

2022 Update on Immunization Recommendations **for Individuals With and At-risk for HIV Disease**

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Queens, NY



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interest

Learning Objectives

1. Describe the epidemiology of vaccine-preventable infections and the role that immunizations play in reducing their impact.
2. Know the current recommendations for vaccines in at-risk adolescent and adult HIV-positive patients and PrEP candidates, including recent updates to influenza, hepatitis, shingles, pneumococcal vaccine and COVID-19 vaccine recommendations.
3. Identify evidence-based strategies for increasing practice-level vaccination coverage rates.

Ten Great Public Health Achievements United States, 1900-1999

- **Vaccination**
- Motor-vehicle safety
- Safer workplaces
- Control of infectious diseases
- Decline in deaths from coronary heart disease and stroke
- Safer and healthier foods
- Healthier mothers and babies
- Family planning
- Fluoridation of drinking water
- Recognition of tobacco use as health hazard

Comparison of 20th Century Annual Morbidity and Current Morbidity: Vaccine-Preventable Diseases

Disease	20th Century Annual Morbidity [†]	2019 Reported Cases ^{††}	Percent Decrease
Smallpox	29,005	0	100%
Diphtheria	21,053	2	>99.9%
Measles	530,217	1,275	>99.8%
Mumps	162,344	3,780	98%
Pertussis	200,752	18,617	91%
Polio (paralytic)	16,316	0	100%
Rubella	47,745	6	>99.9%
Congenital Rubella Syndrome	152	1	99%
Tetanus	580	26	96%

[†]Source: JAMA. 2007;298(18):2155-2163

^{††} Source: CDC. <https://wonder.cdc.gov/nndss/static/2019/annual/2019-table1.html>, accessed 9/13/2022

Comparison of 20th Century Annual Morbidity and Current Morbidity, Vaccine-Preventable Diseases

	Pre-vaccine Era Annual Morbidity	2019 Cases*	% reduction
Hepatitis A	117,333	18,846	84%
Hepatitis B (acute)	66,232	3,544	95%
<i>H. influenzae b</i> (invasive)**	20,000	18	99.9%
Pneumococcus (invasive)**	63,067	1,115	98%
Varicella (6 deaths)	4,085,120	8,297	99.8%
Influenza***	N/A	160	---
Meningococcus (invasive)	2,183	371	83%

* Source: CDC. <https://wonder.cdc.gov/nndss/static/2019/annual/2019-table1.html>, accessed 9/13/2022

** Among children < 5 years of age

*** Pediatric deaths among children <18 years of age

2021 Case Counts, NYC

Disease	Case Count* (Confirmed/Probable)	Suspects Reported/Investigated
Hep B in Pregnancy	811	---
Pertussis	73	344
Varicella	36	40
Mumps	10	130
S. Pneumoniae (<5 years)	19	22
Measles	0	122
Tetanus	0	5
Rubella**	0	66
Diphtheria	0	10
Polio	0	0

* Data as of 9/2/2019; Based on report date for hepatitis B and onset date for all others

** Includes congenital rubella

Recommended Adult Immunization Schedule for ages 19 years or older

UNITED STATES
2022

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 or other indication (**Table 2**)
- 3** Review vaccine types, frequencies, intervals, and considerations for special situations (**Notes**)
- 4** Review contraindications and precautions for vaccine types (**Appendix**)

Vaccines in the Adult Immunization Schedule*

Vaccine	Abbreviation(s)	Trade name(s)
<i>Haemophilus influenzae</i> type b vaccine	Hib	ActHIB® Hiberix® PedvaxHIB®
Hepatitis A vaccine	HepA	Havrix® Vaqta®
Hepatitis A and hepatitis B vaccine	HepA-HepB	Twintrix®
Hepatitis B vaccine	HepB	Engerix-B® Recombivax HB® Heplisav-B®
Human papillomavirus vaccine	HPV	Gardasil 9®
Influenza vaccine (inactivated)	IIV4	Many brands
Influenza vaccine (live, attenuated)	LAIV4	FluMist® Quadrivalent
Influenza vaccine (recombinant)	RIV4	Flublok® Quadrivalent
Measles, mumps, and rubella vaccine	MMR	M-M-RII®
Meningococcal serogroups A, C, W, Y vaccine	MenACWY-D MenACWY-CRM MenACWY-TT	Menactra® Menveo® MenQuadfi®
Meningococcal serogroup B vaccine	MenB-4C MenB-FHbp	Bexsero® Trumenba®
Pneumococcal 15-valent conjugate vaccine	PCV15	Vaxneuvance™
Pneumococcal 20-valent conjugate vaccine	PCV20	Prennar 20™
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

*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.

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), American College of Nurse-Midwives (www.midwife.org), and American Academy of Physician Associates (www.aapa.org), and Society for Healthcare Epidemiology of America (www.shea-online.org).

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) 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 Advisory Committee on Immunization Practices (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, 2022: www.cdc.gov/vaccines/schedules/hcp/child-adolescent.html
- ACIP Shared Clinical Decision-Making Recommendations: www.cdc.gov/vaccines/acip/acip-scdm-faqs.html



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Hepatitis A and hepatitis B vaccine	HepA-HepB	Twintrix*
Hepatitis B vaccine	HepB	Engertx-B* Recombvax HB* Heplisav-B*
Human papillomavirus vaccine	HPV	Gardasil 9*
Influenza vaccine (Inactivated)	IIV4	Many brands
Influenza vaccine (live, attenuated)	LAIV4	FluMist* Quadrivalent
Influenza vaccine (recombinant)	RIV4	Flublok* Quadrivalent
Measles, mumps, and rubella vaccine	MMR	M-M-R II*
Meningococcal serogroups A, C, W, Y vaccine	MenACWY-D MenACWY-CRM MenACWY-TT	Menactra* Menveo* MenQuadfi*
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- 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
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Table 1 Recommended Adult Immunization Schedule by Age Group, United States, 2022

Vaccine	19–26 years	27–49 years	50–64 years	≥65 years
Influenza inactivated (IIV4) or Influenza recombinant (RIV4) or Influenza live, attenuated (LAIV4)	1 dose annually			
Tetanus, diphtheria, pertussis (Tdap or Td)	1 dose Tdap each pregnancy; 1 dose Td/Tdap for wound management (see notes)			
	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)	2 doses for immunocompromising conditions (see notes)		2 doses	
Human papillomavirus (HPV)	2 or 3 doses depending on age at initial vaccination or condition	27 through 45 years		
Pneumococcal (PCV15, PCV20, PPSV23)	1 dose PCV15 followed by PPSV23 OR 1 dose PCV20 (see notes)			1 dose PCV15 followed by PPSV23 OR 1 dose PCV20
Hepatitis A (HepA)	2 or 3 doses depending on vaccine			
Hepatitis B (HepB)	2, 3, or 4 doses depending on vaccine or condition			
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 1 Recommended Adult Immunization Schedule by Age Group, United States, 2022

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Pneumococcal (PCV15, PCV20, PPSV23)	2 or 3 doses depending on age at initial vaccination or condition	27 through 45 years		
Hepatitis A (HepA)	1 dose PCV15 followed by PPSV23 OR 1 dose PCV20 (see notes)			
Hepatitis B (HepB)	1 dose PCV15 followed by PPSV23 OR 1 dose PCV20			
Meningococcal A, C, W, Y (MenACWY)	2 or 3 doses depending on vaccine			
Meningococcal B (MenB)	2, 3, or 4 doses depending on vaccine or condition			
Haemophilus influenzae type b (Hib)	1 or 2 doses depending on indication, see notes for booster recommendations			
	2 or 3 doses depending on vaccine and indication, see notes for booster recommendations			
	19 through 23 years			
	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

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Table 1 Recommended Adult Immunization Schedule by Age Group, United States, 2022

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Measles, mumps, rubella (MMR)	1 dose Tdap, then Td or Tdap booster every 10 years			
Varicella (VAR)	1 or 2 doses depending on indication (if born in 1957 or later)			
Zoster recombinant (RZV)	2 doses (if born in 1980 or later)		2 doses	
Human papillomavirus (HPV)	2 doses for immunocompromising conditions (see notes)		2 doses	
Pneumococcal (PCV15, PCV20, PPSV23)	2 or 3 doses depending on age at initial vaccination or condition	27 through 45 years		
Hepatitis A (HepA)	1 dose PCV15 followed by PPSV23 OR 1 dose PCV20 (see notes)			
Hepatitis B (HepB)	1 dose PCV15 followed by PPSV23 OR 1 dose PCV20			
Meningococcal A, C, W, Y (MenACWY)	2 or 3 doses depending on vaccine			
Meningococcal B (MenB)	2, 3, or 4 doses depending on vaccine or condition			
Haemophilus influenzae type b (Hib)	1 or 2 doses depending on indication, see notes for booster recommendations			
	2 or 3 doses depending on vaccine and indication, see notes for booster recommendations			
	19 through 23 years			
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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 or Other Indication, United States, 2022

Vaccine	Pregnancy	Immuno-compromised (excluding HIV infection)	HIV infection CD4 percentage and 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
			<15% or <200 mm ³	≥15% and ≥200 mm ³							
IIV4 or RIV4 or LAIV4					1 dose annually						
Tdap or Td	1 dose Tdap each pregnancy				1 dose Tdap, then Td or Tdap booster every 10 years						
MMR	Contraindicated*	Contraindicated			1 or 2 doses depending on indication						
VAR	Contraindicated*	Contraindicated			2 doses						
RZV		2 doses at age ≥19 years			2 doses at age ≥50 years						
HPV	Not Recommended*	3 doses through age 26 years			2 or 3 doses through age 26 years depending on age at initial vaccination or condition						
Pneumococcal (PCV15, PCV20, PPSV23)					1 dose PCV15 followed by PPSV23 OR 1 dose PCV20 (see notes)						
HepA					2 or 3 doses depending on vaccine						
HepB	3 doses (see notes)				2, 3, or 4 doses depending on vaccine or condition						
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

 Recommended vaccination based on shared clinical decision-making

 Precaution—vaccination might be indicated if benefit of protection outweighs risk of adverse reaction

 Contraindicated or not recommended—vaccine should not be administered.

 No recommendation/Not applicable

*Vaccinate after pregnancy.

1. Precaution for LAIV4 does not apply to alcoholism. 2. See notes for influenza; hepatitis B; measles, mumps, and rubella; and varicella vaccinations. 3. Hematopoietic stem cell transplant.



Table 2 Recommended Adult Immunization Schedule by Medical Condition or Other Indication, United States, 2022

Vaccine	Pregnancy	Immuno-compromised (excluding HIV infection)	HIV infection CD4 percentage and 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
			<15% or <200 mm ³	≥15% and ≥200 mm ³							
IIV4 or RIV4 or LAIV4	1 dose annually										
	Contraindicated					Precaution			1 dose annually		
Tdap or Td	1 dose Tdap each pregnancy	1 dose Tdap, then Td or Tdap booster every 10 years									
MMR	Contraindicated*	Contraindicated	1 or 2 doses depending on indication								
VAR	Contraindicated*	Contraindicated		2 doses							
RZV		2 doses at age ≥19 years			2 doses at age ≥50 years						
HPV	Not Recommended*	3 doses through age 26 years			2 or 3 doses through age 26 years depending on age at initial vaccination or condition						
Pneumococcal (PCV15, PCV20, PPSV23)		1 dose PCV15 followed by PPSV23 OR 1 dose PCV20 (see notes)									
HepA				2 or 3 doses depending on vaccine							
HepB	3 doses (see notes)	2, 3, or 4 doses depending on vaccine or condition									
MenACWY		1 or 2 doses depending on indication, see notes for booster recommendations									
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Recommended vaccination for adults who meet age requirement, lack documentation of vaccination, or lack evidence of past infection

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1. Precaution for LAIV4 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 for ages 19 years or older, United States, 2022

For vaccine recommendations for persons 18 years of age or younger, see the Recommended Child and Adolescent Immunization Schedule.

COVID-19 Vaccination

COVID-19 vaccines are recommended within the scope of the Emergency Use Authorization or Biologics License Application for the particular vaccine. ACIP recommendations for the use of COVID-19 vaccines can be found at www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/covid-19.html.

CDC's interim clinical considerations for use of COVID-19 vaccines can be found at www.cdc.gov/vaccines/covid-19/clinical-considerations/covid-19-vaccines-us.html.

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: dose 1 to dose 2: 4 weeks / dose 2 to dose 3: 5 months])

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** (HepA-HepB [Twinrix] may be administered on an accelerated schedule of 3 doses at 0, 7, and 21–30 days, followed by a booster dose at 12 months)
- **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

- **Age 19 through 59 years:** complete a 2- or 3-, or 4-dose series
- 2-dose series only applies when 2 doses of Heplisav-B* are used at least 4 weeks apart
- 3-dose series Engerix-B or Recombivax HB at 0, 1, 6 months [minimum intervals: dose 1 to dose 2: 4 weeks / dose 2 to dose 3: 8 weeks / dose 1 to dose 3: 16 weeks]
- 3-dose series HepA-HepB (Twinrix at 0, 1, 6 months [minimum intervals: dose 1 to dose 2: 4 weeks / dose 2 to dose 3: 5 months])
- 4-dose series HepA-HepB (Twinrix) accelerated schedule of 3 doses at 0, 7, and 21–30 days, followed by a booster dose at 12 months
- 4-dose series Engerix-B at 0, 1, 2, and 6 months for persons on adult hemodialysis (note: each dosage is double that of normal adult dose, i.e., 2 mL instead of 1 mL)

*Note: Heplisav-B not recommended in pregnancy due to lack of safety data in pregnant women

Special situations

- **Age 60 years or older* and 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 for 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; patients with diabetes)
- **Incarcerated persons**
- **Travel in countries with high or intermediate endemic hepatitis B**

*Note: Anyone age 60 years or older who does not meet risk-based recommendations may still receive Hepatitis B vaccination.

Human papillomavirus vaccination

Routine vaccination

- **HPV vaccination recommended for all persons 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 months, 6 months (minimum intervals: dose 1 to dose 2: 4 weeks / dose 2 to dose 3: 12 weeks / dose 1 to dose 3: 5 months; repeat dose if administered too soon)
- **Age 9–14 years at initial vaccination and received 1 dose or 2 doses less than 5 months apart:** 1 additional dose
- **Age 9–14 years at initial vaccination and received 2 doses at least 5 months apart:** HPV vaccination series complete, no additional dose needed

Notes

Recommended Adult Immunization Schedule, United States, 2022

- **Interrupted schedules:** If vaccination schedule is interrupted, the series does not need to be restarted
- **No additional dose recommended when any HPV vaccine series has been completed using the recommended dosing intervals**

Shared clinical decision-making

- **Some adults age 27–45 years:** Based on shared clinical decision-making, 2- or 3-dose series as above

Special situations

- **Age ranges recommended above for routine and catch-up vaccination or shared clinical decision-making also apply in special situations**
 - **Immunocompromising conditions, including HIV infection:** 3-dose series, even for those who initiate vaccination at age 9 through 14 years.
 - **Pregnancy:** Pregnancy testing is not needed before vaccination; HPV vaccination is not recommended until after pregnancy; no intervention needed if inadvertently vaccinated while pregnant

Influenza vaccination

Routine vaccination

- **Age 19 years or older:** 1 dose any influenza vaccine appropriate for age and health status annually
- For the 2021–2022 season, see www.cdc.gov/mmwr/volumes/70/rr/rr7005a1.htm
- For the 2022–23 season, see the 2022–23 ACIP influenza vaccine recommendations.

Special situations

- **Egg allergy, hives only:** any influenza vaccine appropriate for age and health status annually
- **Egg allergy—any symptom other than hives** (e.g., angioedema, respiratory distress) or required epinephrine or another emergency medical intervention: see Appendix listing contraindications and precautions
- **Severe allergic reaction (e.g., anaphylaxis) to a vaccine component or a previous dose of any influenza vaccine:** see Appendix listing contraindications and precautions
- **History of Guillain-Barré syndrome within 6 weeks after 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 percentages $\geq 15\%$ and CD4 count ≥ 200 cells/mm³ 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 for HIV infection with CD4 percentage $< 15\%$ or CD4 count < 200 cells/mm³
- **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 doses of MMR or 1 dose if previously received 1 dose MMR
- **Health care personnel:**
 - **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
 - **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

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-D (Menactra, Menveo, or MenQuadfi) at least 8 weeks apart and revaccinate every 5 years if risk remains
- **Travel in countries with hyperendemic or epidemic meningococcal disease, or microbiologists routinely exposed to *Neisseria meningitidis*:** 1 dose MenACWY (Menactra, Menveo, or MenQuadfi) 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) or military recruits:** 1 dose MenACWY (Menactra, Menveo, or MenQuadfi)
- For MenACWY booster dose recommendations for groups listed under "Special situations" and in an outbreak setting (e.g., in community or organizational settings and among men who have sex with men) and additional meningococcal vaccination information, see www.cdc.gov/mmwr/volumes/69/rr/rr6909a1.htm

Shared clinical decision-making for MenB

- **Adolescents and young adults age 16–23 years (age 16–18 years preferred) not at increased risk for meningococcal disease:** Based on shared clinical decision-making, 2-dose series MenB-4C (Bexsero) at least 1 month apart or 2-dose series MenB-FHbp (Trumenba) 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, or 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

Notes

Recommended Adult Immunization Schedule, United States, 2022

- **Pregnancy:** Delay MenB until after pregnancy unless at increased risk and vaccination benefits outweigh potential risks
- For MenB **booster dose recommendations** for groups listed under "Special situations" and in an outbreak setting (e.g., in community or organizational settings and among men who have sex with men) and additional meningococcal vaccination information, see www.cdc.gov/mmwr/volumes/69/rr/r6909a1.htm

Note: MenB vaccines may be administered simultaneously with MenACWY vaccines if indicated, but at a different anatomic site, if feasible.

Pneumococcal vaccination

Routine vaccination

- **Age 65 years or older** who have not previously received a pneumococcal conjugate vaccine or whose previous vaccination history is unknown: 1 dose PCV15 or 1 dose PCV20. If PCV15 is used, this should be followed by a dose of PPSV23 given at least 1 year after the PCV15 dose. A minimum interval of 8 weeks between PCV15 and PPSV23 can be considered for adults with an immunocompromising condition,* cochlear implant, or cerebrospinal fluid leak to minimize the risk of invasive pneumococcal disease caused by serotypes unique to PPSV23 in these vulnerable groups.
- For guidance for patients who have already received a previous dose of PCV13 and/or PPSV23, see www.cdc.gov/mmwr/volumes/71/wr/mm7104a1.htm.

Special situations

- **Age 19–64 years** with certain underlying medical conditions or other risk factors** who have not previously received a pneumococcal conjugate vaccine or whose previous vaccination history is unknown: 1 dose PCV15 or 1 dose PCV20. If PCV15 is used, this should be followed by a dose of PPSV23 given at least 1 year after the PCV15 dose. A minimum interval of 8 weeks between PCV15 and PPSV23 can be considered for adults with an immunocompromising condition,* cochlear implant, or cerebrospinal fluid leak to minimize the risk of invasive pneumococcal disease caused by serotypes unique to PPSV23 in these vulnerable groups.
- For guidance for patients who have already received a previous dose of PCV13 and/or PPSV23, see www.cdc.gov/mmwr/volumes/71/wr/mm7104a1.htm.

***Note:** Immunocompromising conditions include chronic renal failure, nephrotic syndrome, immunodeficiency, iatrogenic immunosuppression, generalized malignancy, human immunodeficiency virus, Hodgkin disease, leukemia, lymphoma, multiple myeloma, solid organ transplants, congenital or acquired asplenia, sickle cell disease, or other hemoglobinopathies.

****Note:** Underlying medical conditions or other risk factors include alcoholism, chronic heart/liver/lung disease, chronic renal failure, cigarette smoking, cochlear implant, congenital or acquired asplenia, CSF leak, diabetes mellitus, generalized malignancy, HIV, Hodgkin disease, immunodeficiency, iatrogenic immunosuppression, leukemia, lymphoma, multiple myeloma, nephrotic syndrome, solid organ transplants, or sickle cell disease or other hemoglobinopathies.

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:** 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
- **Wound management:** Persons with 3 or more doses of tetanus-toxoid-containing vaccine: For clean and minor wounds, administer Tdap or Td if more than 10 years since last dose of tetanus-toxoid-containing vaccine; for all other wounds, administer Tdap or Td if more than 5 years since last dose of tetanus-toxoid-containing vaccine. Tdap is preferred for persons who have not previously received Tdap or whose Tdap history is unknown. If a tetanus-toxoid-containing vaccine is indicated for a pregnant woman, use Tdap. For detailed information, see www.cdc.gov/mmwr/volumes/69/wr/mm6903a5.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 percentages $\geq 15\%$ and CD4 count ≥ 200 cells/mm³ with no evidence of immunity:** Vaccination may be considered (2 doses 3 months apart); VAR contraindicated for HIV infection with CD4 percentage $< 15\%$ or CD4 count < 200 cells/mm³
- **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 zoster vaccine live (ZVL, Zostavax) vaccination (administer RZV at least 2 months after ZVL)

Special situations

- **Pregnancy:** There is currently no ACIP recommendation for RZV use in pregnancy. Consider delaying RZV until after pregnancy.
- **Immunocompromising conditions (including HIV):** RZV recommended for use in persons age 19 years or older who are or will be immunodeficient or immunosuppressed because of disease or therapy. For detailed information, see www.cdc.gov/mmwr/volumes/71/wr/mm7103a2.htm.

Use of Vaccines in PLWA

- Immune response dependent on level of immunosuppression
 - ART >3 months
 - >200 CD4+ cells/mm³
- Inactivated vaccines are safe and immunogenic
- Live virus vaccines can be given depending on level of immunosuppression
- No unusual adverse events or HIV-related events identified
- Opportunity to vaccinate patients on PrEP

Key Changes to the 2022 Immunization Schedules

- Influenza for 65+
 - Preference for high-dose, adjuvanted or recombinant vaccine
- Hepatitis
 - Now recommended for everyone through age 59
- Shingrix
 - Immunocompromised 19+
- Pneumococcal conjugate vaccines
- COVID-19 bivalent boosters

Influenza Vaccine

Influenza Vaccine Recommendations

- An annual flu vaccine is recommended for all persons 6 months of age
 - Specific indication for persons living with HIV
 - Can use any age-appropriate inactivated vaccine product
 - Do not use LAIV
- Provides an annual opportunity to review a patient's immunization history and administer other indicated vaccines

Influenza Vaccine Products

- Inactivated influenza vaccine, quadrivalent (IIV4)
- Cell-culture IIV4 [4+]
- Recombinant IV (RIV4) [18+]
- Adjuvanted IIV3 [65+]
- High dose IIV3 [65+]
 - High dose IIV4 licensed this week!
- LAIV4 [2-49 years]

Influenza Burden of Disease

- In 2019, influenza and pneumonia together were the sixth leading cause of death in New York City
 - This is a change from 2018, when influenza and pneumonia were the third leading cause of death
 - There were 1624 deaths due to influenza and pneumonia in NYC during 2019*
- 2020-2021 influenza season was a mild season with low rates of influenza**
 - Vaccination in addition to precautions taken during the COVID-19 pandemic (e.g., physical distancing and wearing masks) likely contributed to low rates of influenza
- 2021-2022 influenza season was mild and occurred in 2 waves**
 - More cases and hospitalizations in the second wave than the first

*The City of New York. Summary of Vital Statistics 2019. Available at: <https://www1.nyc.gov/assets/doh/downloads/pdf/vs/2019sum.pdf>

**CDC. Weekly U.S. Influenza Surveillance Report. Available at: <https://www.cdc.gov/flu/weekly/index.htm>

Routine Flu Vaccination Recommendation

- Recommended for all people 6 months and older, especially those at increased risk for influenza complications:
 - Infants and young children
 - People who are pregnant
 - Adults 65 years of age and older
 - People with certain underlying medical conditions, such as:
 - Asthma and chronic lung disease
 - Heart disease
 - Renal, hepatic, neurologic, hematologic, or metabolic disorders, including diabetes
 - Weakened immune system
 - Obesity
- People who care for individuals at increased risk of complications

Key Updates: Adults 65+ Years

- Adults aged ≥ 65 years are recommended to preferentially receive any higher dose or adjuvanted influenza vaccines:
 - High-dose inactivated influenza vaccine (HD-IIV4)
 - Recombinant influenza vaccine (RIV4)
 - Adjuvanted inactivated influenza vaccine (aIIV4)
- If none of these three vaccines is available at an opportunity for vaccine administration, then any other age-appropriate influenza vaccine should be administered

Adults 65+ Years: Rationale

- Certain observational studies have reported relative benefit for HD-IIV, RIV, and aIIV in comparison with nonadjuvanted SD-IIVs, particularly in prevention of influenza-associated hospitalizations
- The size of the relative benefit has varied from season to season and is not seen in all studies in all seasons, making it difficult to generalize the findings to all or most seasons
- Studies directly comparing HD-IIV, RIV, and aIIV with one another are few and do not support a conclusion that any one of these vaccines is consistently superior to the others across seasons

Influenza Vaccine and Egg Allergy

- In 2016, ACIP removed egg allergy as a contraindication to flu vaccine
- Any brand and presentation of the injectable influenza vaccine may be administered
- Persons with a history of severe allergic reaction to egg (i.e., any symptom other than hives) should be vaccinated in medical setting under the supervision of a health care provider who is able to recognize and manage severe allergic conditions

Hepatitis B

Strategy to Eliminate Hepatitis B Virus (HBV) Transmission—United States*

- Part of a National Plan to reduce Hepatitis A, B and C
- Prevent new infections
 - Perinatal HBV transmission
 - Routine vaccination of all infants
 - Catch up vaccination of older children
 - **Routine vaccination of adults**
- Improve outcomes
- Reduce disparities and health inequities
- Address epidemics

* Viral Hepatitis National Strategic Plan Overview | HHS.gov

Adults at Risk for HBV Infection

- **HIV infection**
- **Sexual (heterosexual and MSM) exposure**
- Injection drug use
- Household contacts of HBsAg+ persons
- Developmentally disabled persons in LTCF
- Persons who are incarcerated
- Occupational risk
- Hemodialysis patients
- Chronic liver disease, HCV infection
- Persons with diabetes
- Travel

Hepatitis B Vaccine

- Hepatitis B vaccine now universally recommended for all adults aged 19-59 years
- Risk-based recommendations for adults ≥ 60 years
- Anyone ≥ 60 years who does not meet risk-based recommendations may still receive hepatitis B vaccine

Hepatitis B Vaccine Formulations

- Recombivax™ HB (Merck)
 - 5 mcg/0.5 ml (pediatric)
 - 10 mcg/1 ml (adult)
 - 40 mcg/1 ml (dialysis)
- Engerix-B™ (GSK)
 - 10 mcg/0.5 ml (pediatric)
 - 20 mcg/1 ml (adult)
- Twinrix™ (GSK), licensed for 18+
 - Pediatric dose HepA and 20 mcg HepB
- Heplisav-B™ (Dynavax) licensed for 18+

Herpes Zoster Vaccine

Herpes Zoster (HZ) Vaccines

- Shingrix®, GSK – recombinant, subunit vaccine (H_zsu)
 - Routine vaccination for 50+
 - Licensed October 23, 2017 for immunocompetent persons 50+
 - 2-dose series, 0.5mL IM, administered 2 months apart
- Zostavax™ (Merck) – live attenuated vaccine is no longer available
- Individuals who received Zostavax should be revaccinated with Shingrix

HZ/su and Persons Living with HIV

- Placebo controlled study, 3 doses (0,2,6)¹
- 3 cohorts stratified by CD4 count and ART
- Vaccine was highly immunogenic (>90%)
- Side effect profile consistent with previous reports

Recombinant Zoster Vaccine (RZV)

- Administer to individuals aged ≥ 19 years who are or will be immunodeficient or immunosuppressed due to disease or therapy, including
 - Hematopoietic stem cell transplant recipients
 - Patients with hematologic malignancies
 - Renal or other solid organ transplant recipients
 - Patients with solid tumor malignancies
 - People living with HIV
 - Patients with primary immunodeficiencies, autoimmune and inflammatory conditions, and taking immunosuppressive medications/therapies
- There is currently no CDC recommendation for RZV use in pregnancy
 - Consider delaying vaccination until after pregnancy

Pneumococcal Vaccine

New Pneumococcal Vaccines are Available

- Three recommended pneumococcal vaccines:
 - 15-valent pneumococcal conjugate vaccine (PCV15)
 - 20-valent pneumococcal conjugate vaccine (PCV20)
 - 23- valent pneumococcal polysaccharide vaccine (PPSV23)
- No longer recommended:
 - 13-valent pneumococcal conjugate vaccine (PCV13)

Pneumococcal Vaccines

- Aged ≥ 65 years who have not previously received a PCV or whose previous vaccination history is unknown, administer
 - PCV20 0.5 ml IM x 1 dose alone **OR**
 - PCV15 0.5 ml IM x 1 dose **followed by** PPSV23 0.5 ml IM x 1 dose
- Aged 19-64 years with certain underlying medical conditions or other risk factors who have not previously received a PCV or whose previous vaccination history is unknown should also receive either
 - PCV20 0.5 ml IM x 1 dose alone **OR**
 - PCV15 0.5 ml IM x 1 dose **followed by** PPSV23 0.5 ml IM x 1 dose

Medical conditions/risk factors for persons aged 19-64 years

- Alcoholism
- Cerebrospinal fluid leak
- Chronic heart/liver/lung disease
- Chronic renal failure
- Cigarette smoking
- Cochlear implant
- Congenital or acquired asplenia
- Congenital or acquired immunodeficiencies
- Diabetes mellitus
- Generalized malignancy
- HIV infection
- Hodgkin disease
- Iatrogenic immunosuppression
- Leukemia
- Lymphoma
- Multiple myeloma
- Nephrotic syndrome
- Sickle cell disease or other hemoglobinopathies
- Solid organ transplant

Pneumococcal Vaccines

CDC Pneumococcal Timing Tables

Pneumococcal Vaccine Timing for Adults

Make sure your patients are up to date with pneumococcal vaccination.

CDC recommends pneumococcal vaccination for

- Adults 65 years old and older
- Adults 19 through 64 years old with certain underlying medical conditions or other risk factors:
 - Alcoholism
 - Cerebrospinal fluid leak
 - Chronic heart/liver/lung disease
 - Chronic renal failure*
 - Cigarette smoking
 - Cochlear implant
 - Congenital or acquired asplenia*
 - Congenital or acquired immunodeficiencies*
 - Diabetes
 - Generalized malignancy*
 - HIV infection*
 - Hodgkin disease*
 - Iatrogenic immunosuppression*
 - Leukemia*
 - Lymphoma*
 - Multiple myeloma*
 - Nephrotic syndrome*
 - Sickle cell disease or other hemoglobinopathies*
 - Solid organ transplants*

* Considered an immunocompromising condition

For those who have never received a pneumococcal vaccine or those with unknown vaccination history

Administer one dose of PCV15 or PCV20.

If **PCV20** is used, their pneumococcal vaccinations are complete.

PCV20

If **PCV15** is used, follow with one dose of PPSV23.

- The recommended interval is at least 1 year.
- The minimum interval is 8 weeks and can be considered in adults with an immunocompromising condition*, cochlear implant, or cerebrospinal fluid leak.
- Their pneumococcal vaccinations are complete.

PCV15

At least 1 year apart
(8 weeks can be considered)

PPSV23

For those who previously received PPSV23 but who have not received any pneumococcal conjugate vaccine (e.g., PCV13, PCV15, PCV20)

You may administer one dose of PCV15 or PCV20.

Regardless of which vaccine is used (PCV15 or PCV20):

- The minimum interval is at least 1 year.
- Their pneumococcal vaccinations are complete.

PPSV23

At least 1 year apart

PCV15 or PCV20

Pneumococcal vaccines

PCV13: 13-valent pneumococcal conjugate vaccine (Prenar13®)

PCV15: 15-valent pneumococcal conjugate vaccine (Vaxneuvance®)

PCV20: 20-valent pneumococcal conjugate vaccine (Prenar20®)

PPSV23: 23-valent pneumococcal polysaccharide vaccine (Pneumovax®)

NCIRDq410 | 02/16/22
www.cdc.gov/pneumococcal/vaccination.html



Pneumococcal vaccine timing for adults who previously received PCV13 but who have not received all recommended doses of PPSV23

The previous pneumococcal recommendations remain in effect pending further evaluation. Use the following information for guidance on the number and interval between any remaining recommended doses of PPSV23.

Adults 65 years or older without an immunocompromising condition, cerebrospinal fluid leak, or cochlear implant

PCV13
(at any age)

At least 1 year apart

→

PPSV23
(at ≥ 65 years)

CDC recommends 1 dose of PPSV23 at age 65 years or older.**
 Administer a single dose of PPSV23 at least 1 year after PCV13 was received. Their pneumococcal vaccinations are complete.

Adults 19 years or older with a cerebrospinal fluid leak or cochlear implant

PCV13
(at any age)

At least 8 weeks apart

→

PPSV23
(at < 65 years)

At least 5 years apart

→

PPSV23
(at ≥ 65 years)

CDC recommends 1 dose of PPSV23 before age 65 years and 1 dose of PPSV23** at age 65 years or older.**
 Administer a single dose of PPSV23 at least 8 weeks after PCV13 was received.

- If the adult is 65 years or older, their pneumococcal vaccinations are complete.
- If the adult was younger than 65 years old when the first dose of PPSV23 was given, then administer a final dose of PPSV23 once they turn 65 years old and at least 5 years have passed since PPSV23 was first given. Their pneumococcal vaccinations are complete.

Adults 19 years or older with an immunocompromising condition

PCV13
(at any age)

At least 8 weeks apart

→

PPSV23
(at < 65 years)

At least 5 years apart

→

PPSV23
(at < 65 years)

At least 5 years apart

→

PPSV23
(at ≥ 65 years)

CDC recommends 2 doses of PPSV23 before age 65 years and 1 dose of PPSV23** at age 65 years or older.**
 Administer a single dose of PPSV23 at least 8 weeks after PCV13 was received.

- If the patient was younger than 65 years old when the first dose of PPSV23 was given and has not turned 65 years old yet, administer a second dose of PPSV23 at least 5 years after the first dose of PPSV23. This is the last dose of PPSV23 that should be given prior to 65 years of age.
- Once the patient turns 65 years old and at least 5 years have passed since PPSV23 was last given, administer a final dose of PPSV23 to complete their pneumococcal vaccinations.

** For adults who have received PCV13 but have not completed their recommended pneumococcal vaccine series with PPSV23, one dose of PCV20 may be used if PPSV23 is not available. If PCV20 is used, their pneumococcal vaccinations are complete.

Available at:

<https://www.cdc.gov/vaccines/vpd/pneumo/downloads/pneumo-vaccine-timing.pdf>

COVID-19 Vaccines

CDC Bivalent Booster Recommendations

- **Everyone ages 12 years and older should receive one age-appropriate bivalent mRNA COVID-19 booster dose at least 2 months after completion of any FDA-approved or FDA-authorized monovalent COVID-19 primary series or last monovalent booster dose**
- The bivalent boosters contain two mRNA components of SARS-CoV-2 virus, one of the ancestral strain of SARS-CoV-2 and one of common portions of the BA.4 and BA.5 lineages of the Omicron variant
- People cannot get a bivalent COVID-19 booster without first completing at least a monovalent primary series

CDC Bivalent Booster Recommendations

- All providers should stop administering Moderna and Pfizer monovalent COVID-19 booster to people ages 12 years and older, effective immediately
- The recommendations for children under 12 years of age are unchanged
 - Children ages 5 through 11 years who received Pfizer primary series should receive 1 monovalent booster dose
 - At this time, children ages 6 to 11 years who received Moderna primary series and children under 5 years of age cannot receive any type of booster

Recent COVID-19 Infection

- People who recently had COVID-19 infection may consider delaying any COVID-19 vaccination, including bivalent booster vaccination, by 3 months from symptom onset or positive test (if infection was asymptomatic)

Moderna COVID-19 Vaccine Formulations



Monovalent Product



Monovalent Product



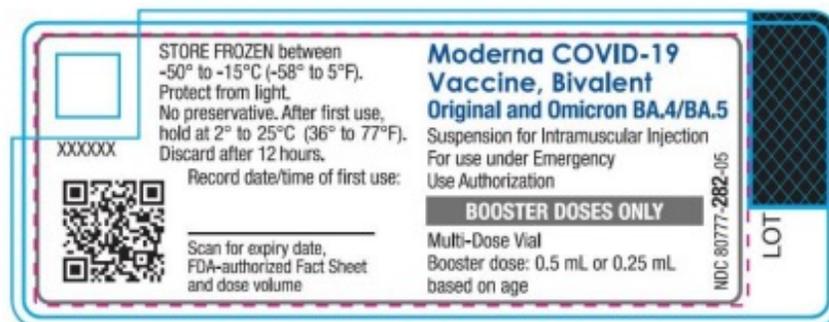
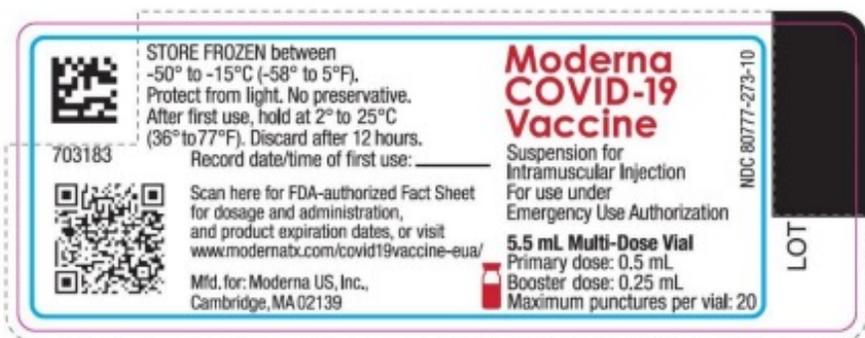
Bivalent Product

	Monovalent Product	Monovalent Product	Bivalent Product
Authorized for ages	12 years and older	6–11 years	18 years and older
Vial cap color	Red	Dark blue	Dark blue
Label border color	Light blue	Purple	Gray
Dose (mRNA concentration)	100 mcg (primary dose)	50 mcg (primary dose)	50 mcg (booster dose) (25 mcg original, 25 mcg Omicron BA.4/BA.5)
Injection volume	0.5 mL	0.5 mL	0.5 mL
Dilution required	No	No	No
Beyond-use date	12 hours	12 hours	12 hours
Storage	Freezer (-15°C to -50°C) until expiration; Refrigerator (2°C to 8°C) up to 30 days	Freezer (-15°C to -50°C) until expiration; Refrigerator (2°C to 8°C) up to 30 days	Freezer (-15°C to -50°C) until expiration; Refrigerator (2°C to 8°C) up to 30 days

Moderna Labels

Monovalent label
Primary series only
Ages 12 years and older

Bivalent label
Booster dose only
Ages 18 years and older

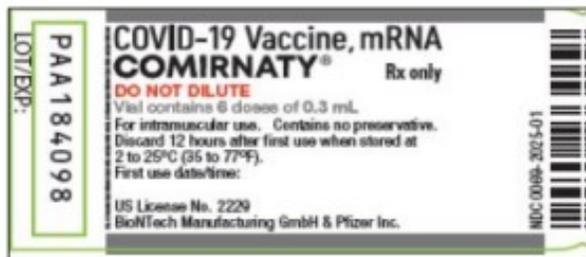
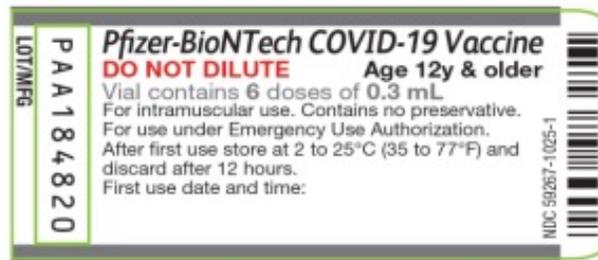


Pfizer COVID-19 Vaccine Formulations

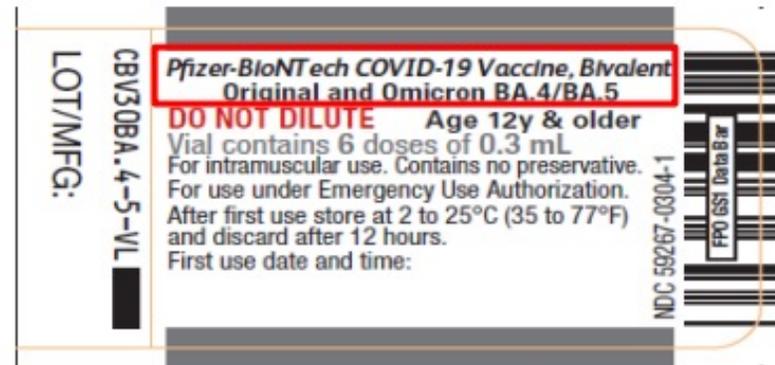
	 Monovalent Product	 Bivalent Product
Authorized for ages	12 years and older	12 years and older
Authorized for doses	Primary series doses	Booster doses
Vial cap color	Gray	Gray
Dose (mRNA concentration)	30 mcg	30 mcg (15 mcg original, 15 mcg Omicron BA.4/BA.5)
Vaccine composition	Monovalent—Original	Bivalent—Original and Omicron BA.4/BA.5
Injection volume	0.3 mL	0.3 mL
Dilution required	No	No
Beyond-use date	12 hours after puncture	12 hours after puncture
Storage	Ultra-cold freezer until expiration; Refrigerator (2°C-8°C) up to 10 weeks	Ultra-cold freezer until expiration; Refrigerator (2°C-8°C) up to 10 weeks

Pfizer Labels

Monovalent label
Primary series only
Ages 12 years and older



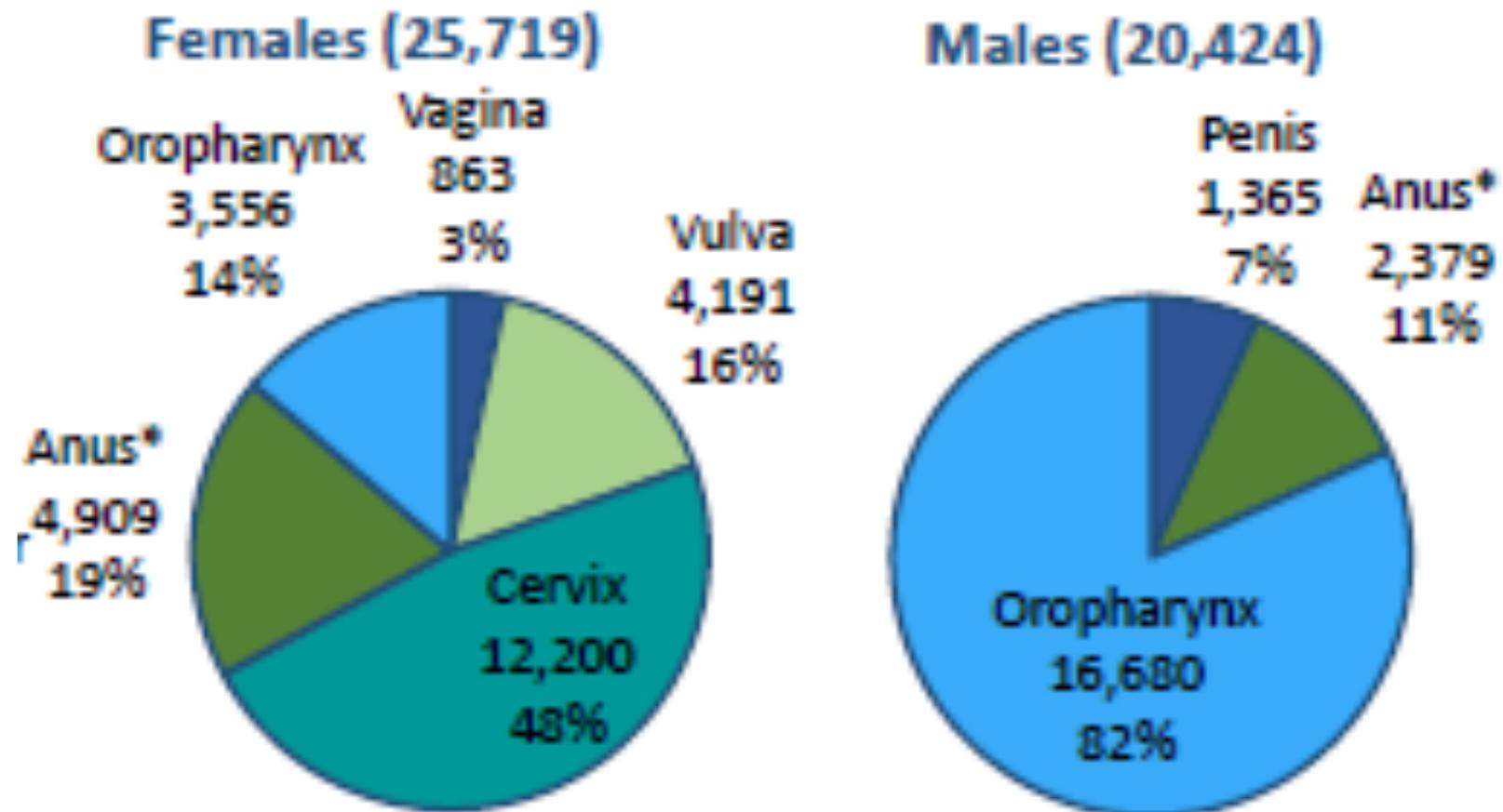
Bivalent label
Booster dose only
Ages 12 years and older



Human Papillomavirus (HPV)

Percent of New HPV-Associated Cancer Cases in US, by Sex (2014-2018)

N=46,143



<https://www.cdc.gov/cancer/uscs/about/data-briefs/no26-hpv-assoc-cancers-UnitedStates-2014-2018.htm#:~:text=HPV%20causes%20most%20cervical%20cancers,of%20the%20tongue%20and%20tonsils>

ACIP Recommendations for HPV Vaccination

- Routine vaccination
 - Age 11 or 12 years
 - Vaccination can be started at age 9 years
- Catch-up vaccination
 - Persons through age 26 years
- Individual clinical decision making for persons 27 through 45 years

ACIP Recommendations

- For teens starting the vaccine before their 15th birthday, 2-dose series at 0, 6 months
 - Minimum interval is 5 months
 - 2-dose series even if 2nd dose given after age 15
- For adults, routine 3-dose schedule at 0, 1-2, 6 months
 - Dose #2: 1 to 2 months (at least 4 weeks) after dose #1
 - Dose #3: At least 12 weeks after dose #2 AND 6 months (≥ 24 weeks) after dose #1
- All immunocompromised persons should receive a 3-dose series

ACIP Recommendations

- There is no maximum interval between doses
- If vaccine schedule interrupted, the series does not need to be restarted
- If someone received prior doses of 2vHPV or 4vHPV, these doses will count
- Complete the series with 9vHPV

Considerations for Who Should Receive HPV Vaccination for Persons >27 Years

- Most sexually active adults have already been exposed to HPV infection
- At any age, having a new sex partner is a risk factor for acquiring new HPV infection
- No clinical antibody test available
- People who are in a long-term monogamous sexual relationship are unlikely to acquire new HPV infection
- HPV vaccine prevents infection but does not impact prevalent infections

Hepatitis A Vaccine

Hepatitis A Vaccine Formulations

- Vaqta™ (Merck)
 - 0.5 ml (pediatric)
 - 1 ml (adult)
- Havrix™ (GSK)
 - 0.5 ml (pediatric)
 - 1 ml (adult, 19+)
- Schedule is 0, 6-12
- Twinrix™ (GSK), licensed for 18+
 - Pediatric dose HepA and adult dose HepB
 - Given at 0, 1-2, 4-6 months

Indications for Hepatitis A Vaccine

- HIV infection – added June 2019
- Men who have sex with men (MSM)
- Users of illegal drugs
- Chronic liver disease
- Persons working in Hep A research lab or with nonhuman primates susceptible to HAV infection
- Travelers to countries with high or intermediate risk of HAV infection

Hepatitis A among MSM — NYC, 2020–2022

- Continuing to see cases among MSM*
 - 10 cases in 2020 (9 in January–March, pre-NYS PAUSE for COVID-19)
 - 18 cases in 2021
 - 9 cases in January–June 2022
- Hepatitis A messaging incorporated into overall health messaging to MSM**



The screenshot shows the NYC Health website interface. At the top, there is a navigation bar with 'NYC Health' and a search bar. Below this is a secondary navigation bar with 'Promoting and Protecting the City's Health' and the NYC Health logo. A main navigation menu includes 'Home', 'COVID', 'About', 'Our Health', 'Services', 'Providers', 'Data', and 'Business'. Below the main navigation is a secondary menu with 'Health Topics', 'Neighborhood Health', 'Emergency Prep', and 'Publications'. The main content area features a title 'Gay Men, Bisexual Men and Other Men Who Have Sex with Men' and a sub-section titled 'Monkeypox'. The 'Monkeypox' section includes a brief description and a link to 'Monkeypox (Orthopoxvirus)'. At the bottom of the page, there is a paragraph of text discussing health disparities for MSM.

* NYC DOHMH surveillance data; data are preliminary and subject to change

** <https://www1.nyc.gov/site/doh/health/health-topics/lgbtq-men-sex-men.page>

Meningitis Vaccines

Routine MenACWY Recommendations

- First dose at age 11 or 12 years with a booster dose at 16 years of age
- Age 13 through 15 years if not previously vaccinated
 - Administer a one-time booster dose, at or after 16 years of age (school requirement)
 - The minimum interval between doses is 8 weeks
- Booster doses are not routinely recommended unless there is ongoing risk
- Required for school entry

MenACWY Recommendations for Individuals at High Risk

- HIV-infection* - added by ACIP June 2016
- MSM, regardless of HIV status (in NYS)
- First-year college students ≤ 21 years living in residence halls
- Identified at increased risk because of MenACWY outbreak
- Persistent complement component deficiencies*
- Anatomic or functional asplenia*
- Microbiologists w/routine exposure to *N. meningitidis*
- Travel to meningitis belt

*** Administer as a 2-dose primary series 8 weeks apart, revaccinate every 5 years**

Meningococcal Vaccines

- MenACWY
 - MenQuadfi – replaces Menactra
 - Menveo HIV-infection* (added by ACIP June 2016)
- Men B: indicated for persons 10 -25 years of age at increased risk
 - Trumenba
 - Bexsero

Strategies to Increase Vaccination Rates

Adult Vaccination Coverage is Low

- NHIS data 2020
 - Pneumococcal: 19-64 24%, ≥ 65 67.5%
 - Zoster: ≥ 50 29.4%
 - Td/Tdp: 19+ past 10 years 63%
- NHIS 2017
 - Hep B: 19+ 34%;
 - Hep A: 19+ 11%
 - HPV: 19-26 female 51.5%, males 21%
- CHS, NYC
 - Influenza: 18+ 48% ; 65+ 68%
 - Hepatitis B (2018 CHS) 18+ 55%

Standards for Adult Immunization Practice

- The National Vaccine Advisory Committee (NVAC) revised the Standards for Adult Immunization Practice in 2013
- Call to action for ALL healthcare professionals to:
 - **Assess** immunization status of all patients at every clinical encounter
 - Strongly **recommend** vaccines that patients need
 - **Administer** needed vaccines or **refer** to a provider who can immunize
 - **Document** vaccines received by patients in state/city vaccine registries

Citywide Immunization Registry (CIR)

- The NYC DOHMH's centralized, computerized database of immunization records
- Citywide implementation January 1, 1997
- Mandated reporting for NYC children <19 years
- Voluntary reporting for NYC adults ≥ 19 years (consent in their medical record)
- Many EMRs have an HL7 connection to the CIR
- Those with bidirectional connection, can look up patients while in their current workflow

347-396-2400, www.nyc.gov/health/cir

US Community Services Task Force: Health-care Provider- or System-Based Strategies

Intervention	Status of Task Force Review
Provider reminder systems when used alone	Recommended (Strong evidence)
Provider assessment and feedback	Recommended (Strong evidence)
Standing orders	Recommended (Strong evidence)
Provider education when used alone	Insufficient evidence
Health care-based interventions when implemented in combination	Recommended (Strong evidence)
Use of Immunization Information Systems	Recommended (Strong evidence)



Source: www.thecommunityguide.org/vaccines/universally/index.html

Questions/Comments?

Thank you!

Provider Access Line: (866) 692-3641

BOI Hotline: 347-396-2400

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347-396-2471