Recommended Adult Immunization Schedule
United States, 2018

Paul Hunter, Chair
David Kim, CDC Lead

Adult Immunization Work Group
Advisory Committee on Immunization Practices
October 24, 2018
Thank You

Laura Riley, MD
ACIP Adult Immunization WG Chair
2016–2018
Adult Immunization Schedule – Background

- Updated each year
  - Represents current, approved ACIP policy
  - Designed for implementation of ACIP policy

- Approved by
  - CDC Director
  - American College of Physicians
  - American Academy of Family Physicians
  - American College of Obstetricians and Gynecologists
  - American College of Nurse-Midwives

- Publication early February 2019
  - MMWR announcement of availability on ACIP website
  - Annals of Internal Medicine (published in entirety)
Updates in ACIP Recommendations for Adults
Policy Statements Published after 2018 Adult Schedule Approval

- Hepatitis B (Feb 2018 ACIP Meeting)
  - Schillie et al. MMWR Apr 2018;67(15):455–458
  - Recommended use of CpG-adjuvanted HepB

- Tdap (Summary)
  - Liang et al. MMWR Apr 2018;67(2):1–44
  - Reiterated use of Tdap for adult catch-up and during each pregnancy

- Influenza (Jun 2018)
  - Grohskopf et al. MMWR Aug 2018;67(3):1–20
  - Updated use of LAIV as option for 2018–2019

- Hepatitis A (Oct 2018)
  - MMWR publication pending
  - Added homelessness as indication for HepA
Usability Testing for Adult Immunization Schedule

- Formal evaluation of 2018 schedule for usability
- In-depth interviews of users
- Redesign adult immunization schedule
- Survey of providers on redesign (reactions and preferences)
Review Immunization Recommendations for Pregnancy

- “No recommendation” for HPV, zoster, PCV13, MenB, Hib in pregnancy
- Review policy and update pregnancy column
Harmonization with Child and Adolescent Schedule

- Overlapping vaccinations
  - H. flu, hepatitis A, hepatitis B, HPV, influenza, MMR, meningococcal, pneumococcal, Tdap/Td, varicella

- Harmonize language, text structure, graphics (to extent possible)

- Collaborators
  - Adult Immunization WG, Child/Adolescent Immunization WG, disease and vaccination SMEs, communication and training staff
Adult Immunization Session Agenda

- Usability testing of 2018 adult immunization schedule
- Updated display for pregnancy
- Harmonization with draft 2019 child and adolescent schedule
- Draft 2019 adult immunization schedule
  - Updated ACIP recommendations
  - Standardized language and text structure
  - Revised graphics and format
- Discussion and vote on Recommended Adult Immunization Schedule, United States, 2019
Adult Immunization Work Group

**ACIP Members**
Paul Hunter (Chair)
Laura Riley (Past Chair)

**Ex Officio Members**
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TBD (NVPO)

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Susan Lett (CSTE)
Greg Poland (ACP)
Chad Rittle (ANA)
William Schaffner (NFID)
Ken Schmader (AGS)
Rhoda Sperling (ACOG)
David Weber (SHEA)
Updates in ACIP Recommendations
Updates in ACIP Recommendations
2019 Adult Immunization Schedule

- Influenza vaccination
  - Use of LAIV

- Hepatitis A vaccination
  - Homelessness as an indication

- Hepatitis B vaccination
  - Use of CpG-adjuvanted HepB
Usability Testing of Adult Schedule
Usability Testing of Adult Schedule – Background

- 2016 schedule evaluated ad hoc to improve usability
  - By Human Factors and Ergonomics Society, Georgia Institute of Technology\(^1\)
  - Based on human factors-driven efficiency of use, select recommendations incorporated in 2017 adult schedule

- 2017 schedule footnotes updated
  - For consistency between vaccination sections
  - Format, language, abbreviations, mathematical symbols

- 2018 schedules formally evaluated for usability\(^2\)

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\(^2\) Porter-Novelli Public Services, Inc. Contract number 200–2015–F–88117
Adult Schedule Evaluation – Overview

- **Purpose** – Determine how providers use adult immunization schedule to guide practices and identify improvements to increase usability
- **Feb 2017 to Sep 2018**
- **Methods**
  - Qualitative interviews of providers
  - Redesign of immunization schedules
  - Survey of providers on immunization schedule preferences (old vs. new)
Qualitative Interviews

- Purpose – Identify ways to increase usability, acceptability, and adoption of adult immunization schedule by providers

- In-depth interviews with providers (N=48)
  - Internists (8); family physicians (8); PAs and NPs (12); RNs, LPNs, MAs (12); pharmacists (8) screened for reported familiarity with schedule
  - Feedback on case-based patient scenarios by telephone and screen-sharing platform

- Discussion
  - Physicians, PAs, NPs, RNs, pharmacists reported recommending vaccines
  - Not confident EMRs updated and comprehensive
  - Difficulty using generic and trade names
  - Most providers referenced Figure 1 (recs by age) only, few referenced Figure 2 (recs by medical and other indications), fewer referenced footnotes and Table of Contraindications and Precautions
Redesign Graphics

- **Purpose** – Improve usability of the adult schedule based on results from qualitative interviews

- **Methods**
  - Little direction provided through qualitative interviews
  - Develop prototype graphics based on assumptions
  - Balance document length and text size and density

- **Discussion**
  - Re-title to “Recommended Adult Immunization Schedule, United States, 20XX”
  - Maintain overall format and flow
  - Reduce amount of information on cover page, redesign to “compartmentalize” information
  - Include table of generic and trade names, abbreviations
  - Figures replaced by Tables, Footnotes replaced by Notes (vaccinations listed alphabetically)
  - Delete Table of Contraindications and Precautions, make Notes easier to read
Survey of Providers on Usability

- **Purpose** – Obtain feedback from providers on redesign features of adult and child/adolescent immunization schedules

- **Methods**
  - Standardized survey administered online to primary care providers who see at least 50 patients/month
  - Adult schedule: 251 internists and family physicians
  - Child and adolescent schedule: 249 pediatricians and family physicians
  - Compared original and redesigned 2018 immunization schedules
### 2018 Figure 2

**Redesigned Table 2**

#### Medical condition and other indications recommendations for immunization of adults aged 19 years or older, United States, 2018

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Pregnancy</th>
<th>Immune-compromised (including HIV)***</th>
<th>HIV Infection (CD4 count &lt;200)</th>
<th>Hepatitis B</th>
<th>Mumps, rubella, varicella</th>
<th>Aspergillus, candidiasis****</th>
<th>End-stage renal disease (ESRD)</th>
<th>Heart or lung disease****</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>
<td>1 dose annually</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Tdap† or Td</td>
<td>1 dose each program</td>
<td>1 dose Tdap, then Td booster every 10 yrs</td>
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<tr>
<td>MMR†</td>
<td>contraindicated</td>
<td>1 or 2 doses depending on indication</td>
<td></td>
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<tr>
<td>VAR†</td>
<td>contraindicated</td>
<td>2 doses</td>
<td></td>
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<tr>
<td>RVV† (preferred):</td>
<td></td>
<td>2 doses RVV at age ≥40 yrs (preferred)</td>
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<tr>
<td>vaccinia or ZVL†</td>
<td>contraindicated</td>
<td>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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<td></td>
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</tr>
<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 20 yrs</td>
<td></td>
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<tr>
<td>PCV13†</td>
<td>1 dose</td>
<td></td>
<td></td>
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<tr>
<td>PPV23†</td>
<td>1, 2, or 3 doses depending on indication</td>
<td></td>
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<tr>
<td>HepA†</td>
<td>2 or 3 doses depending on vaccine</td>
<td></td>
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<tr>
<td>HepB†</td>
<td>3 doses</td>
<td></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>
<td></td>
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<tr>
<td>MenB**</td>
<td>2 or 3 doses depending on vaccine</td>
<td></td>
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<tr>
<td>HbV</td>
<td>3 doses DTwST recipients only</td>
<td>1 dose</td>
<td></td>
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</tr>
</tbody>
</table>

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**Notes:**

- Pregnancy: [CDC Pregnancy and Immunization Information](https://www.cdc.gov/vaccines/schedules/hcp/pregnancy-2018.pdf)
- Immune-compromised: [CDC Recommendations for the Immunization of Persons with HIV Infection](https://www.cdc.gov/vaccines/hcp/ Henipha/2018-HIV-vaccine-recommendations.pdf)
- Heart or lung disease: [CDC Guidelines for the Prevention and Management of Infections in Heart Disease Patients](https://www.cdc.gov/dialysis/Guidelines/Heart-Disease-Guidelines_2018.pdf)

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**Recommendations:**

- Recommended for adults who meet the age requirement, lack documentation of vaccinations, or lack evidence of prior infection
- Recommended for adults with other indications
- Contraindicated
- No recommendation

**Nosocomial infection:**

- For adults who require hospitalization, catheterization, or other medical interventions.
2018 Footnotes

Redesigned Notes
Results – Survey of Providers on Usability

- Adult Immunization Schedule
  - Redesigned cover page easier to use
  - Original color scheme easier to use
  - Should increase font size
  - List fewer vaccines and health conditions per table
  - Overall, 2 out of 3 preferred original over redesigned schedule (mostly due to color)

- Child and Adolescent Immunization Schedule
  - No difference between original and redesigned cover page and Table 1
  - Original color scheme easier to use
  - Should increase font size
  - Overall, redesigned schedule (except for color) slightly preferred
Updated Display for Pregnancy
Review Available Information on Pregnancy

“In general, inactivated vaccines may be administered to pregnant women... [except] HPV vaccine, which should be deferred during pregnancy because of a lack of safety and efficacy data.” Pink Book

“There are no available data to establish whether RZV is safe in pregnant or lactating women and there is currently no ACIP recommendation for RZV... Consider delaying vaccination with RZV...” MMWR 67(3);103–108

“HPV vaccines are not recommended for use in pregnant women... [Vaccination] should be delayed until completion of pregnancy.” MMWR 64(11);300–304

“Available data... are insufficient to inform... risks in pregnancy. [A study] in female rabbits... revealed no evidence of harm to the fetus... due to [PCV13].” Package Insert (FDA)

"MenB... vaccination should be deferred in women known to be pregnant or lactating unless the woman is at increased risk for serogroup B meningococcal disease, and, after consultation with her health care provider, the benefits of vaccination are considered to outweigh the potential risks.” MMWR 66(19);509–513

“Animal reproduction studies have not been conducted with [Hib]. It is also not known whether [Hib] can cause fetal harm when administered to a pregnant woman...” Package Inserts (FDA)
- Influenza (IIV, RIV), Tdap
  - Recommended routinely

- PPSV23, HepA, HepB, MenACWY
  - Recommended if other indications present

- MMR, VAR, ZVL, LAIV
  - Contraindicated

- RZV, HPV, PCV13, MenB, Hib
  - Delay until after pregnancy → RZV, HPV
  - Precaution—weigh risk vs. benefit → MenB
  - No recommendation → PCV13, Hib

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**Refine Display for Pregnancy Column**

- **Influenza (IIV, RIV), Tdap**
  - Recommended routinely

- **PPSV23, HepA, HepB, MenACWY**
  - Recommended if other indications present

- **MMR, VAR, ZVL, LAIV**
  - Contraindicated

- **RZV, HPV, PCV13, MenB, Hib**
  - Delay until after pregnancy → RZV, HPV
  - Precaution—weigh risk vs. benefit → MenB
  - No recommendation → PCV13, Hib

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- **Figure 2. Recommended Immunization schedule for adults aged 19 years or older by**

  - **Vaccine**
    - **Pregnancy**
      - **Immunocompromised including HIV**
      - **HIV Infection**
      - **Asplenia, complement deficiencies**
      - **End-stage renal disease, c hemodyalisis**

  - **Influenza**
    - 1 dose
  - **PPSV23**
    - 1 dose
  - **Tdap**
    - 1 dose
  - **MMR**
    - 1 dose
  - **HepA**
    - 1 dose
  - **HepB**
    - 1 dose
  - **MenACWY**
    - 1 dose
  - **LAIV**
    - 1 dose
  - **VAR**
    - 1 dose
  - **RZV**
    - 1 dose
  - **HPV**
    - 1 dose

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**Notes:**

- **“consider delaying”**
- **“not recommended”, “delay”**
- **“no evidence of harm” (FDA)**
- **“defer... unless at increased risk”, “weigh benefit/risk”**
- **no information**
<table>
<thead>
<tr>
<th>Vaccine*</th>
<th>Indicated During Every Pregnancy</th>
<th>May Be Given During Pregnancy in Certain Populations</th>
<th>Contraindicated During Pregnancy</th>
<th>Can Be Initiated Postpartum or When Breastfeeding or Both</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inactivated influenza</td>
<td>X²,³</td>
<td></td>
<td></td>
<td>X²</td>
</tr>
<tr>
<td>Tetanus toxoid, reduced diphtheria toxoid and acellular pertussis (Tdap)</td>
<td>X¹,²,⁴</td>
<td></td>
<td></td>
<td>X²</td>
</tr>
<tr>
<td>Pneumococcal vaccines</td>
<td>X²,⁵,⁶</td>
<td></td>
<td>X²,⁵,⁶</td>
<td></td>
</tr>
<tr>
<td>Meningococcal conjugate (MenACWY) and Meningococcal serogroup B</td>
<td></td>
<td>X²,⁷</td>
<td></td>
<td>X²,⁷</td>
</tr>
<tr>
<td>Hepatitis A</td>
<td>X¹,⁸</td>
<td></td>
<td></td>
<td>X¹,⁸</td>
</tr>
<tr>
<td>Hepatitis B</td>
<td>X²,⁹,¹⁰</td>
<td></td>
<td></td>
<td>X²,⁹,¹⁰</td>
</tr>
<tr>
<td>Human papillomavirus (HPV)**</td>
<td></td>
<td></td>
<td></td>
<td>X²️,¹¹,¹²</td>
</tr>
<tr>
<td>Measles–mumps–rubella</td>
<td>X¹,¹,¹³,¹⁴</td>
<td></td>
<td>X¹,¹</td>
<td></td>
</tr>
<tr>
<td>Varicella</td>
<td>X¹,¹,¹⁵,¹⁶</td>
<td></td>
<td>X¹</td>
<td></td>
</tr>
</tbody>
</table>

*An “X” indicates that the vaccine can be given in this window. See the corresponding numbered footnote for details.
Harmonization with Child and Adolescent Schedule
Harmonization of Schedules & Standardization of Notes

- Shortened title
- Included trade names on list (trade names used in HepA, HepB, MenACWY, MenB notes)
- Simplified and compartmentalized content on cover page
- Changed “footnotes” to “notes” and alphabetized “notes”
- Organized notes by heading (“routine vaccination” and “special situations”—”special situations” used to refer to people and indications)
- Revised notes for brevity, clarity, consistency
- Used bold text to highlight population or indication for which vaccination recommended, minimized use of specialized text
- Removed articles, conjunctions, other words if meaning not compromised
- Used consistent text structure and language (e.g., 00-dose series VAC at 0, 00, 000 months)
Proposed *Recommended Adult Immunization Schedule, United States, 2019*
Cover Page

Recommended Adult Immunization Schedule
Table 1
Recommended Adult Immunization Schedule by Age Group
<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 inactivated (IIV) or</td>
<td></td>
<td></td>
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<tr>
<td>Influenza recombinant (RIV)</td>
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<td></td>
</tr>
<tr>
<td>Influenza live attenuated (LAIY)</td>
<td></td>
<td></td>
<td>1 dose annually</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tetanus, diphtheria, pertussis</td>
<td></td>
<td></td>
<td></td>
<td>1 dose Tdap, then Td booster every 10 yrs</td>
<td></td>
</tr>
<tr>
<td>Varicella</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 doses</td>
</tr>
<tr>
<td>Zoster recombinant (RZV) (preferred)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 doses</td>
</tr>
<tr>
<td>Zoster live (ZVL)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 dose</td>
</tr>
<tr>
<td>Human papillomavirus (HPV)</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td>2 or 3 doses depending on age at initial vaccination</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td></td>
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<tr>
<td>Human papillomavirus (HPV)</td>
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<tr>
<td>Female</td>
<td></td>
<td></td>
<td>2 or 3 doses depending on age at initial vaccination</td>
<td></td>
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<tr>
<td>Male</td>
<td></td>
<td></td>
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<tr>
<td>Pneumococcal conjugate (PCV13)</td>
<td></td>
<td></td>
<td></td>
<td>1 dose</td>
<td></td>
</tr>
<tr>
<td>Pneumococcal polysaccharide (PPSV23)</td>
<td>1 or 2 doses depending on indication</td>
<td></td>
<td>1 dose</td>
<td></td>
<td></td>
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<tr>
<td>Hepatitis A (HepA)</td>
<td></td>
<td></td>
<td></td>
<td>2 or 3 doses depending on vaccine</td>
<td></td>
</tr>
<tr>
<td>Hepatitis B (HepB)</td>
<td></td>
<td></td>
<td></td>
<td>2 or 3 doses depending on vaccine</td>
<td></td>
</tr>
<tr>
<td>Meningococcal A, C, W, Y (MenACWY)</td>
<td></td>
<td></td>
<td></td>
<td>1 or 2 doses depending on indication, then booster every 5 yrs if risk remains</td>
<td></td>
</tr>
<tr>
<td>Meningococcal B (MenB)</td>
<td></td>
<td></td>
<td></td>
<td>2 or 3 doses depending on vaccine and indication</td>
<td></td>
</tr>
<tr>
<td>Haemophilus influenzae type b (HiB)</td>
<td></td>
<td></td>
<td></td>
<td>1 or 3 doses depending on indication</td>
<td></td>
</tr>
</tbody>
</table>

Notes: 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 other indication. No recommendation.
Table 2

Recommended Adult Immunization Schedule by Medical Condition and Other Indications
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>Immunocompromised (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, 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>IIV or RIV LAIV</td>
<td></td>
<td></td>
<td>1 dose annually</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tdap or Td</td>
<td>1 dose Tdap each pregnancy</td>
<td></td>
<td>1 dose Tdap, then Td booster</td>
<td></td>
<td></td>
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<tr>
<td>MMR</td>
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<tr>
<td>VAR</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RZV (preferred)</td>
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<td>2 or 3 doses through age 26 yrs</td>
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<td>2 or 3 doses through age 26 yrs</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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LAIV separated from IIV and RIV

Updated display for pregnancy

Updated key
Notes

Recommended Adult Immunization Schedule
**Notes**

**Recommended Adult Immunization Schedule United States, 2019**

### Hepatitis A vaccination

**Routine vaccination**
- **Not at risk but want protection from hepatitis A** (identification of risk factor not required): 2-dose series HepA (Havrix 6–12 months apart or Vaqta 6–18 months apart [minimum interval: 6 months]) or 3-dose series HepA-HepB (Twinrix at 0, 1, 6 months [minimum intervals: 4 weeks between doses 1 and 2, 5 months between doses 2 and 3])

**Special situations**
- **At risk for hepatitis A infection**: 2-dose series HepA 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

---

**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 HepB at least 4 weeks apart; 2-dose series HepB only applies when 2 doses of HepB are used at least 4 weeks apart) or 3-dose series Engerix-B® or Recombivax HB at 0, 1, 6 months (minimum interval: 8 weeks) or 0, 1, 6 months (minimum intervals: 4 weeks between doses 1 and 2, 5 months between doses 2 and 3)

**Special situations**
- **At risk for hepatitis B infection**: 2- or 3-dose series HepB as above
  - Hepatitis C 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 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 of exposure to the blood or body fluids of persons with hepatitis B (e.g., health care or 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 or 60 years or older at discretion of treating clinician)
  - Incarcerated persons
  - Travel in countries with high or intermediate endemic hepatitis B

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**Human papillomavirus vaccination**

**Routine vaccination**
- **Females through age 26 years and males through age 21 years**: 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
- **Age through age 18 years at initial vaccination and received 2 doses at least 5 months apart**: HPV vaccination complete, no additional dose 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

---

**Added use of CpG-adjuvanted HepB**

**Added ‘transgender persons’ for HPV vaccination**

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**Added ‘homelessness’ for HepA**

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**Removed language on use of HepA and Hep B in outbreaks**

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**10/16/18**

**Centers for Disease Control and Prevention | Recommended Adult Immunization Schedule, United States, 2019 | Page 4**
Added LAIV option, when not to use LAIV

Removed language on use of MMR in mumps outbreak and MenACWY and MenB in meningococcal outbreak

Added "precaution" for MenB use in pregnancy
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 PPSV23; at age 65 years or older, administer 1 dose PPSV23 at least 5 years after most recent dose 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 (Td) can be substituted for any Td dose, but preferred as first dose; Td booster every 10 years
  - 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/rr6702ar.htm

Varicella vaccination

Routine vaccination
- No evidence of immunity to varicella: 1 dose VAR if previously received 1 dose varicella-containing vaccine, or 2-dose series VAR 4–8 weeks apart if previously did not receive any varicella-containing vaccine, regardless of whether U.S.-born before 1980
- HIV infection with CD4 count ≥200 cells/µL with no evidence of immunity: Consider 2-dose series VAR 3 months apart based on individual clinical decision: VAR contraindicated in HIV infection with CD4 count <200 cells/µL
- Severe immunocompromising conditions: VAR contraindicated

Zoster vaccination

Routine vaccination

Updated use of RZV in pregnancy and status of RZV recommendations in severely immunocompromised

- Health care personnel with no evidence of immunity to varicella: 1 dose VAR if previously received 1 dose varicella-containing vaccine, or 2-dose series VAR 4–8 weeks apart if previously did not receive any varicella-containing vaccine, regardless of whether U.S.-born before 1980
- HIV infection with CD4 count ≥200 cells/µL with no evidence of immunity: Consider 2-dose series VAR 3 months apart based on individual clinical decision: VAR contraindicated in HIV infection with CD4 count <200 cells/µL
- Severe immunocompromising conditions: VAR contraindicated

Pregnancy: ZVL contraindicated; consider delaying RZV until after pregnancy if RZV indicated
- Severe immunocompromising conditions including HIV infection with CD4 count <200 cells/µL: ZVL contraindicated; recommendations for RZV under review

Special situations

Pregnancy: ZVL contraindicated; consider delaying RZV until after pregnancy if RZV indicated
- Severe immunocompromising conditions including HIV infection with CD4 count <200 cells/µL: ZVL contraindicated; recommendations for RZV under review

DRAFT
NOT APPROVED FOR PUBLIC DISTRIBUTION
**Recommended Adult Immunization Schedule**

for ages 19 years or older

**2019 UNITED STATES**

**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>Antigen</th>
<th>Vaccines</th>
<th>Abbreviations</th>
<th>Trade names</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haemophilus influenzae type b</td>
<td>Haemophilus influenzae type b vaccine</td>
<td>Hib</td>
<td>ActHIB, Hiberix</td>
</tr>
<tr>
<td>Hepatitis A</td>
<td>Hepatitis A vaccine</td>
<td>HepA</td>
<td>Havrix, Vaqta</td>
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<td>Hepatitis A and hepatitis B vaccine</td>
<td>HepA-HepB</td>
<td>Twinrix</td>
</tr>
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<td>Hepatitis B</td>
<td>Hepatitis B vaccine</td>
<td>HepB</td>
<td>Engerix-B, Recombivax HB, Heplive-B</td>
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<tr>
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<td>Hepatitis A and hepatitis B vaccine</td>
<td>HepA-HepB</td>
<td>Twinrix</td>
</tr>
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<td>Human papillomavirus</td>
<td>Human papillomavirus vaccine</td>
<td>HPV vaccine</td>
<td>Gardasil 9</td>
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<tr>
<td>Influenza</td>
<td>Inactivated influenza vaccine</td>
<td>IV</td>
<td>Many brands</td>
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<td>Live attenuated influenza vaccine</td>
<td>LAIV</td>
<td>FluMist</td>
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<td>Recombinant influenza vaccine</td>
<td>RIV</td>
<td>Flublok</td>
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<tr>
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<td>M-M-R II</td>
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<td>Meningococcal serogroups A, C, W vaccine</td>
<td>MenACWY</td>
<td>Menactra, Menveo</td>
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<td>Meningococcal serogroup B vaccine</td>
<td>MenB-4C</td>
<td>Bexsero</td>
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<td>MenB-FHpp</td>
<td>Trumeneba</td>
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<td>Pneumococcal 13-valent conjugate vaccine</td>
<td>PCV13</td>
<td>Prevnar 13</td>
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<td>Pneumococcal 23-valent polysaccharide vaccine</td>
<td>PP5V23</td>
<td>Pneumovax</td>
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</tr>
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<td>Tetanus and diphtheria toxoids and acellular pertussis vaccine</td>
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<td>Adacel, Boostrix</td>
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<td>Zoster vaccine live</td>
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<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.*

**Report**

- Suspected cases of reportable vaccine-preventable diseases to the local or state health department
- Clinically significant post-vaccination reactions to the Vaccine Adverse Event Reporting System at www.vaers.hhs.gov or 800-822-7967

**Injury claims**

All vaccines included in the adult immunization schedule except pneumococcal 23-valent polysaccharide 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 800-338-2382.

**Questions or comments**

Contact CDC at 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
- General Best Practice Guidelines for Immunization: www.cdc.gov/vaccines/hcp/acip-recs/general-recs/index.html
- Vaccine Information Statements: www.cdc.gov/vaccines/hcp/vis/index.html
- Travel vaccine recommendations: www.cdc.gov/travel
- Recommended Child and Adolescent Immunization Schedule, United States, 2019: www.cdc.gov/vaccines/schedules/hcp/child-adolescent.html
- Download the CDC Vaccine Schedules App for providers at www.cdc.gov/vaccines/schedules/hcp/schedule-app.htm