Annals of Internal Medicine

CLINICAL GUIDELINE

Recommended Adult Immunization Schedule, United States, 2020*

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In October 2019, the Advisory Committee on Immunization Practices (ACIP) voted to approve the Recommended Adult Immunization Schedule for Ages 19 Years or Older, United States, 2020. The 2020 adult immunization schedule, available at www.cdc.gov/vaccines/schedules/hcp/imz/adult.html, summarizes ACIP recommendations in 2 tables and accompanying notes (**Figure**). The full ACIP recommendations for each vaccine are available at www.cdc.gov/vaccines/hcp/acip-recs/index.html. The 2020 schedule has also been approved by the director of the Centers for Disease Control and Prevention (CDC) and by the American College of Physicians (www.acponline.org), American Academy of Family Physicians (www.aafp.org), American College of Obstetricians and Gynecologists (www.acog.org), and American College of Nurse-Midwives (www.midwife.org).

The ACIP develops recommendations on the use of each vaccine after in-depth review of vaccine-related data, such as the epidemiology and burden of the vaccine-preventable disease, vaccine efficacy and effectiveness, vaccine safety, the quality of evidence, feasibility of program implementation, and economic analyses of immunization policy (1). ACIP recommendations can be complex and challenging to implement. The purpose of the schedule, published annually, is to consolidate and summarize updates to ACIP recommendations on vaccination of adults and assist providers in implementing current ACIP recommendations. The use of vaccine trade names in this article and in the schedule is for identification purposes only and does not imply endorsement by the ACIP or CDC.

Changes to the 2020 Adult Immunization Schedule

Influenza vaccination (2). Updates to the recommendations reflect discussions during public meetings of ACIP held on 25 October 2018, 27 February 2019, and 27 June 2019. For the 2019–2020 flu season, routine annual influenza vaccination is recommended for all persons age 6 months and older who do not have contraindications. No preferential recommendation is made for one influenza vaccine product over another for persons for whom more than one licensed, recommended, and appropriate product is available. LAIV (influenza vaccine, live attenuated) is an option for adults through age 49 years, except for those who have immunocompromising conditions, including HIV infection; have anatomical or functional asplenia; are pregnant; have close contact with or are caregivers of severely immunocompromised persons in a protected environment; have received influenza antiviral medications in the previous 48 hours; or have cerebrospinal fluid leak or a cochlear implant. Those with a history of Guillain–Barré syndrome within 6 weeks of a previous dose of influenza vaccine generally should not be vaccinated, unless vaccination benefits outweigh risks for those at higher risk for severe complications from influenza.

Hepatitis A vaccination (3). In June 2019, ACIP recommended all persons with HIV age 1 year or older be routinely vaccinated with hepatitis A vaccine. The list of other populations at risk for hepatitis A infection or severe hepatitis A disease has not changed significantly and includes persons with chronic liver disease; travelers in countries with high or intermediate endemic hepatitis A; persons with close, personal contact with an international adoptee in the first 60 days after arrival from a country with high or intermediate endemic hepatitis A; men who have sex with men; persons who use injection or noninjection drugs; persons experiencing homelessness; and persons who work with hepatitis A virus in a laboratory or nonhuman primates infected with the virus (3–6). Clotting factor disorders has been removed from the list. The definition of chronic liver disease has been expanded and includes, but is not limited to, persons with hepatitis B, hepatitis C, cirrhosis, fatty liver disease, alcoholic liver disease, autoimmune hepatitis, and alanine aminotransferase (ALT) or aspartate aminotransferase (AST) level greater than twice the upper limit of normal. A 2-dose series HepA (or 3-dose series HepA-HepB) is recommended for pregnant women if they are at risk for infection or severe outcome from infection during pregnancy. Lastly, hepatitis A vaccination is recommended for persons working in settings of exposure (e.g., those working in health care settings for injection or noninjection drug users or group homes and nonresidential day care facilities for developmentally disabled persons). In addition, any person who is not at risk for hepatitis A virus infection but wants protection against it may be vaccinated.

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* The 2020 adult immunization schedule appeared in *Annals of Internal Medicine* and on the Centers for Disease Control and Prevention Web site at www.cdc.gov/vaccines/schedules/hcp/index.html. An announcement summarizing changes to the 2020 adult immunization schedule is published concurrently in the *Morbidity and Mortality Weekly Report*. Readers can cite the 2020 adult immunization schedule as follows: Freedman M, Kroger A, Hunter P, Ault K; Advisory Committee on Immunization Practices. Recommended adult immunization schedule, United States, 2020. Ann Intern Med. 2020;172:337-47. doi:10.7326/M20-0046

† The 2020 adult immunization schedule was prepared by the Advisory Committee on Immunization Practices (ACIP); the ACIP Adult Immunization Work Group; Mark Freedman, DVM, MPH, and Andrew Kroger, MD, MPH (Centers for Disease Control and Prevention, Atlanta, Georgia); Paul Hunter, MD (City of Milwaukee Health Department, Milwaukee, Wisconsin); and Kevin A. Ault, MD (University of Kansas Medical Center, Kansas City, Kansas). For a list of members of the ACIP and the ACIP Adult Immunization Work Group, see the **Appendix** (available at Annals.org).

Figure. Recommended Adult Immunization Schedule for Ages 19 Years or Older, United States, 2020.

Recommended Adult Immunization Schedule
for ages 19 years or older

UNITED STATES 2020

How to use the adult immunization schedule

1 Determine recommended vaccinations by age (Table 1)

2 Assess need for additional recommended vaccinations by medical condition and other indications (Table 2)

3 Review vaccine types, frequencies, and intervals and considerations for special situations (Notes)

Recommended by the Advisory Committee on Immunization Practices (www.cdc.gov/vaccines/acip) and approved by the Centers for Disease Control and Prevention (www.cdc.gov), American College of Physicians (www.acponline.org), American Academy of Family Physicians (www.aafp.org), American College of Obstetricians and Gynecologists (www.acog.org), and American College of Nurse-Midwives (www.midwife.org).

Vaccines in the Adult Immunization Schedule*

Vaccines	Abbreviations	Trade names
Haemophilus influenzae type b vaccine	Hib	ActHIB® Hiberix® PedvaxHIB®
Hepatitis A vaccine	HepA	Havrix® Vaqta®
Hepatitis A and hepatitis B vaccine	HepA-HepB	Twinrix®
Hepatitis B vaccine	HepB	Engerix-B® Recombivax HB® Heplisav-B®
Human papillomavirus vaccine	HPV vaccine	Gardasil 9®
Influenza vaccine (inactivated)	IIV	Many brands
Influenza vaccine (live, attenuated)	LAIV	FluMist® Quadrivalent
Influenza vaccine (recombinant)	RIV	Flublok® Quadrivalent
Measles, mumps, and rubella vaccine	MMR	M-M-R® II
Meningococcal serogroups A, C, W, Y vaccine	MenACWY	Menactra® Menveo®
Meningococcal serogroup B vaccine	MenB-4C MenB-FHbp	Bexsero® Trumenba®
Pneumococcal 13-valent conjugate vaccine	PCV13	Prevnar 13®
Pneumococcal 23-valent polysaccharide vaccine	PPSV23	Pneumovax® 23
Tetanus and diphtheria toxoids	Td	Tenivac® Tdvax™
Tetanus and diphtheria toxoids and acellular pertussis vaccine	Tdap	Adacel® Boostrix®
Varicella vaccine	VAR	Varivax®
Zoster vaccine, recombinant	RZV	Shingrix
Zoster vaccine live	ZVL	Zostavax®

*Administer recommended vaccines if vaccination history is incomplete or unknown. Do not restart or add doses to vaccine series if there are extended intervals between doses. The use of trade names is for identification purposes only and does not imply endorsement by the ACIP or CDC.

Report

- Suspected cases of reportable vaccine-preventable diseases or outbreaks to the local or state health department
- Clinically significant postvaccination reactions to the Vaccine Adverse Event Reporting System at www.vaers.hhs.gov or 800-822-7967

Injury claims

All vaccines included in the adult immunization schedule except pneumococcal 23-valent polysaccharide (PPSV23) and zoster (RZV, ZVL) vaccines are covered by the Vaccine Injury Compensation Program. Information on how to file a vaccine injury claim is available at www.hrsa.gov/vaccinecompensation.

Questions or comments

Contact www.cdc.gov/cdc-info or 800-CDC-INFO (800-232-4636), in English or Spanish, 8 a.m.–8 p.m. ET, Monday through Friday, excluding holidays.

Download the CDC Vaccine Schedules App for providers at www.cdc.gov/vaccines/schedules/hcp/schedule-app.html.

Helpful information

- Complete ACIP recommendations: www.cdc.gov/vaccines/hcp/acip-recs/index.html
- General Best Practice Guidelines for Immunization (including contraindications and precautions): www.cdc.gov/vaccines/hcp/acip-recs/general-recs/index.html
- Vaccine information statements: www.cdc.gov/vaccines/hcp/vis/index.html
- Manual for the Surveillance of Vaccine-Preventable Diseases (including case identification and outbreak response): www.cdc.gov/vaccines/pubs/surv-manual
- Travel vaccine recommendations: www.cdc.gov/travel
- Recommended Child and Adolescent Immunization Schedule, United States, 2020: www.cdc.gov/vaccines/schedules/hcp/child-adolescent.html

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

Table 1 Recommended Adult Immunization Schedule by Age Group, United States, 2020

Vaccine	19–26 years	27–49 years	50–64 years	≥65 years
Influenza inactivated (IIV) or Influenza recombinant (RIV)	1 dose annually			
or				
Influenza live, attenuated (LAIV)	1 dose annually			
Tetanus, diphtheria, pertussis (Tdap or Td)	1 dose Tdap, then Td or Tdap booster every 10 years			
Measles, mumps, rubella (MMR)	1 or 2 doses depending on indication (if born in 1957 or later)			
Varicella (VAR)	2 doses (if born in 1980 or later)		2 doses	
Zoster recombinant (RZV) (*preferred*)			2 doses	
or				
Zoster live (ZVL)			1 dose	
Human papillomavirus (HPV)	2 or 3 doses depending on age at initial vaccination or condition	27 through 45 years		
Pneumococcal conjugate (PCV13)	1 dose			65 years and older
Pneumococcal polysaccharide (PPSV23)	1 or 2 doses depending on indication			1 dose
Hepatitis A (HepA)	2 or 3 doses depending on vaccine			
Hepatitis B (HepB)	2 or 3 doses depending on vaccine			
Meningococcal A, C, W, Y (MenACWY)	1 or 2 doses depending on indication, see notes for booster recommendations			
Meningococcal B (MenB)	2 or 3 doses depending on vaccine and indication, see notes for booster recommendations			
	19 through 23 years			
Haemophilus influenzae type b (Hib)	1 or 3 doses depending on indication			

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

Recommended vaccination for adults with an additional risk factor or another indication

Recommended vaccination based on shared clinical decision-making

No recommendation/ Not applicable

Table 2 Recommended Adult Immunization Schedule by Medical Condition and Other Indications, United States, 2020

Vaccine	Pregnancy	Immuno-compromised (excluding HIV infection)	HIV infection CD4 count		Asplenia, complement deficiencies	End-stage renal disease; or on hemodialysis	Heart or lung disease, alcoholism[1]	Chronic liver disease	Diabetes	Health care personnel[2]	Men who have sex with men
			<200	≥200							
IIV or RIV	1 dose annually										
or										or	
LAIV	NOT RECOMMENDED						PRECAUTION			1 dose annually	
Tdap or Td	1 dose Tdap each pregnancy	1 dose Tdap, then Td or Tdap booster every 10 years									
MMR	NOT RECOMMENDED			1 or 2 doses depending on indication							
VAR	NOT RECOMMENDED			2 doses							
RZV (*preferred*)	DELAY			2 doses at age ≥50 years							
or				or							
ZVL	NOT RECOMMENDED			1 dose at age ≥60 years							
HPV	DELAY	3 doses through age 26 years		2 or 3 doses through age 26 years							
PCV13		1 dose									
PPSV23		1, 2, or 3 doses depending on age and indication									
HepA				2 or 3 doses depending on vaccine							
HepB				2 or 3 doses depending on vaccine							
MenACWY	1 or 2 doses depending on indication, see notes for booster recommendations										
MenB	PRECAUTION	2 or 3 doses depending on vaccine and indication, see notes for booster recommendations									
Hib		3 doses HSCT[3] recipients only		1 dose							

- Recommended vaccination for adults who meet age requirement, lack documentation of vaccination, or lack evidence of past infection
- Recommended vaccination for adults with an additional risk factor or another indication
- Precaution—vaccination might be indicated if benefit of protection outweighs risk of adverse reaction
- Delay vaccination until after pregnancy if vaccine is indicated
- Not recommended/ contraindicated—vaccine should not be administered
- No recommendation/ Not applicable

1. Precaution for LAIV does not apply to alcoholism. 2. See notes for influenza; hepatitis B; measles, mumps, and rubella; and varicella vaccinations. 3. Hematopoietic stem cell transplant.

Notes Recommended Adult Immunization Schedule, United States, 2020

Haemophilus influenzae type b vaccination

Special situations

- **Anatomical or functional asplenia (including sickle cell disease):** 1 dose if previously did not receive Hib; if elective splenectomy, 1 dose, preferably at least 14 days before splenectomy
- **Hematopoietic stem cell transplant** (HSCT): 3-dose series 4 weeks apart starting 6–12 months after successful transplant, regardless of Hib vaccination history

Hepatitis A vaccination

Routine vaccination

- **Not at risk but want protection from hepatitis A** (identification of risk factor not required): 2-dose series HepA (Havrix 6–12 months apart or Vaqta 6–18 months apart [minimum interval: 6 months]) or 3-dose series HepA-HepB (Twinrix at 0, 1, 6 months [minimum intervals: 4 weeks between doses 1 and 2/5 months between dose 2 and 3])

Special situations

- **At risk for hepatitis A virus infection:** 2-dose series HepA or 3-dose series HepA-HepB as above
  - **Chronic liver disease** (e.g., persons with hepatitis B, hepatitis C, 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**
  - **Men who have sex with men**
  - **Injection or noninjection drug use**
  - **Persons experiencing homelessness**
  - **Work with hepatitis A virus** in research laboratory or with nonhuman primates with hepatitis A virus infection
  - **Travel in countries with high or intermediate endemic hepatitis A**
  - **Close, personal contact with international adoptee** (e.g., household or regular babysitting) in first 60 days after arrival from country with high or intermediate endemic hepatitis A (administer dose 1 as soon as adoption is planned, at least 2 weeks before adoptee's arrival)
  - **Pregnancy** if at risk for infection or severe outcome from infection during pregnancy
  - **Settings for exposure, including health** care settings targeting services to injection or noninjection drug users or group homes and nonresidential day care facilities for developmentally disabled persons (individual risk factor screening not required)

Hepatitis B vaccination

Routine vaccination

- **Not at risk but want protection from hepatitis B** (identification of risk factor not required): 2- or 3-dose series (2-dose series Heplisav-B at least 4 weeks apart [2-dose series HepB only applies when 2 doses of Heplisav-B are used at least 4 weeks apart] or 3-dose series Engerix-B or Recombivax HB at 0, 1, 6 months [minimum intervals: 4 weeks between doses 1 and 2/8 weeks between doses 2 and 3/16 weeks between doses 1 and 3]) or 3-dose series HepA-HepB (Twinrix at 0, 1, 6 months [minimum intervals: 4 weeks between doses 1 and 2/5 months between doses 2 and 3])

Special situations

- **At risk for hepatitis B virus infection:** 2-dose (Heplisav-B) or 3-dose (Engerix-B, Recombivax HB) series or 3-dose series HepA-HepB (Twinrix) as above
  - **Chronic liver disease** (e.g., persons with hepatitis C, cirrhosis, fatty liver disease, alcoholic liver disease, autoimmune hepatitis, alanine aminotransferase [ALT] or aspartate aminotransferase [AST] level greater than twice upper limit of normal)
  - **HIV infection**
  - **Sexual exposure risk** (e.g., sex partners of hepatitis B surface antigen [HBsAg]-positive persons; sexually active persons not in mutually monogamous relationships; persons seeking evaluation or treatment of a sexually transmitted infection; men who have sex with men)
  - **Current or recent injection drug use**
  - **Percutaneous or mucosal risk for exposure to blood** (e.g., household contacts of HBsAg-positive persons; residents and staff of facilities for developmentally disabled persons; health care and public safety personnel with reasonably anticipated risk for exposure to blood or blood-contaminated body fluids; hemodialysis, peritoneal dialysis, home dialysis, and predialysis patients; persons with diabetes mellitus age younger than 60 years and, at discretion of treating clinician, those age 60 years or older)
  - **Incarcerated persons**
  - **Travel in countries with high or intermediate endemic hepatitis B**
  - **Pregnancy** if at risk for infection or severe outcome from infection during pregnancy (Heplisav-B not currently recommended due to lack of safety data in pregnant women)

Human papillomavirus vaccination

Routine vaccination

- **HPV vaccination recommended for all adults through age 26 years:** 2- or 3-dose series depending on age at initial vaccination or condition:
  - **Age 15 years or older at initial vaccination:** 3-dose series at 0, 1–2, 6 months (minimum intervals: 4 weeks between doses 1 and 2/12 weeks between doses 2 and 3/5 months between doses 1 and 3; repeat dose if administered too soon)
  - **Age 9 through 14 years at initial vaccination and received 1 dose or 2 doses less than 5 months apart:** 1 dose
  - **Age 9 through 14 years at initial vaccination and received 2 doses at least 5 months apart:** HPV vaccination complete, no additional dose needed.
- **If completed valid vaccination series with any HPV vaccine, no additional doses needed**

Shared clinical decision-making

- **Age 27 through 45 years based on shared clinical decision-making:**
  - 2- or 3-dose series as above

Notes Recommended Adult Immunization Schedule, United States, 2020

Special situations

- **Pregnancy through age 26 years:** HPV vaccination is not recommended until after pregnancy; no intervention needed if vaccinated while pregnant; pregnancy testing not needed before vaccination

Influenza vaccination

Routine vaccination

- **Persons age 6 months or older:** 1 dose any influenza vaccine appropriate for age and health status annually For additional guidance, see www.cdc.gov/flu/professionals/index.htm

Special situations

- **Egg allergy, hives only:** 1 dose any influenza vaccine appropriate for age and health status annually
- **Egg allergy more severe than hives** (e.g., angioedema, respiratory distress): 1 dose any influenza vaccine appropriate for age and health status annually in medical setting under supervision of health care provider who can recognize and manage severe allergic conditions
- **LAIV should not be used** in persons with the following conditions or situations:
  - History of severe allergic reaction to any vaccine component (excluding egg) or to a previous dose of any influenza vaccine
  - Immunocompromised due to any cause (including medications and HIV infection)
  - Anatomical or functional asplenia
  - Cochlear implant
  - Cerebrospinal fluid-oropharyngeal communication
  - Close contacts or caregivers of severely immunosuppressed persons who require a protected environment
  - Pregnancy
  - Received influenza antiviral medications within the previous 48 hours
- **History of Guillain-Barré syndrome within 6 weeks of previous dose of influenza vaccine:** Generally should not be vaccinated unless vaccination benefits outweigh risks for those at higher risk for severe complications from influenza

Measles, mumps, and rubella vaccination

Routine vaccination

- **No evidence of immunity to measles, mumps, or rubella:** 1 dose
  - **Evidence of immunity:** Born before 1957 (health care personnel, see below), documentation of receipt of MMR vaccine, laboratory evidence of immunity or disease (diagnosis of disease without laboratory confirmation is not evidence of immunity)

Special situations

- **Pregnancy with no evidence of immunity to rubella:** MMR contraindicated during pregnancy; after pregnancy (before discharge from health care facility), 1 dose
- **Nonpregnant women of childbearing age with no evidence of immunity to rubella:** 1 dose
- **HIV infection with CD4 count ≥200 cells/μL for at least 6 months and no evidence of immunity to measles, mumps, or rubella:** 2-dose series at least 4 weeks apart; MMR contraindicated in HIV infection with CD4 count <200 cells/μL
- **Severe immunocompromising conditions:** MMR contraindicated
- **Students in postsecondary educational institutions; international travelers; and household or close, personal contacts of immunocompromised persons with no evidence of immunity to measles, mumps, or rubella:** 2-dose series at least 4 weeks apart if previously did not receive any dose of MMR or 1 dose if previously received 1 dose MMR
- **Health care personnel:**
  - **Born in 1957 or later with no evidence of immunity to measles, mumps, or rubella:** 2-dose series at least 4 weeks apart for measles or mumps or at least 1 dose for rubella
  - **Born before 1957 with no evidence of immunity to measles, mumps, or rubella:** Consider 2-dose series at least 4 weeks apart for measles or mumps or 1 dose for rubella

Meningococcal vaccination

Special situations for MenACWY

- **Anatomical or functional asplenia (including sickle cell disease), HIV infection, persistent complement component deficiency, complement inhibitor (e.g., eculizumab, ravulizumab) use:** 2-dose series MenACWY (Menactra, Menveo) at least 8 weeks apart and revaccinate every 5 years if risk remains
- **Travel in countries with hyperendemic or epidemic meningococcal disease, microbiologists routinely exposed to *Neisseria meningitidis*:** 1 dose MenACWY (Menactra, Menveo) and revaccinate every 5 years if risk remains
- **First-year college students who live in residential housing (if not previously vaccinated at age 16 years or older) and military recruits:** 1 dose MenACWY (Menactra, Menveo)

Shared clinical decision-making for MenB

- **Adolescents and young adults age 16 through 23 years (age 16 through 18 years preferred) not at increased risk for meningococcal disease:** Based on shared clinical decision-making, 2-dose series MenB-4C at least 1 month apart or 2-dose series MenB-FHbp at 0, 6 months (if dose 2 was administered less than 6 months after dose 1, administer dose 3 at least 4 months after dose 2); MenB-4C and MenB-FHbp are not interchangeable (use same product for all doses in series)

Special situations for MenB

- **Anatomical or functional asplenia (including sickle cell disease), persistent complement component deficiency, complement inhibitor (e.g., eculizumab, ravulizumab) use, microbiologists routinely exposed to *Neisseria meningitidis*:** 2-dose primary series MenB-4C (Bexsero) at least 1 month apart or 3-dose primary series MenB-FHbp (Trumenba) at 0, 1–2, 6 months (if dose 2 was administered at least 6 months after dose 1, dose 3 not needed); MenB-4C and MenB-FHbp are not interchangeable (use same product for all doses in series); 1 dose MenB booster 1 year after primary series and revaccinate every 2–3 years if risk remains
- **Pregnancy:** Delay MenB until after pregnancy unless at increased risk and vaccination benefits outweigh potential risks

Notes Recommended Adult Immunization Schedule, United States, 2020

Pneumococcal vaccination

Routine vaccination

- **Age 65 years or older** (immunocompetent – see www.cdc.gov/mmwr/volumes/68/wr/mm6846a5.htm?s_cid=mm6846a5_w): 1 dose PPSV23
  - If PPSV23 was administered prior to age 65 years, administer 1 dose PPSV23 at least 5 years after previous dose

Shared clinical decision-making

- **Age 65 years and older** (immunocompetent): 1 dose PCV13 based on **shared clinical decision-making**
  - If both PCV13 and PPSV23 are to be administered, PCV13 should be administered first
  - PCV13 and PPSV23 should be administered at least 1 year apart
  - PCV13 and PPSV23 should not be administered during the same visit

Special situations

(see www.cdc.gov/mmwr/volumes/68/wr/mm6846a5.htm?s_cid=mm6846a5_w)

- **Age 19 through 64 years with chronic medical conditions (chronic heart [excluding hypertension], lung, or liver disease, diabetes), alcoholism, or cigarette smoking:** 1 dose PPSV23
- **Age 19 years or older with immunocompromising conditions (congenital or acquired immunodeficiency [including B- and T-lymphocyte deficiency, complement deficiencies, phagocytic disorders, HIV infection], chronic renal failure, nephrotic syndrome, leukemia, lymphoma, Hodgkin disease, generalized malignancy, iatrogenic immunosuppression [e.g., drug or radiation therapy], solid organ transplant, multiple myeloma) or anatomical or functional asplenia (including sickle cell disease and other hemoglobinopathies):** 1 dose PCV13 followed by 1 dose PPSV23 at least 8 weeks later, then another dose PPSV23 at least 5 years after previous PPSV23; at age 65 years or older, administer 1 dose PPSV23 at least 5 years after most recent PPSV23 (note: only 1 dose PPSV23 recommended at age 65 years or older)
- **Age 19 years or older with cerebrospinal fluid leak or cochlear implant:** 1 dose PCV13 followed by 1 dose PPSV23 at least 8 weeks later; at age 65 years or older, administer another dose PPSV23 at least 5 years after PPSV23 (note: only 1 dose PPSV23 recommended at age 65 years or older)

Tetanus, diphtheria, and pertussis vaccination

Routine vaccination

- **Previously did not receive Tdap at or after age 11 years:** 1 dose Tdap, then Td or Tdap every 10 years

Special situations

- **Previously did not receive primary vaccination series for tetanus, diphtheria, or pertussis:** At least 1 dose Tdap followed by 1 dose Td or Tdap at least 4 weeks after Tdap and another dose Td or Tdap 6–12 months after last Td or Tdap (Tdap can be substituted for any Td dose, but preferred as first dose); Td or Tdap every 10 years thereafter
- **Pregnancy:** 1 dose Tdap during each pregnancy, preferably in early part of gestational weeks 27–36
- For information on use of Td or Tdap as tetanus prophylaxis in wound management, see www.cdc.gov/mmwr/volumes/67/rr/rr6702a1.htm

Varicella vaccination

Routine vaccination

- **No evidence of immunity to varicella:** 2-dose series 4–8 weeks apart if previously did not receive varicella-containing vaccine (VAR or MMRV [measles-mumps-rubella-varicella vaccine] for children); if previously received 1 dose varicella-containing vaccine, 1 dose at least 4 weeks after first dose
  - Evidence of immunity: U.S.-born before 1980 (except for pregnant women and health care personnel [see below]), documentation of 2 doses 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 situations

- **Pregnancy with no evidence of immunity to varicella:** VAR contraindicated during pregnancy; after pregnancy (before discharge from health care facility) 1 dose if previously received 1 dose varicella-containing vaccine or dose 1 of 2-dose series (dose 2: 4–8 weeks later) if previously did not receive any varicella-containing vaccine, regardless of whether U.S.-born before 1980
- **Health care personnel with no evidence of immunity to varicella:** 1 dose if previously received 1 dose varicella-containing vaccine; 2-dose series 4–8 weeks apart if previously did not receive any varicella-containing vaccine, regardless of whether U.S.-born before 1980
- **HIV infection with CD4 count ≥200 cells/μL with no evidence of immunity:** Vaccination may be considered (2 doses, administered 3 months apart); VAR contraindicated in HIV infection with CD4 count <200 cells/μL
- **Severe immunocompromising conditions:** VAR contraindicated

Zoster vaccination

Routine vaccination

- **Age 50 years or older:** 2-dose series RZV (Shingrix) 2–6 months apart (minimum interval: 4 weeks; repeat dose if administered too soon), regardless of previous herpes zoster or history of ZVL (Zostavax) vaccination (administer RZV at least 2 months after ZVL)
- **Age 60 years or older:** 2-dose series RZV 2–6 months apart (minimum interval: 4 weeks; repeat if administered too soon) or 1 dose ZVL if not previously vaccinated. RZV preferred over ZVL (if previously received ZVL, administer RZV at least 2 months after ZVL)

Special situations

- **Pregnancy:** ZVL contraindicated; consider delaying RZV until after pregnancy if RZV is otherwise indicated
- **Severe immunocompromising conditions (including HIV infection with CD4 count <200 cells/μL):** ZVL contraindicated; recommended use of RZV under review

Hepatitis B vaccination (7). The list of populations at risk for hepatitis B infection or severe hepatitis B disease has not changed and includes persons with hepatitis C, 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, persons with HIV infection, sexual exposure risk (e.g., sex partners of hepatitis B surface antigen [HBsAg]–positive persons, sexually active persons not in mutually monogamous relationships, persons seeking evaluation or treatment of a sexually transmitted infection, men who have sex with men), current or recent injection drug use, percutaneous or mucosal risk for exposure to blood (e.g., household contacts of HBsAg-positive persons, residents and staff of facilities for developmentally disabled persons, health care and public safety personnel with reasonably anticipated risk for exposure to blood or blood-contaminated body fluids, hemodialysis, peritoneal dialysis, home dialysis, and predialysis patients, persons with diabetes mellitus younger than 60 years of age and, at the discretion of the treating clinician, those age 60 years or older), incarcerated persons, and persons traveling in countries with high or intermediate endemic hepatitis B. Pregnancy, if at risk for infection or severe outcome from infection during pregnancy, has been added as a population at risk. In addition, HepB-Cpg (Heplisav-B) administration is not recommended during pregnancy due to a lack of safety data.

Human papillomavirus (HPV) vaccination (8). In June 2019, ACIP recommended catch-up HPV vaccination for all adults through age 26 years who are not adequately vaccinated. Previously, catch-up vaccination was recommended through age 26 years for females and 21 years for males; the updated recommendation is harmonized across genders. In addition, ACIP recommended shared clinical decision-making regarding HPV vaccination for adults aged 27 through 45 years who are not adequately vaccinated. Public health benefit of HPV vaccinations for adults in this age range is minimal, yet some persons who are not adequately vaccinated might benefit. HPV vaccination does not need to be discussed with most adults older than 26 years of age, but clinicians can consider discussing HPV vaccination with persons who are most likely to benefit. HPV vaccines are not licensed for use in adults older than age 45 years.

Measles, mumps, and rubella (MMR) vaccination (9). Language has been added in the notes section to clarify indications for MMR vaccine in health care workers. For health care personnel born in 1957 or later without evidence of immunity to measles, mumps, or rubella, a 2-dose series at least 4 weeks apart should be administered for measles or mumps immunity and at least 1 dose of MMR should be administered for rubella immunity. For health care personnel born before 1957 without evidence of immunity to measles, mumps, or rubella, consider a 2-dose series at least 4 weeks apart for measles or mumps immunity and at least 1 dose MMR for rubella immunity.

Meningococcal B vaccination. In June 2019, ACIP recommended persons age 10 years or older with complement deficiency, complement inhibitor use, or asplenia or who are microbiologists should receive a MenB booster dose 1 year following completion of a MenB primary series, followed by MenB booster doses every 2–3 years thereafter, for as long as the increased risk remains. For persons age 10 years or older determined by public health officials to be at increased risk during an outbreak, ACIP recommends a one-time booster dose if it has been 1 year or more since completion of a MenB primary series. In addition, a booster dose interval of 6 months or more may be considered by public health officials depending on the specific outbreak, vaccination strategy, and projected duration of elevated risk.

Pneumococcal vaccination (10). In June 2019, ACIP recommended PCV13 (pneumococcal 13-valent conjugate vaccine) based on shared clinical decision-making for adults 65 years or older who do not have an immunocompromising condition, cerebrospinal fluid leak, or cochlear implant and who have not previously received PCV13. All adults 65 years or older should receive a dose of PPSV23 (pneumococcal 23-valent polysaccharide vaccine).

Tetanus, diphtheria, and pertussis vaccination (11). In October 2019, ACIP recommended either Td or Tdap vaccine be used in situations where only Td vaccine is currently recommended for the decennial booster, tetanus prophylaxis in wound management, and in the catch-up immunization schedule, including in pregnant women.

Varicella vaccination (12). Vaccination may be considered for persons with HIV without evidence of varicella immunity who have CD4 counts ≥200 cells/μL.

REVISED CONTENT, FORMAT, AND GRAPHICS

The cover page of the 2020 schedule provides basic instructions on how to use the schedule to systematically identify vaccination needs of adults and lists routinely recommended vaccines and their standardized abbreviations and trade names. Web links are provided, where providers can download the CDC Vaccine Schedules app and access reference materials for the surveillance of vaccine-preventable diseases, including case identification and disease outbreak response. Instructions on reporting suspected cases of reportable vaccine-preventable diseases to local or state health departments and significant postvaccination adverse events to the Vaccine Adverse Event Reporting System are listed. Information on the Vaccine Injury Compensation Program is provided, as well as links to other resources, such as vaccine information statements and recommended vaccines for travelers.

Table 1. Recommended Adult Immunization Schedule by Age Group. Table 1 describes routine and catch-up vaccination recommendations for adults by age. For 2020, the columns for ages 19–21 and 22–26 years have been combined into a single column for 19–26 years and there is a single row for HPV vaccine (previously there were separate rows for females and

males). In addition, a new color (blue) has been added to indicate shared clinical decision-making for HPV vaccination in persons 27–45 years of age, for meningococcal B vaccination for adolescents and young adults age 16 through 23 years (age 16 through 18 years preferred) not at increased risk for meningococcal disease, and for pneumococcal conjugate (PCV13) vaccination in immunocompetent persons 65 years of age and older.

Table 2. Recommended Adult Immunization Schedule by Medical Condition and Other Indications. Table 2 describes the recommended adult immunization schedule by medical condition and other indications. For 2020, the HPV row has been combined into a single row for all genders, including females and males. In the hepatitis A row, the box for all persons living with HIV, regardless of CD4 count, has been changed to yellow. Lastly, the red color now indicates the vaccine is not recommended/contraindicated.

Notes. Recommended Adult Immunization Schedule. Each recommended vaccine for adults in Tables 1 and 2 is accompanied by a note (previously known as a footnote), which is designed to provide additional information on routine vaccination and recommendations in special situations. Each section contains concise information on vaccine indications, dosing frequencies and intervals, and other published ACIP recommendations. New or revised recommendations for influenza, hepatitis A, HPV, pneumococcal, and meningococcal B vaccines have been added to their respective sections in the notes. All vaccines identified in Tables 1 and 2 (except zoster vaccines) also appear in the Recommended Child and Adolescent Immunization Schedule for Ages 18 Years or Younger, United States, 2020 (https://www.cdc.gov/vaccines/schedules/hcp/imz/child-adolescent.html). The notes for vaccines that appear in both the adult immunization schedule and the child and adolescent immunization schedule have been harmonized to the extent possible.

HPV Vaccination

HPV is a preventable, potentially cancer-causing infection commonly acquired soon after first sexual activity (13). Most HPV infections are transient and asymptomatic and do not progress to cancer. However, persistent infections with high-risk (oncogenic) HPV types can lead to development of cervical, anal, penile, vaginal, vulvar, and oropharyngeal cancers, usually after several decades (13). Most new HPV infections occur in adolescents and young adults. Although most sexually active adults have been exposed to HPV (14), new infections can occur with a new sex partner at any age (15).

In October 2018, the U.S. Food and Drug Administration expanded the approved age range for 9vHPV use from 9 through 26 years to 9 through 45 years in women and men (www.fda.gov/media/90064/download). After reviewing evidence related to HPV vaccination of adults, in June 2019, ACIP updated recommendations for catch-up vaccination and for vaccination of adults older than the recommended catch-up age.

ACIP does not recommend catch-up HPV vaccination for all adults older than age 26 years. Instead, shared clinical decision-making regarding HPV vaccination is recommended for some adults age 27 through 45 years who are not adequately vaccinated. For these adults, clinicians can consider discussing HPV vaccination with persons who are most likely to benefit, using the following considerations (8):

- HPV is a very common sexually transmitted infection. Most HPV infections are transient and asymptomatic and cause no clinical problems.
- Although new HPV infections are most commonly acquired in adolescence and young adulthood, some adults are at risk for new HPV infections. At any age, having a new sex partner is a risk factor for acquiring a new HPV infection.
- Persons who are in a long-term, mutually monogamous sexual partnership are not likely to acquire a new HPV infection.
- Most sexually active adults have been exposed to some HPV types, although not necessarily all of the HPV types targeted by vaccination.
- No clinical antibody test can determine whether a person is already immune or still susceptible to any given HPV type.
- HPV vaccine efficacy is high among persons who have not been exposed to vaccine-type HPV before vaccination.
- Vaccine effectiveness might be low among persons with risk factors for HPV infection or disease (e.g., adults with multiple lifetime sex partners and likely previous infection with vaccine-type HPV), as well as among persons with certain immunocompromising conditions.
- HPV vaccines are prophylactic (i.e., they prevent new HPV infections). They do not prevent progression of HPV infection to disease, decrease time to clearance of HPV infection, or treat HPV-related disease.

Pneumococcal Conjugate Vaccination

Streptococcus pneumoniae (pneumococcus) has the potential to cause serious illness, including sepsis, meningitis, and pneumonia, both with bacteremia (invasive) or without bacteremia (noninvasive). Herd immunity due to routine vaccination of children with pneumococcal conjugate vaccine (PCV) protects adults from pneumococcal disease. There have been sharp declines in pneumococcal disease in unvaccinated children and adults due to the widespread use of PCV7 and PCV13 in children. This has resulted in the prevention of carriage and, thereby, transmission, of vaccine-type strains. In 2014, ACIP recognized that, while in the short term, routine PCV13 use among adults age 65 years and older was warranted, in the long term, continued indirect effects from PCV13 use in children might limit the utility of this recommendation. In addition, an economic model estimated that vaccinating adults would have limited public health benefits in the long term, given the relatively low remaining PCV13-

type disease burden (16). Therefore, in 2014, ACIP recommended that routine PCV13 use among adults age 65 years and older be reevaluated in or after 2018 (10).

Indirect effects of the pediatric use of PCV13 has reduced the incidence of PCV13-type disease to historically low levels among adults age 65 years and older. Implementation of a PCV13 recommendation for all adults age 65 years and older in 2014 has had minimal impact on PCV13-type disease at the population level in this age group. However, PCV13 has been shown to be a safe and effective vaccine that can reduce the risk for PCV13-type invasive pneumococcal disease and noninvasive pneumonia among persons age 65 years and older. Balancing this evidence and considering acceptability and feasibility concerns, in June 2019, ACIP voted to no longer routinely recommend PCV13 for all adults age 65 years and older and, instead, to recommend PCV13 based on shared clinical decision-making for adults age 65 years and older who do not have an immunocompromising condition, cerebrospinal fluid leak, or cochlear implant (10).

When patients and vaccine providers engage in a discussion to determine whether PCV13 is right for an immunocompetent individual age 65 years or older, the following considerations may be used (10):

- PCV13 is a safe and effective vaccine for older adults.
- The following adults age 65 years and older are potentially at increased risk for exposure to PCV13 serotypes and might attain higher than average benefit from PCV13 vaccination. Clinicians and practices caring for many patients in these groups may consider *regularly* offering PCV13 to their patients age 65 years and older who have not previously received PCV13:
  - Persons residing in nursing homes or other long-term care facilities.
  - Persons residing in settings with low pediatric PCV13 uptake.
  - Persons traveling to settings with no pediatric PCV13 program.
- Incidence of PCV13-type invasive pneumococcal disease and pneumonia increases with increasing age and is higher among persons with chronic heart, lung, or liver disease, diabetes, or alcoholism, and those who smoke cigarettes or who have more than one chronic medical condition. Although indirect effects from pediatric PCV13 use were documented for these groups of adults and were comparable to those observed among healthy adults, the residual PCV13-type disease burden remains higher in these groups. Clinicians and practices caring for patients with these medical conditions may consider offering PCV13 to such patients who are age 65 years and older and who have not previously received PCV13.

ACIP continues to recommend that all adults age 65 years and older receive 1 dose of PPSV23. A single dose of PPSV23 is recommended for routine use among all adults age 65 years and older (16).

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Disclosures: To ensure the integrity of the ACIP, the U.S. Department of Health and Human Services has taken steps to ensure there is technical adherence to ethics statutes and regulations regarding financial conflicts of interest. Concerns regarding the potential for the appearance of a conflict are addressed or avoided altogether through preappointment and postappointment considerations. Individuals with particular vaccine-related interests will not be considered for appointment to the committee. Potential nominees are screened for conflicts of interest and, if any are found, are asked to 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. Dr. Freedman and Dr. Kroger have nothing to disclose. Dr. Hunter reports travel expenses to ACIP meetings paid by the Centers for Disease Control and Prevention; grants from the Wisconsin Department of Health Services for speaking to clinicians in Milwaukee about adult vaccinations; and board membership in Immunize Milwaukee! (www.immunizationcoalitions.org/network-members/?coal=immunize-milwaukee_oid457), an ad hoc, nonincorporated, unfunded community coalition seeking to increase vaccination rates in metro Milwaukee. Dr. Ault reports travel expenses to the ACIP meetings paid by the Centers for Disease Control and Prevention and the American College of Obstetricians and Gynecologists (ACOG). Dr. Ault is also on committees for ACOG and the National Cancer Institute and has travel expenses paid by those organizations. Dr. Ault was a member of a data safety and monitoring committee for an immunization trial and received consultant fees and travel expenses from ACI Clinical for this activity. Dr. Ault is also a volunteer medical advisor for "Families Fighting Flu" (www.familiesfightingflu.org) and receives no compensation from that nonprofit organization. Disclosures can also be viewed at www.acponline.org/authors/icmje/ConflictOfInterestForms.do?msNum=M20-0046.

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Appendix

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 the use of vaccines and related agents to control 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 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, the American College of Physicians (ACP), and the American College of Nurse-Midwives (ACNM). ACIP recommendations adopted by the CDC Director become agency guidelines on the date they are published in the *Morbidity and Mortality Weekly Report* (MMWR). Additional information on ACIP is available at www.cdc.gov/vaccines/acip.

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Correction: Recommended Adult Immunization Schedule, United States, 2020

The 2020 adult immunization schedule from the Advisory Committee on Immunization Practices (1) contained an inaccuracy regarding the efficacy of PCV13. The Revised Content and Graphics section states that "PCV13 is a safe and potentially effective vaccine for older adults." The word "potentially" is inaccurate. The sentence should state: "PCV13 is a safe and effective vaccine for older adults."

Reference

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