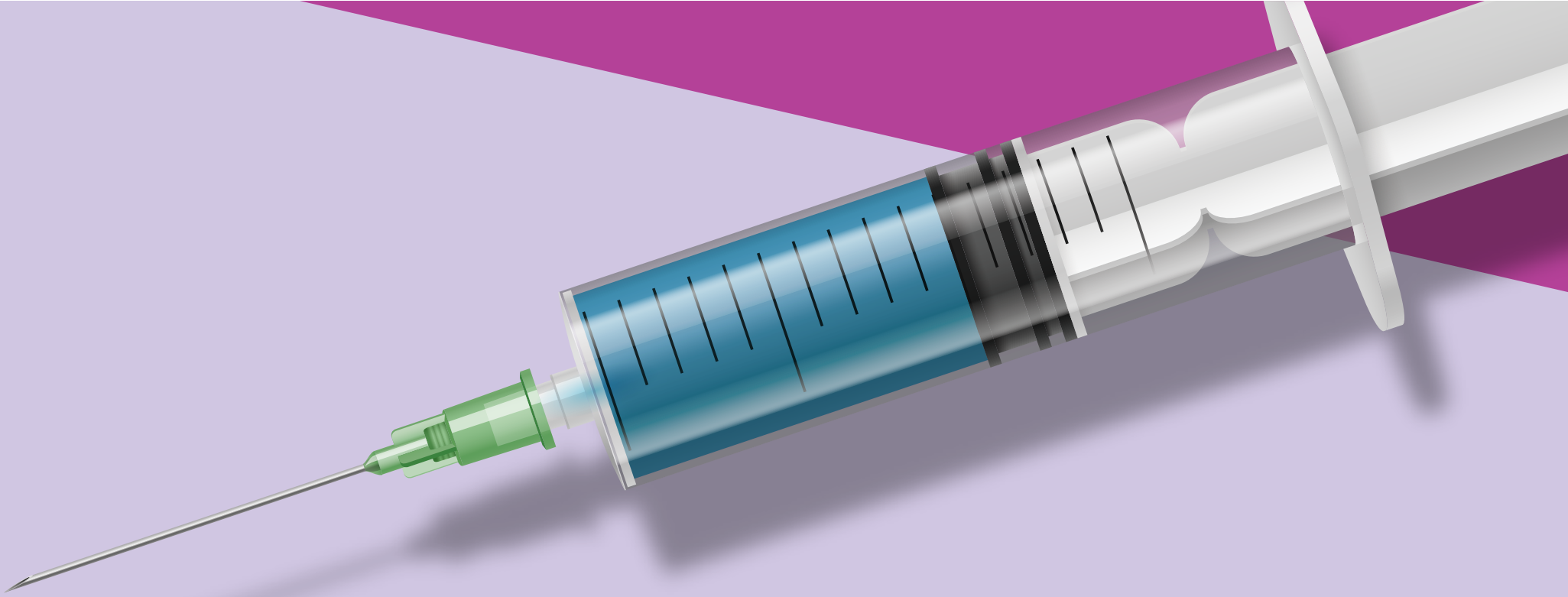

IMMUNIZATION
REFERENCE GUIDE 2022 – 2023

APhA
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Executive Summary

This Immunization Guide was created for current certified immunizing pharmacists and student pharmacists to utilize as a quick reference in the field, to stay up to date on current vaccinations and guidelines, and to answer questions from patients and other practitioners that may not present frequently.

This guide is created and updated by APhA's Academy of Pharmacy Practice and Management (APPM) Immunizing Pharmacists Special Interest Group (SIG). The information presented within this guide correlates to the Vaccine Recommendations of the Advisory Committee on Immunization Practices (ACIP) and is current according to the date established on the cover page. This guide is meant to be used as a reference only, and pharmacists and student pharmacists are encouraged to review current ACIP guidelines for full, up-to-date information.

This quick reference guide includes the following information for each vaccine: brand name(s) and manufacturer(s) for available vaccines; dose and route of administration; common adverse effects; storage and handling of the vaccine; additional comments pertaining to the vaccine; and the most current version of the CDC Immunization Schedules.

Quick Reference Chart

Vaccine Chart	Hepatitis A	Hepatitis B	Hepatitis A&B combo	Human Papillomavirus	Measles, Mumps, & Rubella
Acronym	**HepA**	**HepB**	**HepA–HepB**	**HPV**	**MMR, MMR-V**
Brand Name:	VAQTA HAVRIX	RECOMBIVAX HB ENGERIX-B HEPLISAV-B PreHevbrio	TWINRIX	GARDASIL 9	M-M-R II ProQuad (MMR-V)
Indications: **Please refer to VIS or ACIP immunization schedule for more complete indications	All children and adolescents ages 1-18 yrs who have not been previously vaccinated. Any person with HIV age ≥ 1 yr Any person seeking protection from HAV infection or persons with any of the following indications: Men who have sex with men Persons who use injection and non injection drugs Homelessness Working with HAV-infected primates or in a HAV laboratory setting Chronic liver disease Traveling or working in countries with high/intermediate risk of HAV Anticipating contact with international adoptee during first 60 days of arrival to U.S. from high or intermediate HAV-endemic areas Postexposure and preexposure prophylaxis for international travel.	All people infant through age 59 and adults 60 years of age and older with risk factors for hepatitis B should receive vaccination (per ACIP recommendations). Risk factors available at https://www.cdc.gov/hepatitis/hbv/vaccadults.htm Adults 60 years of age and older without known risk factors for hepatitis B may receive vaccination.	All children Adults 18 years or older needing both HAV and HBV vaccinations Use TWINRIX- for all 3 doses of series	Females and males 9–26 years (per ACIP) Recommended age is 9-14 years. Target age is 11-12 years Adults aged 27-45 years if appropriate based on shared clinical decision making	MMR is a live vaccine indicated for patients 12 months of age and older seeking protection from measles, mumps, and rubella. Adults (>18 years) born after 1957 with no evidence of immunity should be vaccinated with one or two doses depending on risk. High risk persons: college students, health care workers, and international travelers. Measles outbreaks: Local health departments may provide additional recommendations, including a second adult dose or second dose for 1 to 4 year olds.

Vaccine Chart	Hepatitis A	Hepatitis B	Hepatitis A&B combo	Human Papillomavirus	Measles, Mumps, & Rubella
Acronym	**HepA**	**HepB**	**HepA–HepB**	**HPV**	**MMR, MMR-V**
Number and schedule of doses:	**2 doses:** 0, 6–12 months (HAVRIX) 0, 6–18 months (VAQTA) -Post-exposure prophylaxis within 2 weeks of exposure	**2 doses:** 0, 1 month (HEPLISAV-B for ≥18 years) OR 3 doses: 0, 1, 6 months (ENGERIX-B, RECOMBIVAX HB, or PREHEVBRIO) OR **4 doses:** 0, 1, 2, 6 months (ENGERIX-B for adults on hemodialysis) -Alternate and accelerated regimens available (see Hepatitis B section for additional information)	3 doses: 0, 1, 6 months OR 4 doses: 0, 7, 21–30 days, followed by booster dose at month 12	2 doses: 0, 6-12 months if starting series before 15th birthday 3 doses (15-45 years and/or immunocompromised): 0, 1-2 months, 6 months	**2 doses:** 12–15 months and 4–6 years of age (2nd dose must be given at least 4 weeks after 1st dose) **International travel:** May administer 1 dose at 6–11 months, but then must also complete routine schedule of 2 doses starting at age minimum age of 12 months (2nd dose must be given at least 4 weeks after 1st dose) **Note:** PROQUAD only approved for ≥12 months thru 12 years of age
Route of admin:	Intramuscular	Intramuscular	Intramuscular	Intramuscular	Subcutaneous
Common Adverse Effects:	-Soreness, tenderness or redness at injection site -Low-grade fever -Headache -Fatigue	-Soreness at injection site -Low-grade fever, fatigue	-Soreness or redness at injection site -Headache -Fever	-Headache -Soreness, swelling, or redness at injection site -Fever -Syncope (recommend 15-minute observation post-injection)	-Mild rash -Fever -Pain or redness at injection site, sore/tender arm -Swelling of glands in the cheek/neck

Vaccine Chart	Meningococcal conjugate	Meningococcal Sero-group B	Pneumococcal 23-polyvalent	Pneumococcal 13-conjugate	Pneumococcal 15-conjugate	Pneumococcal 20-conjugate
Acronym	**MenACWY or MCV4**	**MenB**	**PPSV23**	**PCV13**	**PCV15**	**PCV20**
Brand Name:	Menactra MENVEO MenQuadfi	BEXSERO TRUMENBA	PNEUMOVAX 23	Prevnar 13	Vaxneuvance	Prevnar 20
Indications: **Please refer to VIS or ACIP immunization schedule for more complete indications	Adolescents aged 11–18 years 1 dose at 11–12 years Booster at 16 years Additionally: At risk from an outbreak Splenectomy/damaged spleen Patients taking complement inhibitor (e.g., eculizumab, ravulizumab) Microbiologists who work with *Neisseria meningitidis* Traveling or living where meningococcal disease is hyperendemic or epidemic First-year college students living in dorms U.S. military recruits People with HIV Anyone with complement component deficiency	Patients aged ≥10 years who are at increased risk for serogroup B infections: At risk from an outbreak Splenectomy/damaged spleen Patients taking complement inhibitor (e.g., eculizumab, ravulizumab) Microbiologists who work with *Neisseria meningitidis* May also be given to anyone aged 16–25 years, not at increased risk for meningococcal disease, to provide short-term protection The same vaccine must be used for all doses -Booster doses are recommended for high risk patients (see Meningococcal B section for additional information)	Patients aged 2 years and older	Patients aged 6 weeks and older	Patients aged 6 weeks and older	Patients aged 18 years and older

Vaccine Chart	Meningococcal conjugate	Meningococcal Sero-group B	Pneumococcal 23-polyvalent	Pneumococcal 13-conjugate	Pneumococcal 15-conjugate	Pneumococcal 20-conjugate
Acronym	**MenACWY or MCV4**	**MenB**	**PPSV23**	**PCV13**	**PCV15**	**PCV20**
Number and schedule of doses:	1 or 2 doses At least 8 weeks apart May need revaccination every 5 years	**Bexsero:** 2 doses, at least 4 weeks apart **Trumenba:** 2 doses (0, 6 months) or 3 doses (0, 2, 6 months) **Note:** Vaccines are NOT interchangeable; must use the same product for each dose **Note:** Trumenba should be given in 3 doses to anyone > 10 years of age who are at an increased risk for meningococcal B (outbreaks, immunocompromised persons, microbiologists working with serogroup B strains)	1, 2, or 3 doses based on indication and pneumococcal vaccine history -If adult patient received PCV15, give PPSV23 at least 1 year later -If adult patient received PCV13, give PPSV23 at least 1 year later. See https://www.cdc.gov/vaccines/vpd/pneumo/downloads/pneumo-vaccine-timing.pdf for additional guidance in adults.	4 doses, routine childhood series	4 doses, routine childhood series 1 dose in adults >19 years -If adult patient receives PCV15, give PPSV23 at least 1 year later See https://www.cdc.gov/vaccines/vpd/pneumo/downloads/pneumo-vaccine-timing.pdf for additional guidance in adults.	1 dose in adults >19 years See https://www.cdc.gov/vaccines/vpd/pneumo/downloads/pneumo-vaccine-timing.pdf for additional guidance in adults.
Route of admin:	Intramuscular	Intramuscular	Intramuscular or subcutaneously	Intramuscular	Intramuscular	Intramuscular
Common Adverse Effects:	-Soreness or redness at injection site -irritability, headache -sleepiness, fatigue -mild fever	-Soreness or redness at injection site -Tiredness/fatigue -Headache -Fever/chills	-Injection-site pain/soreness/tenderness	-Injection-site pain/soreness/tenderness -Decreased appetite -Headache -Fatigue	-Injection-site pain/soreness/tenderness -Decreased appetite -Headache -Fatigue	-Injection-site pain/soreness/tenderness -Decreased appetite -Headache -Fatigue

Vaccine Chart	Varicella (Chicken pox)	Shingles (Zoster recombinant vaccine)	Tetanus, diphtheria, & pertussis	Tetanus, diphtheria
Acronym	**VAR**	**RZV**	**Tdap**	**Td**
Brand Name:	VARIVAX	SHINGRIX	Adacel BOOSTRIX	TENIVAC Td generic (TDVAX)
Indications: **Please refer to VIS or ACIP immunization schedule for more complete indications	Children who have never had chickenpox First dose: 12–15 months Second dose: 4–6 years, may be given earlier if at least 3 months after the first dose Persons aged ≥13 years who have never had chickenpox or received chickenpox vaccine: 2 doses at least 28 days apart	Adults aged ≥50 years regardless of prior episode of herpes zoster or receipt of VAR or ZVL (Zostavax - no longer commercially available) ≥18 years who are or will be at increased risk for herpes zoster because of immunodeficiency or immunosuppression caused by known disease or therapy	Persons aged ≥10 years Health care professionals Pregnant women (every pregnancy at 27–36 weeks gestation)	Persons aged ≥7 years Given as a booster dose every 10 years Can be given earlier after a severe and dirty wound or burn
Number and schedule of doses:	2 doses	2 doses 2–6 months apart	1 adult dose with boosters of tetanus-containing vaccine every 10 years (Tdap or Td) Each pregnancy at 27-36 weeks gestation	Every 10 years (Tdap or Td)
Route of admin:	Subcutaneous	Intramuscular	Intramuscular	Intramuscular
Common Adverse Effects:	-Soreness or redness at injection site -Mild fever -Mild rash	-Pain, redness, or swelling at injection site -Myalgias -Headache -Fatigue -Fever/chills	-Pain, soreness, or redness at injection site -Headache -Mild fever -Nausea, vomiting, diarrhea	-Pain, soreness, or redness at injection site -Headache -Mild fever -Fatigue

INFLUENZA (FLU)

For the prevention of: Seasonal influenza
Type of vaccine: Inactivated and live-attenuated are available
Brand names (manufacturer):

- Quadrivalent, inactivated, with adjuvant (aIIV4)
    - FLUAD Quadrivalent (Seqirus)
- Quadrivalent, inactivated, high-dose (HD-IIV4)
    - Fluzone High-Dose Quadrivalent (Sanofi Pasteur)
- Quadrivalent, inactivated, standard dose (IIV4)
    - AFLURIA Quadrivalent (Seqirus)
    - FLUARIX Quadrivalent (GSK)
    - FLULAVAL Quadrivalent (GSK)
    - Fluzone Quadrivalent (Sanofi Pasteur)
- Quadrivalent, recombinant, standard dose (RIV4)
    - Flublok (Sanofi Pasteur)
- Quadrivalent, cell-cultured-based, standard dose (ccIIV4)
    - FLUCELVAX (Seqirus)
- Quadrivalent, live-attenuated, standard dose (LAIV4)
    - FluMist (AstraZeneca)

Product	Indicated Age	Dose and Route of Administration	Adverse Effects
AFLURIA Quadrivalent	≥6 months via needle/syringe 18-64 years old via jet injector	**6–35 months:** 1-2 doses of 0.25 mL IM. If 2 doses needed, must be ≥4 weeks apart* **36 months–8 years:** 1-2 doses of 0.5 mL IM. If 2 doses needed, must be ≥4 weeks apart* **≥9 years:** 0.5 mL IM	**Injection site:** Pain, erythema, tenderness **Systemic:** Irritability (children), myalgia, headache, fever
FLUARIX Quadrivalent	≥6 months	**6 months–8 years:** 1-2 doses of 0.5mL IM. If 2 doses needed, must be ≥4 weeks apart* ≥9 years: 0.5 mL IM	
FLULAVAL Quadrivalent	≥6 months	**6 months–8 years:** 1-2 doses of 0.5mL IM. If 2 doses are needed, must be≥4 weeks apart* **≥9 years:** 0.5 mL IM	
Fluzone Quadrivalent	≥6 months	**6–35 months:** 1-2 doses of 0.25 mL or 0.5 mL IM. If 2 doses needed, must be ≥4 weeks apart* **36 months–8 years:** 1-2 doses of 0.5 mL IM. If 2 doses needed, must be ≥4 weeks apart **≥9 years:** 0.5 mL IM	
FLUCELVAX Quadrivalent	≥6 months	**4–8 years:** 1-2 doses of 0.5 mL IM. If 2 doses needed, must be ≥4 weeks apart* **≥9 years:** 0.5 mL IM	
Flublok Quadrivalent	≥18 years	0.5 mL IM	
Fluzone-High Dose Quadrivalent	≥65 years	0.7 mL IM	
FLUAD Quadrivalent	≥65 years	0.5 mL IM	
FluMist Quadrivalent	2–49 years	**2–8 years:** 1 spray (0.1 mL) intranasally into each nostril. If 2 doses needed must be ≥4 weeks apart* **≥8years:** 1 spray (0.1 mL) intranasally into each nostril	**Systemic:** Rhinorrhea, nasal congestion, fever, sore throat

*Children aged 6 months through 8 years require 2 doses of influenza vaccine (administered ≥4 weeks apart) during their first season of vaccination to optimize response. ACIP recommends that children aged 6 months through 8 years who have previously received ≥2 total doses of trivalent or quadrivalent influenza vaccine within the same season need only receive 1 dose.

Storage:

Protect from light and store refrigerated between 36°F and 46°F (2°C and 8°C). Do not freeze.

Additional Information:

- Annual vaccination against influenza is recommended for all persons aged ≥6 months without contraindications.
    - Vaccination should occur before the end of October, but providers should continue to offer the vaccine as long as there is unexpired vaccine available and influenza viruses are still circulating locally.
    - Vaccination during July and August is not recommended for most groups
        - Most adults (esp those age ≥65 years) and pregnant persons in their first or second trimester should avoid vaccination during July and August unless there is concern that later vaccination might not be possible
        - Children 6 months through 8 years old who require 2 doses should receive the first dose as soon a vaccine is available
        - Vaccination during July and August can be considered in children of any age who require only one dose
        - Vaccination in July and August can be considered for pregnant people who are in their third trimester
- Persons aged ≥6 months, including pregnant women, can receive an age-appropriate IIV4 formulation.
- LAIV4 should not be used in pregnancy, in immunocompromised persons, or in persons with certain chronic medical conditions.
    - If not given simultaneously, wait at least 4 weeks after administering LAIV4 before administering another live vaccine.
    - Additionally, do not use if the antiviral medications olestamavir or zanamvir were received within the previous 48 hours, peramivir within previous 5 days, or baloxavir within the previous 17 days.
- HD-IIV4, RIV4, and aIIV4 are preferentially recommended for persons aged ≥65 years; vaccination in this population should not be delayed if one of these vaccines is not available.
- For persons with suspected or confirmed acute COVID-19 infection, clinicians should consider delaying influenza vaccine until the person is no longer acutely ill.
- Refer to CDC Pink Book at http://www.cdc.gov/vaccines/pubs/pinkbook/appendix/appdx-b.html for components of vaccines (excipients, thimerosal, latex, *etc.*).
- Egg allergy in patients who have not received vaccine in the past:
    - **Hives only:** may receive any licensed, recommended influenza vaccine
    - **Any symptoms other than hives (angioedema, respiratory distress, etc):** May receive licensed, recommended vaccine in an inpatient or outpatient medical setting under the supervision of a healthcare provider able to manage allergic reactions.
    - aRIV4 and ccIIV4 do not contain egg and may require fewer safety precautions in persons allergic to eggs.
- History of severe allergic reaction to influenza vaccine (regardless of suspected reaction-causing component) is a contraindication to receiving future influenza vaccines.
- Health care personnel who care for severely immunocompromised persons who require care in a protected environment should not receive LAIV4.

PNEUMOCOCCAL

For the prevention of: Pneumococcal disease
Type of vaccine: Inactivated
Brand names (manufacturer):

- Inactivated, polysaccharide vaccine
  - PNEUMOVAX 23 (PPSV23) (Merck)
- Inactivated, conjugated vaccine
  - Prevnar 13 (PCV13) (Pfizer)
  - Vaxneuvance (PCV15) (Merck)
  - Prevnar 20 (PCV20) (Pfizer)

Product	Indicated Age	Dose and Route of Administration	Adverse Effects
Prevnar 13 (PCV13)	Individuals 6 weeks of age and older	**6 weeks–5 years*:** 0.5 mL IM at 2, 4, 6, and 12–15 months **6–17 years:** 0.5 mL single IM dose **≥18 years:** 0.5 mL single IM dose	**Injection site:** Redness, swelling, pain, or tenderness **Systemic:** Fever, loss of appetite, (infants/children-fussiness,irritability, feeling tired), headache, and chills Young children may be at a small increased risk for seizures caused by fever after PCV13 if it is administered at the same time as inactivated influenza vaccine.
PNEUMOVAX 23 (PPSV23)	Individuals 2 years of age and older	0.5 mL IM or SubQ	
Vaxneuvance (PCV15)	Individuals 6 weeks of age and older	**Children*:** 0.5 mL IM at 2, 4, 6, and 12-15 months **≥18 years:** 0.5 mL single dose	
Prevnar 20 (PCV20)	Adults aged >18 years old	0.5mL IM dose	

*PCV13 and PCV15 can be used interchangeably on persons <19 years old

Schedule for adults older than 65 years with no medical indication:

- None or those who received only PCV7:
  - Option A: PCV 15 followed by PPSV23 ≥ 1 year later
  - Option B: PCV 20 ONLY
- PPSV23 only at any age
  - Option A: PCV20 at least one year after PPSV23
  - Option B: PCV15 at least one year after PPSV23
- PCV13 only at any age
  - Option A: PCV20 at least one year after PCV13
  - Option B: PPSV23 at least one year after PCV13

- PCV13 at any age & PPSV23 at <65 yrs
    - Option A: PCV20 at least 5 years after last pneumococcal vaccine dose
    - Option B: PPSV23 at least 5 years after last PPSV23 dose AND at least one year after last PCV13
- Complete series: PCV13 at any age & PPSV23 at ≥65 yrs
    - MAY administer PCV20 based on shared clinical decision making

Adults 19-64 with immunocompromising conditions, underlying health conditions or other risk factors

- *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.
- *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
- None or those who received only PCV7:
    - Option A: PCV20
    - Option B: Administer PCV15 then PPSV23 at least 1 year later
- PPSV23 only
    - Option A: PCV20 at least one year after PPSV23
    - Option B: PCV15 at least one year after PPSV23
- PCV13 only:
    - Option A: PCV20 at least 1 year after PCV13
    - Option B:
        - For those with *immunocompromising health conditions:* Give the first dose of PPSV23 at least 8 weeks after PCV13. Then, the second dose of PPSV23 should be administered at least 5 years after the first dose of PPSV23. The third dose of PPSV23 should be administered at age 65 years or older (minimum interval 5 years after the second dose of PPSV23). If a patient is aged 65 years or older when the second dose is given, then a third dose is not indicated.
        - For those with *underlying medical conditions or other risk factors*: Give one dose of PPSV23 at least 8 weeks after PCV13. Give the second dose of PPSV23 at age 65 years or older (at least 5 years after the first dose of PPSV23).
- PCV13 and 1 dose of PPSV23:
    - Option A: PCV20 at least 5 years after last pneumococcal vaccine dose
    - Option B: Give a second dose of PPSV23 at least 8 weeks after PCV13 and 5 years after PPSV23 if they have an *immunocompromising condition*.
- PCV13 and 2 doses of PPSV23:
    - Option A: PCV20 at least 5 years after last pneumococcal dose
    - Option B: No vaccines recommended at this time

Special Situations in Children

- 2–5 years old with presence of: **sickle cell disease and other hemoglobinopathies; anatomic or functional asplenia; congenital or acquired immunodeficiency; HIV infection; chronic renal failure; nephrotic syndrome; malignant neoplasms, leukemias, lymphomas, Hodgkin disease, and other diseases associated with treatment with immunosuppressive drugs or radiation therapy; solid organ transplantation; multiple myeloma**
    - Any incomplete series* with:
        - Three PCV13 or PCV15 doses: 1 dose PCV13 or PCV15 (at least 8 weeks after any prior PCV13 or PCV15 dose)
        - Less than Three PCV13 doses: 2 doses PCV13 or PCV15 (8 weeks after the most recent dose and administered 8 weeks apart)
    - No history of PPSV23: 1 dose PPSV23 (at least 8 weeks after any prior PCV13 dose) and a 2nd dose of PPSV23 5 years later
- 2–5 years old with presence of: **cerebrospinal fluid leak, cochlear implant**
    - Any incomplete series with:
        - Three PCV13 or PCV15 doses: 1 dose PCV13 or PCV15 (at least 8 weeks after any prior PCV13 or PCV15 dose)
        - Less than Three PCV13 or PCV15 doses: 2 doses PCV13 or PCV15, 8 weeks after the most recent dose and administered 8 weeks apart
    - No history of PPSV23: 1 dose PPSV23 (at least 8 weeks after any prior PCV13 or PCV15 dose)
- 2–5 years with presence of: **chronic heart disease (particularly cyanotic congenital heart disease and cardiac failure); chronic lung disease (including asthma treated with high-dose, oral corticosteroids); diabetes mellitus**
    - Any incomplete series with:
        - Three PCV13 or PCV15 doses: 1 dose PCV13 or PCV15 (at least 8 weeks after any prior PCV13 dose)
        - Less than Three PCV13 or PCV15 doses: 2 doses PCV13 or PCV15 (8 weeks after the most recent dose and administered 8 weeks apart)
    - No history of PPSV23: 1 dose PPSV23 (at least 8 weeks after any prior PCV13 or PCV15 dose)
- 6–18 years with presence of: **cochlear implants, cerebrospinal fluid leaks**
    - **When both PCV13/PCV15 and PPSV23 are indicated, administer PCV13 first. PCV13 and PPSV23 should not be administered during the same visit.**
    - Vaccine naïve (never received PPSV23 or PCV13 or PCV15):
        - **PCV13 or PCV15:** administer PCV13 or PCV15
        - **PPSV23:** administer PPSV23 ≥ 8 weeks after PCV13 or PCV15
    - Received PCV13/PCV15 previously
        - **PPSV23:** administer PPSV23 ≥ 8 weeks after most recent PCV13/PCV15
    - Received PPSV23
        - **PCV13/PCV15:** administer PCV13/PCV15 ≥ 8 weeks after most recent PPSV23

- 6–18 years old with presence of: **sickle cell disease and other hemoglobinopathies, anatomical or functional asplenia, congenital or acquired immunodeficiencies, HIV infection, leukemias, lymphomas, multiple myeloma, Hodgkin Disease, chronic renal failure, nephrotic syndrome, malignant neoplasms, solid organ transplant, treatment with immunosuppressive drugs or radiation therapy**
    - Vaccine naïve (never received PPSV23 or PCV13 or PCV15):
        - **PCV13/PCV15:** administer 1 dose of PCV13 or PCV15
        - **PPSV23:** 2 doses; administer 1 dose of PPSV23 ≥ 8 weeks after PCV13/PCV15, then revaccinate with dose 2 PPSV23 ≥5 years after first dose of PPSV23
    - Received PCV13 previously
        - **PPSV23:** administer PPSV23 ≥ 8 weeks after PCV13/PCV15 and re-vaccinate with PPSV23 in 5 years
    - Received only one dose of PPSV23 previously:
        - **PCV13/PCV15:** administer 1 dose of PCV13 or PCV15 ≥ 8 weeks after most recent PPSV23 and re-vaccinate with PPSV23 in 5 years
- 6–18 years old with **chronic liver disease, heart disease, lung disease, diabetes mellitus, and/or alcoholism**
    - Never received PPSV23
        - **PCV13/PCV15:** no recommendation
        - **PPSV23:** 1 dose PPSV23 ≥ 8 weeks after most recent PCV13 (if not given earlier in childhood)

*Incomplete series= not having received all doses in either the recommended series or an age appropriate series

Storage:

Refrigerate at a temperature between 36°F and 46°F (2°C and 8°C). Do not freeze.

MENINGOCOCCAL

For the prevention of: Meningococcal disease
Type of vaccine: Inactivated
Brand names (manufacturer):

- MenACWY
  - **MENVEO** (GlaxoSmithKline)
  - **Menactra** (Sanofi Pasteur)
  - **MenQuadfi** (Sanofi Pasteur)
- MenB
  - BEXSERO (GlaxoSmithKline)
  - TRUMENBA (Wyeth Pharmaceuticals, a subsidiary of Pfizer)

Meningococcal Conjugate Vaccine (MenACWY or MCV4)			
Product	**Indicated Age**	**Dose and Route of Administration**	**Adverse Effects**
MENVEO	2 months–55 years	0.5 mL IM *See below for vaccine schedule	**Injection site:** pain, myalgia, erythema, swelling **Systemic:** headache, fatigue
Menactra	9 months–55 years	0.5 mL IM *See below for vaccine schedule	
MenQuadfi	2 years and older	0.5 mL IM *See below for vaccine schedule	

Meningococcal Group B			
Product	**Indicated Age**	**Dose and Route of Administration**	**Adverse Effects**
BEXSERO	10–25 years	0.5mL IM *See below for vaccine schedule	**Injection site:** pain, myalgia, erythema, induration **Systemic:** fatigue, headache, nausea, and arthralgia
TRUMENBA	10–25 years	0.5mL IM *See below for vaccine schedule	**Injection site:** pain, myalgia **Systemic:** fatigue, headache

Recommendations for meningococcal group (MenACWY) Vaccines:

Licensed Products
There are three MenACWY conjugate vaccines (Menactra, Menveo, MenQuadfi) licensed for use in the United States.

Minimum Intervals
The minimum interval between doses of MenACWY is 8 weeks.

ACIP Recommendations
Recommended Child and Adolescent Immunization Schedule for ages 18 years or younger

- **Routine vaccination 2-dose series: 1 dose at 11-12 years, booster at age 16 years**
    - Catch-up vaccination
        - Age 13–15 years: 1 dose now and booster at age 16-18 years (minimum interval: 8 weeks)
        - Age 16-18 years: 1 dose
- **Anatomic or functional asplenia (including sickle cell disease), HIV infection, persistent complement component deficiency, complement inhibitor (e.g., eculizumab, ravulizumab) use:**
    - MENVEO
        - Dose 1 at age 8 weeks: 4-dose series at 2, 4, 6, 12 months
        - Dose 1 at age 7–23 months: 2-dose series (dose 2 at least 12 weeks after dose 1 and after age 12 months)
        - Dose 1 at age 24 months or older: 2-dose series at least 8 weeks apart

    Menactra
        - Persistent complement component deficiency or complement inhibitor use:
            - Age 9–23 months: 2 doses at least 12 weeks apart
            - Age 24 months or older: 2 doses at least 8 weeks apart
        - Anatomic or functional asplenia, sickle cell disease, or HIV infection:
            - Age 9–23 months: Not recommended
            - 24 months or older: 2 doses at least 8 weeks apart
            - Menactra must be administered at least 4 weeks after completion of PCV13 series.
    - MedQuadfi
        - Dose 1 at age 24 months or older: 2-dose series at least 8 weeks apart
- Travel in countries with hyperendemic or epidemic meningococcal disease, including countries in the African meningitis belt or during the Hajj:
    - Children age less than 24 months:
        - MENVEO (age 2–23 months):
            - Dose 1 at 8 weeks: 4-dose series at 2, 4, 6, 12 months
            - Dose 1 at 7–23 months: 2-dose series (dose 2 at least 12 weeks after dose 1 and after age 12 months)
        - Menactra (age 9–23 months):
            - 2-dose series (dose 2 at least 12 weeks after dose 1; dose 2 may be administered as early as 8 weeks after dose 1 in travelers)
    - Children age 2 years or older: 1 dose Menveo, Menactra, or MenQuadfi
- **First-year college students who live in residential housing (if not previously vaccinated at age 16 years or older) or military recruits:** 1 dose of MENVEO,Menactra, or MedQuadfi

- Adolescent vaccination of children who received MenACWY prior to age 10 years:
  - Children for whom boosters are recommended because of an ongoing increased risk of meningococcal disease (e.g., those with complement deficiency, HIV, or asplenia): Follow the booster schedule for persons at increased risk https://www.cdc.gov/vaccines/programs/vfc/downloads/resolutions/mening-508.pdf.
  - Children for whom boosters are not recommended (e.g., those who received a single dose for travel to a country where meningococcal disease is endemic): Administer MenACWY according to the recommended adolescent schedule with dose 1 at age 11–12 years and dose 2 at age 16 years.

Recommended Adult Immunization Schedule for ages 19 years or older

- **Adults should receive 1 or 2 doses depending on indication, then booster every 5 years if risk remains**
  - Anatomical or functional asplenia (including sickle cell disease), HIV infection, persistent complement component deficiency, or complement inhibitor (e.g., eculizumab, ravulizumab) use: 2-dose series MenACWY (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, microbiologists routinely exposed to Neisseria meningitidis: 1 dose MenACWY (Menactra, MENVEO, or MedQuadfi) 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, or MedQuadfi)

Recommendations for Serogroup B Meningococcal (MenB) Vaccines:

Licensed Products and Interchangeability

There are two MenB vaccines (BEXSERO, TRUMENBA) licensed for use in the United States among persons aged 10–25 years. Either MenB vaccine can be used when indicated; ACIP does not state a product preference. The two MenB vaccines are not interchangeable; the same vaccine product must be used for all doses in a series.

Minimum Intervals and Co-administration with other vaccines

The minimum interval between any 2 doses of MenB vaccine is 4 weeks. On the basis of available data and expert opinion, MenB-FHbp or MenB-4C may be administered concomitantly with other vaccines indicated for this age, but at a different anatomic site, if feasible.

ACIP Recommendations

- **Persons aged ≥10 years at increased risk for serogroup B meningococcal disease***
  - 2-dose series MenB-4C (BEXSERO) at least 1 month apart, or 3-dose 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)
    - *Persons at increased risk for meningococcal disease include:
      - Persons with persistent complement component deficiencies (including inherited or chronic deficiencies in C3, C5–C9, properdin, factor D, factor H, or who are taking eculizumab [Solaris])
      - Persons with anatomic or functional asplenia (including sickle cell disease)
      - Microbiologists routinely exposed to isolates of Neisseria meningitidis
      - Persons identified as at increased risk because of a serogroup B meningococcal disease outbreak.

- **Adolescents and young adults aged 16–23 years (age 16 through 18 years preferred)** not at increased risk for meningococcal disease:
- Based on shared clinical decision-making, may receive 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)
- Booster doses
    - For persons ≥10 years at increased risk due to complement deficiency, complement inhibitor use, or functional or anatomic asplenia, or who are microbiologists:
        - A booster is recommend if it has been at least one year since primary series; repeat every 2-3 years as long as risk remains
    - For persons ≥10 years 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 since completion of a MenB primary series.
        - A booster dose interval of ≥6 months may be considered by public health officials depending on the specific outbreak, vaccination strategy, and projected duration of elevated risk.
    - Booster doses are not recommended for adolescents 10-18 years who are not at increased risk for meningococcal disease.

Storage:

- **MENVEO:** Store refrigerated, away from the freezer compartment, at 36°F and 46°F (2°C and 8°C). Protect from light. Vaccine must be maintained at 36°F and 46°F (2°C and 8°C) during transport. The reconstituted vaccine should be used immediately, but may be held at 36°F to 77°F (2°C to 25°C) for up to 8 hours. Do not freeze. Discard reconstituted vaccine if it has been frozen or not used within 8 hours.
- **Menactra:** Store at 35°F and 46°F (2°C and 8°C). Do not freeze. Frozen/previously frozen product should not be used.
- **MenQuadfi:** Store at 35°F and 46°F (2°C and 8°C). Do not freeze. Do not use vaccine that has been frozen.
- **BEXSERO:** Store refrigerated between 36°F and 46°F (2°C and 8°C). Do not freeze. Discard if the vaccine has been frozen. Protect from light.
- TRUMENBA: Upon receipt, store refrigerated at 36°F and 46°F (2°C and 8°C). Store syringes in the refrigerator horizontally (lying flat on the shelf) to minimize the re-dispersion time. Do not freeze. Discard if the vaccine has been frozen.

Additional Information:

- MENVEO
  - Supplied in 2 vials (MenCYW grey cap; MenA orange cap) that must be combined prior to administration.
  - Use the MenCYW-135 liquid conjugate vaccine component (Vial 1) to reconstitute the MenA lyophilized conjugate vaccine component (Vial 2) to form MENVEO. Invert the vial and shake well until powder is complete dissolved
  - After reconstitution, clear, colorless appearance, free from visible foreign particles.
- Menactra
  - Supplied as a single-dose vial.
  - Supplied as a clear to slightly turbid solution.
  - The vial stopper is not made with natural rubber latex.
- MenQuadfi
  - Supplied as a single-dose vial.
  - Supplied as a clear solution.
  - The vial stopper is not made with natural rubber latex.
- BEXSERO (MenB-4C)
  - Supplied as a prefilled syringe.
  - The tip caps of the prefilled syringes contain natural rubber latex; the plungers are not made with natural rubber latex.
  - Shake the syringe immediately before use to form a homogeneous suspension.
  - Not interchangeable with Trumenba; same product must be used for all doses.
- TRUMENBA (MenB-FHbp)

  Supplied as a prefilled syringe.
  The tip caps do not contain natural rubber latex
  Shake the syringe vigorously to ensure that a homogenous white suspension of Trumenba is obtained.
  Not interchangeable with Bexsero; same product must be used for all doses.

TETANUS, DIPHTHERIA TOXOID and ACELLULAR PERTUSSIS

For the prevention of: Diphtheria, tetanus, +/- pertussis (whooping cough)
Type of vaccine: Inactivated
Brand names (manufacturer):

- Tetanus, diphtheria, and pertussis:
  - Tdap
    - **BOOSTRIX (GSK)**
    - **Adacel(Sanofi Pasteur)**
- DTaP
    - **DAPTACEL (Sanofi Pasteur)**
    - **INFANRIX (GSK)**
    - **KINRIX (GSK)**
    - **PEDIARIX (GSK)**
    - **Pentacel (Sanofi Pasteur)**
    - **QUADRACEL (Sanofi Pasteur)**
    - **Vaxelis (MSP Vaccine Company)**
- Tetanus and diphtheria:
  - Td
    - **Td generic (TDVAX) (MassBiologics)**
    - **TENIVAC (Sanofi Pasteur)**

Product	Indicated Age	Dose and Route of Administration	Adverse Effects
Adacel (Tdap)	10–64 years	0.5 mL IM	**Injection site:** Pain, swelling, redness **Systemic:** Fever, headache, fatigue, nausea, vomiting, diarrhea, stomach ache, chills, body aches, rash, swollen glands
BOOSTRIX (Tdap)	≥10 years	0.5 mL IM	
Td generic (TDVAX) (Td)	≥7 years	0.5 mL IM	**Injection site:** Pain, redness, swelling **Systemic:** Headache, malaise, muscle weakness, joint pain, fever, nausea
TENIVAC (Td)	≥7 years	0.5 mL IM	
Daptacel (DTaP)	6wks-6years	0.5mL IM	**Injection Site:** Tenderness, redness, increase arm circumference **Systemic:** Fever, irritability, lethargy
INFANRIX (DTaP)	6wks-6years	0.5mL IM	**Injection site:** Pain, redness, swelling **Systemic:** Fever, drowsiness, irritability, loss of appetite
PEDIARIX (DTaP/IPV/HepB)	6wks-6 years	0.5mL IM	

Pentacel (DTaP/IPV/HiB)	6wks-4 years	0.5mL IM	**Injection site:** Tenderness and increase arm circumference **Systemic:** Fussiness/irritability, fever
Kinrix (DTaP/IPV)	4-6 years	0.5mL IM	**Injection site:** Pain, redness, swelling, increase in arm circumference **Systemic:** Drowsiness, fever, loss of appetite
Quadracel (DTaP/IPV)	4-6 years	0.5mL IM	**Injection Site:** Pain, redness, swelling, increased arm circumference **Systemic:** Myalgia, heachache, tiredness
Vaxelis (DTaP/HiB/HepB)	6 wks-4 years	0.5ml IM	**Injection Site:** Pain, redness, or swelling **Systemic:** Irritability, crying, fever

Storage:

Refrigerate at a temperature between 36° and 46°F (2° and 8°C). Do not freeze.

Additional Information:

- DTap is indicated for:
  - Children 6 weeks old should receive a 5 dose series at 2,4,6,15-18 months, and 4-6 years
    - The 4th dose can be administered at least 6 months after 3rd dose but not to children < 12 months
    - Children who had their 4th dose of DTaP at 4 years old or greater that was administered 6 months after the 3rd dose, do not have to receive the 5th dose
  - PEDIARIX is approved for infants born from mothers who are hepatitis B surface antigen (HBsAg) negative.
    - Can be used to complete series in children who received 1-2 doses of INFANRIX
- DTaP vaccine dosing recommendations
  - DAPTACEL/INFANRIX: 5 dose series: 2,4,6 months, 15-20 months, 4-6 years
    - INFANRIX may be used to complete a DTaP series started with PEDIARIX
  - PEDIARIX: 3 dose series: 2,4, 6 months.
  - Pentacel: 4 dose series: 2,4,6, and 15-18 months
    - ACIP recommends an additional booster dose of age-appropriate IPV-containing vaccine on or after age 4 years and at least 6 months after previous dose
  - Kinrix: 5th dose in the DTaP series and 4th dose in the IPV series in children 4-6 years who received INFANRIX and/or PEDIARIX
  - Quadracel: 5th dose in DTaP series and 4th or 5th dose in IPV series in children who received Pentacel, DAPTACEL, and/or VAXELIS.

- Tdap is indicated for:
    - Adolescents aged 11-18 years, who have completed initial vaccination series against pertussis, tetanus, and diphtheria, should receive a Tdap dose, and then Td or Tdap every 10 years thereafter.
    - Persons aged 7 years and older to use as part of the catch up series
    - Adults who have not received Tdap should have a one-time dose, then boost with Td or Tdap every 10 years
    - All pregnant women should receive one dose of Tdap vaccine during each pregnancy,regardless of interval since prior Td or Tdap vaccination.
        - The optimal time for administration is between 27- and 36-weeks gestation, although Tdap may be given at any time during the pregnancy.
    - Wound management: Tetanus toxoid-containing vaccine is preferred if more than 5 years have passed since last dose of Tdap or Td
        - Tdap is preferred for persons who have not previously received Tdap or with unknown history
        - If the patient is pregnant, Tdap is preferred
        - Children less than 7 who have had 3 doses of DTaP, and 5 years since the last dose, can receive a dose of DTaP for wound management
- Td is indicated for:
    - Any person who is 7 years and older to use as part of the catch-up series
        - Can also be used for routine decennial booster immunization and wound management
- Administration for Pentacel
    - Consists of liquid vaccine component (DTaP-IPV) and a lyophilized component (ActHIB).
    - After gently shaking the vial of DTaP-IPV, withdraw the entire contents and inject into the vial of ActHIB.
    - Swirl the vial until a cloudy white to off white suspension occurs (may have yellow tinge)
    - Should be used immediately after reconstitution
- Additional Information
    - The tip caps of prefilled syringes may contain latex.
    - Do not inject tetanus toxoid containing vaccines in the gluteal.
    - Except for Pentacel, all other vaccines do not require mixing before injection.
    - Vaccine solutions should be shaken to obtain a homogenous white/opaque suspension.
    - Preferred administration site for children < 1 year is the anterolateral thigh.
    - Preferred administration site for children 1 year + is the deltoid muscle.
    - For children at increased risk for seizures, an antipyretic may be administered at the time of vaccination and for 24 hours after to reduce the possibility of fever after vaccination.

HEPATITIS A

For the prevention of: Hepatitis A
Type of vaccine: Inactivated
Brand names (manufacturer):

- Inactivated vaccines:
  - HAVRIX (GSK)
  - VAQTA (Merck)

Product	Indicated Age	Dose and Route of Administration	Adverse Effects
HAVRIX (720 EL. U) **Pediatric Formulation**	1–18 years	0.5 mL IM **2-dose series: 0, 6–12 months**	**Injection site:** Pain, erythema, or swelling **Systemic:** Malaise, fatigue, low-grade fever, irritability, headache, drowsiness, syncope, loss of appetite
HAVRIX (1440 EL. U) **Adult Formulation**	≥19 years	1 mL IM **2-dose series: 0, 6–12 months**	
VAQTA (25 U) **Pediatric Formulation**	1–18 years	0.5 mL IM **2-dose series: 0, 6–18 months**	
VAQTA (50 U) **Adult Formulation**	≥19 years	1 mL IM **2-dose series: 0, 6–18 months**	

Storage:

Store at temperatures between 36°F and 46°F (2°C and 8°C). Do not freeze.

Additional Information :

- Recommended for:
  - All children and adolescents ages 2-18 yrs who have not been previously vaccinated.
  - Any person with HIV age ≥ 1 yr
  - Persons not at risk but want protection from hepatitis A
  - Persons in direct contact with persons who have hepatitis A
  - Men who have sex with men
  - Persons who use injection or non-injection drugs
  - Persons traveling to or working in countries that have high or immediate endemicity of hepatitis A virus (HAV)
  - Persons experiencing homelessness
  - Persons working with HAV-infected primates or with HAV in a research laboratory setting
  - Persons with chronic liver disease (including HBV, HCV, cirrhosis, fatty liver disease, alcoholic liver disease, autoimmune hepatitis, persistent elevated AST and ATL twice above the upper limit of normal)
  - Unvaccinated persons who anticipate close contact with an international adoptee during the first 60 days after arrival in the US from a country with high or intermediate endemicity
- Minimum interval between 2 doses is 6 months.
- Hepatitis A vaccine may be used for post-exposure prophylaxis when administered within 2 weeks after exposure for ages 1 year and older.
- Series should be completed with the same product. If the original product is unknown or unavailable, may be completed with another brand.
  - Booster dose of VAQTA may be given 6–12 months after the primary dose of HAVRIX.
- Prefilled syringes may contain latex, but they are preservative free.

HEPATITIS B

For the prevention of: Hepatitis B
Type of vaccine: Inactivated
Brand names (manufacturer):

- Inactivated vaccines:
  - RECOMBIVAX HB (Merck)
  - ENGERIX-B (GSK)
  - HEPLISAV-B (Dynavax)
  - PreHevbrio (VBI Vaccines)

Product	Indicated Age	Dose and Route of Administration	Adverse Effects
RECOMBIVAX HB (5 mcg) **Pediatric/ Adolescent Formulation**	0–19 years	0.5 mL IM **3-dose series: 0, 1, 6 months**	Injection site: Pain **Systemic:** Irritability, fever, diarrhea, fatigue/weakness, diminished appetite, and rhinitis.
RECOMBIVAX HB (10 mcg) **Adult Formulation**	≥20 years	1 mL IM **3-dose series: 0, 1, 6 months**	
RECOMBIVAX HB (40 mcg) **Dialysis Formulation**	≥20 years	1 mL IM **3-dose series: 0, 1, 6 months**	
ENGERIX (10 mcg)	0–19 years	0.5 mL IM **3-dose series: 0, 1, 6 months**	**Injection site:** Soreness **Systemic:** Fatigue
ENGERIX-B (20 mcg)	≥20 years	1 mL IM **3-dose series: 0, 1, 6 months**	
ENGERIX-B (20 mcg) **Adult dialysis patients**	≥20 years	2 mL IM **4-dose series: 0, 1, 2, 6 months**	
HEPLISAV-B (20 mcg)	≥18 years	0.5 mL IM **2-dose series: 0, 1 month**	**Injection site:** Pain **Systemic:** Fatigue, headache
PreHevbrio (10 mcg)	>18 years	1 mL IM **3-dose series: 0, 1, 6 months**	**Injection site:** Pain, tenderness **Systemic:** Headache, fatigue, and myalgia

Storage:

Store at temperatures between 36°F and 46°F (2°C and 8°C). Do not freeze.

Additional Information:

- Alternative and accelerated dosing series for infants born of HBsAg-positive mothers, children (birth through 10 years), and adolescents (aged 11 through 19 years), travelers in immediate need of vaccination, and adults (aged 20 years and older) are available.
- Vaccine recommended for the following:
    - All infants
    - Unvaccinated children aged <19 years
    - All adults aged 19-59 years
    - Adults aged 60 years and older with risk factors for hepatitis B
- Risk Factors
    - Sexually active persons who are at risk for infection
        - Sex partners of persons who test positive for hepatitis B surface antigen (HBsAg)
        - People who are not in long-term, mutually monogamous relationships
        - People seeking evaluation/treatment for a sexually transmitted infection
        - Men who have sex with men
    - Persons at risk for infection by percutaneous or mucosal exposure to blood
        - Persons with current or recent injection use
        - Household contacts of persons who tested positive for HBsAg
        - Residents and staff of facilities for persons with developmental disabilities
        - Health care and public safety personnel with reasonably anticipated risk for exposure to blood or blood-contaminated body fluids
        - Persons on maintenance dialysis, including in-center or home hemodialysis and peritoneal dialysis, and persons who are predialysis
        - Persons with diabetes at the discretion of the treating clinician
    - Others
        - International travelers to countries with high or intermediate levels of endemic hepatitis B (HBV) infection (HBsAg prevalence of >2%)
        - Persons with hepatitis C virus infection
        - Persons with chronic liver disease (including, but not limited to, persons with cirrhosis, fatty liver disease, alcoholic liver disease, autoimmune hepatitis, or an alanine aminotransferase [ALT] or aspartate aminotransferase [AST] level greater than twice the upper limit of normal)
        - Persons with HIV infection
        - Incarcerated persons
- Allergy to yeast is a contraindication to administration of all hepatitis B vaccines.
- If vaccination is started with HEPLISAV-B (recombinant, adjuvanted), dose 2 must be completed using HEPLISAV-B. If the vaccination series is started with Recombivax HB or Engerix-B (recombinant), a 3-dose series would be needed to complete vaccination. The same type of vaccine recombinant, adjuvanted OR recombinant should be used for all doses in the series.
- All vaccines are preservative free.
- RECOMBIVAX HB vial stopper, syringe plunger stopper, and tip cap contain dry natural latex rubber.
- ENGERIX-B prefilled syringe tip caps contain natural rubber latex.
- HEPLISAV-B prefilled syringe tip caps do not contain natural rubber latex.
- PREHEVBRIO vial stopper are not made with natural rubber latex

HEPATITIS A & B

For the prevention of: Hepatitis A and B
Type of vaccine: Inactivated vaccine
Brand names (manufacturer):

- **TWINRIX** (GSK)

Product	Indicated Age	Dose and Route of Administration	Adverse Effects
TWINRIX	≥18 years (given over 6 months)	1 mL IM **3-dose series: 0, 1, 6 months**	**Injection site:** soreness, redness **Systemic:** headache, fatigue
	>18 years accelerated schedule	1 mL IM **4-dose series: 0,7, 21–30 days with booster in 12 months**	

Storage:

Store at temperatures between 36°F and 46°F (2°C and 8°C). Do not freeze.

Additional Information:

- This is a combination of both the HAVRIX and ENGERIX-B.
- Prefilled syringe tip caps contain natural rubber latex.
- Vigorously shake the prefilled syringe by tipping it upside down and back upright again for at least 15 seconds before use.
- Do not administer in the gluteal region; such injection may result in suboptimal response.

HUMAN PAPILLOMAVIRUS

For the prevention of: Human Papillomavirus (HPV)
Type of vaccine: Inactivated vaccine
Brand names (manufacturer):

- **GARDASIL 9 (HPV9)** (Merck)

Product	Indicated Age	Dose and Route of Administration	Adverse Effects
GARDASIL 9 (HPV9)	9–26 years (ACIP recommendation) Recommendations for children and adults aged 9-26 years and adults >26 years apply to all persons, regardless of behavioral or medical risk factors for HPV infection or disease FDA Approved: 9–45 years***	0.5 mL IM **2-dose series (9-14 years old)*:** 0, 6-12 months; may start at 9 years old **3-dose series (≥15 years):** 0, 1-2 months, 6 months**	**Injection site:** Pain, swelling, and erythema **Systemic:** Headache, fever, syncope

*CDC recommendation: 2-dose series—the minimum interval is 5 months. If shorter than 5 months, must administer a third dose at least 12 weeks after the second dose and a minimum of 5 months after the first dose.
**CDC recommendation: 3-dose series—the minimum interval is 4 weeks between the first and second dose and 12 weeks between the second and third dose, with 5 months between the first and third dose. If interval is less than minimal interval allowed, must re-administer dose. If the vaccination schedule is interrupted, vaccine doses do not need to be repeated (no maximum interval).
***Catch-up HPV vaccination is not recommended for all adults aged >26 years. Instead, shared clinical decision-making regarding HPV vaccination is recommended for adults aged 27 through 45 years who are not adequately vaccinated. Catch-up HPV vaccination is recommended for all persons through age 26 who are not adequately vaccinated.

Storage:

- Store at temperatures between 36°F and 46°F (2°C and 8°C). Do not freeze. Protect from light.
- Gardasil 9 may be administered as long as total excursions from the above temperature range equal less than 72 hours. Administer as soon as possible after retrieval from the refrigerator.

Additional Information:

- Dosing Schedule:
    - 2 doses: 0, 6-12 months if starting series before 15th birthday
    - 3 doses (15-45 years and/or immunocompromised): 0, 1-2 months, 6 months
- Vaccine is preservative free.
- Shake vaccine well prior to withdrawal and administration, maintain suspension of the vaccine.
- If the series was started with a different HPV vaccine product, may complete with Gardasil 9.
- Observe patients for 15 minutes after administration due to possible syncope events.
- Vaccine is for prophylaxis only, not for treatment.
- If the vaccine schedule is interrupted, the vaccination series does not need to be restarted.
- Counsel women to continue cervical cancer screenings per standard of care.
- Recipients of vaccine should continue anal cancer screenings, if recommended by provider.
- For persons who are pregnant, HPV vaccination should be delayed until after pregnancy; however, pregnancy testing is not needed before vaccination.
- No pre-vaccination testing (Pap smear, HPV test) is recommended to establish the appropriateness of administration
- Patients who are breastfeeding or lactating caution should be exercised. It is unknown whether Gardasil is excreted in human milk.
- Severe allergy to yeast is a contraindication to administration.

MEASLES, MUMPS, RUBELLA (MMR) (+/- varicella)

For prevention of: Measles, Mumps, and Rubella
Type of vaccine: Live vaccine
Brand names (manufacturer):

- **M-M-R II** (Merck)
- **ProQuad** (Merck)
- **Priorix** (GSK)

Product	Indicated Age	Dose and Route of administration	Adverse Effects
M-M-R II	≥12 months	0.5 mL SubQ **2-dose series for children:** 12–15 months and 4–6 years	**Injection site:** Redness, stinging, burning, and pain **Systemic:** Fever, swelling in cheeks or neck, mild rash
Priorix	>12 months		
ProQuad (contains MMR and varicella)	≥12 months thru 12 years		

Storage and Reconstitution:

- Protect the vaccines from light at all times.
- The vaccines must be reconstituted with sterile diluent supplied with the vaccines. Diluent can be refrigerated or stored at room temperature. Do not freeze the diluent.
- M-M-R II and Priorix
    - To maintain potency, store at temperatures between 36°F and +46°F (2°C to +8°C).
    - Use the vaccine as soon as possible after reconstitution. May store reconstituted vaccine in the vaccine vial in a dark place at 36°F to 46°F (2°C to 8°C) and discard if not used within 8 hours.
- ProQuad
    - Frozen Formulation
        - Store frozen at temperatures between -58°F and +5°F (-50°C to -15°C) for up to 18 months.
        - May be stored in the refrigerator for up to 72 hours prior to reconstitution. Discard if not used within 72 hours of removal from freezer.
    - Refrigerator-stable Formulation
        - Store at temperatures between 36°F and +46°F (2°C to +8°C) or colder.
        - May also be stored in a freezer and subsequently transferred to the refrigerator. Lyophilized vaccine should not be refrozen.
    - Use the vaccine as soon as possible after reconstitution. May store reconstituted vaccine at room temperature, protected from light, for up to 30 minutes, then discarded if not used. Do not freeze reconstituted vaccine.

Additional Information:

- Can be administered on the same day as other live vaccines. If not given on the same day, live vaccines must be separated by at least 4 weeks.
- **Contraindications:** anaphylactic reaction to neomycin, hypersensitivity to previous MMR or MMRV vaccine or gelatin, severe immunosuppression (including AIDS/leukemia/lymphomas/blood dyscrasias), HIV infection with CD4 percentages <15% or CD4 count <200 cells/mm3, pregnancy, severe fever (>101.3 °F), or active untreated tuberculosis.
- Precautions and Warnings- febrile seizures, hypersensitivity to eggs, thrombocytopenia, immune globulins and transfusions.
- **Catch-up vaccination:** Ensure all school-aged children and adolescents have had 2 doses of MMR; the minimum interval between 2 doses is 4 weeks.
- **Pregnancy:** Do not give either vaccine to pregnant patients. Women of child-bearing age should avoid pregnancy for 1 month after receiving MMR and 3 months after receiving ProQuad.
- **PPD tests:** if a patient requires a tuberculin skin test (TST), it should be done before or on the same day as MMR or MMRV. If either vaccine has already been given, wait at least 4 to 6 weeks after vaccination to do TST.
- **International travel:** following CDC recommendations, may administer one dose to children 6–11 months old prior to international travel, but then must also complete the routine schedule of 2 doses after 12 months of age.
- **Outbreaks:** Local health departments may provide additional recommendations, including a second dose for children 1 through 4 years of age and for adults who have only received one dose.
- **M-M-R II and Priorix**
    - Adults born before 1957 are considered immune.
    - Adults born after 1957 without documented evidence of immunity should receive at least one dose of vaccine.
    - **High-risk groups:** health care workers, college students, and international travelers.
- **ProQuad**
    - Maximum age to receive MMRV is 12 years.
    - For patients 12-23 months old who have not been previously vaccinated with measles, mumps, rubella, or varicella: dose 1 of MMRV is associated with higher rates of fever and febrile seizures 5-12 days after MMRV vs. children who receive MMR and varicella vaccines separately.
        - ➢ If the separate MMR and varicella vaccines are used for the 1st dose, then the 2nd dose can be completed with ProQuad
    - Use caution when administering to children with cerebral injury or seizures, hypersensitivity to eggs, hypersensitivity to neomycin
    - Avoid use of salicylates for 6 weeks following administration.
    - May be administered concomitantly with PCV-13, Hepatitis A vaccines at separate injection sites.

VARICELLA

For prevention of: Chickenpox
Type of vaccine: Live vaccine
Brand name (manufacturer):

- **VARIVAX** (Merck)

Product	Indicated Age	Dose and Route of Administration	Adverse Effecs
VARIVAX	≥12 months	0.5 mL SubQ 2-dose series for children: 12–15 months and 4–6 years Minimal interval between varicella doses is 3 months if <13 years of age 2-dose series for persons ≥13 years: 2 doses at least 4 weeks apart [if have extended interval (>8 weeks) between first and second dose, no need to repeat first dose]	**Injection site:** Redness, soreness, swelling, itching **Systemic:** Fever (≥102°F for age 1–12 years; ≥100°F for age ≥13 years), mild varicella-like rash

Storage:

- Prior to reconstitution, store the lyophilized vaccine in a freezer at a temperature between -58°F and 5°F (-50°C and -15°C) and protect from light.
- May be removed from freezer and stored at refrigerator temperature (36°F to 46°F; 2°C to 8°C) for up to 72 continuous hours prior to reconstitution. Vaccine must be discarded if not used within 72 hours
- The diluent should be stored separately at room temperature (68°F to 77°F; 20°C to 25°C) or in the refrigerator.
- Reconstitute the lyophilized vaccine immediately after removing from the freezer and allowing the vaccine to thaw. Discard the reconstituted vaccine if not used within 30 minutes. Do not freeze the reconstituted vaccine.
- When reconstituted, the vaccine is a clear, colorless to pale yellow liquid.

Additional Information:

- Administer to all persons aged ≥13 years without evidence of varicella immunity.
- ACIP strongly recommends VARIVAX to be administered with other recommended vaccines at 12–15 months, regardless of prior history of varicella disease.
- Administer VARIVAX at any time without regards to inactivated vaccines.
- Administer VARIVAX at least 4 weeks before or after another live-attenuated vaccine unless given on the same day (oral typhoid-no time lapse needed).
- FDA approved for the prevention of varicella, not the treatment in individuals 12 months and older.
- Contraindications: severe allergy to gelatin or neomycin, severe reaction to a previous varicella-containing vaccine, pregnancy, immunosuppression, moderate or severe febrile illness, active or untreated Tuberculosis.
- Patients of child-bearing age should avoid pregnancy for 1 month after vaccination.
- The vaccine may be given to postpartum patients without evidence of immunity regardless if breastfeeding or not.
- TB skin testing can be performed before vaccination with VARIVAX, on the same day, or 4 weeks post administration.
- Avoid use of salicylates for 6 weeks following administration of VARIVAX to children and adolescents due to risk of Reye's Syndrome during wild-type varicella infections.
- HIV-infected children with CD4 T-lymphocyte percentage of 15% or higher and older children and adults with a CD4 count of 200 per microliter or higher may be considered for vaccination.
    - These patients may receive single-antigen varicella vaccines but not combination MMR + varicella vaccine (ProQuad).
- Administration of blood products (whole blood, packed red blood cells) and varicella vaccine should be separated by 3–11 months after receipt of antibody-containing blood products.
- Low-dose (<2 mg/kg/day or <20mg/day for less than 2 weeks), alternate day, topical, replacement, inhaled steroid products, and steroid therapy discontinued for 1 month are not contraindications to vaccination.
- Chemotherapy discontinued for at least 3 months is not a contraindication to vaccination.

HERPES ZOSTER

For the prevention of: Herpes zoster (Shingles)
Type of vaccine: inactivated
Brand names (manufacturer):

- Inactivated, recombinant, adjuvanted vaccine:
  - SHINGRIX (GSK)

Product	Indicated Age	Dose and Route of Administration	Adverse Events
SHINGRIX	≥50 years ≥18 years who are immuno-compromised*	0.5 mL IM **2-dose series: 0, 2–6 months****	**Injection site:** Pain, redness, swelling, muscle pain **Systemic:** Myalgia, fatigue, headache, fever, shivering, syncope, Guillain-Barré Syndrome (GBS)***

*ACIP recommends 2 doses of RZV for the prevention of herpes zoster and related complications in adults aged ≥19 years who are or will be immunodeficient or immunosuppressed because of disease or therapy.
**ACIP recommendations: for persons who are or will be immunodeficient or immunosuppressed and who would benefit from a shorter vaccination schedule, the second dose can be administered 1–2 months after the first. If the second RZV dose is given sooner than 4 weeks after the first, a valid second dose should be repeated at least 4 weeks after the dose given too early. If it has been >6 months since first dose, give the vaccine as soon as feasible and do not restart series.
***Increased risk of GBS within the first 42 days following SHINGRIX vaccination. While the results of this observational study suggest a causal association of GBS with SHINGRIX, available evidence is insufficient to establish a causal relationship.

Storage and Handling:

- Refrigerate both lyophilized vaccine and adjuvant suspension between 36°F and 46°F (2°C and 8°C). Once reconstituted, it may be stored in the refrigerator for up to 6 hours.
- Do not freeze; discard if adjuvant suspension, antigen component, or reconstituted vaccine have been frozen. Protect from light.

Additional Information:

- SHINGRIX is FDA approved for the prevention, not treatment, of herpes zoster (shingles).
- SHINGRIX is not indicated and has not been studied for the prevention of varicella.
- Vaccination is recommended with SHINGRIX for individuals who have previously received ZOSTAVAX (at least 8 weeks after ZOSTAVAX).
- There is currently no ACIP recommendation for RZV use in pregnancy. Consider delaying RZV until after pregnancy.
- Recombinant vaccines such as RZV pose no known risk to mothers who are breastfeeding or to their infants.
- There is no ACIP or CDC recommendation on a specific interval that a patient must wait to receive a herpes zoster vaccine after having shingles, but it is recommended to wait until the symptoms of the acute illness have resolved.

COVID 19 (Coronavirus Disease 2019)

For the most up to date information, please visit the following site: https://www.cdc.gov/vaccines/covid-19/clinical-considerations/interim-considerations-us.html

Monkeypox

For the most up to date information, please visit the following site:

https://www.cdc.gov/poxvirus/monkeypox/health-departments/vaccine-considerations.html

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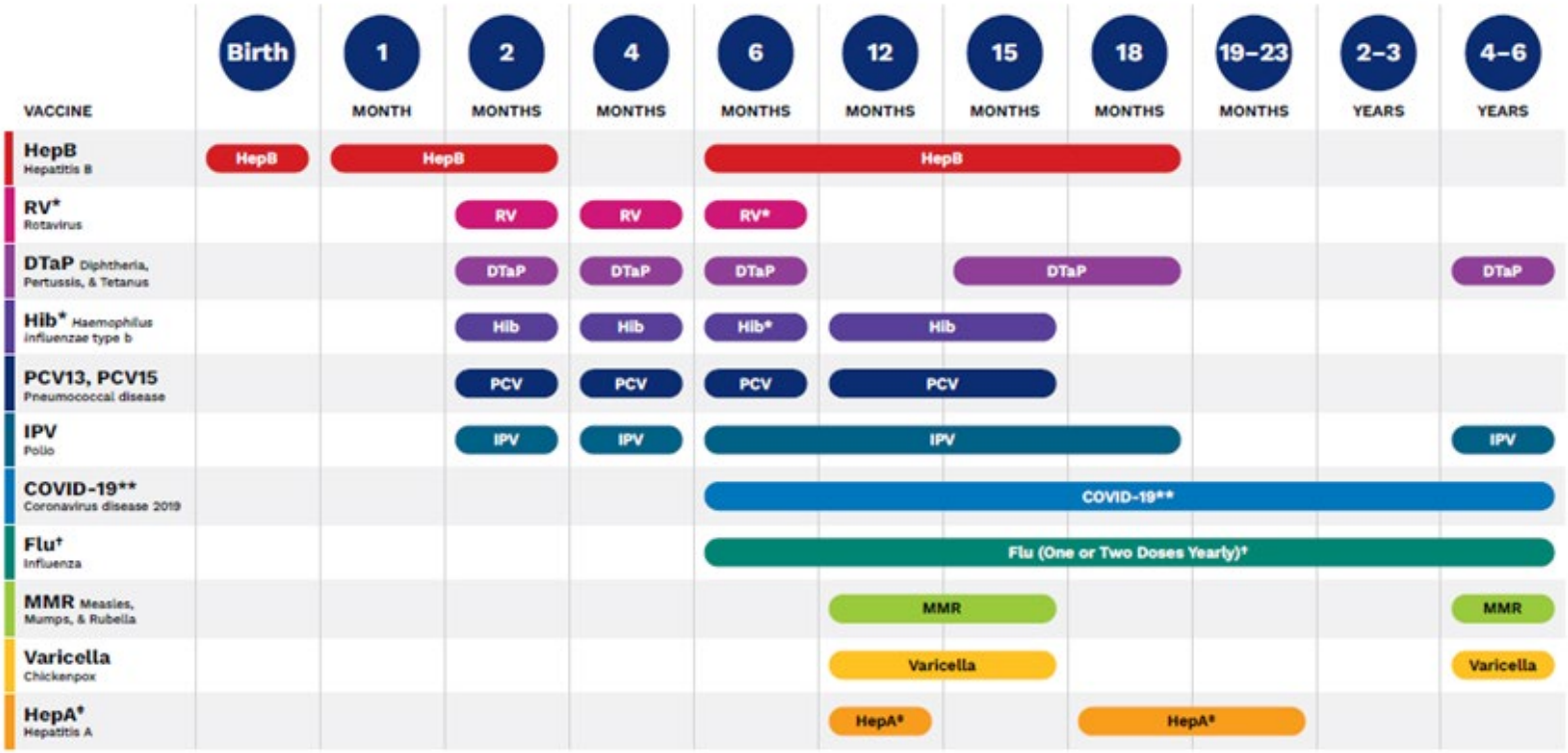
2023 Recommended Immunizations for Children from Birth Through 6 Years Old



FOOTNOTES

RV* Hib*
Administering a third dose at age 6 months depends on the brand of Hib or rotavirus vaccine used for previous dose.

COVID-19**
Number of doses recommended depends on your child's age and type of COVID-19 vaccine used.

Flu†
Two doses given at least 4 weeks apart are recommended for children age 6 months through 8 years of age who are getting an influenza (flu) vaccine for the first time and for some other children in this age group.

HepA‡
Two doses of Hep A vaccine are needed for lasting protection. The 2 doses should be given between age 12 and 23 months. Both doses should be separated by at least 6 months. Children 2 years and older who have not received 2 doses of Hep A should complete the series.

ADDITIONAL INFORMATION

1. If your child misses a shot recommended for their age, talk to your child's doctor as soon as possible to see when the missed shot can be given.

2. If your child has any medical conditions that put them at risk for infection (e.g., sickle cell, HIV infection, cochlear implants) or is traveling outside the United States, talk to your child's doctor about additional vaccines that they may need.

Talk with your child's doctor if you have questions about any shot recommended for your child.

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

FOR MORE INFORMATION
Call toll-free: 1-800-CDC-INFO (1-800-232-4636)
Or visit: cdc.gov/vaccines/parents

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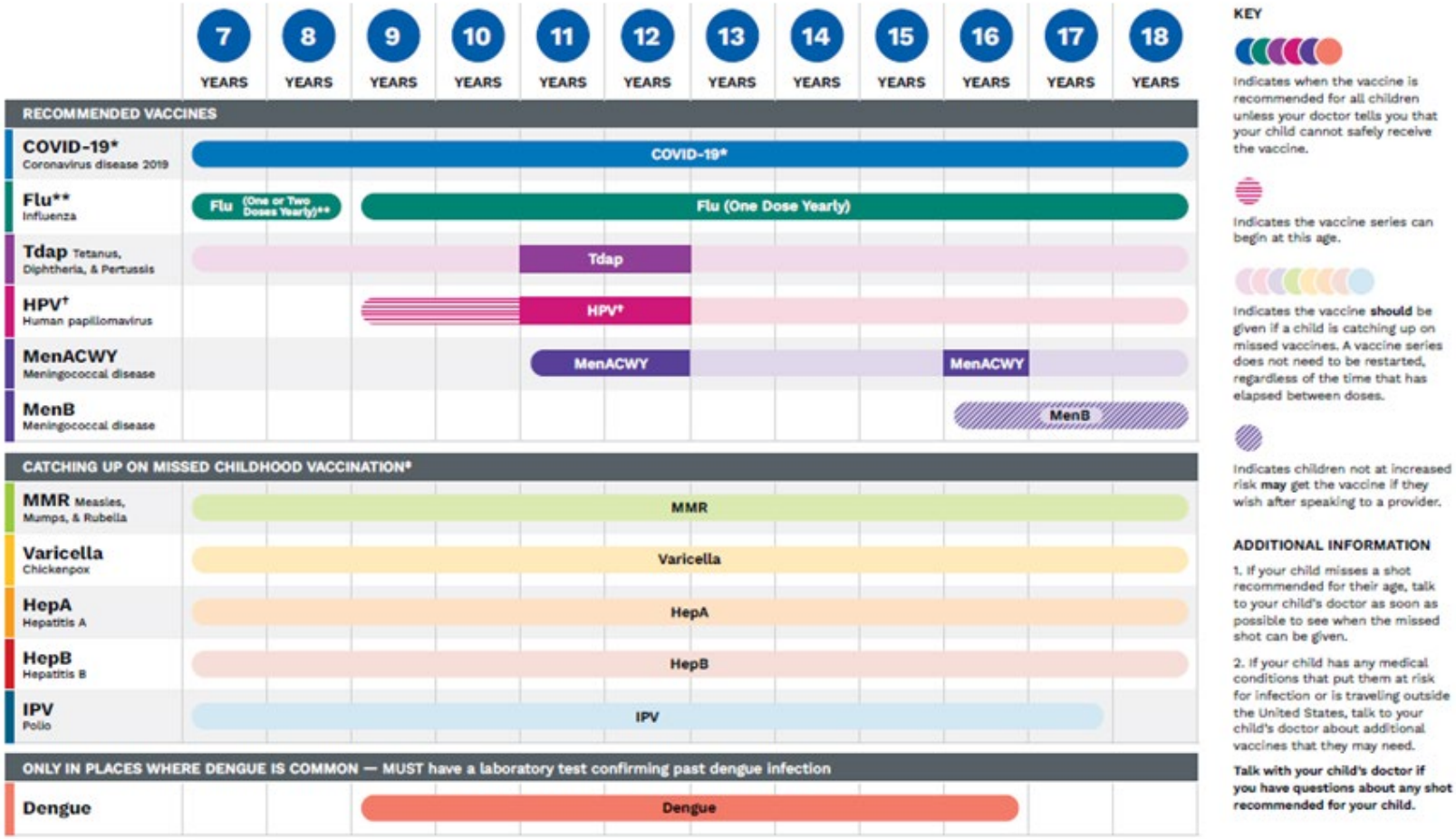
2023 Recommended Immunizations for Children 7–18 Years Old



KEY

Indicates when the vaccine is recommended for all children unless your doctor tells you that your child cannot safely receive the vaccine.

Indicates the vaccine series can begin at this age.

Indicates the vaccine **should** be given if a child is catching up on missed vaccines. A vaccine series does not need to be restarted, regardless of the time that has elapsed between doses.

Indicates children not at increased risk **may** get the vaccine if they wish after speaking to a provider.

ADDITIONAL INFORMATION

1. If your child misses a shot recommended for their age, talk to your child's doctor as soon as possible to see when the missed shot can be given.

2. If your child has any medical conditions that put them at risk for infection or is traveling outside the United States, talk to your child's doctor about additional vaccines that they may need.

Talk with your child's doctor if you have questions about any shot recommended for your child.

FOOTNOTES

COVID-19* Number of doses recommended depends on your child's age and type of COVID-19 vaccine used.

Flu** Two doses given at least 4 weeks apart are recommended for children age 6 months through 8 years of age who are getting an influenza (flu) vaccine for the first time and for some other children in this age group.

HPV† Ages 11 through 12 years old should get a 2-shot series separated by 6 to 12 months. The series can begin at 9 years old. A 3-shot series is recommended for those with weakened immune systems and those who start the series after their 15th birthday.

§Originally recommended age ranges for missed childhood vaccinations: 2-dose series of **MMR** at 12–15 months and 4–6 years; 2-dose series of **Varicella** at 12–15 months and 4–6 years; 2-dose series of **HepA** (minimum interval: 6 months) at age 12–23 months; 3-dose series of **HepB** at birth, 1–2 months, and 6–18 months; and 4-dose series of **Polio** at 2 months, 4 months, 6–18 months, and 4–6 years.

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

FOR MORE INFORMATION
Call toll-free: 1-800-CDC-INFO (1-800-232-4636)
Or visit: cdc.gov/vaccines/parents

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Table 1 Recommended Adult Immunization Schedule by Age Group, United States, 2023

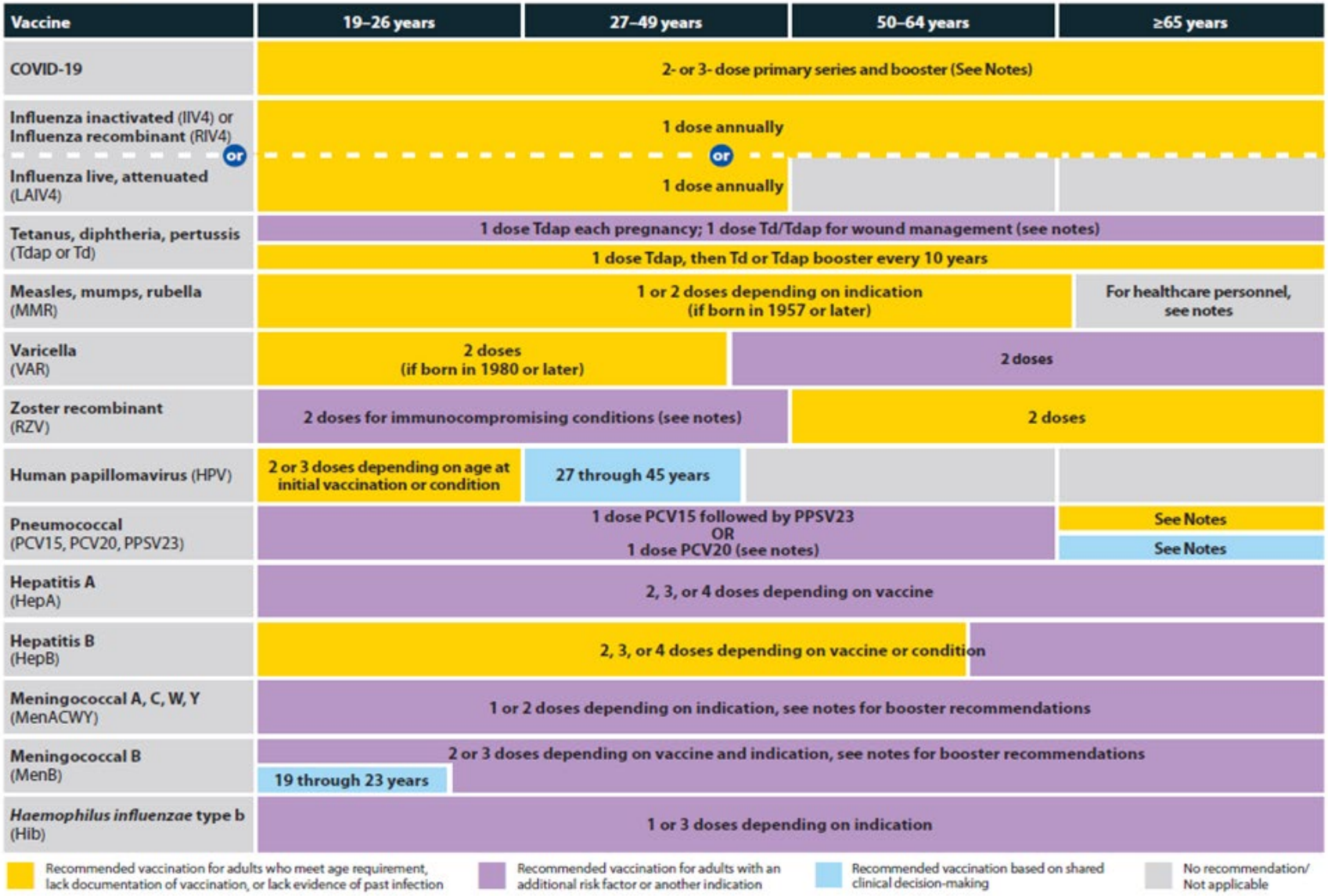

Table 2 Recommended Adult Immunization Schedule by Medical Condition or Other Indication, United States, 2023

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[a]	Chronic liver disease	Diabetes	Health care personnel[b]	Men who have sex with men
			<15% or <200 mm³	≥15% and ≥200 mm³							
COVID-19		See Notes									
IIV4 or RIV4	1 dose annually										
or										or	
LAIV4	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, 3, or 4 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[c] 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.
  *Vaccinate after pregnancy.
- No recommendation/ Not applicable

a. Precaution for LAIV4 does not apply to alcoholism. **b.** See notes for influenza; hepatitis B; measles, mumps, and rubella; and varicella vaccinations. **c.** Hematopoietic stem cell transplant.