



# MARYLAND Department of Health

## 2022 Recommended Childhood Immunization Schedule

Vaccine ↓	Age ▶	Birth	2 months	4 months	6 months	12 months	15 months	18 months	2-3 years	4-6 years
Hepatitis B		<b>Hep B</b>	<b>Hep B</b>		<b>Hep B</b>					
Rotavirus			<b>RV</b>	<b>RV</b>	<b>RV</b>					
Diphtheria, tetanus, & acellular pertussis			<b>DTaP</b>	<b>DTaP</b>	<b>DTaP</b>		<b>DTaP</b>			<b>DTaP</b>
Haemophilus Influenzae type b			<b>Hib</b>	<b>Hib</b>	<b>Hib</b>		<b>Hib</b>			<b>Hib</b>
Pneumococcal Conjugate			<b>PCV13</b>	<b>PCV13</b>	<b>PCV13</b>	<b>PCV13</b>				<b>PCV 13</b>
Pneumococcal Polysaccharide								<b>PPSV23</b>		
Inactivated Poliovirus			<b>IPV</b>	<b>IPV</b>	<b>IPV</b>					<b>IPV</b>
Influenza						<b>INFLUENZA (YEARLY)</b>		<b>1 OR 2 DOSES</b>		
Measles, Mumps, Rubella					<b>MMR</b>	<b>MMR</b>				<b>MMR</b>
Varicella						<b>Var</b>				<b>Var</b>
Hepatitis A						<b>Hep A</b>		<b>Hep A</b>	<b>Hep A</b>	
Meningococcal			<b>Meningococcal</b>							

Please see reverse side for footnotes

Approved by MedChi - The Maryland State Medical Society

**Catch-Up Vaccination**

**Certain High-Risk Groups**

This schedule includes recommendations in effect as of January 01, 2022. The use of a combination vaccine generally is preferred over separate injections of its equivalent component vaccines. Clinically significant adverse events that follow vaccination should be reported to the Vaccine Adverse Event Reporting System (VAERS) online (<http://www.vaers.hhs.gov>) or by telephone (800-822-7967)

**Table 1. Recommended Immunization Schedule for Children from Birth through 6 Years Old—United States, 2022**



# MARYLAND Department of Health

## 2022 Recommended Adolescent Immunization Schedule

Vaccine	Age	7 - 10 Years	11-12 Years	13 –18 Years
Tetanus, Diphtheria, Pertussis		Tdap (if indicated)	Tdap	Tdap
Human Papillomavirus		Boys & Girls at 9 HPV	HPV	HPV
Meningococcal		MCV4	MCV4	MCV4 Booster At Age 16
Influenza		Influenza ( Yearly)		
Hepatitis B		Complete Hep B Series		
Inactivated Polio		Complete Inactivated Polio		
Measles, Mumps, Rubella		Complete MMR Series		
Varicella		Complete Varicella Series		
Hepatitis A		Complete Hep A Series and/or High Risk Groups		
Meningococcal B			Meningococcal B	Ages 16—18
Pneumococcal		Pneumococcal		
Haemophilus Influenzae type b		Haemophilus Influenzae type b		

Please see reverse side for footnotes

Approved by MedChi—The Maryland State Medical Society

Do not restart any series when there is proof of prior vaccination, just complete series by administering missing doses.

**Recommended ages for all Adolescents**

**Catch-Up Vaccination**

**Certain High-Risk Groups**

**Non-high risk groups subject to clinical decision making**

This schedule includes recommendations in effect as of January 01, 2022. The use of a combination vaccine generally is preferred over separate injections of its equivalent component vaccines. Clinically significant adverse events that follow vaccination should be reported to the Vaccine Adverse Event Reporting System (VAERS) online (<http://www.vaers.hhs.gov>) or by telephone (800-822-7967).

**Table 1 Cont'd. Recommended Immunization Schedule for Children and Adolescents Aged 7-18 Years old —United States, 2022**

# Table 2 Recommended Catch-up Immunization Schedule for Children and Adolescents Who Start Late or Who Are More than 1 Month Behind, United States, 2022

The table below provides catch-up schedules and minimum intervals between doses for children whose vaccinations have been delayed. A vaccine series does not need to be restarted, regardless of the time that has elapsed between doses. Use the section appropriate for the child's age. **Always use this table in conjunction with Table 1 and the Notes that follow.**

Children age 4 months through 6 years					
Vaccine	Minimum Age for Dose 1	Minimum Interval Between Doses			
		Dose 1 to Dose 2	Dose 2 to Dose 3	Dose 3 to Dose 4	Dose 4 to Dose 5
Hepatitis B	Birth	<b>4 weeks</b>	<b>8 weeks and at least 16 weeks after first dose</b> minimum age for the final dose is 24 weeks		
Rotavirus	6 weeks Maximum age for first dose is 14 weeks, 6 days.	<b>4 weeks</b>	<b>4 weeks</b> maximum age for final dose is 8 months, 0 days		
Diphtheria, tetanus, and acellular pertussis	6 weeks	<b>4 weeks</b>	<b>4 weeks</b>	<b>6 months</b>	<b>6 months</b>
<i>Haemophilus influenzae</i> type b	6 weeks	<b>No further doses needed</b> if first dose was administered at age 15 months or older. <b>4 weeks</b> if first dose was administered before the 1 <sup>st</sup> birthday. <b>8 weeks (as final dose)</b> if first dose was administered at age 12 through 14 months.	<b>No further doses needed</b> if previous dose was administered at age 15 months or older <b>4 weeks</b> if current age is younger than 12 months <b>and</b> first dose was administered at younger than age 7 months <b>and</b> at least 1 previous dose was PRP-T (ActHib®, Pentacel®, Hiberix®), Vaxelis® or unknown <b>8 weeks and age 12 through 59 months (as final dose)</b> if current age is younger than 12 months <b>and</b> first dose was administered at age 7 through 11 months; OR if current age is 12 through 59 months <b>and</b> first dose was administered before the 1 <sup>st</sup> birthday <b>and</b> second dose was administered at younger than 15 months; OR if both doses were PedvaxHIB® and were administered before the 1st birthday	<b>8 weeks (as final dose)</b> This dose only necessary for children age 12 through 59 months who received 3 doses before the 1 <sup>st</sup> birthday.	
Pneumococcal conjugate	6 weeks	<b>No further doses needed</b> for healthy children if first dose was administered at age 24 months or older <b>4 weeks</b> if first dose was administered before the 1 <sup>st</sup> birthday <b>8 weeks (as final dose for healthy children)</b> if first dose was administered at the 1 <sup>st</sup> birthday or after	<b>No further doses needed</b> for healthy children if previous dose was administered at age 24 months or older <b>4 weeks</b> if current age is younger than 12 months and previous dose was administered at <7 months old <b>8 weeks (as final dose for healthy children)</b> if previous dose was administered between 7–11 months (wait until at least 12 months old); OR if current age is 12 months or older and at least 1 dose was administered before age 12 months	<b>8 weeks (as final dose)</b> This dose only necessary for children age 12 through 59 months who received 3 doses before age 12 months or for children at high risk who received 3 doses at any age.	
Inactivated poliovirus	6 weeks	<b>4 weeks</b>	<b>4 weeks</b> if current age is <4 years <b>6 months (as final dose)</b> if current age is 4 years or older	<b>6 months (minimum age 4 years for final dose)</b>	
Measles, mumps, rubella	12 months	<b>4 weeks</b>			
Varicella	12 months	<b>3 months</b>			
Hepatitis A	12 months	<b>6 months</b>			
Meningococcal ACWY	2 months MenACWY-CRM 9 months MenACWY-D 2 years MenACWY-TT	<b>8 weeks</b>	See Notes	See Notes	
Children and adolescents age 7 through 18 years					
Meningococcal ACWY	Not applicable (N/A)	<b>8 weeks</b>			
Tetanus, diphtheria; tetanus, diphtheria, and acellular pertussis	7 years	<b>4 weeks</b>	<b>4 weeks</b> if first dose of DTaP/DT was administered before the 1 <sup>st</sup> birthday <b>6 months (as final dose)</b> if first dose of DTaP/DT or Tdap/Td was administered at or after the 1 <sup>st</sup> birthday	<b>6 months</b> if first dose of DTaP/DT was administered before the 1 <sup>st</sup> birthday	
Human papillomavirus	9 years	<b>Routine dosing intervals are recommended.</b>			
Hepatitis A	N/A	<b>6 months</b>			
Hepatitis B	N/A	<b>4 weeks</b>	<b>8 weeks and at least 16 weeks after first dose</b>		
Inactivated poliovirus	N/A	<b>4 weeks</b>	<b>6 months</b> A fourth dose is not necessary if the third dose was administered at age 4 years or older and at least 6 months after the previous dose.	A fourth dose of IPV is indicated if all previous doses were administered at <4 years or if the third dose was administered <6 months after the second dose.	
Measles, mumps, rubella	N/A	<b>4 weeks</b>			
Varicella	N/A	<b>3 months</b> if younger than age 13 years. <b>4 weeks</b> if age 13 years or older			

**Table 3**

**Recommended Child and Adolescent Immunization Schedule by Medical Indication, United States, 2022**

Always use this table in conjunction with Table 1 and the Notes that follow.

VACCINE	INDICATION									
	Pregnancy	Immunocompromised status (excluding HIV infection)	HIV infection CD4+ count <sup>1</sup>		Kidney failure, end-stage renal disease, or on hemodialysis	Heart disease or chronic lung disease	CSF leak or cochlear implant	Asplenia or persistent complement deficiencies	Chronic liver disease	Diabetes
			<15% or total CD4 cell count of <200/mm <sup>3</sup>	≥15% and total CD4 cell count of ≥200/mm <sup>3</sup>						
Hepatitis B	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Rotavirus	Yellow	Red (SCID <sup>2</sup> )	Orange	Orange	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Diphtheria, tetanus, and acellular pertussis (DTaP)	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
<i>Haemophilus influenzae</i> type b	Yellow	Yellow with dots	Yellow with dots	Yellow with dots	Yellow	Yellow	Yellow with dots	Yellow	Yellow	Yellow
Pneumococcal conjugate	Yellow	Yellow with dots	Yellow with dots	Yellow with dots	Yellow with dots	Yellow with dots	Yellow with dots	Yellow with dots	Yellow with dots	Yellow with dots
Inactivated poliovirus	Orange	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Influenza (IIV4) or Influenza (LAIV4)	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Influenza (LAIV4)	Red	Red	Red	Red	Red	Orange (Asthma, wheezing: 2–4yrs <sup>3</sup> )	Red	Red	Orange	Orange
Measles, mumps, rubella	Red (*)	Red	Red	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Varicella	Red (*)	Red	Red	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Hepatitis A	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Tetanus, diphtheria, and acellular pertussis (Tdap)	Yellow with dots	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Human papillomavirus	Red (*)	Yellow with dots	Yellow with dots	Yellow with dots	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Meningococcal ACWY	Yellow	Yellow	Yellow with dots	Yellow with dots	Yellow	Yellow	Yellow	Yellow with dots	Yellow	Yellow
Meningococcal B	Orange	Purple	Purple	Purple	Purple	Purple	Purple	Purple with dots	Purple	Purple
Pneumococcal polysaccharide	Purple	Yellow with dots	Yellow with dots	Yellow with dots	Yellow with dots	Yellow with dots	Yellow with dots	Yellow with dots	Yellow with dots	Yellow with dots

Vaccination according to the routine schedule recommended
 
 Recommended for persons with an additional risk factor for which the vaccine would be indicated
 

 Vaccination is recommended, and additional doses may be necessary based on medical condition or vaccine. See Notes.
 

 Precaution—vaccine 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

<sup>1</sup> For additional information regarding HIV laboratory parameters and use of live vaccines, see the *General Best Practice Guidelines for Immunization, "Altered Immunocompetence,"* at [www.cdc.gov/vaccines/hcp/acip-recs/general-recs/immunocompetence.html](http://www.cdc.gov/vaccines/hcp/acip-recs/general-recs/immunocompetence.html) and Table 4-1 (footnote J) at [www.cdc.gov/vaccines/hcp/acip-recs/general-recs/contraindications.html](http://www.cdc.gov/vaccines/hcp/acip-recs/general-recs/contraindications.html).  
<sup>2</sup> Severe Combined Immunodeficiency  
<sup>3</sup> LAIV4 contraindicated for children 2–4 years of age with asthma or wheezing during the preceding 12 months

For vaccination recommendations for persons ages 19 years or older, see the Recommended Adult Immunization Schedule, 2022.

### Additional information

#### COVID-19 Vaccination

**COVID-19 vaccines are recommended for use 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](http://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](http://www.cdc.gov/vaccines/covid-19/clinical-considerations/covid-19-vaccines-us.html).**

- Consult relevant ACIP statements for detailed recommendations at [www.cdc.gov/vaccines/hcp/acip-recs/index.html](http://www.cdc.gov/vaccines/hcp/acip-recs/index.html).
- For calculating intervals between doses, 4 weeks = 28 days. Intervals of ≥4 months are determined by calendar months.
- Within a number range (e.g., 12–18), a dash (–) should be read as “through.”
- Vaccine doses administered ≤4 days before the minimum age or interval are considered valid. Doses of any vaccine administered ≥5 days earlier than the minimum age or minimum interval should not be counted as valid and should be repeated as age appropriate. **The repeat dose should be spaced after the invalid dose by the recommended minimum interval.** For further details, see Table 3-1, Recommended and minimum ages and intervals between vaccine doses, in *General Best Practice Guidelines for Immunization* at [www.cdc.gov/vaccines/hcp/acip-recs/general-recs/timing.html](http://www.cdc.gov/vaccines/hcp/acip-recs/general-recs/timing.html).
- Information on travel vaccination requirements and recommendations is available at [www.cdc.gov/travel/](http://www.cdc.gov/travel/).
- For vaccination of persons with immunodeficiencies, see Table 8-1, Vaccination of persons with primary and secondary immunodeficiencies, in *General Best Practice Guidelines for Immunization* at [www.cdc.gov/vaccines/hcp/acip-recs/general-recs/immunocompetence.html](http://www.cdc.gov/vaccines/hcp/acip-recs/general-recs/immunocompetence.html), and Immunization in Special Clinical Circumstances (In: Kimberlin DW, Brady MT, Jackson MA, Long SS, eds. *Red Book: 2018 Report of the Committee on Infectious Diseases*. 31<sup>st</sup> ed. Itasca, IL: American Academy of Pediatrics; 2018:67–111).
- For information about vaccination in the setting of a vaccine-preventable disease outbreak, contact your state or local health department.
- The National Vaccine Injury Compensation Program (VICP) is a no-fault alternative to the traditional legal system for resolving vaccine injury claims. All routine child and adolescent vaccines are covered by VICP except for pneumococcal polysaccharide vaccine (PPSV23). For more information, see [www.hrsa.gov/vaccinecompensation/index.html](http://www.hrsa.gov/vaccinecompensation/index.html).

### Diphtheria, tetanus, and pertussis (DTaP) vaccination (minimum age: 6 weeks [4 years for Kinrix® or Quadracel®])

#### Routine vaccination

- 5-dose series at age 2, 4, 6, 15–18 months, 4–6 years
  - Prospectively:** Dose 4 may be administered as early as age 12 months if at least 6 months have elapsed since dose 3.
  - Retrospectively:** A 4<sup>th</sup> dose that was inadvertently administered as early as age 12 months may be counted if at least 4 months have elapsed since dose 3.

#### Catch-up vaccination

- Dose 5 is not necessary if dose 4 was administered at age 4 years or older and at least 6 months after dose 3.
- For other catch-up guidance, see Table 2.

#### Special situations

- Wound management in children less than age 7 years with history of 3 or more doses of tetanus-toxoid-containing vaccine: For all wounds except clean and minor wounds, administer DTaP if more than 5 years since last dose of tetanus-toxoid-containing vaccine. For detailed information, see [www.cdc.gov/mmwr/volumes/67/rr/rr6702a1.htm](http://www.cdc.gov/mmwr/volumes/67/rr/rr6702a1.htm).

### Haemophilus influenzae type b vaccination (minimum age: 6 weeks)

#### Routine vaccination

- ActHIB®, Hiberix®, Pentacel®, or Vaxelis®:** 4-dose series (3 dose primary series at age 2, 4, and 6 months, followed by a booster dose\* at age 12–15 months)
  - \*Vaxelis® is not recommended for use as a booster dose. A different Hib-containing vaccine should be used for the booster dose.
- PedvaxHIB®:** 3-dose series (2-dose primary series at age 2 and 4 months, followed by a booster dose at age 12–15 months)

#### Catch-up vaccination

- Dose 1 at age 7–11 months:** Administer dose 2 at least 4 weeks later and dose 3 (final dose) at age 12–15 months or 8 weeks after dose 2 (whichever is later).
- Dose 1 at age 12–14 months:** Administer dose 2 (final dose) at least 8 weeks after dose 1.

- Dose 1 before age 12 months and dose 2 before age 15 months:** Administer dose 3 (final dose) at least 8 weeks after dose 2.
- 2 doses of PedvaxHIB® before age 12 months:** Administer dose 3 (final dose) at 12–59 months and at least 8 weeks after dose 2.
- 1 dose administered at age 15 months or older:** No further doses needed
- Unvaccinated at age 15–59 months:** Administer 1 dose.
- Previously unvaccinated children age 60 months or older who are not considered high risk:** Do not require catch-up vaccination

For other catch-up guidance, see Table 2. Vaxelis® can be used for catch-up vaccination in children less than age 5 years. Follow the catch-up schedule even if Vaxelis® is used for one or more doses. For detailed information on use of Vaxelis® see [www.cdc.gov/mmwr/volumes/69/wr/mm6905a5.htm](http://www.cdc.gov/mmwr/volumes/69/wr/mm6905a5.htm).

#### Special situations

##### Chemotherapy or radiation treatment:

###### Age 12–59 months

- Unvaccinated or only 1 dose before age 12 months: 2 doses, 8 weeks apart
- 2 or more doses before age 12 months: 1 dose at least 8 weeks after previous dose

*Doses administered within 14 days of starting therapy or during therapy should be repeated at least 3 months after therapy completion.*

##### Hematopoietic stem cell transplant (HSCT):

- 3-dose series 4 weeks apart starting 6 to 12 months after successful transplant, regardless of Hib vaccination history

##### Anatomic or functional asplenia (including sickle cell disease):

###### Age 12–59 months

- Unvaccinated or only 1 dose before age 12 months: 2 doses, 8 weeks apart
- 2 or more doses before age 12 months: 1 dose at least 8 weeks after previous dose

###### Unvaccinated\* persons age 5 years or older

- 1 dose

##### Elective splenectomy:

###### Unvaccinated\* persons age 15 months or older

- 1 dose (preferably at least 14 days before procedure)

##### HIV infection:

###### Age 12–59 months

- Unvaccinated or only 1 dose before age 12 months: 2 doses, 8 weeks apart
- 2 or more doses before age 12 months: 1 dose at least 8 weeks after previous dose

###### Unvaccinated\* persons age 5–18 years

- 1 dose

##### Immunoglobulin deficiency, early component complement deficiency:

###### Age 12–59 months

- Unvaccinated or only 1 dose before age 12 months: 2 doses, 8 weeks apart
- 2 or more doses before age 12 months: 1 dose at least 8 weeks after previous dose

\*Unvaccinated = Less than routine series (through age 14 months) OR no doses (age 15 months or older)

**Hepatitis A vaccination**

(minimum age: 12 months for routine vaccination)

**Routine vaccination**

- 2-dose series (minimum interval: 6 months) at age 12–23 months

**Catch-up vaccination**

- Unvaccinated persons through age 18 years should complete a 2-dose series (minimum interval: 6 months).
- Persons who previously received 1 dose at age 12 months or older should receive dose 2 at least 6 months after dose 1.
- Adolescents age 18 years or older may receive the combined HepA and HepB vaccine, **Twinrix**<sup>®</sup>, as a 3-dose series (0, 1, and 6 months) or 4-dose series (3 doses at 0, 7, and 21–30 days, followed by a booster dose at 12 months).

**International travel**

- Persons traveling to or working in countries with high or intermediate endemic hepatitis A ([www.cdc.gov/travel/](http://www.cdc.gov/travel/)):
  - **Infants age 6–11 months:** 1 dose before departure; revaccinate with 2 doses, separated by at least 6 months, between age 12–23 months.
  - **Unvaccinated age 12 months or older:** Administer dose 1 as soon as travel is considered.

**Hepatitis B vaccination**

(minimum age: birth)

**Birth dose (monovalent HepB vaccine only)**

- **Mother is HBsAg-negative:**
  - **All** medically stable infants  $\geq 2,000$  grams: 1 dose within 24 hours of birth
  - Infants  $< 2,000$  grams: Administer 1 dose at chronological age 1 month or hospital discharge (whichever is earlier and even if weight is still  $< 2,000$  grams).
- **Mother is HBsAg-positive:**
  - Administer **HepB vaccine** and **hepatitis B immune globulin (HBIG)** (in separate limbs) within 12 hours of birth, regardless of birth weight. For infants  $< 2,000$  grams, administer 3 additional doses of vaccine (total of 4 doses) beginning at age 1 month.
  - Test for HBsAg and anti-HBs at age 9–12 months. If HepB series is delayed, test 1–2 months after final dose.
- **Mother's HBsAg status is unknown:**
  - Administer **HepB vaccine** within 12 hours of birth, regardless of birth weight.
  - For infants  $< 2,000$  grams, administer **HBIG** in addition to HepB vaccine (in separate limbs) within 12 hours of birth. Administer 3 additional doses of vaccine (total of 4 doses) beginning at age 1 month.
  - Determine mother's HBsAg status as soon as possible. If mother is HBsAg-positive, administer **HBIG** to infants  $\geq 2,000$  grams as soon as possible, but no later than 7 days of age.

**Routine series**

- 3-dose series at age 0, 1–2, 6–18 months (use monovalent HepB vaccine for doses administered before age 6 weeks)
- Infants who did not receive a birth dose should begin the series as soon as feasible (see Table 2).

- Administration of **4 doses** is permitted when a combination vaccine containing HepB is used after the birth dose.
- **Minimum age** for the final (3<sup>rd</sup> or 4<sup>th</sup>) dose: 24 weeks
- **Minimum intervals:** dose 1 to dose 2: 4 weeks / dose 2 to dose 3: 8 weeks / dose 1 to dose 3: 16 weeks (when 4 doses are administered, substitute "dose 4" for "dose 3" in these calculations)

**Catch-up vaccination**

- Unvaccinated persons should complete a 3-dose series at 0, 1–2, 6 months.
- Adolescents age 11–15 years may use an alternative 2-dose schedule with at least 4 months between doses (adult formulation **Recombivax HB**<sup>®</sup> only).
- Adolescents age 18 years or older may receive a 2-dose series of HepB (**Heplisav-B**<sup>®</sup>) at least 4 weeks apart.
- Adolescents age 18 years or older may receive the combined HepA and HepB vaccine, **Twinrix**<sup>®</sup>, as a 3-dose series (0, 1, and 6 months) or 4-dose series (3 doses at 0, 7, and 21–30 days, followed by a booster dose at 12 months).
- For other catch-up guidance, see Table 2.

**Special situations**

- Revaccination is not generally recommended for persons with a normal immune status who were vaccinated as infants, children, adolescents, or adults.
- **Post-vaccination serology testing and revaccination** (if anti-HBs  $< 10$  mIU/mL) is recommended for certain populations, including:
  - **Infants born to HBsAg-positive mothers**
  - **Hemodialysis patients**
  - **Other immunocompromised persons**

For detailed revaccination recommendations, see [www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/hepb.html](http://www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/hepb.html).

**Human papillomavirus vaccination**

(minimum age: 9 years)

**Routine and catch-up vaccination**

- HPV vaccination routinely recommended at **age 11–12 years (can start at age 9 years)** and catch-up HPV vaccination recommended for all persons through age 18 years if not adequately vaccinated
- 2- or 3-dose series depending on age at initial vaccination:
  - **Age 9–14 years at initial vaccination:** 2-dose series at 0, 6–12 months (minimum interval: 5 months; repeat dose if administered too soon)
  - **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)
- **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.

**Special situations**

- **Immunocompromising conditions, including HIV infection:** 3-dose series, even for those who initiate vaccination at age 9 through 14 years.
- **History of sexual abuse or assault:** Start at age 9 years.

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

**Influenza vaccination**

(minimum age: 6 months [IIV], 2 years [LAIV4], 18 years [recombinant influenza vaccine, RIV4])

**Routine vaccination**

- Use any influenza vaccine appropriate for age and health status annually:
  - 2 doses, separated by at least 4 weeks, for **children age 6 months–8 years** who have received fewer than 2 influenza vaccine doses before July 1, 2021, or whose influenza vaccination history is unknown (administer dose 2 even if the child turns 9 between receipt of dose 1 and dose 2)
  - 1 dose for **children age 6 months–8 years** who have received at least 2 influenza vaccine doses before July 1, 2021
  - 1 dose for **all persons age 9 years or older**
- For the 2021–2022 season, see [www.cdc.gov/mmwr/volumes/70/rr/rr7005a1.htm](http://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 with symptoms 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

**Measles, mumps, and rubella vaccination**

(minimum age: 12 months for routine vaccination)

**Routine vaccination**

- 2-dose series at age 12–15 months, age 4–6 years
- MMR or MMRV may be administered
- Note:** For dose 1 in children age 12–47 months, it is recommended to administer MMR and varicella vaccines separately. MMRV may be used if parents or caregivers express a preference.

**Catch-up vaccination**

- Unvaccinated children and adolescents: 2-dose series at least 4 weeks apart
- The maximum age for use of MMRV is 12 years.
- Minimum interval between MMRV doses: 3 months

**Special situations****International travel**

- **Infants age 6–11 months:** 1 dose before departure; revaccinate with 2-dose series at age 12–15 months (12 months for children in high-risk areas) and dose 2 as early as 4 weeks later.
- **Unvaccinated children age 12 months or older:** 2-dose series at least 4 weeks apart before departure

**Meningococcal serogroup A,C,W,Y vaccination**  
(minimum age: 2 months [MenACWY-CRM, Menveo], 9 months [MenACWY-D, Menactra], 2 years [MenACWY-TT, MenQuadfi])

### Routine vaccination

- 2-dose series at age 11–12 years; 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

### Special situations

**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 2 months: 4-dose series (additional 3 doses at age 4, 6 and 12 months)
  - Dose 1 at age 3–6 months: 3- or 4- dose series (dose 2 [and dose 3 if applicable] at least 8 weeks after previous dose until a dose is received at age 7 months or older, followed by an additional dose at least 12 weeks later and after age 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-dose series at least 12 weeks apart
- Age 24 months or older: 2-dose series at least 8 weeks apart

**- Anatomic or functional asplenia, sickle cell disease, or HIV infection:**

- Age 9–23 months: Not recommended
- Age 24 months or older: 2-dose series at least 8 weeks apart
- **Menactra**<sup>®</sup> must be administered at least 4 weeks after completion of PCV13 series.

#### MenQuadfi<sup>®</sup>

- 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 ([www.cdc.gov/travel/](http://www.cdc.gov/travel/)):**

- Children less than age 24 months:

#### - Menveo<sup>®</sup> (age 2–23 months)

- Dose 1 at age 2 months: 4-dose series (additional 3 doses at age 4, 6 and 12 months)
- Dose 1 at age 3–6 months: 3- or 4- dose series (dose 2 [and dose 3 if applicable] at least 8 weeks after previous dose until a dose is received at age 7 months or older, followed by an additional dose at least 12 weeks later and after age 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)

#### - Menactra<sup>®</sup> (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<sup>®</sup>, Menactra<sup>®</sup>, or MenQuadfi<sup>®</sup>

**First-year college students who live in residential housing (if not previously vaccinated at age 16 years or older) or military recruits:**

- 1 dose **Menveo<sup>®</sup>, Menactra<sup>®</sup>, or MenQuadfi<sup>®</sup>**

**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.
- **Children for whom boosters are not recommended** (e.g., a healthy child 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.

**Note:** **Menactra**<sup>®</sup> should be administered either before or at the same time as DTaP. MenACWY vaccines may be administered simultaneously with MenB vaccines if indicated, but at a different anatomic site, if feasible.

For MenACWY **booster dose recommendations** for groups listed under “Special situations” and in an outbreak setting and additional meningococcal vaccination information, see [www.cdc.gov/mmwr/volumes/69/rr/rr6909a1.htm](http://www.cdc.gov/mmwr/volumes/69/rr/rr6909a1.htm).

### Meningococcal serogroup B vaccination

(minimum age: 10 years [MenB-4C, Bexsero<sup>®</sup>; MenB-FHbp, Trumenba<sup>®</sup>])

### Shared clinical decision-making

- **Adolescents not at increased risk** age 16–23 years (preferred age 16–18 years) based on shared clinical decision-making:
  - **Bexsero**<sup>®</sup>: 2-dose series at least 1 month apart
  - **Trumenba**<sup>®</sup>: 2-dose series at least 6 months apart; if dose 2 is administered earlier than 6 months, administer a 3<sup>rd</sup> dose at least 4 months after dose 2.

### Special situations

**Anatomic or functional asplenia (including sickle cell disease), persistent complement component deficiency, complement inhibitor (e.g., eculizumab, ravulizumab) use:**

- **Bexsero**<sup>®</sup>: 2-dose series at least 1 month apart
- **Trumenba**<sup>®</sup>: 3-dose series at 0, 1–2, 6 months

**Note:** **Bexsero**<sup>®</sup> and **Trumenba**<sup>®</sup> are not interchangeable; the same product should be used for all doses in a series.

For MenB **booster dose recommendations** for groups listed under “Special situations” and in an outbreak setting and additional meningococcal vaccination information, see [www.cdc.gov/mmwr/volumes/69/rr/rr6909a1.htm](http://www.cdc.gov/mmwr/volumes/69/rr/rr6909a1.htm).

### Pneumococcal vaccination

(minimum age: 6 weeks [PCV13], 2 years [PPSV23])

### Routine vaccination with PCV13

- 4-dose series at age 2, 4, 6, 12–15 months

### Catch-up vaccination with PCV13

- 1 dose for healthy children age 24–59 months with any incomplete\* PCV13 series
- For other catch-up guidance, see Table 2.

### Special situations

**Underlying conditions below: When both PCV13 and PPSV23 are indicated, administer PCV13 first. PCV13 and PPSV23 should not be administered during same visit.**

**Chronic heart disease (particularly cyanotic congenital heart disease and cardiac failure); chronic lung disease (including asthma treated with high-dose, oral corticosteroids); diabetes mellitus:**

#### Age 2–5 years

- Any incomplete\* series with:
  - 3 PCV13 doses: 1 dose PCV13 (at least 8 weeks after any prior PCV13 dose)
  - Less than 3 PCV13 doses: 2 doses PCV13 (8 weeks after the most recent dose and administered 8 weeks apart)
- No history of PPSV23: 1 dose PPSV23 (at least 8 weeks after completing all recommended PCV13 doses)

#### Age 6–18 years

- No history of PPSV23: 1 dose PPSV23 (at least 8 weeks after completing all recommended PCV13 doses)

**Cerebrospinal fluid leak, cochlear implant:**

#### Age 2–5 years

- Any incomplete\* series with:
  - 3 PCV13 doses: 1 dose PCV13 (at least 8 weeks after any prior PCV13 dose)
  - Less than 3 PCV13 doses: 2 doses PCV13 (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)

#### Age 6–18 years

- No history of either PCV13 or PPSV23: 1 dose PCV13, 1 dose PPSV23 at least 8 weeks later
- Any PCV13 but no PPSV23: 1 dose PPSV23 at least 8 weeks after the most recent dose of PCV13
- PPSV23 but no PCV13: 1 dose PCV13 at least 8 weeks after the most recent dose of PPSV23

**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:**

#### Age 2–5 years

- Any incomplete\* series with:
  - 3 PCV13 doses: 1 dose PCV13 (at least 8 weeks after any prior PCV13 dose)
  - Less than 3 PCV13 doses: 2 doses PCV13 (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 dose 2 of PPSV23 5 years later

#### Age 6–18 years

- No history of either PCV13 or PPSV23: 1 dose PCV13, 2 doses PPSV23 (dose 1 of PPSV23 administered 8 weeks after PCV13 and dose 2 of PPSV23 administered at least 5 years after dose 1 of PPSV23)
- Any PCV13 but no PPSV23: 2 doses PPSV23 (dose 1 of PPSV23 administered 8 weeks after the most recent dose of PCV13 and dose 2 of PPSV23 administered at least 5 years after dose 1 of PPSV23)
- PPSV23 but no PCV13: 1 dose PCV13 at least 8 weeks after the most recent PPSV23 dose and a dose 2 of PPSV23 administered 5 years after dose 1 of PPSV23 and at least 8 weeks after a dose of PCV13

**Chronic liver disease, alcoholism:****Age 6–18 years**

- No history of PPSV23: 1 dose PPSV23 (at least 8 weeks after any prior PCV13 dose)

\**Incomplete series* = Not having received all doses in either the recommended series or an age-appropriate catch-up series. See Tables 8, 9, and 11 in the ACIP pneumococcal vaccine recommendations ([www.cdc.gov/mmwr/pdf/rr/rr5911.pdf](http://www.cdc.gov/mmwr/pdf/rr/rr5911.pdf)) for complete schedule details.

**Poliovirus vaccination**

(minimum age: 6 weeks)

**Routine vaccination**

- 4-dose series at ages 2, 4, 6–18 months, 4–6 years; administer the final dose on or after age 4 years and at least 6 months after the previous dose.
- 4 or more doses of IPV can be administered before age 4 years when a combination vaccine containing IPV is used. However, a dose is still recommended on or after age 4 years and at least 6 months after the previous dose.

**Catch-up vaccination**

- In the first 6 months of life, use minimum ages and intervals only for travel to a polio-endemic region or during an outbreak.
- IPV is not routinely recommended for U.S. residents age 18 years or older.

**Series containing oral polio vaccine (OPV),** either mixed OPV-IPV or OPV-only series:

- Total number of doses needed to complete the series is the same as that recommended for the U.S. IPV schedule. See [www.cdc.gov/mmwr/volumes/66/wr/mm6601a6.htm?s\\_cid=mm6601a6\\_w](http://www.cdc.gov/mmwr/volumes/66/wr/mm6601a6.htm?s_cid=mm6601a6_w).
- Only trivalent OPV (tOPV) counts toward the U.S. vaccination requirements.
  - Doses of OPV administered before April 1, 2016, should be counted (unless specifically noted as administered during a campaign).
  - Doses of OPV administered on or after April 1, 2016, should not be counted.
  - For guidance to assess doses documented as "OPV," see [www.cdc.gov/mmwr/volumes/66/wr/mm6606a7.htm?s\\_cid=mm6606a7\\_w](http://www.cdc.gov/mmwr/volumes/66/wr/mm6606a7.htm?s_cid=mm6606a7_w).
- For other catch-up guidance, see Table 2.

**Rotavirus vaccination**

(minimum age: 6 weeks)

**Routine vaccination**

- **Rotarix**<sup>®</sup>: 2-dose series at age 2 and 4 months
- **RotaTeq**<sup>®</sup>: 3-dose series at age 2, 4, and 6 months
- If any dose in the series is either **RotaTeq**<sup>®</sup> or unknown, default to 3-dose series.

**Catch-up vaccination**

- Do not start the series on or after age 15 weeks, 0 days.
- The maximum age for the final dose is 8 months, 0 days.
- For other catch-up guidance, see Table 2.

**Tetanus, diphtheria, and pertussis (Tdap) vaccination**

(minimum age: 11 years for routine vaccination, 7 years for catch-up vaccination)

**Routine vaccination**

- **Adolescents age 11–12 years:** 1 dose Tdap
- **Pregnancy:** 1 dose Tdap during each pregnancy, preferably in early part of gestational weeks 27–36.
- Tdap may be administered regardless of the interval since the last tetanus- and diphtheria-toxoid-containing vaccine.

**Catch-up vaccination**

- **Adolescents age 13–18 years who have not received Tdap:** 1 dose Tdap, then Td or Tdap booster every 10 years
- **Persons age 7–18 years not fully vaccinated\* with DTaP:** 1 dose Tdap as part of the catch-up series (preferably the first dose); if additional doses are needed, use Td or Tdap.
- **Tdap administered at age 7–10 years:**
  - **Children age 7–9 years** who receive Tdap should receive the routine Tdap dose at age 11–12 years.
  - **Children age 10 years** who receive Tdap do not need the routine Tdap dose at age 11–12 years.
- **DTaP inadvertently administered on or after age 7 years:**
  - **Children age 7–9 years:** DTaP may count as part of catch-up series. Administer routine Tdap dose at age 11–12 years.
  - **Children age 10–18 years:** Count dose of DTaP as the adolescent Tdap booster.
- For other catch-up guidance, see Table 2.

**Special situations**

- **Wound management** in persons age 7 years or older with history of 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 age 11 years or older who have not previously received Tdap or whose Tdap history is unknown. If a tetanus-toxoid-containing vaccine is indicated for a pregnant adolescent, use Tdap.
- For detailed information, see [www.cdc.gov/mmwr/volumes/69/wr/mm6903a5.htm](http://www.cdc.gov/mmwr/volumes/69/wr/mm6903a5.htm).

\**Fully vaccinated* = 5 valid doses of DTaP OR 4 valid doses of DTaP if dose 4 was administered at age 4 years or older

**Varicella vaccination**

(minimum age: 12 months)

**Routine vaccination**

- 2-dose series at age 12–15 months, 4–6 years
- VAR or MMRV may be administered\*
- Dose 2 may be administered as early as 3 months after dose 1 (a dose inadvertently administered after at least 4 weeks may be counted as valid)

\***Note:** For dose 1 in children age 12–47 months, it is recommended to administer MMR and varicella vaccines separately. MMRV may be used if parents or caregivers express a preference.

**Catch-up vaccination**

- Ensure persons age 7–18 years without evidence of immunity (see *MMWR* at [www.cdc.gov/mmwr/pdf/rr/rr5604.pdf](http://www.cdc.gov/mmwr/pdf/rr/rr5604.pdf)) have a 2-dose series:
  - **Age 7–12 years:** routine interval: 3 months (a dose inadvertently administered after at least 4 weeks may be counted as valid)
  - **Age 13 years and older:** routine interval: 4–8 weeks (minimum interval: 4 weeks)
  - The maximum age for use of MMRV is 12 years.