

Appendix A - Immunization Schedule, 2018

Figure 1. Recommended immunization schedule for adults aged 19 years or older by age group, United States, 2018

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.

Vaccine	19–21 years	22–26 years	27–49 years	50–64 years	≥65 years
Influenza ¹	1 dose annually				
Tdap ² or Td ²	1 dose Tdap, then Td booster every 10 yrs				
MMR ³	1 or 2 doses depending on indication (if born in 1957 or later)				
VAR ⁴	2 doses				
RZV ⁵ (preferred) or ZVL ⁵				2 doses RZV (preferred) OR 1 dose ZVL	
HPV–Female ⁶	2 or 3 doses depending on age at series initiation				
HPV–Male ⁶	2 or 3 doses depending on age at series initiation				
PCV13 ⁷	1 dose				
PPSV23 ⁷	1 or 2 doses depending on indication				1 dose
HepA ⁸	2 or 3 doses depending on vaccine				
HepB ⁹	3 doses				
MenACWY ¹⁰	1 or 2 doses depending on indication, then booster every 5 yrs if risk remains				
MenB ¹⁰	2 or 3 doses depending on vaccine				
Hib ¹¹	1 or 3 doses depending on indication				

Recommended for adults who meet the age requirement, lack documentation of vaccination, or lack evidence of past infection
 Recommended for adults with other indications
 No recommendation

Figure 2. Recommended immunization schedule for adults aged 19 years or older by medical condition and other indications, United States, 2018

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.

Vaccine	Pregnancy ^{1,6}	Immuno-compromised (excluding HIV infection) ^{3,7,11}	HIV infection CD4+ count (cells/ μ L) ^{3,7,9-10}		Asplenia, complement deficiencies ^{7,10,11}	End-stage renal disease, on hemodialysis ^{7,9}	Heart or lung disease, alcoholism ⁷	Chronic liver disease ^{7,9}	Diabetes ^{7,9}	Health care personnel ^{1,4,9}	Men who have sex with men ^{4,9}	
			<200	≥200								
Influenza ¹	1 dose annually											
Tdap ² or Td ²	1 dose Tdap each pregnancy	1 dose Tdap, then Td booster every 10 yrs										
MMR ³	contraindicated		1 or 2 doses depending on indication									
VAR ⁴	contraindicated		2 doses									
RZV ⁵ (preferred) or ZVL ⁵	contraindicated		2 doses RZV at age ≥50 yrs (preferred) OR 1 dose ZVL at age ≥60 yrs									
HPV–Female ⁶		3 doses through age 26 yrs			2 or 3 doses through age 26 yrs							
HPV–Male ⁶		3 doses through age 26 yrs			2 or 3 doses through age 21 yrs						2 or 3 doses through age 26 yrs	
PCV13 ⁷		1 dose										
PPSV23 ⁷		1, 2, or 3 doses depending on indication										
HepA ⁸		2 or 3 doses depending on vaccine										
HepB ⁹		3 doses										
MenACWY ¹⁰		1 or 2 doses depending on indication, then booster every 5 yrs if risk remains										
MenB ¹⁰		2 or 3 doses depending on vaccine										
Hib ¹¹		3 doses HSCT recipients only			1 dose							

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

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 (RIV) 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 RIV to:
 - **Pregnant women**
 - Adults with **hives-only egg allergy**
 - Adults with **egg allergy other than hives** (e.g., angioedema or respiratory distress): Administer IIV or RIV in a medical setting under supervision of a health care provider who can recognize and manage severe allergic conditions

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/mmwrhtml/rr5517a1.htm

Special populations

- **Pregnant women:** Administer 1 dose of Tdap during each pregnancy, preferably in the early part of gestational weeks 27–36

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 1957 (except for health care personnel, see below)
 - Documentation of receipt of MMR
 - Laboratory evidence of immunity or disease
- Documentation of a health care provider-diagnosed 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/ μ L 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 mumps, 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 authority to be 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 (VAR) 4–8 weeks apart if previously received no varicella-containing vaccine (if previously received 1 dose of varicella-containing vaccine, administer 1 dose of VAR 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
 - Laboratory evidence of immunity or disease

Special populations

- Administer 2 doses of VAR 4–8 weeks apart if previously received no varicella-containing vaccine (if previously received 1 dose of varicella-containing vaccine, administer 1 dose of VAR at least 4 weeks after the first dose) to:
 - **Pregnant women without evidence of immunity:** Administer the first of the 2 doses or the second dose after pregnancy and before discharge from health care facility
 - **Health care personnel without evidence of immunity**
- Adults with **HIV infection and CD4 cell count ≥ 200 cells/ μ L:** May administer, based on individual clinical decision, 2 doses of VAR 3 months apart
- VAR 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 50 years or older regardless of past episode of herpes zoster or receipt of zoster vaccine live (ZVL)

- 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)

Special populations

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

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 at 0, 1–2, and 6 months (minimum intervals: 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)** 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 at 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/pneumo.html

General information

- Administer to immunocompetent adults aged 65 years or older 1 dose of 13-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/vpd/pneumo/downloads/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 (if the most recent dose of PPSV23 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 disorders** (including B- and T-lymphocyte 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 PCV13 (if the dose of PPSV23 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):
 - **Cerebrospinal fluid leak**
 - **Cochlear implant**

Hepatitis A vaccination

www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/hepa.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; Havrix at 0 and 6–12 months or Vaqta at 0 and 6–18 months; minimum interval: 6 months) or a 3-dose series of combined hepatitis A and hepatitis B vaccine (HepA-HepB) at 0, 1, and 6 months; minimum intervals: 4 weeks between first and second doses, 5 months between second and third doses

Special populations

- Administer HepA or HepA-HepB to adults with the following indications:
 - **Travel** to or 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 40 years who have recently been exposed to hepatitis A virus**; adults older than age 40 years may receive HepA if hepatitis A immunoglobulin cannot be obtained

9. Hepatitis B vaccination

www.cdc.gov/vaccines/hcp/acip-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, 3-dose series of single antigen hepatitis B vaccine (HepB) or combined hepatitis A and hepatitis B vaccine (HepA-HepB) at 0, 1, and 6 months (minimum intervals: 4 weeks between doses 1 and 2 for HepB and HepA-HepB; between doses 2 and 3, 8 weeks for HepB and 5 months for HepA-HepB)

Special populations

- Administer HepB or HepA-HepB to adults with the following indications:
 - **Chronic liver disease** (e.g., hepatitis C 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)
 - **HIV infection**
 - **Percutaneous or mucosal 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 mutually monogamous relationship; persons seeking evaluation or treatment for a sexually transmitted infection; and **men who have sex with men [MSM]**)
 - Receive care in **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 prevention 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

10. Meningococcal vaccination

www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/mening.html

Special populations: Serogroups A, C, W, and Y meningococcal vaccine (MenACWY)

- Administer 2 doses of MenACWY 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 to or 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, W, or Y**
 - **Microbiologists** 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 16–18 years) who are not at increased risk 2-dose series of MenB-4C (Bexsero) at least 1 month apart or 2-dose series of MenB-FHbp (Trumenba) at least 6 months apart
- MenB-4C and MenB-FHbp are not interchangeable

Special populations: MenB

- Administer 2-dose series of MenB-4C at least 1 month apart or 3-dose series of MenB-FHbp 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/hcp/acip-recs/vacc-specific/hib.html

Special populations

- Administer *Haemophilus influenzae* type b vaccine (Hib) to adults with the following indications:
 - **Anatomical or functional asplenia** (including sickle cell disease) or undergoing elective splenectomy: Administer 1 dose if not previously vaccinated (preferably at least 14 days before elective splenectomy)
 - **Hematopoietic stem cell transplant (HSCT)**: Administer 3-dose series with doses 4 weeks apart starting 6 to 12 months after successful transplant regardless of Hib vaccination history