;sup&gt;4&lt;/sup&gt;</td>
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<td>RZV&lt;sup&gt;5&lt;/sup&gt; (preferred) or ZVL&lt;sup&gt;5&lt;/sup&gt;</td>
<td>2 doses RZV (preferred)</td>
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<td></td>
<td>1 dose ZVL</td>
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<td>HPV-Female&lt;sup&gt;6&lt;/sup&gt;</td>
<td>2 or 3 doses depending on age at series initiation</td>
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<tr>
<td>HPV-Male&lt;sup&gt;8&lt;/sup&gt;</td>
<td>2 or 3 doses depending on age at series initiation</td>
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<tr>
<td>PCV13&lt;sup&gt;7&lt;/sup&gt;</td>
<td>1 dose</td>
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<tr>
<td>PPSV23&lt;sup&gt;7&lt;/sup&gt;</td>
<td>1 or 2 doses depending on indication</td>
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<td>1 dose</td>
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<tr>
<td>HepA&lt;sup&gt;4&lt;/sup&gt;</td>
<td>2 or 3 doses depending on vaccine</td>
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<tr>
<td>HepB&lt;sup&gt;9&lt;/sup&gt;</td>
<td>3 doses</td>
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<tr>
<td>MenACWY&lt;sup&gt;10&lt;/sup&gt;</td>
<td>1 or 2 doses depending on indication, then booster every 5 yrs if risk remains</td>
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<tr>
<td>MenB&lt;sup&gt;16&lt;/sup&gt;</td>
<td>2 or 3 doses depending on vaccine</td>
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<td>Hib&lt;sup&gt;11&lt;/sup&gt;</td>
<td>1 or 3 doses depending on indication</td>
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<sup>1</sup> Recommended for adults who meet the age requirement, lack documentation of vaccination, or lack evidence of past infection.

<sup>2</sup> Recommended for adults with other indications.

<sup>3</sup> No recommendation.
<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Pregnancy(^{16})</th>
<th>Immuno-compromised (excluding HIV infection)(^{2,23})</th>
<th>HIV infection CD4+ count (cells/(\mu L))(^{1,14,19})</th>
<th>Asplenia, complement deficiencies(^{2,14})</th>
<th>End-stage renal disease, on hemodialysis(^{19})</th>
<th>Heart or lung disease, alcoholism(^{19})</th>
<th>Chronic liver disease(^{2})</th>
<th>Diabetes(^{2})</th>
<th>Health care personnel(^{4,44})</th>
<th>Men who have sex with men(^{49})</th>
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<tbody>
<tr>
<td>Influenza(^{1})</td>
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<tr>
<td>Tdap(^{7}) or Td(^{7})</td>
<td>1 dose Tdap each pregnancy</td>
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<tr>
<td>MMR(^{7})</td>
<td>contraindicated</td>
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<td>VAR(^{4})</td>
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<tr>
<td>RZV(^{5})(preferred) or ZVL(^{5})</td>
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<td>2 doses RZV at age ≥50 yrs (preferred)</td>
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<td>contraindicated</td>
<td>1 dose ZVL at age ≥60 yrs</td>
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<td>HPV-Female(^{7})</td>
<td>3 doses through age 26 yrs</td>
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<td>2 or 3 doses through age 26 yrs</td>
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<td>HPV-Male(^{6})</td>
<td>3 doses through age 26 yrs</td>
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<td>2 or 3 doses through age 21 yrs</td>
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<tr>
<td>PCV13(^{7})</td>
<td>1 dose</td>
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<td>HepA(^{8})</td>
<td>2 or 3 doses depending on vaccine</td>
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<td>HepB(^{9})</td>
<td>3 doses</td>
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<td>MenACWY(^{10})</td>
<td>1 or 2 doses depending on indication, then booster every 5 yrs if risk remains</td>
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<tr>
<td>MenB(^{9})</td>
<td>3 doses HSCT recipients only</td>
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<td>2 or 3 doses depending on vaccine</td>
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<td>Hib(^{10})</td>
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</table>

*Recommended for adults who meet the age requirement, lack documentation of vaccination, or lack evidence of past infection

*Recommended for adults with other indications

*Contraindicated

*No recommendation

This figure should be reviewed with the accompanying footnotes. This figure and the footnotes describe indications for which vaccines, if not previously administered, should be administered unless noted otherwise.
Footnotes. Recommended immunization schedule for adults aged 19 years or older, United States, 2018

1. Influenza vaccination
   www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/flu.html
   General Information
   - Administer 1 dose of age-appropriate inactivated influenza vaccine (IIV) or recombinant influenza vaccine (RIIV) annually.
   - Live attenuated influenza vaccine (LAIV) is not recommended for the 2017–2018 influenza season.
   - A list of currently available influenza vaccines is available at www.cdc.gov/flu/protect/vaccine/vaccines.htm

   Special populations
   - Administer age-appropriate IIV or RIIV to:
     - Pregnant women
     - Adults with HIV/AIDS who are not immunocompromised
     - Adults with chronic pulmonary, cardiovascular, or renal disease
     - Adults with metabolic disease (i.e., diabetes)

   - Young children who are younger than 5 years old and have a history of egg allergy may be vaccinated with the LAIV vaccine.
   - Children ages 5 years and older who are at risk for complications from influenza may be vaccinated with the LAIV vaccine.

   2. Tetanus, diphtheria, and pertussis vaccination
      www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/tdap-td.html
      General Information
      - Administer to adults who previously did not receive a dose of tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis vaccine (Tdap) as an adult or child (routinely recommended at age 11–12 years) 1 dose of Tdap; followed by a dose of tetanus and diphtheria toxoids (Td) booster every 10 years
      - Information on the use of Tdap or Td as tetanus prophylaxis in wound management is available at www.cdc.gov/mmwr/preview/mmwr/vs51n17.htm

   Special populations
   - Pregnant women: Administer 1 dose of Tdap during each pregnancy, preferably in the early part of gestational weeks 27–56

   3. Measles, mumps, and rubella vaccination
      www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/mmr.html
      General Information
      - Administer 1 dose of measles, mumps, and rubella vaccine (MMR) to adults with no evidence of immunity to measles, mumps, or rubella
      - Evidence of immunity is:
        - Born before 1967 (except for health care personnel, see below)
        - Documentation of receipt of MMR
        - Laboratory evidence of immunity or disease without laboratory confirmation is not considered evidence of immunity

   Special populations
   - Pregnant women and nonpregnant women of childbearing age with no evidence of immunity to rubella: Administer 1 dose of MMR (if pregnant; administer MMR after pregnancy and before discharge from health care facility)

   - HIV infection and CD4 cell count ≥200 cells/μL for at least 6 months and no evidence of immunity to measles, mumps, or rubella: Administer 2 doses of MMR at least 28 days apart

   - Students in postsecondary educational institutions, international travelers, and household contacts of immunocompromised persons: Administer 2 doses of MMR at least 28 days apart (or 1 dose of MMR if previously administered 1 dose of MMR)

   - Health care personnel born in 1957 or later with no evidence of immunity: Administer 2 doses of MMR at least 28 days apart for measles or MMR, or 1 dose of MMR for rubella (if born before 1957, consider MMR vaccination)

   - Adults who previously received ≤2 doses of mumps-containing vaccine and are identified by public health authorities to have been at increased risk for mumps in an outbreak: Administer 1 dose of MMR

   - MMR is contraindicated for pregnant women and adults with severe immunodeficiency

   4. Varicella vaccination
      www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/varicella.html
      General Information
      - Administer to adults without evidence of immunity to varicella 2 doses of varicella vaccine (VARV) 4–8 weeks apart if previously received 1 dose of varicella-containing vaccine, or administered 1 dose of VARV at least 4 weeks after the first dose
      - Evidence of immunity to varicella is:
        - U.S.-born before 1980 (except for pregnant women and health care personnel, see below)
        - Documentation of receipt of 2 doses of varicella or varicella-containing vaccine at least 4 weeks apart
        - Diagnosis or verification of history of varicella or herpes zoster by a health care provider

   Special populations
   - Adults with evidence of immunity: Administer 1 dose of VARV 4–8 weeks apart if previously received 1 dose of varicella-containing vaccine, or administered 1 dose of VARV at least 4 weeks after the first dose

   - Pregnant women without evidence of immunity: Administer 2 doses of VARV at least 4 weeks apart after pregnancy and before discharge from health care facility

   - Health care personnel without evidence of immunity: Administer 2 doses of VARV at least 4 weeks apart after pregnancy and before discharge from health care facility

   - Adults with HIV infection and CD4 cell count ≥200 cells/μL: May administer, based on individual clinical decision, 2 doses of VARV 3 months apart

   - VARV is contraindicated for pregnant women and adults with severe immunodeficiency

   5. Zoster vaccination
      www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/shingles.html
      General Information
      - Administer 2 doses of recombinant zoster vaccine (RZV) 2–6 months apart to adults aged 60 years or older regardless of past episode of herpes zoster or receipt of zoster vaccine live (ZVL)

   Special populations
   - Administer 2 doses of RZV 2–6 months apart to adults who previously received ZVL at least 2 months after ZVL

   - For adults aged 60 years or older, administer either RZV or ZVL (RZV is preferred)

   6. Human papillomavirus vaccination
      www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/hpv.html
      General Information
      - Administer human papillomavirus (HPV) vaccine to females through age 26 years and males through age 21 years (males aged 22 through 26 years may be vaccinated based on individual clinical decision)

   - The number of doses of HPV vaccine to be administered depends on age at initial HPV vaccination:
     - No previous dose of HPV vaccine: Administer 3-dose series on 0, 2, and 6 months (minimum interval: 4 weeks between doses 1 and 2, 12 weeks between doses 2 and 3, and 5 months between doses 1 and 3; repeat doses if given too soon)
     - Aged 9–14 years at HPV vaccine series initiation and received 1 dose or 2 doses less than 5 months apart: Administer 1 dose
     - Aged 9–14 years at HPV vaccine series initiation and received 2 doses at least 5 months apart: No additional dose is needed

   Special populations
   - Adults with immunocompromising conditions (including HIV infection) aged through age 26 years: Administer 3-dose series at 0, 1–2, and 6 months

   - Men who have sex with men through age 26 years: Administer 2- or 3-dose series depending on age at initial vaccination (see above); if no history of HPV vaccine, administer 3-dose series on 0, 1–2, and 6 months

   - Pregnant women through age 26 years: HPV vaccination is not recommended during pregnancy, but there is no evidence that the vaccine is harmful and no intervention needed for women who inadvertently receive HPV vaccine while pregnant; delay remaining doses until after pregnancy; pregnancy testing is not needed before vaccination

   7. Pneumococcal vaccination
      www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/pneumococcal.html
      General Information
      - Administer to immunocompetent adults aged 65 years or older 1 dose of 14-valent pneumococcal conjugate vaccine (PCV13), if not previously administered, followed by 1 dose of 23-valent pneumococcal polysaccharide vaccine (PPSV23) at least 1 year after PCV13; if PPSV23 was previously administered but not PCV13, administer PCV13 at least 1 year after PPSV23

   - When both PCV13 and PPSV23 are indicated, administer PCV13 first (PCV13 and PPSV23 should not be administered during the same visit); additional information on vaccine timing is available at www.cdc.gov/vaccines/pdf/pneumo/download/pneumo-vaccine-timing.pdf
Special populations
- Administer to adults aged 19 through 64 years with the following chronic conditions 1 dose of PPSV23 (at age 65 years or older, administer 1 dose of PCV13, if not previously received, and another dose of PPSV23 at least 1 year after PCV13 and at least 5 years after PPSV23):
  - Chronic heart disease (excluding hypertension)
  - Chronic lung disease
  - Chronic liver disease
  - Alcoholism
  - Diabetes mellitus
  - Cigarette smoking
- Administer to adults aged 19 years or older with the following indications 1 dose of PCV13 followed by 1 dose of PPSV23 at least 8 weeks after PCV13, and a second dose of PPSV23 at least 5 years after the first dose of PPSV23 of the most recent dose of PCV13 was administered before age 65 years, at age 65 years or older, administer another dose of PPSV23 at least 5 years after the last dose of PPSV23:
  - Immunodeficiency disorder (including HIV- and Thyroid deficiency, complement deficiencies, and phagocytic disorders)
  - HIV infection
  - Anatomical or functional asplenia (including sickle cell disease and other hemoglobinopathies)
  - Chronic renal failure and nephrotic syndrome
- Administer to adults aged 19 years or older with the following indications 1 dose of PCV13 followed by 1 dose of PPSV23 at least 8 weeks after the last dose of PPSV23 was administrated before age 65 years, at age 65 years or older, administer another dose of PPSV23 at least 5 years after the last dose of PPSV23:
  - Cerebrospinal fluid leak
  - Cochlear implant

8. Hepatitis A vaccination
www.cdc.gov/vaccines/recs/vacc-specific/heap.html
General information
- Administer to adults who have a specific risk (see below), or lack a risk factor but want protection, 2-dose series of single antigen hepatitis A vaccine (HepA-Vax, Havrix at 0 and 6-12 months or Vastra at 0 and 6-18 months; minimum interval 6 months) or a 3-dose series of combined hepatitis A and hepatitis B vaccine (HepA-Bilrix) at 0, 1, and 6 months; minimum intervals: 4 weeks between doses 1 and 2 for HepA and HepA-Bilrix; between doses 2 and 3, 8 weeks for HepA and 5 months for HepA-Bilrix

Special populations
- Administer HepA or HepA-Bilrix to adults with the following indications:
  - Travel or to work in countries with high or intermediate hepatitis A endemicity
  - Men who have sex with men
  - Injection or noninjection drug use
  - Work with hepatitis A virus in a research laboratory or with nonhuman primates infected with hepatitis A virus
  - Clotting factor disorders
  - Chronic liver disease

- Close, personal contact with an international adoptee (e.g., household or regular babysitting) during the first 60 days after arrival in the United States from a country with high or intermediate endemicity (administer the first dose as soon as the adoption is planned)
- Healthy adults through age 60 years who have recently been exposed to hepatitis A virus; adults older than 60 years may receive HepA or HepA-B if hepatitis A immunoglobulin cannot be obtained

9. Hepatitis B vaccination
www.cdc.gov/vaccines/recs/vacc-specific/hepb.html
General Information
- Administer to adults who have a specific risk (see below), or lack a risk factor but want protection, 2-dose series of single antigen hepatitis B vaccine (HepB) or combined hepatitis A and hepatitis B vaccine (HepA-Bilrix) at 0, 1, and 6 months; minimum intervals: 4 weeks between doses 1 and 2 for HepA and HepA-Bilrix; between doses 2 and 3, 8 weeks for HepA and 5 months for HepA-Bilrix

Special populations
- Administer HepB or HepA-Bilrix to adults with the following indications:
  - Chronic liver disease (e.g., hepatitis C infection, cirrhosis, fatty liver disease, alcoholic liver disease, autoimmune hepatitis, alamine aminotransferase [ALT] or aspartate aminotransferase [AST] level greater than twice the upper limit of normal)
  - HIV infection
  - Perinatal or sexual risk of exposure to blood (e.g., household contacts of hepatitis B surface antigen [HBsAg]-positive persons; adults younger than age 60 years with diabetes mellitus or aged 60 years or older with diabetes mellitus based on individual clinical decision; adults in predialysis care or receiving hemodialysis or peritoneal dialysis; recent or current injection drug users; health care and public safety workers at risk for exposure to blood or blood-contaminated body fluids)
  - Sexual exposure risk (e.g., sex partners of HBsAg-positive persons; sexually active persons not in a monogamous relationship; persons seeking evaluation or treatment for a sexually transmitted infection; and men who have sex with men [MSM])
  - Recreational settings where a high proportion of adults have risks for hepatitis B infection (e.g., facilities providing sexually transmitted disease treatment, drug abuse treatment and correction services, hemodialysis and end-stage renal disease programs, institutions for developmentally disabled persons, health care settings targeting services to injection drug users or MSM, HIV testing and treatment facilities, and correctional facilities)
  - Travel to countries with high or intermediate hepatitis B endemicity

- Administer 2 doses of MenACWY or at least 8 weeks apart and revaccinate with 1 dose of MenACWY every 5 years, if the risk remains, to adults with the following indications:
  - Anatomical or functional asplenia (including sickle cell disease and other hemoglobinopathies)
  - HIV infection
  - Persistent complement component deficiency
  - Eculizumab use
- Administer 1 dose of MenACWY and revaccinate with 1 dose of MenACWY every 5 years, if the risk remains, to adults with the following indications:
  - Travel or to live in countries where meningococcal disease is hyperendemic or epidemic, including countries in the African meningitis belt or during the Hajj
  - At risk from a meningococcal disease outbreak attributed to serogroup A, C, Y, or W
  - Meningoococcus routinely exposed to Neisseria meningitidis
  - Military recruits
  - First-year college students who live in residential housing (if they did not receive MenACWY at age 16 years or older)

General Information: Serogroup B meningococcal vaccine (MenB)
- May administer, based on individual clinical decision, to young adults and adolescents aged 16–23 years (preferred age is 18–18 years) who are not at increased risk 2-dose series of MenB-4C (Bexsero) at least 1 month apart or 3-dose series of MenB-PRP (Trumavax) at least 6 months apart
- MenB-4C and MenB-PRP are not interchangeable

Special populations: MenB
- Administer 2-dose series of MenB-4C at least 1 month apart or 3-dose series of MenB-PRP at 0, 1–2, and 6 months to adults with the following indications:
  - Anatomical or functional asplenia (including sickle cell disease)
  - Persistent complement component deficiency
  - Eculizumab use
  - At risk from a meningococcal disease outbreak attributed to serogroup B
  - Microbiologists routinely exposed to Neisseria meningitidis

11. Haemophilus influenzae type b vaccination
www.cdc.gov/vaccines/recs/vacc-specific/hib.html
Special populations: Serogroups A, C, W, and Y meningococcal vaccine (MenACWY)
- Administer Haemophilus influenza type b vaccine (Hib) to adults with the following indications:
  - Anatomical or functional asplenia (including sickle cell disease) or undergoing elective splenectomy
  - Adult 1 dose if not previously vaccinated (preferably at least 14 days before elective splenectomy)
  - Hematopoietic stem cell transplant (H SCT): Administer 3-dose series with doses 4 weeks apart starting at 12 months after successful transplant regardless of Hib vaccination history
### Table. Contraindications and precautions for vaccines recommended for adults aged 18 years or older*

The Advisory Committee on Immunization Practices (ACIP) recommendations and package inserts for vaccines provide information on contraindications and precautions related to vaccines. Contraindications are conditions that increase the chances of a serious adverse reaction in vaccine recipients and the vaccine should not be administered when a contraindication is present. Precautions should be reviewed for potential risks and benefits for vaccine recipients.

#### Contraindications and precautions for vaccines routinely recommended for adults

<table>
<thead>
<tr>
<th>Vaccine(s)</th>
<th>Contraindications</th>
<th>Precautions</th>
</tr>
</thead>
<tbody>
<tr>
<td>All vaccines routinely recommended for adults</td>
<td>Severe 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>

#### Additional contraindications and precautions for vaccines routinely recommended for adults

<table>
<thead>
<tr>
<th>Vaccine(s)</th>
<th>Additional Contraindications</th>
<th>Additional Precautions</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV</td>
<td>• History of Guillain-Barré syndrome within 6 weeks after previous influenza vaccination</td>
<td>• Egg allergy other than hen’s egg, e.g., angioedema, respiratory distress, lightheadedness, or recurrent urticaria; or required epinephrine or another emergency medical intervention (IV may be administered in an inpatient or outpatient medical setting and under the supervision of a health care provider who is able to recognize and manage severe allergic conditions)</td>
</tr>
<tr>
<td>IV</td>
<td>• History of Guillain-Barré syndrome within 6 weeks after previous influenza vaccination</td>
<td>• Guillain-Barré syndrome within 6 weeks after a previous dose of tetanus toxoid-containing vaccine</td>
</tr>
<tr>
<td>Tdap (Td)</td>
<td>• For parturients containing vaccines anaphylaxis, 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 a vaccine containing tetanus or diphtheria toxoid or acellular pertussis</td>
<td>• History of Arthus-type hypersensitivity reactions after a previous dose of tetanus or diphtheria toxoid-containing vaccine. Delay vaccination until at least 10 years have elapsed since the last tetanus toxoid-containing vaccine</td>
</tr>
<tr>
<td>MMR</td>
<td>• Severe immunodeficiency, e.g., hematologic and solid tumors, chemotherapy, congenital immunodeficiency or long-term immunosuppressive therapy4, human immunodeficiency virus (HIV) infection with severe immunocompromise</td>
<td>• Recent (within 11 months) receipt of antibody-containing blood product (specific intent) depends on product2</td>
</tr>
<tr>
<td>VAR</td>
<td>• Severe immunodeficiency, e.g., hematologic and solid tumors, chemotherapy, congenital immunodeficiency or long-term immunosuppressive therapy2, HIV infection with severe immunocompromise</td>
<td>• History of thrombocytopenia or thrombocytopenics purpura</td>
</tr>
<tr>
<td>ZVL</td>
<td>• Severe immunodeficiency, e.g., hematologic and solid tumors, chemotherapy, congenital immunodeficiency or long-term immunosuppressive therapy1, HIV infection with severe immunocompromise</td>
<td>• Need for tuberculosis skin testing2</td>
</tr>
<tr>
<td>HPV vaccine</td>
<td>• Recipient of specific antiviral drugs (acyclovir, famciclovir, or valacyclovir) 24 hours before vaccination (avoid use of these antiviral drugs for 14 days after vaccination)</td>
<td>• Recent (within 11 months) receipt of antibody-containing blood product (specific intent) depends on product2</td>
</tr>
<tr>
<td>PCV13</td>
<td>• Severe allergic reaction to any vaccine containing diphtheria toxoid</td>
<td>• Receipt of specific antiviral drugs (acyclovir, famciclovir, or valacyclovir) 24 hours before vaccination (avoid use of these antiviral drugs for 14 days after vaccination)</td>
</tr>
</tbody>
</table>

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1. For additional information on use of influenza vaccines among persons with egg allergy, see CDC. Prevention and control of seasonal influenza with vaccines: recommendations of the Advisory Committee on Immunization Practices (ACIP).MMWR. 2010;59(No. RR-4). Available at www.cdc.gov/mmwr/preview/mmwrhtml/mm5904a7.htm.

2. MMR may be administered with Td or ZVL on the same day, if not administered on the same day separate live vaccines by at least 28 days.

3. Immunosuppressive steroid dose is considered to be daily receipt of 20 mg or more prednisone or equivalent for 2 or more weeks. Vaccination should be delayed for at least 1 month after discontinuation of immunosuppressive steroid therapy. Providers should consult ACIP recommendations for complete information on the specific live vaccines among persons on immune suppressing medications or with immune suppression because of other reasons.


5. Materns vaccination may temporarily suppress tubulin reactivity. Materns-containing vaccine may be administered on the same day as tubulin skin testing, or should be postponed for at least 4 weeks after vaccination.

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**Abbreviations of vaccines**

<table>
<thead>
<tr>
<th>IV</th>
<th>Inactivated influenza vaccine</th>
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<tbody>
<tr>
<td>RV</td>
<td>Recombinant influenza vaccine</td>
</tr>
<tr>
<td>Td</td>
<td>Tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis vaccine</td>
</tr>
<tr>
<td>dT</td>
<td>Tetanus and diphtheria toxoids</td>
</tr>
<tr>
<td>MMR</td>
<td>Measles, mumps, and rubella vaccine</td>
</tr>
<tr>
<td>ZVL</td>
<td>Zoster vaccine live</td>
</tr>
<tr>
<td>HPV</td>
<td>Human papillomavirus vaccine</td>
</tr>
<tr>
<td>PCV13</td>
<td>Pneumococcal conjugate vaccine</td>
</tr>
<tr>
<td>PRP-OL</td>
<td>23-valent pneumococcal polysaccharide vaccine</td>
</tr>
</tbody>
</table>

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| HepA | Hepatitis A vaccine |
| HepB | Hepatitis B vaccine |
| HepA/HepB | Hepatitis A and hepatitis B vaccines |
| HAV | Hepatitis A vaccine |
| HBsAg | Hepatitis B surface antigen |
| HAVAg | Hepatitis A antibody |
| HBcAg | Hepatitis B core antigen |
| HBsAb | Hepatitis B surface antibody |
| HBcAb | Hepatitis B core antibody |
| MRV | Measles, mumps, and rubella virus |
| MMR | Measles, mumps, and rubella virus |
| HAV | Hepatitis A virus |
| HBV | Hepatitis B virus |
Recombinant zoster vaccine (RZV) licensed by FDA on October 20
Administer 2 doses RZV 2–6 mos apart to adults ≥50y regardless of past herpes zoster or receipt of zoster vaccine live (ZVL)
Administer RZV 2–6 mos apart to adults who previously received ZVL at least 2 mos after ZVL
For adults ≥60y, administer either RZV or ZVL (RZV is preferred)
Administer RZV to age-eligible adults with chronic health conditions including diabetes, chronic heart/lung/liver/kidney ds, asplenia, complement deficiencies
Pending considerations on use of RZV in immunocompromising conditions including HIV infection
No data on pregnant women (consider delay)
2018 Adult Immunization Updates – Mumps Vaccination

- Routine mumps vaccination recommendations
  - Children – 2 doses MMR during K-12 (12–15 mos and 4–6 yrs for measles)
  - Adults – 2 doses MMR for high risk (students at post-high school educational institutions, health care personnel, international travelers)

- Multiple outbreaks of mumps and high numbers of reported cases since 2015, many among young adults who received 2 doses MMR

- Updated ACIP recommendations on use of MMR during mumps outbreak
  - Administer 1 dose MMR to persons who previously received ≤2 doses mumps-containing vaccine and identified by public health authority to be at increased risk during mumps outbreak
ACIP Updates Hepatitis B Prevention

- New or updated ACIP recommendations for children
  - Universal HepB within 24 hrs of birth for medically stable infants weighing ≥2,000 g
  - Test HBsAg(+) pregnant women for hepatitis B virus deoxyribonucleic acid (HBV DNA)
  - Test postvaccination serology for infants whose mother’s HBsAg status unknown indefinitely
    (e.g., when a parent or person with lawful custody surrenders an infant confidentially shortly after birth)
  - Single-dose revaccination for infants born to HBsAg(+) women when not respond to initial vaccine series
  - Removal of permissive language for delaying birth dose after hospital discharge

- Relevant for adults
  - Vaccinate persons with chronic liver disease (hepatitis C virus [HCV] infection, cirrhosis, fatty liver disease, alcoholic liver disease, autoimmune hepatitis, alanine aminotransferase [ALT] or aspartate aminotransferase [AST] level greater than twice the upper limit of normal)

New Hepatitis B Vaccine for Adults

- FDA licensed (Nov 9, 2017) single antigen HepB (HEPLISAV-B, Dynavax Technologies Corp.) for all HBV subtypes for ≥18y
- 5th inactivated HepB in U.S. (Engerix-B, Recombivax HB, Pediarix, Twinrix)
- Contains yeast-derived recombinant HBsAg with 1018 adjuvant (immunostimulatory sequences) that binds Toll-like receptor 9 to stimulate directed immune response
- 2 doses 1 month apart
Heplisav-B – Seroprotection and Safety

- **Immunogenicity**
  - 90.0%–100% vs. 70.5%–90.2% in comparison group (3 doses Engerix-B)
  - Diabetes Type II: 90.0% vs. 65.1% (3 doses Engerix-B)
  - Chronic kidney disease: 89.9% (3 doses) vs. 81.1% (4 double doses Engerix-B)

- **Safety and reactogenicity**
  - Mild and serious adverse events similar
    - Mild: 45.6% vs. 45.7% (Engerix-B)
    - Serious: 5.4% vs. 6.3% (Engerix-B)
  - Cardiovascular events
    - 0.27% vs. 0.14% (Engerix-B)
  - Potentially immune-mediated adverse events (e.g., granulomatosis with polyangiitis, Grave’s disease)
    - 0.1%–0.2% vs. 0%–0.7% (Engerix-B)


Pending ACIP Deliberation on Heplisav-B

- Use of Heplisav-B in prevention of hepatitis B for ≥18y up for ACIP vote in February 2018
- Other considerations
For more information, contact CDC
1-800-CDC-INFO (232-4636)

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