Dear Colleague:

The Centers for Disease Control and Prevention (CDC) has released the 2019 Recommended Immunization Schedules. These schedules and footnotes, which are meant to be used together, are attached. Links to the schedules and summaries of changes to the child/adolescent and adult schedules are available on the CDC website, at https://www.cdc.gov/vaccines/schedules/hcp/imz/child-adolescent.html and https://www.cdc.gov/vaccines/schedules/hcp/imz/adult.html, respectively.

The overall appearance of the schedules has been updated, and the notes (previously known as “footnotes”) have been placed in alphabetical order.

Highlights of the changes to both schedules include homelessness being added as an indication for hepatitis A vaccine (hep A). In addition, the hepatitis B vaccine notes were revised to include information regarding the use of CpG-adjuvanted HepB vaccine (Heplisav-B®) in persons 18 years or older.

**For children and adolescents specifically:**
Changes to the child and adolescent schedule include: 1) a section on international travel within the hep A note, with recommendations for vaccination of travelers 6-11 months and unvaccinated travelers aged ≥12 months; and 2) an update of the Tdap note to indicate that those who receive a dose of Tdap or diphtheria and tetanus toxoids and acellular pertussis vaccine (DTaP) at age 7-10 years inadvertently, or as part of the catch-up series, should still receive the routine doses of Tdap at age 11-12 years.

Recommendations from the Advisory Committee on Immunization Practices (ACIP) are considered the standard of immunization practice in the United States, even if not included in the package insert. Vaccines should always be administered in accordance with current CDC and ACIP recommendations.

For questions on the new immunization schedules, or any other vaccine-related issue, please call (347) 396-2400 or email nycimmunize@health.nyc.gov. Thank you for keeping New York City children safe from vaccine-preventable diseases.

Sincerely,

Jane R. Zucker, MD, MSc
**Recommended Child and Adolescent Immunization Schedule**

**for ages 18 years or younger**

![Image](image.png)

**How to use the child/adolescent immunization schedule**

1. Determine recommended vaccine by age (Table 1)
2. Determine recommended interval for catch-up vaccination (Table 2)
3. Assess need for additional recommended vaccines by medical condition and other indications (Table 3)
4. Review vaccine types, frequencies, intervals, and considerations for special situations (Notes)

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**Vaccines in the Child and Adolescent Immunization Schedule**

<table>
<thead>
<tr>
<th>Vaccines</th>
<th>Abbreviations</th>
<th>Trade names</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diphtheria, tetanus, and acellular pertussis vaccine</td>
<td>DTaP</td>
<td>Daptacel, Infanrix</td>
</tr>
<tr>
<td>Diphtheria, tetanus vaccine</td>
<td>DT</td>
<td>No Trade Name</td>
</tr>
<tr>
<td><em>Haemophilus influenzae</em> type b vaccine</td>
<td>Hib (PRP-T)</td>
<td>ActHIB, Hiberyx, PedvaxHib</td>
</tr>
<tr>
<td><em>Haemophilus influenzae</em> type b vaccine</td>
<td>Hib (PRP-OMP)</td>
<td>ActHIB, Hiberyx, PedvaxHib</td>
</tr>
<tr>
<td>Hepatitis A vaccine</td>
<td>HepA</td>
<td>Havrix, Vaqta</td>
</tr>
<tr>
<td>Hepatitis B vaccine</td>
<td>HepB</td>
<td>Engerix-B, Recombivax HB</td>
</tr>
<tr>
<td>Human papillomavirus vaccine</td>
<td>HPV</td>
<td>Gardasil 9</td>
</tr>
<tr>
<td>Influenza vaccine (inactivated)</td>
<td>IIV</td>
<td>Multiple</td>
</tr>
<tr>
<td>Influenza vaccine (live, attenuated)</td>
<td>LAIV</td>
<td>FluMist</td>
</tr>
<tr>
<td>Measles, mumps, and rubella vaccine</td>
<td>MMR</td>
<td>M-M-R II</td>
</tr>
<tr>
<td>Meningococcal serogroups A, C, W, Y vaccine</td>
<td>MenACWY-D</td>
<td>Menactra</td>
</tr>
<tr>
<td>Meningococcal serogroup B vaccine</td>
<td>MenACWY-CRM</td>
<td>Menevo</td>
</tr>
<tr>
<td>Meningococcal serogroup B vaccine</td>
<td>MenB-4C</td>
<td>Bexsero</td>
</tr>
<tr>
<td>Pneumococcal 13-valent conjugate vaccine</td>
<td>PCV13</td>
<td>Prevnar 13</td>
</tr>
<tr>
<td>Pneumococcal 23-valent polysaccharide vaccine</td>
<td>PPSV23</td>
<td>Pneumovax</td>
</tr>
<tr>
<td>Poliovirus vaccine (inactivated)</td>
<td>IPV</td>
<td>IPOL</td>
</tr>
<tr>
<td>Rotavirus vaccine</td>
<td>RV1, RV5</td>
<td>Rotarix, RotaTeq</td>
</tr>
<tr>
<td>Tetanus, diphtheria, and acellular pertussis vaccine</td>
<td>Tdap</td>
<td>Adacel, Boostrix</td>
</tr>
<tr>
<td>Tetanus and diphtheria vaccine</td>
<td>Td</td>
<td>Tenivac, Td vaccine</td>
</tr>
<tr>
<td>Varicella vaccine</td>
<td>VAR</td>
<td>Varivax</td>
</tr>
<tr>
<td><strong>Combination Vaccines</strong> (Use combination vaccines instead of separate injections when appropriate)**</td>
<td><strong>DTaP, hepatitis B, and inactivated poliovirus vaccine</strong></td>
<td><strong>Pediarix</strong></td>
</tr>
<tr>
<td><strong>DTaP, inactivated poliovirus, and <em>Haemophilus influenzae</em> type b vaccine</strong></td>
<td><strong>DTaP-IPV/Hib</strong></td>
<td><strong>Pentacel</strong></td>
</tr>
<tr>
<td><strong>DTaP and inactivated poliovirus vaccine</strong></td>
<td><strong>DTaP-IPV</strong></td>
<td><strong>Kinrix, Quadracel</strong></td>
</tr>
<tr>
<td><strong>Measles, mumps, rubella, and varicella vaccines</strong></td>
<td><strong>MMRV</strong></td>
<td><strong>ProQuad</strong></td>
</tr>
</tbody>
</table>

*Administer recommended vaccines if immunization history is incomplete or unknown. Do not restart or add doses to vaccine series for extended intervals between doses. When a vaccine is not administered at the recommended age, administer at a subsequent visit. The use of trade names is for identification purposes only and does not imply endorsement by the ACIP or CDC.*
### Table 1

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

*United States, 2019*

These recommendations must be read with the Notes that follow. For those who fall behind or start late, provide catch-up vaccination at the earliest opportunity as indicated by the green bars in Table 1. To determine minimum intervals between doses, see the catch-up schedule (Table 2). School entry and adolescent vaccine age groups are shaded in gray.

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Birth</th>
<th>1 mo</th>
<th>2 mos</th>
<th>4 mos</th>
<th>6 mos</th>
<th>9 mos</th>
<th>12 mos</th>
<th>15 mos</th>
<th>18 mos</th>
<th>19-23 mos</th>
<th>2-3 yrs</th>
<th>4-6 yrs</th>
<th>7-10 yrs</th>
<th>11-12 yrs</th>
<th>13-15 yrs</th>
<th>16 yrs</th>
<th>17-18 yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hepatitis B (HepB)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1st</td>
<td>2nd</td>
<td></td>
<td>3rd</td>
<td>4th</td>
<td></td>
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</tr>
<tr>
<td><strong>Rotavirus (RV) RV1 (2-dose series); RV5 (3-dose series)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1st</td>
<td>2nd</td>
<td>See Notes</td>
<td></td>
<td>3rd</td>
<td>4th</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Diphtheria, tetanus, &amp; acellular pertussis (DTaP: &lt;7 yrs)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1st</td>
<td>2nd</td>
<td>3rd</td>
<td>4th</td>
<td>5th</td>
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<td></td>
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</tr>
<tr>
<td><strong>Haemophilus influenzae type b (Hib)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1st</td>
<td>2nd</td>
<td>See Notes</td>
<td>3rd or 4th dose</td>
<td>See Notes</td>
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<tr>
<td><strong>Pneumococcal conjugate (PCV13)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1st</td>
<td>2nd</td>
<td>3rd</td>
<td>4th</td>
<td>5th</td>
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<tr>
<td><strong>Inactivated poliovirus (IPV: &lt;18 yrs)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1st</td>
<td>2nd</td>
<td>3rd</td>
<td>4th</td>
<td>5th</td>
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<tr>
<td><strong>Influenza (IIV)</strong></td>
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<td></td>
<td>Annual vaccination 1 or 2 doses</td>
<td>Annual vaccination 1 or 2 doses</td>
<td>Annual vaccination 1 dose only</td>
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<tr>
<td><strong>Influenza (LAIV)</strong></td>
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<td></td>
<td>Annual vaccination 1 or 2 doses</td>
<td>Annual vaccination 1 dose only</td>
<td>Annual vaccination 1 dose only</td>
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</tr>
<tr>
<td><strong>Measles, mumps, rubella (MMR)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>See Notes</td>
<td>1st dose</td>
<td>2nd</td>
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</tr>
<tr>
<td><strong>Varicella (VAR)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1st</td>
<td>2nd</td>
<td>See Notes</td>
<td>1st dose</td>
<td>2nd</td>
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<tr>
<td><strong>Hepatitis A (HepA)</strong></td>
<td></td>
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<td>See Notes</td>
<td>2-dose series, See Notes</td>
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<tr>
<td><strong>Meningococcal (MenACWY-D ≥9 mos; MenACWY-CRM ≥2 mos)</strong></td>
<td></td>
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<td></td>
<td></td>
<td>See Notes</td>
<td>1st dose</td>
<td>2nd</td>
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</tr>
<tr>
<td><strong>Tetanus, diphtheria, &amp; acellular pertussis (Tdap: ≥7 yrs)</strong></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Tdap</td>
<td>See Notes</td>
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</tr>
<tr>
<td><strong>Human papillomavirus (HPV)</strong></td>
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<td></td>
<td>See Notes</td>
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</tr>
<tr>
<td><strong>Meningococcal B</strong></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>See Notes</td>
<td></td>
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</tr>
<tr>
<td><strong>Pneumococcal polysaccharide (PPSV23)</strong></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td>See Notes</td>
<td></td>
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</tr>
</tbody>
</table>

- **Range of recommended ages for all children**
- **Range of recommended ages for catch-up immunization**
- **Range of recommended ages for certain high-risk groups**
- **Range of recommended ages for non-high-risk groups that may receive vaccine, subject to individual clinical decision-making**
- **No recommendation**
The figure 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

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Minimum Age for Dose 1</th>
<th>Dose 1 to Dose 2</th>
<th>Minimum Interval Between Doses</th>
<th>Dose 3 to Dose 4</th>
<th>Dose 4 to Dose 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatitis B</td>
<td>Birth</td>
<td>4 weeks</td>
<td>No further doses needed if first dose was administered at age 15 months or older.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rotavirus</td>
<td>6 weeks</td>
<td>4 weeks</td>
<td>4 weeks if first dose was administered before the 1st birthday.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diphtheria, tetanus, and acellular pertussis</td>
<td>6 weeks</td>
<td>4 weeks</td>
<td>4 weeks if first dose at age 12 through 14 months.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Haemophilus influenzae</em> type b</td>
<td>6 weeks</td>
<td>4 weeks</td>
<td>No further doses needed if previous dose was administered at age 15 months or older.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pneumococcal conjugate</td>
<td>6 weeks</td>
<td>4 weeks</td>
<td>8 weeks (as final dose) if first dose was administered at age 12 through 14 months.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inactivated poliovirus</td>
<td>6 weeks</td>
<td>4 weeks</td>
<td>4 weeks if previous dose was administered at age 12 months or older.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measles, mumps, rubella</td>
<td>12 months</td>
<td>4 weeks</td>
<td>4 weeks if current age is &lt; 4 years.</td>
<td></td>
<td>6 months (minimum age 4 years for final dose).</td>
</tr>
<tr>
<td>Varicella</td>
<td>12 months</td>
<td>6 months</td>
<td>4 weeks if current age is 4 years or older.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hepatitis A</td>
<td>12 months</td>
<td>8 weeks</td>
<td>See Notes.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meningococcal</td>
<td>2 months MenACWY-CRM</td>
<td>8 weeks</td>
<td>See Notes.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inactivated poliovirus</td>
<td>N/A</td>
<td>4 weeks</td>
<td>6 months and at least 16 weeks after first dose.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measles, mumps, rubella</td>
<td>N/A</td>
<td>4 weeks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Varicella</td>
<td>N/A</td>
<td>3 months if younger than age 13 years.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Children and adolescents age 7 through 18 years

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Minimum Age for Dose 1</th>
<th>Dose 1 to Dose 2</th>
<th>Minimum Interval Between Doses</th>
<th>Dose 3 to Dose 4</th>
<th>Dose 4 to Dose 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meningococcal</td>
<td>Not Applicable (N/A)</td>
<td>8 weeks</td>
<td>Routine dosing intervals are recommended.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tetanus, diphtheria; tetanus, diphtheria, and acellular pertussis</td>
<td>7 years</td>
<td>4 weeks</td>
<td>4 weeks if first dose of DTaP/DT was administered before the 1st birthday.</td>
<td></td>
<td>6 months if first dose of DTaP/DT was administered before the 1st birthday.</td>
</tr>
<tr>
<td>Human papillomavirus</td>
<td>9 years</td>
<td>Routine dosing intervals are recommended.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hepatitis A</td>
<td>N/A</td>
<td>4 weeks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hepatitis B</td>
<td>N/A</td>
<td>8 weeks and at least 16 weeks after first dose.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inactivated poliovirus</td>
<td>N/A</td>
<td>4 weeks</td>
<td>6 months.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measles, mumps, rubella</td>
<td>N/A</td>
<td>4 weeks</td>
<td>A fourth dose of IPV is indicated if all previous doses were administered at &lt;4 years or if the third dose was administered &lt;6 months after the second dose.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Varicella</td>
<td>N/A</td>
<td>4 weeks</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The table above shows the recommended child and adolescent immunization schedule for persons aged 4 months—18 years who start late or who are more than 1 month behind, United States, 2019.
<table>
<thead>
<tr>
<th>VACCINE</th>
<th>INDICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hepatitis B</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Pregnancy</em></td>
</tr>
<tr>
<td></td>
<td><em>Immunocompromised status (excluding HIV infection)</em></td>
</tr>
<tr>
<td></td>
<td><em>HIV infection CD4+ count</em></td>
</tr>
<tr>
<td></td>
<td>≤15% and total CD4 cell count of &lt;200/mm³</td>
</tr>
<tr>
<td></td>
<td>≥15% and total CD4 cell count of ≥200/mm³</td>
</tr>
<tr>
<td></td>
<td><em>Kidney failure, end-stage renal disease, on hemodialysis</em></td>
</tr>
<tr>
<td></td>
<td><em>Heart disease, chronic lung disease</em></td>
</tr>
<tr>
<td></td>
<td><em>CSF leaks/cochlear implants</em></td>
</tr>
<tr>
<td></td>
<td><em>Asplenia and persistent complement deficiencies</em></td>
</tr>
<tr>
<td></td>
<td><em>Chronic liver disease</em></td>
</tr>
<tr>
<td></td>
<td><em>Diabetes</em></td>
</tr>
<tr>
<td><strong>Rotavirus</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>SCID</em></td>
</tr>
<tr>
<td><strong>Diphtheria, tetanus, &amp; acellular pertussis (DTaP)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Haemophilus influenzae type b</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Pneumococcal conjugate</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Inactivated poliovirus</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Influenza (IIV)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Influenza (LAIIV)</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Asthma, wheezing: 2-4yrs</em></td>
</tr>
<tr>
<td><strong>Measles, mumps, rubella</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Varicella</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Hepatitis A</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Meningococcal ACWY</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Tetanus, diphtheria, &amp; acellular pertussis (Tdap)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Human papillomavirus</strong></td>
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<tr>
<td><strong>Meningococcal B</strong></td>
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<tr>
<td><strong>Pneumococcal polysaccharide</strong></td>
<td></td>
</tr>
</tbody>
</table>

1 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 D) at: [www.cdc.gov/vaccines/hcp/acip-recs/general-recs/contraindications.html](http://www.cdc.gov/vaccines/hcp/acip-recs/general-recs/contraindications.html).

2 Severe Combined Immunodeficiency

3 LAIV contraindicated for children 2–4 years of age with asthma or wheezing during the preceding 12 months.
For vaccine recommendations for persons 19 years of age and older, see the Recommended Adult Immunization Schedule.

### Additional information

- 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 information on contraindications and precautions for the use of a vaccine, consult the General Best Practice Guidelines for Immunization and relevant ACIP statements 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 vaccine requirements and recommendations is available at [wwwnc.cdc.gov/travel/](http://wwwnc.cdc.gov/travel/).
- For information regarding 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).

### Notes

Recommended Child and Adolescent Immunization Schedule for ages 18 years or younger, United States, 2019

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

**Routine vaccination**

- 5-dose series at 2, 4, 6, 15–18 months, 4–6 years
  - Prospectively: Dose 4 may be given as early as age 12 months if at least 6 months have elapsed since dose 3.
  - Retrospectively: A 4th dose that was inadvertently given as early as 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.
- For other catch-up guidance, see Table 2.

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

**Routine vaccination**

- ActHIB, Hibexir, or Pentacel: 4-dose series at 2, 4, 6, 12–15 months
- PedvaxHIB: 3-dose series at 2, 4, 12–15 months

**Catch-up vaccination**

- Dose 1 at 7–11 months: Administer dose 2 at least 4 weeks later and dose 3 (final dose) at 12–15 months or 8 weeks after dose 2 (whichever is later).
- Dose 1 at 12–14 months: Administer dose 2 (final dose) at least 8 weeks after dose 1.
- Dose 1 before 12 months and dose 2 before 15 months: Administer dose 3 (final dose) 8 weeks after dose 2.
- 2 doses of PedvaxHIB before 12 months: Administer dose 3 (final dose) at 12–59 months and at least 8 weeks after dose 2.
- Unvaccinated at 15–59 months: 1 dose
  - For other catch-up guidance, see Table 2.

### Special situations

- Chemotherapy or radiation treatment:
  - 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
Infants age 6–11 months
Age 9 through 14 years at initial vaccination
Test for HBsAg and anti-HBs at age 9–12 months. If HepB
Determine mother’s HBsAg status as soon as possible. If
Administer
Recommended Child and Adolescent Immunization Schedule for ages 18 years or younger, United States, 2019
Unvaccinated age 12 months and older
For infants <2,000 grams, administer
Birth dose (monovalent HepB vaccine only)
- Mother is HBsAg-negative: 1 dose within 24 hours of
  birth for all medically stable infants ≥2,000 grams. Infants
  <2,000 grams: administer 1 dose at chronological age 1 month
  or hospital discharge.
- Mother is HBsAg-positive:
  - Administer HepB vaccine and 0.5 mL of hepatitis B
    immune globulin (HBIG) (at separate anatomic sites) 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 0.5 mL of HBIG in
    addition to HepB vaccine 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 0.5 mL of HBIG to
    infants ≥2,000 grams as soon as possible, but no later than
    7 days of age.
Routine series
- 3-dose series at 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 (3rd or 4th) 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 only).
- Adolescents 18 years and older may receive a 2-dose series
  of HepB (Heplisav-B) at least 4 weeks apart.
- Adolescents 18 years and older may receive the combined
  HepA and HepB vaccine, Twinrix, as a 3-dose series (0, 1, and
  6 months) or 4-dose series (0, 7, and 21–30 days, followed by a
  dose at 12 months).
- For other catch-up guidance, see Table 2.
Human papillomavirus vaccination
(minimum age: 9 years)
Routine and catch-up vaccination
- HPV vaccination routinely recommended for all adolescents
  age 11–12 years (can start at age 9 years) and through age
  18 years if not previously adequately vaccinated
  - 2- or 3-dose series depending on age at initial vaccination:
  - Age 9 through 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)
- If completed valid vaccination series with any HPV vaccine, no
  additional doses needed
Special situations
- Immunocompromising conditions, including HIV
  infection: 3-dose series as above
- History of sexual abuse or assault: Start at age 9 years
- Pregnancy: HPV vaccination not recommended until after
  pregnancy; no intervention needed if vaccinated while
  pregnant; pregnancy testing not needed before vaccination
Inactivated 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 the 4th birthday and at least 6 months
  after the previous dose.
  - 4 or more doses of IPV can be administered before the
    4th birthday when a combination vaccine containing IPV
    is used. However, a dose is still recommended after the 4th
    birthday 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 18 years
  and 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.
Recommended Child and Adolescent Immunization Schedule for ages 18 years or younger, United States, 2019

**Influenza vaccination** (minimum age: 6 months [IIV], 2 years [LAIV], 18 years [RIV])

**Routine vaccination**
- 1 dose any influenza vaccine appropriate for age and health status annually (2 doses separated by at least 4 weeks for children 6 months–8 years who did not receive at least 2 doses of influenza vaccine before July 1, 2018)

**Special situations**
- Egg allergy, hives only: Any influenza vaccine appropriate for age and health status annually
- Egg allergy more severe than hives (e.g., angioedema, respiratory distress): Any influenza vaccine appropriate for age and health status annually in medical setting under supervision of health care provider who can recognize and manage severe allergic conditions
- LAIV should not be used for those with a history of severe allergic reaction to any component of the vaccine (excluding egg) or to a previous dose of any influenza vaccine, children and adolescents receiving concomitant aspirin or salicylate-containing medications, children age 2 through 4 years with a history of asthma or wheezing, those who are immunocompromised due to any cause (including immunosuppression caused by medications and HIV infection), anatomic and functional asplenia, cochlear implants, cerebrospinal fluid-oropharyngeal communication, close contacts and caregivers of severely immunosuppressed persons who require a protected environment, pregnancy, and persons who have received influenza antiviral medications within the previous 48 hours.

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

**Routine vaccination**
- 2-dose series: 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, ecuizumab 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 the 1st birthday)
    - Dose 1 at age 24 months or older: 2-dose series at least 8 weeks apart
  - **Menactra**
    - Persistent complement component deficiency:
      - 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.

**Measles, mumps, and rubella vaccination** (minimum age: 12 months for routine vaccination)

**Routine vaccination**
- 2-dose series at 12–15 months, 4–6 years
- Dose 2 may be administered as early as 4 weeks after dose 1.

**Catch-up vaccination**
- Unvaccinated children and adolescents: 2 doses at least 4 weeks apart
- The maximum age for use of MMRV is 12 years.

**Special situations**

- International travel
  - Infants age 6–11 months: 1 dose before departure; revaccinate with 2 doses at 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 and older: 2-dose series at least 4 weeks apart before departure

**Meningococcal serogroup B vaccination** (minimum age: 10 years [MenB-4C, Bexsero; MenB-FHbp, Trumenba])

**Clinical discretion**
- MenB vaccine may be administered based on individual clinical decision to adolescents not at increased risk age 16–23 years (preferred age 16–18 years):
  - **Bexsero:** 2-dose series at least 1 month apart
  - **Trumenba:** 2-dose series at least 6 months apart; if dose 2 is administered earlier than 6 months, administer a 3rd dose at least 4 months after dose 2.

**Special situations**

- Anatomic or functional asplenia (including sickle cell disease), persistent complement component deficiency, ecuizumab use:
  - **Bexsero:** 2-dose series at least 1 month apart
  - **Trumenba:** 3-dose series at 0, 1–2, 6 months

Bexsero and Trumenba are not interchangeable; the same product should be used for all doses in a series.

For additional meningococcal vaccination information, see meningococcal MMWR publications at www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/mening.html.

**Notes**
- Only trivalent OPV (tOPV) counts toward the U.S. vaccination requirements. For guidance to assess doses documented as “OPV,” see www.cdc.gov/mmwr/volumes/66/wr/mm6606a7. htm?s_cid=mm6606a7_w.
- For other catch-up guidance, see Table 2.

**Travel in countries with hyperendemic or epidemic meningococcal disease, including countries in the African meningitis belt or during the Hajj (wwwnc.cdc.gov/travel):**
- 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 the 1st birthday)
  - **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 or Menactra

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 or Menactra

**Note:** Menactra should be administered either before or at the same time as DTaP. For MenACWY booster dose recommendations for groups listed under “Special situations” above and additional meningococcal vaccination information, see meningococcal MMWR publications at www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/mening.html.
**Pneumococcal vaccination**  
*(minimum age: 6 weeks [PCV13], 2 years [PPSV23])*

**Routine vaccination with PCV13**
- 4-dose series at 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**

**High-risk conditions**:
- 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 any prior PCV13 dose) and a 2nd dose of PPSV23 5 years later
  - Age 6–18 years
  - Any 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 8 weeks after the most recent PPSV23 dose and a 2nd dose of PPSV23 administered at least 5 years after dose 1 of PPSV23
  - Chronic liver disease, alcoholism:
    - Age 2–5 years
    - An incomplete series is defined as 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) for complete schedule details.

**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 PPSV23: 1 dose PPSV23 (at least 8 weeks after any prior PCV13 dose)

**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**

**Rotavirus vaccination**  
*(minimum age: 6 weeks)*

**Routine vaccination**
- Rotarix: 2-dose series at 2 and 4 months.
- RotaTeq: 3-dose series at 2, 4, and 6 months.
  If any dose in the series is either **RotaTeq** 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 Figure 2.

**Varicella vaccination**  
*(minimum age: 12 months)*

**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 booster every 10 years
- Persons age 7–18 years not fully immunized with DTAp: 1 dose Tdap as part of the catch-up series (preferably the first dose); if additional doses are needed, use Td.
- Children age 7–10 years who receive Tdap inadvertently or as part of the catch-up series should receive the routine Tdap dose at 11–12 years.
- DTaP inadvertently given after the 7th birthday:
  - Child age 7–10 years: DTaP may count as part of catch-up series. Routine Tdap dose at 11–12 should be administered.
  - Adolescent age 11–18 years: Count dose of DTaP as the adolescent Tdap booster.
  - For other catch-up guidance, see Table 2.
  - For information on use of Tdap or Td as tetanus prophylaxis in wound management, see www.cdc.gov/mmwr/volumes/67/rr/rr6702a1.htm.

**Varicella vaccination**
*(minimum age: 12 months)*

**Routine vaccination**
- 2-dose series: 12–15 months, 4–6 years
- Dose 2 may be administered as early as 3 months after dose 1 (a dose administered after a 4-week interval may be counted).

**Catch-up vaccination**
- Ensure persons age 7–18 years without evidence of immunity (see MMWR at www.cdc.gov/mmwr/pdf/rr/rr5604.pdf) have 2-dose series:
  - Ages 7–12 years: routine interval: 3 months (minimum interval: 4 weeks)
  - Ages 13 years and older: routine interval: 4–8 weeks (minimum interval: 4 weeks).
  - The maximum age for use of MMRV is 12 years.
## Recommended Adult Immunization Schedule
### for ages 19 years or older

**Report**
- Suspected cases of reportable vaccine-preventable diseases or outbreaks to the local or state health department
- Clinically significant postvaccination reactions to the Vaccine Adverse Event Reporting System at [www.vaers.hhs.gov](http://www.vaers.hhs.gov) or 800-822-7967

**Injury claims**
All vaccines included in the adult immunization schedule except pneumococcal 23-valent polysaccharide and zoster vaccines are covered by the Vaccine Injury Compensation Program. Information on how to file a vaccine injury claim is available at [www.hrsa.gov/vaccinecompensation](http://www.hrsa.gov/vaccinecompensation) or 800-338-2382.

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

**Helpful information**
- Complete ACIP recommendations: [www.cdc.gov/vaccines/hcp/acip-recs/index.html](http://www.cdc.gov/vaccines/hcp/acip-recs/index.html)
- General Best Practice Guidelines for Immunization (including contraindications and precautions): [www.cdc.gov/vaccines/hcp/acip-recs/general-recs/index.html](http://www.cdc.gov/vaccines/hcp/acip-recs/general-recs/index.html)
- Vaccine Information Statements: [www.cdc.gov/vaccines/hcp/vis/index.html](http://www.cdc.gov/vaccines/hcp/vis/index.html)
- Travel vaccine recommendations: [www.cdc.gov/travel](http://www.cdc.gov/travel)
- Recommended Child and Adolescent Immunization Schedule, United States, 2019: [www.cdc.gov/vaccines/schedules/hcp/child-adolescent.html](http://www.cdc.gov/vaccines/schedules/hcp/child-adolescent.html)

### How to use the adult immunization schedule
1. Determine recommended vaccinations by age (Table 1)
2. Assess need for additional recommended vaccinations by medical condition and other indications (Table 2)
3. Review vaccine types, frequencies, and intervals, and considerations for special situations (Notes)

### Vaccines in the Adult Immunization Schedule*

<table>
<thead>
<tr>
<th>Vaccines</th>
<th>Abbreviations</th>
<th>Trade names</th>
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<tbody>
<tr>
<td>Haemophilus influenzae type b vaccine</td>
<td>Hib</td>
<td>ActHIB</td>
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<td></td>
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<td>Hiberix</td>
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<td>Hepatitis A vaccine</td>
<td>HepA</td>
<td>Havrix</td>
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<td>Vaqt</td>
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<td>Hepatitis A and hepatitis B vaccine</td>
<td>HepA-HepB</td>
<td>Twinrix</td>
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<td>Hepatitis B vaccine</td>
<td>HepB</td>
<td>Engerix-B</td>
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<td>Recombivax HB</td>
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<td>Human papillomavirus vaccine</td>
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<td>Gardasil 9</td>
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<td>Influenza vaccine, inactivated</td>
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<td>Many brands</td>
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<td>Influenza vaccine, live attenuated</td>
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<td>FluMist Quadrivalent</td>
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<td>RIV</td>
<td>Flublok Quadrivalent</td>
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<td>Measles, mumps, and rubella vaccine</td>
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<td>M-M-R II</td>
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<td>Meningococcal serogroups A, C, W, Y vaccine</td>
<td>MenACWY</td>
<td>Menactra</td>
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<td>Meningococcal serogroup B vaccine</td>
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<td>Pneumococcal 13-valent conjugate vaccine</td>
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<td>Tetanus and diphtheria toxoids</td>
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<td>Tetanus and diphtheria toxoids and acellular pertussis vaccine</td>
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<td>Adacel</td>
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<td>Zoster vaccine, recombinant</td>
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<td>Shingrix</td>
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<tr>
<td>Zoster vaccine live</td>
<td>ZVL</td>
<td>Zostavax</td>
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</table>

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

*For the latest product information, visit [www.cdc.gov/vaccines/hcp/vis/index.html](http://www.cdc.gov/vaccines/hcp/vis/index.html).*
<table>
<thead>
<tr>
<th>Vaccine</th>
<th>19–21 years</th>
<th>22–26 years</th>
<th>27–49 years</th>
<th>50–64 years</th>
<th>≥65 years</th>
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</thead>
<tbody>
<tr>
<td><strong>Influenza inactivated (IIV) or Influenza recombinant (RIV)</strong></td>
<td></td>
<td></td>
<td>1 dose annually</td>
<td></td>
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<tr>
<td><strong>Influenza live attenuated (LAIV)</strong></td>
<td></td>
<td></td>
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<tr>
<td><strong>Tetanus, diphtheria, pertussis (Tdap or Td)</strong></td>
<td></td>
<td></td>
<td>1 dose Tdap, then Td booster every 10 yrs</td>
<td></td>
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</tr>
<tr>
<td><strong>Measles, mumps, rubella (MMR)</strong></td>
<td></td>
<td></td>
<td>1 or 2 doses depending on indication (if born in 1957 or later)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Varicella (VAR)</strong></td>
<td></td>
<td></td>
<td>2 doses (if born in 1980 or later)</td>
<td></td>
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<tr>
<td><strong>Zoster recombinant (RZV) (preferred)</strong></td>
<td></td>
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<tr>
<td><strong>Zoster live (ZVL)</strong></td>
<td></td>
<td></td>
<td>2 doses</td>
<td></td>
<td></td>
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<tr>
<td><strong>Human papillomavirus (HPV) Female</strong></td>
<td>2 or 3 doses depending on age at initial vaccination</td>
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</tr>
<tr>
<td><strong>Human papillomavirus (HPV) Male</strong></td>
<td>2 or 3 doses depending on age at initial vaccination</td>
<td></td>
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<tr>
<td><strong>Pneumococcal conjugate (PCV13)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 dose</td>
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<tr>
<td><strong>Pneumococcal polysaccharide (PPSV23)</strong></td>
<td></td>
<td></td>
<td>1 or 2 doses depending on indication</td>
<td>1 dose</td>
<td></td>
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<tr>
<td><strong>Hepatitis A (HepA)</strong></td>
<td></td>
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<tr>
<td><strong>Hepatitis B (HepB)</strong></td>
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<tr>
<td><strong>Meningococcal A, C, W, Y (MenACWY)</strong></td>
<td></td>
<td></td>
<td>1 or 2 doses depending on indication, then booster every 5 yrs if risk remains</td>
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<tr>
<td><strong>Meningococcal B (MenB)</strong></td>
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<tr>
<td><strong>Haemophilus influenzae type b (Hib)</strong></td>
<td>1 or 3 doses depending on indication</td>
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</tr>
</tbody>
</table>

Table 1: Recommended Adult Immunization Schedule by Age Group
United States, 2019

- **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**
- **No recommendation**
Table 2
Recommended Adult Immunization Schedule by Medical Condition and Other Indications
United States, 2019

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Pregnancy</th>
<th>Immuno-compromised (excluding HIV infection)</th>
<th>HIV infection CD4 count</th>
<th>Asplenia, complement deficiencies</th>
<th>End-stage renal disease, on hemodialysis</th>
<th>Heart or lung disease, alcoholism¹</th>
<th>Chronic liver disease</th>
<th>Diabetes</th>
<th>Health care personnel²</th>
<th>Men who have sex with men</th>
</tr>
</thead>
<tbody>
<tr>
<td>IIV or RIV or LAIV</td>
<td>CONTRAINDILOCATED</td>
<td></td>
<td></td>
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<tr>
<td>Tdap or Td</td>
<td>1 dose Tdap each pregnancy</td>
<td>1 dose Tdap, then Td booster every 10 yrs</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>MMR</td>
<td>CONTRAINDILOCATED</td>
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<tr>
<td>VAR</td>
<td>CONTRAINDILOCATED</td>
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<tr>
<td>RZV (preferred) or ZVL</td>
<td>DELAY</td>
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<tr>
<td>HPV Female</td>
<td>DELAY</td>
<td>3 doses through age 26 yrs</td>
<td></td>
<td></td>
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<tr>
<td>HPV Male</td>
<td>3 doses through age 26 yrs</td>
<td>2 or 3 doses through age 21 yrs</td>
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<td></td>
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<tr>
<td>PCV13</td>
<td></td>
<td>1 dose</td>
<td></td>
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<tr>
<td>PPSV23</td>
<td></td>
<td>1, 2, or 3 doses depending on age and indication</td>
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<tr>
<td>HepA</td>
<td></td>
<td>2 or 3 doses depending on vaccine</td>
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<tr>
<td>HepB</td>
<td></td>
<td>2 or 3 doses depending on vaccine</td>
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<tr>
<td>MenACWY</td>
<td></td>
<td>1 or 2 doses depending on indication, then booster every 5 yrs if risk remains</td>
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<tr>
<td>MenB</td>
<td>PRECAUTION</td>
<td>2 or 3 doses depending on vaccine and indication</td>
<td></td>
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<td></td>
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<tr>
<td>Hib</td>
<td></td>
<td>3 doses HSCT³ recipients only</td>
<td>1 dose</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

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

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

Hepatitis A vaccination

Routine vaccination
- Not at risk but want protection from hepatitis A
  - Identification of risk factor not required: 2- or 3-dose series HepA (Havrix 6–12 months apart or Vaqta 6–18 months apart [minimum interval: 6 months]) or 3-dose series HepA-HepB (Twinrix at 0, 1, 6 months [minimum intervals: 4 weeks between doses 1 and 2, 8 weeks between doses 2 and 3, 16 weeks between doses 1 and 3]) or 3-dose series HepA-HepB as above

Special situations
- At risk for hepatitis A virus infection: 2-dose series HepA or 3-dose series HepA-HepB as above
  - Chronic liver disease
  - Clotting factor disorders
  - Men who have sex with men
  - Injection or non-injection drug use
  - Homelessness
  - Work with hepatitis A virus in research laboratory or nonhuman primates with hepatitis A virus infection
  - Travel in countries with high or intermediate endemic hepatitis A
  - Close personal contact with international adoptee
    (e.g., household, regular babysitting) in first 60 days after arrival from country with high or intermediate endemic hepatitis A (administer dose 1 as soon as adoption is planned, at least 2 weeks before adoptee’s arrival)

Hepatitis B vaccination

Routine vaccination
- Not at risk but want protection from hepatitis B
  - Identification of risk factor not required: 2- or 3-dose series HepB (2-dose series Heplisav-B at least 4 weeks apart [2-dose series HepB only applies when 2 doses of Heplisav-B are used at least 4 weeks apart] or 3-dose series Engerix-B or Recombivax HB at 0, 1, 6 months [minimum intervals: 4 weeks between doses 1 and 2, 8 weeks between doses 2 and 3, 16 weeks between doses 1 and 3]) or 3-dose series HepA-HepB as above
- Hepatitis C virus infection
- Chronic liver disease (e.g., cirrhosis, fatty liver disease, alcoholic liver disease, autoimmune hepatitis, alanine aminotransferase [ALT] or aspartate aminotransferase [AST] level greater than twice upper limit of normal)
- HIV infection
- Sexual exposure risk (e.g., sex partners of hepatitis B surface antigen [HBsAg]-positive persons; sexually active persons not in mutually monogamous relationships, persons seeking evaluation or treatment for a sexually transmitted infection, men who have sex with men)
- Current or recent injection drug use
- Percutaneous or mucosal risk for exposure to blood (e.g., household contacts of HBsAg-positive persons; residents and staff of facilities for developmentally disabled persons; health care and public safety personnel with reasonably anticipated risk for exposure to blood or blood-contaminated body fluids; hemodialysis, peritoneal dialysis, home dialysis, and predialysis patients; persons with diabetes mellitus age younger than 60 years and, at discretion of treating clinician, those age 60 years or older)
- Incarcerated persons
- Travel in countries with high or intermediate endemic hepatitis B

Human papillomavirus vaccination

Routine vaccination
- Females through age 26 years and males through age 21 years: 2- or 3-dose series HPV vaccine depending on age at initial vaccination; males age 22 through 26 years may be vaccinated based on individual clinical decision (HPV vaccination routinely recommended at age 11–12 years)
- Age 15 years or older at initial vaccination: 3-dose series HPV vaccine at 0, 1–2, 6 months (minimum intervals: 4 weeks between doses 1 and 2, 12 weeks between doses 2 and 3, 5 months between doses 1 and 3; repeat dose if administered too soon)
- Age 9 through 14 years at initial vaccination and received 1 dose, or 2 doses less than 5 months apart: 1 dose HPV vaccine
- Age 9 through 14 years at initial vaccination and received 2 doses at least 5 months apart: HPV vaccination complete, no additional dose needed
- If completed valid vaccination series with any HPV vaccine, no additional doses needed

Special situations
- Immunocompromising conditions (including HIV infection) through age 26 years: 3-dose series HPV vaccine at 0, 1–2, 6 months as above
- Men who have sex with men and transgender persons through age 26 years: 2- or 3-dose series HPV vaccine depending on age at initial vaccination as above
- Pregnancy through age 26 years: HPV vaccination not recommended until after pregnancy; no intervention needed if vaccinated while pregnant; pregnancy testing not needed before vaccination
Influenza vaccination

**Routine vaccination**
- **Persons age 6 months or older:** 1 dose IIV, RIV, or LAIV appropriate for age and health status annually
- **For additional guidance,** see www.cdc.gov/flu/professionals/index.htm

**Special situations**
- **Egg allergy, hives only:** 1 dose IIV, RIV, or LAIV appropriate for age and health status annually
- **Egg allergy more severe than hives** (e.g., angioedema, respiratory distress): 1 dose IIV, RIV, or LAIV appropriate for age and health status annually in medical setting under supervision of health care provider who can recognize and manage severe allergic conditions
- **Immunocompromising conditions** (including HIV infection, anatomical or functional asplenia, pregnant women, close contacts and caregivers of severely immunocompromised persons in protected environment, use of influenza antiviral medications in previous 48 hours, with cerebrospinal fluid leak or cochlear implant): 1 dose IIV or RIV annually (LAIV not recommended)
- **History of Guillain-Barré syndrome within 6 weeks of previous dose of influenza vaccine:** Generally should not be vaccinated

Measles, mumps, and rubella vaccination

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

**Special situations**
- **Pregnancy with no evidence of immunity to rubella:** MMR contraindicated during pregnancy; after pregnancy (before discharge from health care facility), 1 dose MMR
- **Non-pregnant women of childbearing age with no evidence of immunity to rubella:** 1 dose MMR
- **Anatomical or functional asplenia (including sickle cell disease), HIV infection, persistent complement component deficiency, eculizumab use, microbiologists routinely exposed to Neisseria meningitidis:** 2-dose series MenACWY 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

Meningococcal vaccination

**Special situations for MenACWY**
- **Anatomical or functional asplenia (including sickle cell disease), HIV infection, persistent complement component deficiency, eculizumab use, microbiologists routinely exposed to Neisseria meningitidis:** 2-dose series MenACWY (Menactra, Menveo) at least 8 weeks apart 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

**Special situations for MenB**
- **Anatomical or functional asplenia (including sickle cell disease), persistent complement component deficiency, eculizumab use, microbiologists routinely exposed to Neisseria meningitidis:** 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)
- **Pregnancy:** Delay MenB until after pregnancy unless at increased risk and vaccination benefit outweighs potential risks
- **Healthy adolescents and young adults age 16 through 23 years (age 16 through 18 years preferred) not at increased risk for meningococcal disease:** Based on individual clinical decision, may receive 2-dose series MenB-4C at least 1 month apart, or 2-dose series MenB-FHbp at 0, 6 months (if dose 2 was administered less than 6 months after dose 1, administer dose 3 at least 4 months after dose 2); MenB-4C and MenB-FHbp are not interchangeable (use same product for all doses in series)
**Recommended Adult Immunization Schedule**
United States, 2019

### Pneumococcal vaccination
#### Routine vaccination
- **Age 65 years or older** (immunocompetent): 1 dose PCV13 if previously did not receive PCV13, followed by 1 dose PPSV23 at least 1 year after PCV13 and at least 5 years after last dose PPSV23
  - Previously received PPSV23 but not PCV13 at age 65 years or older: 1 dose PCV13 at least 1 year after PPSV23
  - When both PCV13 and PPSV23 are indicated, administer PCV13 first (PCV13 and PPSV23 should not be administered during same visit)

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

### Tetanus, diphtheria, and pertussis vaccination
#### Routine vaccination
- **Previously did not receive Tdap at or after age 11 years**: 1 dose Tdap, then Td booster every 10 years

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

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

#### Special situations
- **Pregnancy**: VAR contraindicated during pregnancy; after pregnancy (before discharge from health care facility), 1 dose VAR if previously received 1 dose varicella-containing vaccine, or dose 1 of 2-dose series VAR (dose 2: 4–8 weeks later) if previously did not receive any varicella-containing vaccine, regardless of whether U.S.-born before 1980

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

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