Updated ACIP Recommendations Reflected in 2018 Child and Adolescent Immunization Schedule
**Polio Vaccination**

- MMWRs published 1/13/17 and 2/17/17 provide additional guidance regarding assessment of poliovirus vaccination status and vaccination of children who have received poliovirus vaccine outside the U.S.

- If both OPV and IPV were administered as part of a series, the **total number of doses needed to complete the series is the same as that recommended for the U.S. IPV schedule**. A minimum interval of 4 weeks should separate doses in the series, with the final dose administered on or after the fourth birthday and at least 6 months after the previous dose.

- Only trivalent OPV (tOPV) counts toward the U.S. vaccination requirements
Influenza Vaccination

- ACIP recommendations for the 2017-18 season were published in the MMWR on August 25, 2017

- Annual influenza vaccination continues to be recommended for persons without contraindications or precautions 6 months of age and older

- Extended recommendation that live attenuated influenza vaccine (LAIV) is not recommended during the 2017-18 season

- For recommendations for the 2018-19 influenza season, refer to recommendations published later this year.
Measles, Mumps, and Rubella (MMR) vaccination

- Recommendation of the Advisory Committee on Immunization Practices for Use of a Third Dose of Mumps Virus–Containing Vaccine in Persons at Increased Risk for Mumps During an Outbreak
  — Published January 12, 2018

- Persons previously vaccinated with 2 doses of a mumps virus–containing vaccine who are identified by public health authorities as being part of a group or population at increased risk for acquiring mumps because of an outbreak should receive a third dose of a mumps virus–containing vaccine
  — To improve protection against mumps disease and related complications.
Changes that impact multiple portions of the schedule
Removal of MenHibrix (Hib-MenCY)

- The manufacturing of MenHibrix has been discontinued and all doses expired mid September 2017
- Mention of MenHibrix has been removed from
  - Figure 1
  - Figure 2
  - Relevant footnotes (Hib and Meningococcal vaccines)
Recommended Immunization Schedule for Children and Adolescents Aged 18 Years or Younger, UNITED STATES, 2018

- Consult relevant ACIP statements for detailed recommendations (www.cdc.gov/vaccines/hcp/acip-recs/index.html).
- When a vaccine is not administered at the recommended age, administer at a subsequent visit.
- Use combination vaccines instead of separate injections when appropriate.
- Report clinically significant adverse events to the Vaccine Adverse Event Reporting System (VAERS) online (www.vaers.hhs.gov) or by telephone (800-822-7967).
- Report suspected cases of reportable vaccine-preventable diseases to your state or local health department.
- For information about precautions and contraindications, see www.cdc.gov/vaccines/hcp/acip-recs/general-recs/contraindications.html.

Approved by the
Advisory Committee on Immunization Practices (www.cdc.gov/vaccines/acip)
American Academy of Pediatrics (www.aap.org)
American Academy of Family Physicians (www.aafp.org)
American College of Obstetricians and Gynecologists (www.acog.org)
This schedule includes recommendations in effect as of January 1, 2018.

<table>
<thead>
<tr>
<th>Vaccine type</th>
<th>Abbreviation</th>
<th>Brand(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diphtheria, tetanus, and acellular pertussis vaccine</td>
<td>DTaP</td>
<td>Diphtherel Immirix</td>
</tr>
<tr>
<td>Diphtheria, tetanus vaccine</td>
<td>DT</td>
<td>No Trade Name</td>
</tr>
<tr>
<td>Haemophilus influenzae type b vaccine</td>
<td>Hib (PRP-T)</td>
<td>ActHIB Hibitrix 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>MultiFlu</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 Menveo</td>
</tr>
<tr>
<td>Meningococcal serogroup B vaccine</td>
<td>MenB-4C</td>
<td>MenB-4C</td>
</tr>
<tr>
<td>Pneumococcal 13-valent conjugate vaccine</td>
<td>PCV13</td>
<td>Prevenar 13</td>
</tr>
<tr>
<td>Pneumococcal 23-valent polysaccharide vaccine</td>
<td>PPsv23</td>
<td>Pneumovax</td>
</tr>
<tr>
<td>Rotavirus vaccine (inactivated)</td>
<td>RV</td>
<td>IPOL</td>
</tr>
<tr>
<td>Rotavirus vaccines</td>
<td>RV1</td>
<td>Rotarix Rotarix</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>Tetvac No Trade Name</td>
</tr>
<tr>
<td>Varicella vaccine</td>
<td>VAR</td>
<td>Varivax</td>
</tr>
</tbody>
</table>

Combination Vaccines
DTaP-HepB-IPV (Inactivated hepatitis B and inactivated poliovirus vaccine) | DTaP-HepB-IPV | PedvaxItal |
DTaP-IPV-Hib (Inactivated poliovirus and Haemophilus influenzae type b vaccine) | DTaP-IPV-Hib | Pentacel |
DTaP and inactivated poliovirus vaccine | DTaP-IPV | Infact Quadrix |
Measles, mumps, rubella, and varicella vaccines | MMRV | ProQuad |
Figure 1

Routine Immunization Schedule
Figure 1. Recommended Immunization Schedule for Children and Adolescents Aged 18 Years or Younger—United States, 2018.

(FOR THOSE WHO FALL BEHIND OR START LATE, SEE THE CATCH-UP SCHEDULE [FIGURE 2]).

These recommendations must be read with the footnotes 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 Figure 1. In determine minimum intervals between doses, see the catch-up schedule (Figure 2). School entry and adolescent vaccine age groups are shaded in gray.

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Birth</th>
<th>1 mos</th>
<th>2 mos</th>
<th>4 mos</th>
<th>6 mos</th>
<th>8 mos</th>
<th>12 mos</th>
<th>15 mos</th>
<th>18 mos</th>
<th>19-23 mos</th>
<th>2-3 yr</th>
<th>4-6 yr</th>
<th>7-10 yr</th>
<th>11-12 yr</th>
<th>13-15 yr</th>
<th>16 yr</th>
<th>17-18 yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatitis B (HepB)</td>
<td>1 dose</td>
<td>2nd dose</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3rd dose</td>
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<tr>
<td>Rotavirus (RVA) B/V/1 (2-dose series); B/2V (3-dose series)</td>
<td>1 dose</td>
<td>2nd dose</td>
<td>See footnote 1</td>
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<tr>
<td>Diphtheria, tetanus, acellular pertussis (DTPa) &lt;2 yr)</td>
<td>1 dose</td>
<td>2nd dose</td>
<td>3rd dose</td>
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<td>4th dose</td>
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<td>5th dose</td>
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<tr>
<td>Haemophilus influenzae type b (Hib)</td>
<td>1 dose</td>
<td>2nd dose</td>
<td>See footnote 2</td>
<td>2nd or 3rd dose</td>
<td>See footnote 4</td>
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<tr>
<td>Pneumococcal conjugate (PCV13)</td>
<td>1 dose</td>
<td>2nd dose</td>
<td>3rd dose</td>
<td></td>
<td>4th dose</td>
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<td>5th dose</td>
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<tr>
<td>Inactivated poliovirus (IPV&lt;18 yrs)</td>
<td>1 dose</td>
<td>2nd dose</td>
<td></td>
<td>3rd dose</td>
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<td>4th dose</td>
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<tr>
<td>Influenza (IV)</td>
<td>Annual vaccination (IV) 1 or 2 doses</td>
<td>Annual vaccination (IV) 1 dose only</td>
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<tr>
<td>Measles, mumps, rubella (MMR)</td>
<td>See footnote 3</td>
<td>1 dose</td>
<td></td>
<td>2nd dose</td>
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<tr>
<td>Varicella (V)</td>
<td>1 dose</td>
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<td>2nd dose</td>
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<tr>
<td>Hepatitis A (HepA)</td>
<td>2-dose series, See footnote 10</td>
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<tr>
<td>Meningococcal B (MenACWY-D, or MenACWY CRM or O)</td>
<td>See footnote 11</td>
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<tr>
<td>Meningococcal C (MenACWY-CRM)</td>
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<td>3rd dose</td>
<td>2nd dose</td>
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<tr>
<td>Tetanus, diphtheria,acellular pertussis (Tdap, &gt;7 yr)</td>
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<tr>
<td>Human papillomavirus (HPV)</td>
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<tr>
<td>Meningococcal B (MenACWY-CRM)</td>
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<tr>
<td>Pneumococcal polysaccharide (PPV23)</td>
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</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

NOTE: The above recommendations must be read along with the footnotes of this schedule.
Figure 2

The Catch-up Figure
FIGURE 2. Catch-up immunization schedule for persons aged 4 months–18 years who start late or who are more than 1 month behind—United States, 2018.

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 Figure 1 and the footnotes that follow.

### Children age 4 months–12 years

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Minimum Age for Dose 1</th>
<th>Minimum Interval Between Doses</th>
<th>Dose 1 to Dose 2</th>
<th>Dose 2 to Dose 3</th>
<th>Dose 3 to Dose 4</th>
<th>Dose 4 to Dose 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hib tetanus</td>
<td>6 weeks</td>
<td>6 weeks and at least 15 weeks after first dose. Minimum interval for the final dose is 24 weeks.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Poliomyelitis</td>
<td>6 weeks</td>
<td>6 weeks</td>
<td>6 months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pneumococcal conjugate</td>
<td>6 weeks</td>
<td>6 weeks and at least 15 weeks after first dose. Minimum interval for the final dose is 24 weeks.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Haemophilus influenza type b</td>
<td>6 weeks</td>
<td>6 weeks and at least 15 weeks after first dose. Minimum interval for the final dose is 24 weeks.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inactivated poliovirus</td>
<td>6 weeks</td>
<td>6 weeks</td>
<td>6 months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mumps</td>
<td>12 months</td>
<td>6 months</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Varicella</td>
<td>12 months</td>
<td>6 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Haemophilus influenza type b</td>
<td>12 months</td>
<td>6 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measles, mumps, rubella</td>
<td>6 weeks</td>
<td>6 weeks</td>
<td>6 months</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** The above recommendations must be read along with the footnotes of this schedule.
### FIGURE 2. Catch-up immunization schedule for persons aged 4 months–18 years who start late or who are more than 1 month behind—United States, 2018.

The figure below catchup 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. See the section appropriate for the child’s age. Always use this table in conjunction with Figure 1 and the exceptions that follow.

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Minimum Age for First Dose</th>
<th>Minimum Intervals Between Doses</th>
<th>Dose 1 to Dose 2</th>
<th>Dose 2 to Dose 3</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>4 weeks</td>
<td>12 months, 6 days</td>
<td>12 months, 6 days</td>
<td>12 months, 6 days</td>
</tr>
<tr>
<td>Rotavirus</td>
<td>6 weeks</td>
<td>4 weeks</td>
<td>0 months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RotaTeq, reovirus, and calicivirus</td>
<td>6 weeks</td>
<td>4 weeks</td>
<td>0 months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Haemophilus influenza type b</td>
<td>6 weeks</td>
<td>4 weeks</td>
<td>0 months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pneumococcal conjugate</td>
<td>6 weeks</td>
<td>4 weeks</td>
<td>0 months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inactivated poliovirus</td>
<td>6 weeks, 12 months, 12 months</td>
<td>4 weeks</td>
<td>0 months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measles, mumps, rubella</td>
<td>12 months, 3 months</td>
<td>4 weeks</td>
<td>0 months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hepatitis A</td>
<td>12 months, 6 months</td>
<td>4 weeks</td>
<td>0 months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hepatitis B</td>
<td>6 weeks</td>
<td>4 weeks</td>
<td>0 months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human papillomavirus</td>
<td>9 years</td>
<td>4 weeks</td>
<td>0 months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tetanus, diphtheria, tetanus, and acellular pertussis</td>
<td>7 years, 4 weeks</td>
<td>4 weeks</td>
<td>0 months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human papillomavirus</td>
<td>9 years</td>
<td>4 weeks</td>
<td>0 months</td>
<td></td>
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</tr>
</tbody>
</table>

**NOTE:** The above recommendations must be read along with the footnotes of this schedule.
<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Minimum Age for First Dose</th>
<th>Dose 1 to Dose 2</th>
<th>Minimum Interval Between Doses</th>
<th>Dose Yet Dose 4</th>
<th>Dose 6 months</th>
<th>Dose 4 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatitis B</td>
<td>Birth</td>
<td>4 weeks</td>
<td>8 weeks and at least 16 weeks after first dose.</td>
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<tr>
<td></td>
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<td></td>
<td>Minimum age for the final dose is 24 weeks.</td>
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<tr>
<td>Poliomyelitis</td>
<td>6 months</td>
<td>4 weeks</td>
<td>6 months (as final dose) if current age is 4 years or older</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Diptheria, tetanus, and whooping cough</td>
<td>6 weeks</td>
<td>4 weeks</td>
<td>6 months (as final dose) if current age is 4 years or older</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Haemophilus influenza type b</td>
<td>6 weeks</td>
<td>4 weeks</td>
<td>6 months (as final dose) if current age is 4 years or older</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pneumococcal conjugate</td>
<td>6 weeks</td>
<td>4 weeks</td>
<td>6 months (as final dose) if current age is 4 years or older</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Inactivated poliovirus</td>
<td>6 weeks</td>
<td>4 weeks</td>
<td>6 months (as final dose) if current age is 4 years or older</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mumps, measles, rubella</td>
<td>12 months</td>
<td>4 weeks</td>
<td>6 months (as final dose) if current age is 4 years or older</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Varicella</td>
<td>12 months</td>
<td>4 weeks</td>
<td>6 months (as final dose) if current age is 4 years or older</td>
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<td></td>
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</tr>
<tr>
<td>Haemophilus influenza type b</td>
<td>12 months</td>
<td>4 weeks</td>
<td>6 months (as final dose) if current age is 4 years or older</td>
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</tr>
<tr>
<td>Haemophilus influenza type b</td>
<td>12 months</td>
<td>4 weeks</td>
<td>6 months (as final dose) if current age is 4 years or older</td>
<td></td>
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</tr>
<tr>
<td>Mumps, measles, rubella</td>
<td>6 weeks</td>
<td>4 weeks</td>
<td>6 months (as final dose) if current age is 4 years or older</td>
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<tr>
<td>Varicella</td>
<td>6 weeks</td>
<td>4 weeks</td>
<td>6 months (as final dose) if current age is 4 years or older</td>
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</tbody>
</table>

NOTE: The above recommendations must be read along with the footnotes of this schedule.

4 weeks if current age is < 4 years

6 months (as final dose) if current age is 4 years or older
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.
6 months

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.
Figure 3

The High-risk Figure
Figure 3. Vaccines that might be indicated for children and adolescents aged 18 years or younger based on medical indications

<table>
<thead>
<tr>
<th>VACCINE</th>
<th>INDICATION</th>
<th>Pregnancy</th>
<th>Immunocompromised status (excluding HIV infection)</th>
<th>HIV Infection CD4+ count†</th>
<th>&lt;50% of total HIV cell count</th>
<th>≥50% of total HIV cell count</th>
<th>Gastroenteritis, chronic diarrhea, or persistent vomiting</th>
<th>Diarrhea, vomiting, or other severe gastrointestinal symptoms</th>
<th>Osteomyelitis, meningitis, peritonitis, or other severe infections</th>
<th>Death due to infection</th>
<th>Other serious infections</th>
<th>Diabetes</th>
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</thead>
<tbody>
<tr>
<td>Hepatitis B†</td>
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<td>Inactivated poliovirus†</td>
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<td>Mumps, measles, rubella*</td>
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<td>Meningococcal B/CAPHP†</td>
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<tr>
<td>Tetanus, diphtheria, &amp; Haemophilus influenzae (Tdap)</td>
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<tr>
<td>Human papillomavirus</td>
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<td>Pneumococcal polysaccharide</td>
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</table>

*Severe Combined Immunodeficiency

For additional information regarding HIV laboratory parameters and use of live vaccines, see the General Best Practice Guidelines for Immunization "At risk Immunocompetence" at www.cdc.gov/vaccineshcp/adv-rec/gener-al-recs/immunocompetencechten and Tables 4-1 (footnoteD) at www.cdc.gov/vaccineshcp/adv-rec/gener-al-recs/adv-rec-containindications.html.

NOTE: The above recommendations must be read along with the footnotes of this schedule.
Figure 3. Vaccines that might be indicated for children and adolescents aged 18 years or younger based on medical indications

<table>
<thead>
<tr>
<th>VACCINE</th>
<th>INDICATION</th>
<th>HIV Infection (CD4+ count)</th>
<th>Other indications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatitis B</td>
<td>Pregnancy (Immunocompromised status excluding HIV infection)</td>
<td>CD4+ count ≥500/mm³</td>
<td>CD4+ count ≥200/mm³</td>
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<tr>
<td>Rotavirus*</td>
<td></td>
<td>CD4+ count ≥200/mm³</td>
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<tr>
<td>Diphtheria, tetanus, &amp; pertussis† (DTaP)</td>
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<tr>
<td>Haemophilus influenzae type b†</td>
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<tr>
<td>Pneumococcal conjugate*</td>
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<tr>
<td>Inactivated poliovirus*</td>
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<tr>
<td>Inactivated influenza†</td>
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<tr>
<td>Mumps, mumps, rubella*</td>
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<tr>
<td>Varicella†</td>
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<tr>
<td>Hepatitis A†</td>
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<tr>
<td>Meningococcal 4CMYN†</td>
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<tr>
<td>Tetanus, diphtheria, &amp; pertussis (Tdap)</td>
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<td>Human papillomavirus†</td>
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<tr>
<td>Meningococcal B†</td>
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<tr>
<td>Pneumococcal polysaccharide*</td>
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</tbody>
</table>

*Severe Combined Immunodeficiency
†For additional information regarding HIV laboratory parameters and use of live vaccines, see the General Best Practice Guidelines for Immunization "At-risk Immunocompetents" at www.cdc.gov/vaccines/hcp/acip-recs/gener-al-recs/immunocompetence.html and Table 4-I (footnote D) at www.cdc.gov/vaccines/hcp/acip-recs/gener-al-recs/immunocompetence.html.

NOTE: The above recommendations must be read along with the footnotes of this schedule.
Footnotes
Footnote simplification

- Remove unnecessary text while preserving all pertinent information and maintaining clarity
  - Transition from complete sentences to bullets
  - Removal of unnecessary or redundant language
  - Formatting changes
Hepatitis B (HepB) vaccine. (Minimum age: birth)

Routine vaccination:
At birth
- Administer monovalent HepB vaccine to all newborns within 24 hours of birth.
- For infants born to hepatitis B surface antigen (HBsAg)-positive mothers, administer HepB vaccine and 0.5 mL of hepatitis B immune globulin (HBIG) within 12 hours of birth. These infants should be tested for HBsAg and antibody to HBsAg (anti-HBs) at age 9 through 12 months (preferably at the next well-child visit) or 1 to 2 months after completion of the HepB series if the series was delayed.
- If mother’s HBsAg status is unknown, within 12 hours of birth administer HepB vaccine regardless of birth weight. For infants weighing less than 2,000 grams, administer HBIG in addition to HepB vaccine within 12 hours of birth. Determine mother’s HBsAg status as soon as possible and, if mother is HBsAg-positive, also administer HBIG for infants weighing 2,000 grams or more as soon as possible, but no later than age 7 days.

Doses following the birth dose
- The second dose should be administered at age 1 or 2 months. Monovalent HepB vaccine should be used for doses administered before age 6 weeks.
- Infants who did not receive a birth dose should receive 3 doses of a HepB-containing vaccine on a schedule of 0, 1 to 2 months, and 6 months starting as soon as feasible (see Figure 2).
- Administer the second dose 1 to 2 months after the first dose (minimum interval of 4 weeks), administer the third dose at least 8 weeks after the second dose AND at least 16 weeks after the first dose. The final (third or fourth) dose in the HepB vaccine series should be administered no earlier than age 24 weeks.
- Administration of a total of 4 doses of HepB vaccine is permitted when a combination vaccine containing HepB is administered after the birth dose.

Catch-up vaccination:
- Unvaccinated persons should complete a 3-dose series.
- A 2-dose series (doses separated by at least 4 months) of adult formulation Recombivax HB is licensed for use in children aged 11 through 15 years.
- For other catch-up guidance, see Figure 2.

Hepatitis B (HepB) vaccine. (Minimum age: birth)

Birth Dose (Monovalent HepB vaccine only):
- Mother is HBsAg-Negative: One dose within 24 hours of birth, for 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:
  - Give HepB vaccine and 0.5 mL of HBIG (at separate anatomic sites) within 12 hours of birth, regardless of birth weight.
  - Test for HBsAg and anti-HBs at age 9 through 12 months. If HepB series is delayed, test 1-2 months after final dose.
- Mother’s HBsAg status is unknown:
  - Give HepB vaccine within 12 hours of birth, regardless of birth weight.
  - For infants <2,000 grams, give HBIG in addition to HepB vaccine within 12 hours of birth.
  - Determine mother’s HBsAg status as soon as possible. If mother is HBsAg-positive, give HBIG to infants >2,000 grams as soon as possible, but no later than 7 days of age.

Routine Series:
- A complete series is 3 doses at 0, 1-2, and 6 months. (Monovalent HepB vaccine should be used for doses given before age 6 weeks.)
- Infants who did not get a birth dose should begin the series as soon as feasible (see Figure 2).
- Administration of 4 doses is permitted when a combination vaccine containing HepB is used after the birth dose.
- Minimum age for the final (third or fourth) 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 given, substitute “Dose 4” for “Dose 3” in these calculations.)

Catch-up vaccination:
- Unvaccinated persons should complete a 3-dose series at 0, 1-2, and 6 months.
- Adolescents 11 through 15 years of age may use an alternative 2-dose series, with at least 4 months between doses (adult formulation Recombivax HB only).
- For other catch-up guidance, see Figure 2.
### 2017 HPV footnote

**Human papillomavirus (HPV) vaccine. (Minimum age: 9 years)**

**Routine and catch-up vaccination:**
- Administer a 2-dose series of HPV vaccine on a schedule of 0, 6-12 months to all adolescents aged 11 or 12 years. The vaccination series can start at age 9 years.
- Administer HPV vaccine to all adolescents through age 18 years who were not previously adequately vaccinated. The number of recommended doses is based on age at administration of the first dose.
- For persons initiating vaccination before age 15, the recommended immunization schedule is 2 doses of HPV vaccine at 0, 6-12 months.
- For persons initiating vaccination at age 15 years or older, the recommended immunization schedule is 3 doses of HPV vaccine at 0, 1–2, 6 months.
- A vaccine dose administered at a shorter interval should be readministered at the recommended interval.
  - In a 2-dose schedule of HPV vaccine, the minimum interval is 5 months between the first and second dose. If the second dose is administered at a shorter interval, a third dose should be administered a minimum of 12 weeks after the second dose and a minimum of 5 months after the first dose.
  - In a 3-dose schedule of HPV vaccine, the minimum intervals are 4 weeks between the first and second dose, 12 weeks between the second and third dose, and 5 months between the first and third dose. If a vaccine dose is administered at a shorter interval, it should be readministered after another minimum interval has been met since the most recent dose.
- Persons who have completed an age-appropriate HPV vaccine series (i.e., either 2 or 3 doses of 2vHPV, 4vHPV, or 9vHPV at the recommended intervals) are considered adequately vaccinated.

**Special populations:**
- For children with history of sexual abuse or assault, administer HPV vaccine beginning at age 9 years.
- Immunocompromised persons* aged 9–26 years, including those with human immunodeficiency virus (HIV) infection, should receive a 3-dose series at 0, 1–2, and 6 months.

Note: HPV vaccination is not recommended during pregnancy, although there is no evidence that the vaccine poses harm. If a woman is found to be pregnant after initiating the vaccination series, no intervention is needed; the remaining vaccine doses should be delayed until after the pregnancy. Pregnancy testing is not needed before vaccination.

*See MMWR, December 16, 2016;65(49):1405–1408, at www.cdc.gov/mmwr/volumes/65/wr/pdfs/mm6549a5.pdf.

### Proposed 2018 HPV footnote

**Human papillomavirus (HPV) vaccine (Minimum age: 9 years)**

**Routine and catch-up vaccination:**
- Routine vaccination at 11–12 years (can start at age 9) and through age 18 if not previously adequately vaccinated. Number of doses dependent on age at initial vaccination:
  - Age 9–14 years at initiation: 2-dose series at 0 and 6–12 months. Minimum interval: 5 months (repeat a dose given too soon at least 12 weeks after the invalid dose and at least 5 months after the 1st dose).
  - Age 15 years or older at initiation: 3-dose series at 0, 1–2 months, and 6 months. Minimum intervals: 4 weeks between 1st and 2nd dose; 12 weeks between 2nd and 3rd dose; 5 months between 1st and 3rd dose (repeat dose/s given too soon).
- Persons who have completed a valid series with any HPV vaccine do not need any additional doses.

**Special situations:**
- **History of sexual abuse or assault:** Begin series at age 9 years.
- **Immunocompromised* (including human immunodeficiency virus [HIV]) aged 9–26 years:** 3-dose series at 0, 1–2 months, and 6 months.
- **Pregnancy:** Vaccination not recommended, but there is no evidence the vaccine is harmful and no intervention needed for women who inadvertently received a dose of HPV vaccine while pregnant. Delay remaining doses until after pregnancy. Pregnancy testing not needed before vaccination.

*See MMWR, December 16, 2016;65(49):1405–1408, at www.cdc.gov/mmwr/volumes/65/wr/pdfs/mm6549a5.pdf.
Footnoted content edits
Footnotes — Recommended Immunization Schedule for Children and Adolescents Aged 18 Years or Younger, UNITED STATES, 2018

For further guidance on the use of the vaccines mentioned below, see: www.cdc.gov/vaccines/hcp/acip-recs/index.html.

For vaccine recommendations for persons 19 years of age and older, see the Adult Immunization Schedule.

Additional Information

• 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.

• 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 interval or minimum age should not be counted as valid and should be repeated as age-appropriate. The repeat dose should be spaced after the interval 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.

• Information on travel vaccine requirements and recommendations is available at www.cdc.gov/travel/.


• 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/

• Within a number range (e.g., 12–18), a dash (–) should be read as “through.”

• ACIP does not express a preference for any vaccine product where 1 or more products may be appropriate and considered for use.

• Within a number range (e.g., 12–18), a dash (–) should be read as “through.”

• ACIP does not express a preference for any vaccine product where 1 or more products may be appropriate and considered for use.
1. Hepatitis B (HepB) vaccine. (Minimum age: birth)

Birth Dose (Monovalent HepB vaccine only):
- Mother is HBsAg-Negative: 1 dose within 24 hours of birth for 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:
  - Give HepB vaccine and 0.5 mL of HBIG at separate anatomic sites within 12 hours of birth, regardless of birth weight.
  - Test for HBsAg and anti-HBs at age 0–12 months. If HepB series is delayed, test 1–2 months after final dose.
- Mother’s HBsAg status is unknown:
  - Give HepB vaccine within 12 hours of birth, regardless of birth weight.
  - For infants <2,000 grams, give 0.5 mL of HBIG in addition to HepB vaccine within 12 hours of birth.
  - Determine mother’s HBsAg status as soon as possible. If mother is HBsAg-positive, give 0.5 mL of HBIG to infants ≥2,000 grams as soon as possible, but no later than 7 days of age.

Routine Series:
- A complete series is 3 doses at 0, 1–2, and 6–18 months. Monovalent HepB vaccine should be used for doses given before age 6 weeks.
- Infants who did not receive a birth dose should begin the series as soon as feasible (see Figure 2).
- Administration of 4 doses is permitted when a combination vaccine containing HepB is used after the birth dose.
- Minimum interval for the final (3rd or 4th) dose: 24 weeks.
- Minimum Interval between doses: 4 weeks / Dose 2 to Dose 3: 8–12 weeks. (Where Dose 4 for Dose 3)
- Catch-up vaccine:
  - Unvaccinated series at 0, 1–2, and 4 years.
  - Adolescents: administer 2 additional doses before age 19 years, regardless of HBsAg status.

2. Rotavirus vaccine

Routine vaccine:
- Rotarix: 3-dose series at 2, 4, and 6 months.
- If any dose in the series is either Rotarix or unknown, default to 3-dose series administered at 4 years or older.

Catch-up vaccination:
- Do not start the series on or after age 15 weeks, 10 days.
- The maximum age for the final dose is 8 months, 0 days.
- For other catch-up guidance, see Figure 2.

3. Diphtheria, tetanus, and acellular pertussis (DTaP) vaccine. (Minimum age: 6 weeks)

- For children aged 6–11 years:
  - If <1 year of age, dose at age 12 months.
  - If ≥1 year of age, dose at age 15 months.

- For children aged 12–23 months:
  - If <1 year of age, dose at age 12 months.
  - If ≥1 year of age, dose at age 15 months.

- For children aged 24–35 months:
  - If <1 year of age, dose at age 12 months.
  - If ≥1 year of age, dose at age 15 months.

- For children aged ≥36 months:
  - If <1 year of age, dose at age 12 months.
  - If ≥1 year of age, dose at age 15 months.

- For children aged 6–11 years:
  - If <1 year of age, dose at age 12 months.
  - If ≥1 year of age, dose at age 15 months.

- For children aged 12–23 months:
  - If <1 year of age, dose at age 12 months.
  - If ≥1 year of age, dose at age 15 months.

- For children aged ≥24 months:
  - If <1 year of age, dose at age 12 months.
  - If ≥1 year of age, dose at age 15 months.
6. Inactivated poliovirus vaccine (IPV). (minimum age: 6 weeks)

Routine vaccination:
- 4-dose series at ages 2, 4, 6–18 months, and 4–6 years. Administer the final dose on or 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.
- If 4 or more doses were given before the 4th birthday, give one more dose at age 4–6 years and at least 6 months after the previous dose.
- A 4th dose is not necessary if the 3rd dose was given on or after the 4th birthday and at least 6 months after the previous dose.
- IPV is not routinely recommended for U.S. residents 18 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.
- 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_w.
- For other catch-up guidance, see Figure 2.

7. Influenza vaccine:

Routine vaccination:
- Administer an age-appropriate dose of influenza vaccine to all persons aged >=6 months annually.
- Children 6 to 23 months of age should receive at least one dose before July 1, separated by at least 8 weeks.
- Persons 9 years of age and older are live attenuated influenza vaccine (LAIV) recommended for primary vaccination for additional guidance influenza vaccination August 25, 2017 volumes/6601a6.
- For the 2018-19 season, influenza vaccine guidance.

8. Measles, mumps, (minimum age: 12 months)

Routine vaccination:
- 2-dose series at 12 and 18 months of age.
- The 2nd dose may overlap with the 1st dose.

Catch-up vaccination:
- Unvaccinated children should receive two doses of measles, mumps, and rubella (MMR) vaccine if they were born after 1980.
- Persons ≥12 years of age with ≥2 doses of OPV identified by providers should receive a dose of tOPV if they meet any of the following:
  - Persons ≥12 years of age or ≥2 doses of OPV identified by providers should receive a dose of tOPV if they meet any of the following.
  - Persons ≥12 years of age or ≥2 doses of OPV identified by providers should receive a dose of tOPV if they meet any of the following.

9. Varicella (VAR) vaccine:

Routine vaccination:
- 2-dose series: 12 and 18 months of age.
- The 2nd dose may overlap with the 1st dose.

For other catch-up guidance, see Figure 2
7. Influenza vaccines. (minimum age: 6 months)

Routine vaccination:
• Administer an age-appropriate formulation and dose of influenza vaccine annually.
  o Children 6 months–8 years who did not receive at least 2 doses of influenza vaccine before July 1, 2017 should receive 2 doses separated by at least 4 weeks.
  o Persons 9 years and older 1 dose
  o Live attenuated influenza vaccine (LAIV) not recommended for the 2017–18 season.
  (For the 2018–19 season, see the 2018–19 ACIP influenza vaccine recommendations.)

Catch-up vaccination:
• Ensure persons 7–18 years without evidence of immunity (see MMWR 2007;56[No. RR-1], at www.cdc.gov/mmwr/volumes/56/rr/pdfs/rr5604pdf.pdf) have 2 doses of varicella vaccine.
  o Age 7–12: routine interval 3 months (minimum interval 4 weeks).
  o Ages 13 and older: minimum interval 4 weeks.

8. Measles, mumps, and rubella (MMR) vaccine. (Minimum age: 12 months)

Routine vaccination:
• 2-dose series at 12–15 months and 4–6 years.
  The 2nd dose may be given as early as 4 weeks after the 1st dose.
Catch-up vaccination:
• Unvaccinated children 1 dose.
• Unvaccinated children 2 doses if international travel:
  o Infants 6–11 months: revaccinate with 2 doses at 12 months for children 12 months of age or older.
  o Unvaccinated children 2 doses at least 4 weeks apart.
Mumps outbreaks:
• Persons ≥12 months of age and ≥2 doses of mumps identified by public health surveillance at increased risk during outbreaks should receive a dose of mumps vaccine.

9. Varicella (VAR) vaccine.

Routine vaccination:
• 2-dose series: 12–15 months.
  The 2nd dose may be given as early as 4 weeks after the 1st dose.
• For additional guidance, see the 2017–18 ACIP varicella vaccine recommendations (MMWR August 26, 2016;65(5):1-54: www.cdc.gov/mmwr/volumes/65/rr/pdfs/rr6505.pdf).
  (For the 2018–19 season, see the 2018–19 ACIP varicella vaccine recommendations.)

For further guidance on the use of the vaccines mentioned below, see: www.cdc.gov/vaccines/hcp/acip-recs/index.html.

• PPSV23 but no PCV13: 1 dose of PCV13 at least 8 weeks after the most recent PPSV23 dose and a 2nd dose of PPSV23 to be given 5 years after the 1st dose of PCV13 and at least 8 weeks after a dose of PCV13.

Chronic liver disease, alcoholism:
Age 6–10 years:
• No history of PPSV23: 1 dose of PPSV23 (at least 8 weeks after any prior PCV13 dose).
  *Incomplete schedules are any schedules where PCV13 doses have not been completed according to ACIP recommended catch-up schedules. The total number and timing of doses for complete PCV13 series are dictated by the age at first vaccination. See Tables 8 and 9 in the ACIP pneumococcal vaccine recommendations (www.cdc.gov/mmwr/pdf/n/v59n10.pdf) for complete schedule details.

6. Inactivated poliovirus vaccine (IPV). (Minimum age: 9 weeks)

Routine vaccination:
• 4-dose series at ages 2, 4, 6–18 months, and 4–6 years.
  Administer the final dose on or 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.
  If 4 or more doses were given before the 4th birthday, give 1 more dose at age 4–6 years and at least 6 months after the previous dose.
  A 4th dose is not necessary if the 3rd dose was given on or after the 4th birthday and at least 6 months after the previous dose.
IPVs not routinely recommended for U.S. residents 18 years and older.

Series Containing Oral Polo 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/mm6601a15.htm/s_cid:mm6601a15_w.
• 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/60/wr/mm6005a7.htm/s_cid:mm6005a7_w.
• For other catch-up guidance, see Figure 2.
8. Measles, mumps, and rubella (MMR) vaccine. (minimum age: 12 months for routine vaccination)
Routine vaccination:
• 2-dose series at 12–15 months and 4–6 years.
• The 2nd dose may be given as early as 4 weeks after the 1st dose.

Catch-up vaccination:
• Unvaccinated children and adolescents: 2 doses at least 4 weeks apart.

International travel:
• Infants 6–11 months: 1 dose before departure. Revaccinate with 2 doses at 12–15 months (12 months for children in high-risk areas) and 2nd dose as early as 4 weeks later.
• Unvaccinated children 12 months and older: 2 doses at least 4 weeks apart before departure.

Mumps outbreak:
• Persons ≥12 months who previously received ≤2 doses of mumps-containing vaccine and are identified by public health authorities to be at increased risk during a mumps outbreak should receive a dose of mumps-virus containing vaccine.

9. Variola (VAR) vaccine. (minimum age: 12 months)
Routine vaccination:
• 2-dose series: 12–15 months and 4–6 years.
• The 2nd dose may be given as early as 3 months after the 1st dose (a 2nd dose given after a 4-week interval may be counted).

Catch-up vaccination:
• Ensure persons 7–18 years without evidence of immunity (see MMWR 2007;56[No. RR-1], at www.cdc.gov/mmwr/volumes/56/ww/mm5604a1.pdf) have 2 doses of varicella vaccine:
  • Age 7–12 routine interval 3 months (minimum interval: 4 weeks).
  • Age 13 and older: minimum interval 4 weeks.

10. Hepatitis A (HepA) vaccine. (minimum age: 12 months)
Routine vaccination:
• 2 doses, separated by 6–18 months, between the 1st and 2nd birthdays. (A series begun before the 2nd birthday should be completed even if the child turns 2 before the second dose is given.)

Catch-up vaccination:
• Anyone 2 years of age or older may receive HepA vaccine if desired. Minimum interval between doses is 6 months.

Special populations:
Previously unvaccinated persons who should be vaccinated:
• Persons traveling to or working in countries with high or intermediate endemicity
• Men who have sex with men
• Users of injection and non-injection drugs
• Persons who work with hepatitis A virus in a research laboratory or with non-human primates
• Persons with clotting-factor disorders
• Persons with chronic liver disease
• Persons who anticipate close, personal contact (e.g., household or regular babysitting) with an international adoptee during the first 60 days after arrival in the United States from a country with high or intermediate endemicity administer the 1st dose as soon as the adoption is planned—ideally at least 2 weeks before the adoptee's arrival.

11. Serogroup A, C, W, Y meningococcal vaccines. (Minimum age: 2 months [Menveo], 9 months [Menactra])
Routine:
• 2-dose series: 11–12 years and 16 years.

Catch-Up:
• Age 13–15 years: 1 dose now and booster at age 16–18 years. Minimum interval 8 weeks.
• Age 16–18 years: 1 dose.
Recommended Immunization Schedule for Adults, United States, 2018
Updates in 2018 Adult Immunization Schedule

- Extended recommendation to not use live attenuated influenza vaccine (LAIV) during 2017–2018 season\(^1\) (LAIV use reinstituted for 2018–2019)
- Recommended use of recombinant zoster vaccine (RZV)\(^2\)
- Recommended use of third dose of MMR in mumps outbreak\(^3\)
- Updated ACIP language in policy notes on prevention of hepatitis B\(^4\)
  - “HCV infection, cirrhosis, fatty liver disease, alcoholic liver disease, autoimmune hepatitis, and ALT or AST level greater than twice the upper limit of normal” – already incorporated into adult immunization schedule in 2017

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1. MMWR 2017;66(2):1-20
2. MMWR 2018;67(3):103-108
3. MMWR 2018;67(1):33-38
4. MMWR 2018;67(1):1-31
Updates NOT in 2018 Adult Immunization Schedule

- Reinstituted use of LAIV during 2018–2019 season\textsuperscript{1}
- Recommended use of Cytosine-phosphate-Guanine-adjuvanted hepatitis B vaccine (HepB-CpG)\textsuperscript{1}
- Revised recommended use of HepA for post-exposure prophylaxis\textsuperscript{1}

\textsuperscript{1} ACIP meeting, February 2018; publication pending
Updates – Influenza Vaccination

- Annual influenza vaccination recommended for persons ≥6 mos
  - Age-appropriate IIV standard dose
  - Options for adults include high-dose IIV for ≥65y, adjuvanted IIV for ≥65y, intradermal IIV for 18–64y, cell culture-based IIV for ≥18y, RIV for ≥18y

- Extended recommendation to not use LAIV during 2017–2018 season¹

- Updated ACIP recommendation for 2018–2019 season² – Reinstitute use of LAIV (not in 2018 adult immunization schedule)
  - Contains new H1N1 strain (A/Slovenia)
  - Option for adults ≤49y

¹. MMWR 2017;66(2):1-20
². ACIP meeting, February 2018; publication pending
Updates – Zoster Vaccination¹

- Administer 2 doses recombinant zoster vaccine (RZV) 2–6 mos apart to adults ≥50y regardless of past herpes zoster or receipt of zoster vaccine live (ZVL)
- Administer RZV 2–6 mos apart to adults who previously received ZVL at least 2 mos after ZVL
- For adults ≥60y, administer either RZV or ZVL (RZV is preferred)
- Special populations
  - Administer RZV to age-eligible adults with chronic health conditions including diabetes, chronic heart/lung/liver/kidney ds, asplenia, complement deficiencies
  - Pending considerations on use of RZV in immunocompromising conditions including HIV infection
  - No data on pregnant women (consider delay)

¹ MMWR 2018;67(3):103-108
Updates – Mumps Vaccination

- Routine mumps vaccination recommendations
  - Children – 2 doses MMR during K-12 (12–15 mos and 4–6 yrs)
  - Adults – 1 dose MMR if born in 1957 or later or without evidence of immunity, 2 doses if high risk (students at post-high school educational institutions, health care personnel, international travelers)

- Multiple outbreaks of mumps and high numbers of reported cases since 2015, many among young adults who received 2 doses MMR

- Updated ACIP recommendations on use of MMR during mumps outbreak\(^1\)
  - Administer 1 dose MMR to persons who previously received ≤2 doses mumps-containing vaccine and identified by public health authority to be at increased risk during mumps outbreak

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1. MMWR 2018;67(1):33-38
Updates – Hepatitis B Vaccination

- Heplisav-B (Dynavax) is single-antigen hepatitis B vaccine for all HBV subtypes, 2-dose series\(^1\)
- Contains yeast-derived recombinant HBsAg with Cytosine-phosphate-Guanine (CpG) adjuvant
- Revised hepatitis B vaccine nomenclature
  - HepB = Hepatitis B vaccine
  - HepB-CpG = Cytosine-phosphate-Guanine-adjuvanted HepB
  - HepB-alum = aluminum-adjuvanted HepB

**HepB-CpG – Seroprotection and Safety**

### Immunogenicity
- 90%–100% (2 doses) vs. 70%–90% in comparison group (3 doses Engerix-B)
- Diabetes Type II: 90% (2 doses) vs. 65% (3 doses Engerix-B)
- Chronic kidney disease: 90% (3 doses) vs. 81% (4 double doses Engerix-B)

### Safety and Reactogenicity
- Mild and serious adverse events similar
  - Mild: 46% vs. 46%
  - Serious: 5% vs. 6%
- Cardiovascular events not significantly different
  - 0.3% vs. 0.1%
- Potentially immune-mediated adverse events similar (e.g., granulomatosis with polyangiitis, Grave’s disease)
  - 0.1%–0.2% vs. 0%–0.7%

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Updates – Hepatitis B Vaccination

- Recommended HepB-CpG use – 2 doses 1 month apart for persons aged ≥18y (not in 2018 adult immunization schedule)
- No preferential recommendation for use of HepB-CpG over HepB-alum
- HepB-CpG may be used in 3-dose HepB-alum series
  - 3 doses of HepB are needed unless 2 doses of HepB-CpG is administered 1 month apart

1. ACIP meeting, February 2018; publication pending
Updates – Hepatitis A Vaccination¹

- Recommendation in 2018 adult immunization schedule
  - Healthy adults through age 40 who have recently been exposed to hepatitis A virus should receive HepA; adults older than age 40 years may receive HepA if hepatitis A immunoglobulin cannot be obtained

- Updated ACIP recommendation¹ (not in 2018 adult immunization schedule)
  - HepA should be administered for post-exposure prophylaxis for all persons aged ≥12 months
  - In addition to HepA, immunoglobulin may be administered to persons aged >40y depending on providers’ risk assessment

¹ ACIP meeting, February 2018; publication pending
Updates – Hepatitis A Vaccination¹

- Recommendation in 2018 adult immunization schedule
  - Healthy adults through age 40 who have recently been exposed to hepatitis A virus should receive HepA; adults older than age 40 years may receive HepA if hepatitis A immunoglobulin cannot be obtained

- Updated recommendation¹ (not in 2018 adult immunization schedule)
  - HepA should be administered for post-exposure prophylaxis for all persons aged ≥12 months
  - In addition to HepA, immunoglobulin may be administered to persons aged >40y depending on providers’ risk assessment

<table>
<thead>
<tr>
<th>Recommendations for hepatitis A post-exposure prophylaxis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2018 adult immunization schedule</strong></td>
</tr>
<tr>
<td>• Adults ≤40y – HepA</td>
</tr>
<tr>
<td>• Adults &gt;40y – May receive IG</td>
</tr>
<tr>
<td><strong>Updated ACIP recommendations¹</strong></td>
</tr>
<tr>
<td>• All adults – HepA</td>
</tr>
<tr>
<td>• Adults &gt;40y – May also receive IG</td>
</tr>
</tbody>
</table>

¹. ACIP meeting, February 2018; publication pending
Recommended Immunization Schedule for Adults Aged 19 Years or Older, United States, 2018

In February 2018, the Recommended Immunization Schedule for Adults Aged 19 Years or Older, United States, 2018 became effective, as recommended by the Advisory Committee on Immunization Practices (ACIP) and approved by the Centers for Disease Control and Prevention (CDC). The adult immunization schedule was also approved by the American College of Physicians, the American Academy of Family Physicians, the American College of Obstetricians and Gynecologists, and the American College of Nurse Midwives.

CDC announced the availability of the 2018 adult immunization schedule in the Morbidity and Mortality Weekly Report (MMWR). The schedule is published in its entirety in the Annals of Internal Medicine.3

The adult immunization schedule consists of figures that summarize routinely recommended vaccines for adults by age groups and medical conditions and other indications, footnotes for the figures, and a table of vaccine contraindications and precautions. Note the following when reviewing the adult immunization schedule:

- The figures in the adult immunization schedule should be reviewed with the accompanying footnotes.
- The figures and footnotes display information for which vaccines, if not previously administered, should be administered unless contraindicated.
- The table of contraindications and precautions identifies populations and situations for which vaccines should not be used or should be used with caution.
- When indicated, a list of recommended vaccines to adults whose vaccination history is incomplete or unknown.
- Increased interval between doses of a multiclone vaccine series does not diminish vaccine effectiveness; it is not necessary to restart the vaccine series or add doses to the series because of an extended interval between doses.
- Combination vaccines may be used when any component of the combination is indicated and when the other components of the combination are not contraindicated.
- The use of trade names in the adult immunization schedule is for identification purposes only and does not imply endorsement by the ACIP or CDC.

Special populations that need additional consideration include:

- Pregnant women. Pregnant women should receive the tetanus, diphtheria, and acellular pertussis vaccine (Tdap) during pregnancy and the influenza vaccine during or before pregnancy. Live vaccines (e.g., measles, mumps, and rubella vaccine [MMR]) are contraindicated.
- Asplenia. Asplenia or splenectomy includes congenital or acquired splenectomy, splenic dysfunction, sickle cell disease, and other hemoglobinopathies, and splenectomy.
- Immunocompromising conditions. Adults with immunocompromise should generally avoid live vaccines. Inactivated vaccines (e.g., pneumococcal vaccines) are generally acceptable.
- High-level immunosuppression includes HIV infection with a CD4 count <200 cells/mm³, receipt of cyclosporine or everolimus with ≥250 mg of prednisone or equivalent for 21-24 days, primary immunodeficiency disorder (e.g., severe combined immunodeficiency or complement component deficiencies), and receipt of cancer chemotherapy. Other immunocompromising conditions and immunosuppressive medications to consider when vaccinating adults can be found in DSSA Clinical Practice Guideline for Vaccination of the Immunocompromised Host.7

Additional information on vaccinating immunocompromised adults is in General Best Practice Guidelines for Immunization.8

Additional resources for health care providers include:

- Details on vaccines recommended for adults and complete ACIP statements at www.cdc.gov/vaccines/hcp/acip-recs/index.html
- Vaccine Information Statements that explain benefits and risks of vaccines at www.cdc.gov/vaccines/pubs/vkindex.html
- Information and resources on vaccinating pregnant women at www.cdc.gov/vaccines/adults/vaccinatemyself/pregnancy.html
- Information on travel vaccine requirements and recommendations at www.cdc.gov/travel/
- CDK Vaccine Schedules App for immunization service providers to download at www.cdc.gov/vaccines/schedules/hcp/schedules-app.html
- Adult Vaccination Quiz for self-assessment of vaccination needs based on age, health conditions, and other indications at www.cdc.gov/vaccines/adults/vaccines/schedules-app.html
- Recommended Immunization Schedules for Children and Adolescents Aged 1-18 Years or Younger at www.cdc.gov/vaccines/schedules/hcp/child adolescente.html

Report suspected cases of reportable vaccine-preventable diseases to the local or state health department, and report all clinically significant postvaccination events to the Vaccine Adverse Event Reporting System at www.vaes.hrsa.gov or by telephone, 800-822-7970. All vaccines included in the adult immunization schedule except 23-valent pneumococcal 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 or by telephone, 800-338-2382. Submit questions and comments to CDC through www.cdc.gov/cdcinfo or by telephone, 800-368-8888, in English and Spanish, 8 a.m.-5 p.m. ET, Monday-Friday, excluding holidays.

The following abbreviations are used for vaccines in the adult immunization schedule in order of their appearance:

- IM: Intramuscular injection
- RV: Recombinant influenza vaccine
- Tdap: Tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis vaccine
- Td: Tetanus and diphtheria toxoids
- MMR: Measles, mumps, and rubella vaccine
- VAR: Varicella vaccine
- PEP: Recombinant zoster vaccine
- ZV: Zoster vaccine
- HPV: Human papillomavirus vaccine
- RV13: 13-valent pneumococcal conjugate vaccine
- RV3: 3-valent pneumococcal polysaccharide vaccine
- HepA: Hepatitis A vaccine
- HepA-HepB: Hepatitis A vaccine and hepatitis B vaccine
- HepB: Hepatitis B vaccine
- MenACWY: Meningococcal A, C, W, and Y vaccines
- MenB: Meningococcal B vaccine
- Hib: Haemophilus influenzae type b vaccine

Recommended Immunization Schedule for Adults Aged 19 Years or Older, United States, 2018

In February 2018, the Recommended Immunization Schedule for Adults Aged 19 Years or Older, United States, 2018 became effective, as recommended by the Advisory Committee on Immunization Practices (ACIP) and approved by the Centers for Disease Control and Prevention (CDC). The adult immunization schedule was also approved by the American Academy of Family Physicians, the American College of Physicians, the American College of Obstetricians and Gynecologists, and the American Academy of Nurse-Midwives.

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- The figures in the adult immunization schedule should be reviewed with the accompanying footnotes.
- The figures and footnotes display indications for which vaccines, if not previously administered, should be administered unless otherwise indicated.
- The table of contraindications and precautions identifies populations and situations for which vaccines should not be administered or used with caution.
- When indicated, administer the vaccine with caution, in the absence of a documented history of an adverse event.
- Increased interval between doses is not necessary when used with caution.
- The use of trade names in the adult immunization schedule for identification purposes only and does not imply endorsement by the ACIP or CDC.
- The use of trade names in the adult immunization schedule for identification purposes only and does not imply endorsement by the ACIP or CDC.

Special populations that need additional considerations...

- Pregnant women. Pregnant women should receive the tetanus, diphtheria, and acellular pertussis vaccine (Tdap) during pregnancy and the influenza vaccine during or before pregnancy. Live vaccines (e.g., measles, mumps, and rubella vaccine [MMR]) are contraindicated.
- Asplenia. Adults with aplasia have specific vaccination recommendations because of their increased risk for infection by encapsulated bacteria. Anatomical or functional asplenia includes congenital or acquired aplasia, splenic dysfunction, sickle cell disease and other hemoglobinopathies, and splenectomy.
- Immunocompromising conditions. Adults with immunosuppression should generally avoid live vaccines. Inactivated vaccines (e.g., pneumococcal vaccines) are generally acceptable. High-level immunosuppression includes HIV infection with a CD4 cell count <200 cells/µL, receipt of daily corticosteroid therapy with ≥20 mg of prednisone or equivalent for ≥14 days, primary immunodeficiency disorders (e.g., severe combined immunodeficiency or complement component deficiencies), and receipt of cancer chemotherapy. Other immunocompromising conditions and immunosuppressive medications to consider when vaccinating adults include those with HIV/AIDS, malignancy, and organ transplantation.

Additional resources for health care providers include:

- Details on vaccines recommended for adults and complete ACIP statements at www.cdc.gov/vaccines/hcp/acip-recs/index.html
- Vaccine information statements that explain benefits and risks of vaccines at www.cdc.gov/vaccines/hcp/vacinfo/statements.html
- Information and resources on vaccinating pregnant women at www.cdc.gov/vaccines/hcp/pregnant-women/index.html
- Information on travel vaccine requirements and recommendations at www.cdc.gov/travel/
- CDC Vaccine Schedules App for immunization service providers to download at www.cdc.gov/vaccines/hcp/schedules/app.html
- Adult Vaccination Quiz for self-assessment of vaccine needs based on age, health conditions, and other indications at www2.cdc.gov/nip/adultimmunization/default.spc
- Recommended Immunization Schedule for Children and Adolescents Aged 18 Years or Younger at www.cdc.gov/vaccines/hcp/schedules/child/childSchedule.html

Report suspected cases of reportable vaccine-preventable diseases to the local or state health department and report all clinically significant post-vaccination events to the Vaccine Adverse Event Reporting System at www.vaers.hhs.gov or by telephone, 800-822-7967. All vaccine included in the adult immunization schedule except 23-valent pneumococcal 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.vaers.hhs.gov or by telephone, 800-822-7967. Submit questions to CDC through www.cdc.gov/cidp or by telephone, 800-232-4636 in Spanish, 8:00am—8:00pm ET, Monday–Friday, excluding holidays.

Figure 1
Recommended Immunization Schedule by Age
Figure 1. Recommended Immunization schedule for adults aged 19 years or older by age group, United States, 2018

This figure should be reviewed with the accompanying footnotes. This figure and the footnotes describe indications for which vaccines, if not previously administered, should be administered unless noted otherwise.

<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>
</tr>
</thead>
<tbody>
<tr>
<td>Influenza</td>
<td>1 dose annually</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tdap&lt;sup&gt;2&lt;/sup&gt; or Td&lt;sup&gt;2&lt;/sup&gt;</td>
<td>1 dose Tdap, then Td booster every 10 yrs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MMR&lt;sup&gt;3&lt;/sup&gt;</td>
<td>1 or 2 doses depending on indication (if born in 1957 or later)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VAR&lt;sup&gt;4&lt;/sup&gt;</td>
<td>2 doses</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RZV&lt;sup&gt;5&lt;/sup&gt; (preferred)</td>
<td>2 doses RZV (preferred)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>or</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ZVL&lt;sup&gt;2&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 dose ZVL</td>
</tr>
<tr>
<td>HPV—Female&lt;sup&gt;6&lt;/sup&gt;</td>
<td>2 or 3 doses depending on age at series initiation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HPV—Male&lt;sup&gt;4&lt;/sup&gt;</td>
<td>2 or 3 doses depending on age at series initiation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCV13&lt;sup&gt;7&lt;/sup&gt;</td>
<td>1 dose</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PPSV23&lt;sup&gt;7&lt;/sup&gt;</td>
<td>1 or 2 doses depending on indication</td>
<td></td>
<td></td>
<td>1 dose</td>
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<tr>
<td>HepA&lt;sup&gt;3&lt;/sup&gt;</td>
<td>2 or 3 doses depending on vaccine</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HepB&lt;sup&gt;9&lt;/sup&gt;</td>
<td>3 doses</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MenACWY&lt;sup&gt;10&lt;/sup&gt;</td>
<td>1 or 2 doses depending on indication, then booster every 5 yrs if risk remains</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MenB&lt;sup&gt;8&lt;/sup&gt;</td>
<td>2 or 3 doses depending on vaccine</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hib&lt;sup&gt;11&lt;/sup&gt;</td>
<td>1 or 3 doses depending on indication</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

Recommended for adults with other indications

No recommendation
Figure 1. Recommended immunization schedule for adults aged 19 years or older by age group, United States, 2018

This figure should be reviewed with the accompanying footnotes. This figure and the footnotes describe indications for which vaccines, if not previously administered, should be administered unless noted otherwise.

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<thead>
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<tbody>
<tr>
<td>Influenza$^1$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tdap$^2$ or Td$^3$</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>1 dose Tdap, then Td booster every 10 yrs</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 or 2 doses depending on indication (if born in 1957 or later)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 doses</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RZV$^5$ (preferred)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>or RZV$^6$</td>
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<tr>
<td>ZVL$^2$</td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>HPV—Female$^4$</td>
<td></td>
<td>2 or 3 doses depending on age at series initiation</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>HPV—Male$^4$</td>
<td></td>
<td></td>
<td>2 or 3 doses depending on age at series initiation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCV13$^7$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 dose</td>
</tr>
<tr>
<td>PPSV23$^3$</td>
<td></td>
<td></td>
<td>1 or 2 doses depending on indication</td>
<td></td>
<td>1 dose</td>
</tr>
<tr>
<td>HepA$^3$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 or 3 doses depending on vaccine</td>
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<tr>
<td>HepB$^8$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 doses</td>
</tr>
<tr>
<td>MenACWY$^{10}$</td>
<td></td>
<td></td>
<td>1 or 2 doses depending on indication, then booster every 5 yrs if risk remains</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MenB$^9$</td>
<td></td>
<td></td>
<td>2 or 3 doses depending on vaccine</td>
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</tr>
<tr>
<td>Hib$^{11}$</td>
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<td></td>
<td>1 or 3 doses depending on indication</td>
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<td></td>
</tr>
</tbody>
</table>

- **Recommended for adults who meet the age requirement, lack documentation of vaccinator, or lack evidence of past infection**
- **Recommended for adults with other indications**
- **No recommendation**
Figure 1. Recommended immunization schedule for adults aged 19 years or older by age group, United States, 2018

This figure should be reviewed with the accompanying footnotes. This figure and the footnotes describe indications for which vaccines, if not previously administered, should be administered unless noted otherwise.

<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>
</tr>
</thead>
<tbody>
<tr>
<td>Influenza&lt;sup&gt;1&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td>1 dose annually</td>
<td></td>
</tr>
<tr>
<td>Tdap&lt;sup&gt;2&lt;/sup&gt; or T&lt;sup&gt;3&lt;/sup&gt;</td>
<td></td>
<td></td>
<td>1 dose Tdap, then Td booster every 10 yrs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MMR&lt;sup&gt;3&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VAR&lt;sup&gt;4&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td>2 doses</td>
<td></td>
</tr>
<tr>
<td>RZV&lt;sup&gt;5&lt;/sup&gt; (preferred)</td>
<td></td>
<td></td>
<td></td>
<td>2 doses RZV (preferred)</td>
<td></td>
</tr>
<tr>
<td>or ZVL&lt;sup&gt;2&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 dose ZVL</td>
</tr>
<tr>
<td>HPV—Female&lt;sup&gt;6&lt;/sup&gt;</td>
<td>2 or 3 doses depending on age at series initiation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HPV—Male&lt;sup&gt;6&lt;/sup&gt;</td>
<td>2 or 3 doses depending on age at series initiation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCV13&lt;sup&gt;7&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td>1 dose</td>
<td></td>
</tr>
<tr>
<td>PPSV23&lt;sup&gt;7&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td>1 or 2 doses depending on indication</td>
<td>1 dose</td>
</tr>
<tr>
<td>HepA&lt;sup&gt;8&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td>2 or 3 doses depending on vaccine</td>
<td></td>
</tr>
<tr>
<td>HepB&lt;sup&gt;9&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td>3 doses</td>
<td></td>
</tr>
<tr>
<td>MenACWY&lt;sup&gt;10&lt;/sup&gt;</td>
<td>1 or 2 doses depending on indication, then booster every 5 yrs if risk remains</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>MenB&lt;sup&gt;9&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td>2 or 3 doses depending on vaccine</td>
<td></td>
</tr>
<tr>
<td>Hib&lt;sup&gt;11&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td>1 or 3 doses depending on indication</td>
<td></td>
</tr>
</tbody>
</table>

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

Recommended for adults with other indications

No recommendation

Removed MPSV4
Change since publication of 2018 adult immunization schedule – will read “2 or 3 doses” in 2019 schedule
Figure 2

Recommended Immunization Schedule by Medical Condition and Other Indications
Figure 2. Recommended immunization schedule for adults aged 19 years or older by medical condition and other indications, United States, 2018

This figure should be reviewed with the accompanying footnotes. This figure and the footnotes describe indications for which vaccines, if not previously administered, should be administered unless noted otherwise.

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Pregnancy*</th>
<th>Immune-compromised (excluding HIV infection)†,‡,§,‖</th>
<th>HPV infection Cervical cell count (cells/μL)†,‡,§,‖ ≥200</th>
<th>Asplenia, complement deficiencies,*,†,‖</th>
<th>End-stage renal disease, on hemodialysis*,‡</th>
<th>Heart or lung disease, alcoholism,†</th>
<th>Chronic liver disease*,†</th>
<th>Diabetes†</th>
<th>Health care personnel‡,‖</th>
<th>Men who have sex with men*‡,‖</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influenza‡</td>
<td>1 dose annually</td>
<td></td>
<td></td>
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<td></td>
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</tr>
<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>
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<tr>
<td>MMR‡</td>
<td>contraindicated</td>
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<tr>
<td>VAR‡</td>
<td>contraindicated</td>
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<tr>
<td>RZV (preferred) or ZVL‡</td>
<td>2 doses RZV at age ≥50 yrs (preferred) or 1 dose ZVL at age ≥60 yrs</td>
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</tr>
<tr>
<td>HPV–Female§</td>
<td>3 doses through age 26 yrs</td>
<td>2 or 3 doses through age 26 yrs</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>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 or 3 doses through age 26 yrs</td>
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<tr>
<td>PCV13‡</td>
<td>1 dose</td>
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<tr>
<td>PPSV23‡</td>
<td>1, 2, or 3 doses depending on indication</td>
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<tr>
<td>HepA‡</td>
<td>2 or 3 doses depending on vaccine</td>
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<tr>
<td>HepB‡</td>
<td>3 doses</td>
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<tr>
<td>MenACWY®</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>2 or 3 doses depending on vaccine</td>
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<tr>
<td>Hib11</td>
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</tbody>
</table>

*Recommended for adults who meet the age requirement, lack documentation of vaccination, or lack evidence of past infection
†Recommended for adults with other indications
‡Contraindicated
‖No recommendation
### Figure 2. Recommended immunization schedule for adults aged 19 years or older by medical condition and other indications, United States, 2018

This figure should be reviewed with the accompanying footnotes. This figure and the footnotes describe indications for which vaccines, if not previously administered, should be administered unless noted otherwise.

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Pregnancy*</th>
<th>Immune-compromised (excluding HIV infection)*</th>
<th>HIV Infection</th>
<th>CD4+ count</th>
<th>RPV*</th>
<th>Asplenia, complement deficiencies*</th>
<th>End-stage renal disease, on hemodialysis*</th>
<th>Heart or lung disease, alcoholism*</th>
<th>Chronic liver disease*</th>
<th>Diabetes*</th>
<th>Health care personnel†</th>
<th>Men who have sex with men†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influenza*</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>2 doses</td>
<td></td>
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<tr>
<td>RZV (preferred)</td>
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<tr>
<td>or ZVL</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>HPV—Female*</td>
<td>3 doses through age 26 yrs</td>
<td>2 or 3 doses through age 26 yrs</td>
<td>2 doses</td>
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<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>
<td>2 or 3 doses through age 26 yrs</td>
<td>2 doses</td>
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<td>PCV13*</td>
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<tr>
<td>PPSV23*</td>
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<tr>
<td>HepA*</td>
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<td>2 or 3 doses depending on vaccine</td>
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<tr>
<td>HepB*</td>
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<td>2 doses</td>
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</tr>
<tr>
<td>MenACWYT*</td>
<td></td>
<td>1 or 2 doses depending on indication, then booster every 5 yrs if risk remains</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>MenB*</td>
<td></td>
<td>2 or 3 doses depending on vaccine</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Hib*</td>
<td></td>
<td>1 dose</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

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

†Recommended for adults with other indications

Based on Roni’s feedback, the RZV row has been added, and the MPSV4 has been removed.
Footnotes
Added “Adult who previously received ≤2 doses of mumps-containing vaccine and are identified by public health authority to be at increased risk for mumps in an outbreak: Administer 1 dose of MMR”
Added “Administer 2 dose of recombinant zoster vaccine (RZV) 2–6 months apart to adults aged 50 years or older regardless of past episode of zoster or receipt of zoster vaccine live (ZVL)”
Removed “For adults 56 or older who have not previously received serogroups A, C, W, and Y meningococcal vaccine and need only 1 dose, MPSV4 is preferred. For adults who previously received MenACWY or anticipate receiving multiple doses of serogroups A, C, W, and Y meningococcal vaccine, MenACWY is preferred.”
Pending change in influenza vaccination recommendation on LAIV in 2019 adult immunization schedule

3. Measles, mumps, and rubella vaccination

General Information
- Administer 1 dose of measles, mumps, and rubella vaccine (MMR) to adults with no evidence of immunity, measles, mumps, or rubella
- Evidence of immunity is:
  - Born before 1980 (except for health care personnel; see below)
  - Documentation of receipt of MMR
  - Laboratory evidence of immunity or disease
- Documentation of a health care provider-diagnosed disease without laboratory confirmation is not considered evidence of immunity

Special populations
- Pregnant women or nonpregnant women of childbearing age with no evidence of immunity to rubella: Administer 1 dose of MMR if pregnant, administer MMR after pregnancy and before discharge from health care facility

2. Tetanus, diphtheria, and pertussis vaccination

General Information
- Administer to adults who previously did not receive a dose of tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis vaccine (Tdap) as adult or child (outdated recommended at age 11–12 years) 1 dose of Tdap followed by a dose of tetanus and diphtheria toxoids (Td booster every 10 years)
- Information on the use of Tdap or Td is tetanus prophylaxis is wound management is available at www.cdc.gov/tetanus

Special populations
- Pregnant women: Administer 1 dose of Tdap during each pregnancy, preferably in the early part of gestational weeks 22–26

Footnotes.

1. Influenza vaccination
   www.cdc.gov/vaccines
   General Information
   - Administer 1 dose of influenza vaccine (IV) or recombinant influenza vaccine (RIV) or inactivated influenza vaccine (IIV) is not recommended for the 2017–2018 influenza season
   - A list of currently available influenza vaccines is available at www.cdc.gov/vaccines

Special populations
- Administer age-appropriate IV or RIV to:
  - Pregnant women
  - Adults with HIV/AIDS
  - Adults with allergy (e.g., angioedema or respiratory distress): Administer IV or RIV in a medical setting under supervision of a health care provider who can recognize and manage severe allergic conditions

4. Varicella vaccination

General Information
- Administer to adults who were not vaccinated in childhood: Administer 2 doses of varicella vaccine (VAR) 4–6 weeks apart if previously received 1 dose of varicella-containing vaccine (administer 1 dose of varicella vaccine at least 4 weeks after the first dose)
- Evidence of immunity to varicella includes:
  - U.S. born before 1980 (except for pregnant women and health care personnel; see below)
  - Documentation of receipt of 2 doses of varicella or varicella-containing vaccine at least 1 week apart
  - Documentation of receipt of 2 doses of varicella or varicella-containing vaccine at least 1 week apart
- Special populations
  - Adults with immuno- supression due to HIV infection, through age 26 years: Administer 2-dose series at 0, 1–2, and 6 months
  - Men who have sex with men through age 36 years: Administer 2–3 dose series depending on age at initial HIV infection (see above); if no history of IPV, administer 3-dose series at 0, 1–2, and 6 months
  - Pregnant women through age 26 years: IPV vaccination is not recommended during pregnancy, but there is no evidence that the vaccine is harmful and noninfection needed for women who inadvertently receive IPV while pregnant; delay remaining doses until after pregnancy. Pregnancy testing is not needed before vaccination

5. Zoster vaccination

General Information
- Administer 2 doses of recombinant zoster vaccine (ZDV) 2–6 months apart, at least 1 year after PCV13
- Special populations
  - ZDV is contraindicated for pregnant women and adults with severe immunocompromise

6. Human papillomavirus vaccination

General Information
- Administer human papillomavirus (HPV) vaccine to females aged 14 through 26 years (males aged 12 through 26 years may be vaccinated based on individual clinical decision)
- The number of doses of HPV vaccine to be administered depends on age at initial vaccine administration:
  - No previous dose of HPV vaccine: Administer 3-dose series: 0, 1–2, and 6 months (minimum intervals: 4 weeks between doses 1 and 2, 12 weeks between doses 2 and 3, and 5 months between doses 1 and 3; repeat doses if given too soon)
  - Age 9–14 years at HPV vaccine series initiation and received 1 dose or 2 doses less than 3 months ago: Administer 1 dose
  - Age 9–14 years at HPV vaccine series initiation and received 1 dose at least 5 months ago: No additional dose is needed

Special populations
- Adults with immunocompromising conditions (including HIV infection) through age 26 years: Administer 2-dose series at 0, 1–2, and 6 months
- Men who have sex with men through age 36 years: Administer 2–3 dose series depending on age at initial HIV infection (see above); if no history of IPV, administer 3-dose series at 0, 1–2, and 6 months
- Pregnant women through age 26 years: IPV vaccination is not recommended during pregnancy, but there is no evidence that the vaccine is harmful and noninfection needed for women who inadvertently receive IPV while pregnant; delay remaining doses until after pregnancy. Pregnancy testing is not needed before vaccination

7. Pneumococcal vaccination

General Information
- Administer to immunocompetent adults aged 65 years or older 1 dose of 13-valent pneumococcal conjugate vaccine (PCV13) if not previously administered; administer 1 dose of PCV13 (at least 1 year after PCV13)
- When both PCV13 and PCV23 are indicated administer PCV13 first; PCV13 and PCV23 should not be administered during the same visit. Additional information on pneumococcal vaccination is available at www.cdc.gov/vaccineinfo/downloads/pneumococcal-vaccine-timing.pdf
Pending changes in hepatitis A and hepatitis B vaccination recommendations in 2019 adult immunization schedule

- Chronic renal failure and nephropathy
- Administer to adults aged 19 years or older with the following indications: 1 dose of PPSV23 at least 8 weeks after PCV13, and a second dose of PPSV23 at least 5 years after the first dose of PPSV23 if the most recent dose of PPSV23 was administered before age 65 years, at age 65 years or older, administer another dose of PPSV23 at least 5 years after the last dose of PPSV23.
- Cerebrospinal fluid leak - Cochlear implant

8. Hepatitis A vaccination

General information
- Administer to adults who have a specific risk (see below), or lack a risk factor but want protection, 2-dose series of single antigen hepatitis A vaccine (HAV; Havrix, Aimmune Therapeutics’ Adacza) or two doses of combined hepatitis A and hepatitis B vaccine (Havrix, Hepa voc, Heplisav-B, or Engerix-B) at 0 and 6 to 12 months; or Vaxigen at 0 and 2 to 6 months; or Engerix-B at 0 and 6 months; or Engerix-B at 0 and 12 months; or Engerix-B at 0 and 18 months; or Engerix-B at 0 and 24 months; or Engerix-B at 0 and 30 months; or Engerix-B at 0 and 36 months.
- Special populations
- Administer HepAor Hep A-Heb to adults with the following indications:
  - Close or personal contact with an international adoptee (e.g., host family of adoptee), who is in regular babysitting during the first 60 days after arrival in the United States.
  - Healthy adults through age 49 years who have recently been exposed to hepatitis A virus; adults older than age 40 years may receive HAV or HAV immune globulin cannot be administered.

9. Hepatitis B vaccination

General information
- Administer to adults who have a specific risk factor (see below), or lack a risk factor but want protection, 2-dose series of single antigen hepatitis B vaccine (Behr or combined hepatitis A and hepatitis B vaccine; Heplisav-B, at 0 and 1 to 6 months; minimum intervals: 4 weeks between doses 1 and 2 for healthy adults, 24 weeks between doses 1 and 2, and 7 to 12 weeks for HepA-Heb and 2 months for Heplisav-B.
- Special populations:
  - Men who have sex with men
  - Injection or non-injection drug use
  - Work with hepatitis A virus in a research laboratory or with nonhuman primates infected with hepatitis A virus
  - Clotting factor disorders
  - Chronic liver disease

11. Haemophilus influenzae type b vaccination

General information
- Administer Haemophilus influenzae type b vaccine (Hib) to adults with the following indications:
  - Anatomical or functional asplenia (including sickle cell disease) and other hemoglobinopathies
  - HIV infection
  - Persistent complement component deficiency
  - Ecumabase
  - Administer 1 dose of MenACWY and revaccinate with 1 dose of MenACWY every 5 years, if the risk remains, to adults with the following indications:
  - Anatomical or functional asplenia (including sickle cell disease) and other hemoglobinopathies
  - HIV infection
  - Persistent complement component deficiency
  - Ecumabase
  - Administer 1 dose of MenACWY and revaccinate with 1 dose of MenACWY every 5 years, if the risk remains, to adults with the following indications:
  - Anatomical or functional asplenia (including sickle cell disease) and other hemoglobinopathies
  - HIV infection
  - Persistent complement component deficiency
  - Ecumabase
  - Microbiologists routinely exposed to Neisseria meningitidis
  - Military recruits

Note: some students who live in residential settings may not receive MenACWY at age 18 years; for Sero group B meningococcal vaccine

- Based on individual clinical decision, to young adults and adolescents aged 16-23 years (preferred age 16-18 years) who are not at increased risk 2-dose series of MenACWY (Bexsero) at least 1 month apart or 2-dose series of MenACWY (Travenol) at least 6 months apart
- MenACWY and MenB-FbPap (Menilsk) cannot be given simultaneously

- Based on individual clinical decision, to young adults and adolescents aged 16-23 years (preferred age 16-18 years) who are not at increased risk 2-dose series of MenACWY (Bexsero) at least 1 month apart or 2-dose series of MenACWY (Travenol) at least 6 months apart
- MenACWY and MenB-FbPap (Menilsk) cannot be given simultaneously
Table of Contraindications and Precautions
Table. Contraindications and precautions for vaccines recommended for adults aged 19 years or older*

The Advisory Committee on Immunization Practices (ACIP) recommendations and package inserts for vaccines provide information on contraindications and precautions related to vaccines. Contraindications are conditions that increase chances of a serious adverse reaction in vaccine recipients and the vaccine should not be administered when a contraindication is present. Precautions should be reviewed for potential risks and benefits for vaccine recipients.

Contraindications and precautions for vaccines routinely recommended for adults

<table>
<thead>
<tr>
<th>Vaccine(s)</th>
<th>Contraindications</th>
<th>Precautions</th>
</tr>
</thead>
<tbody>
<tr>
<td>All vaccines routinely recommended for adults</td>
<td>Severe reactions, e.g., anaphylaxis, after a previous dose or to a vaccine component</td>
<td>History of Guillain-Barré syndrome within 6 weeks after previous influenza vaccination</td>
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<td></td>
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Contraindications and precautions for vaccines routinely recommended for adults

<table>
<thead>
<tr>
<th>Vaccine(s)</th>
<th>Additional Contraindications</th>
<th>Additional Precautions</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV</td>
<td>Severe immunodeficiency, e.g., hereditary and solid tumors, chemotherapy, congenital immunodeficiency or long-term immunosuppressive therapy, human immunodeficiency virus (HIV) infection with severe immuno compromised</td>
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Abbreviations of vaccines

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<td>Live vaccine</td>
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For more information, contact CDC
1-800-CDC-INFO (232-4636)

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