The Medical Letter®
on Drugs and Therapeutics

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Expanded Table: Some Vaccines for Adults

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Vaccine	**Dose**	**Schedule**	**General Recommendations[1]**	**Some Adverse Effects**	**Comments/Recommendations for Special Populations[1,2]**	**Cost[3]**
Tetanus, Diphtheria (Td)						
Tetanus and Diptheria Toxoids *Tenivac* (Sanofi)	0.5 mL IM	3 doses (0, 1, and 6-12 mos)	▸ Primary series recommended for all adults without history of vaccination ▸ 1 booster of Td or Tdap every 10 yrs	▸ Injection-site reactions, such as erythema and induration, are common ▸ Arthus-type reactions can occur rarely	▸ Inactivated vaccine ▸ **Pregnancy:** Tdap during each pregnancy ▸ **Special Populations:** recommended	$45.90
Tetanus, Diphtheria, Acellular Pertussis (Tdap)						
Adacel (Sanofi) *Boostrix* (GSK)	0.5 mL IM	1 dose	▸ 1 dose for adults, regardless of interval since last Td or as part of primary series ▸ 1 booster of Td or Tdap every 10 yrs	▸ Injection-site reactions, such as erythema and induration, are common ▸ Fever and injection-site pain more common than with Td ▸ Arthus-type reactions can occur rarely	▸ Inactivated vaccine ▸ *Adacel* is not FDA-approved for use in adults ≥65 years old, but ACIP recommends use of either *Adacel* or *Boostrix* in this age group ▸ **Pregnancy:** a dose during each pregnancy during the early part of gestational weeks 27 through 36 ▸ **Special Populations:** recommended	51.10 50.10
Measles, Mumps, Rubella (MMR)						
M-M-R II (Merck) *Priorix* (GSK)	0.5 mL SC	1-2 doses (at least 28 days apart)[4]; 1 additional dose recommended for adults with a risk of acquiring mumps during an outbreak	▸ Adults born during or after 1957 without evidence of immunity (documentation of vaccination or laboratory evidence)	▸ Injection-site pain and erythema, fever, rash, and transient arthralgias are common ▸ Anaphylactic reactions and thrombocytopenic purpura are rare	▸ Live-attenuated vaccine ▸ **Pregnancy:** contraindicated ▸ **Special Populations:** contra-indicated in adults with severe immunodeficiency[5,6]	98.00 98.10

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Expanded Table: Some Vaccines for Adults (continued)						
Vaccine	**Dose**	**Schedule**	**General Recommendations[1]**	**Some Adverse Effects**	**Comments/Recommendations for Special Populations[1,2]**	**Cost[3]**
Varicella (VAR)						
Varivax (Merck)	0.5 mL SC	2 doses (0, 4-8 wks)	▸ Adults born during or after 1980 without evidence of immunity (documentation of vaccination, laboratory evidence, or history of varicella or herpes zoster diagnosed by a healthcare provider)	▸ Injection-site reactions such as soreness, erythema, and swelling are common ▸ Fever and varicella-like rash (injection site or generalized) can occur ▸ Spread of vaccine virus to susceptible contacts is rare	▸ Live-attenuated vaccine ▸ Persons born in the US before 1980 are considered immune ▸ Immunity after vaccination is probably permanent ▸ **Pregnancy:** contraindicated ▸ **Special Populations:** contraindicated in adults with severe immunodeficiency[5,6]	$192.10
Zoster						
Shingrix (RZV; GSK)	0.5 mL IM 0.65 mL SC	2 doses (0, 2-6 mos) 1 dose	▸ Adults ≥50 yrs old, including those with a previous episode of herpes zoster or previous use of ZVL ▸ Adults ≥19 yrs old who are or will be immunodeficient or immunocompromised because of disease or therapy	▸ Injection-site pain, redness, and swelling, myalgia, fatigue, headache, fever	▸ Recombinant vaccine ▸ Licensed by the FDA for persons ≥50 yrs old and those ≥18 yrs old with immunodeficiency or immunosuppression ▸ **Pregnancy:** safety and efficacy are not established ▸ **Special Populations:** recommended	242.70
Human Papillomavirus (HPV)						
Gardasil 9 (Merck)	0.5 mL IM	3 doses (0, 1-2, and 6 mos; minimum interval between doses 1 and 2 is 4 wks, between doses 2 and 3 is 12 wks, and between doses 1 and 3 is 5 mos)[7]	▸ Previously unvaccinated persons through age 26 ▸ May be considered for adults 27-45 yrs old who might be at risk of acquiring new HPV infections	▸ Injection-site pain, swelling, and erythema ▸ Syncope; patients should be seated or lying down during vaccine administration and observed for 15 minutes after injection	▸ 9-valent recombinant vaccine ▸ Quadrivalent *(Gardasil)* and bivalent *(Cervarix)* vaccines are no longer available in the US; a schedule begun with one of these can be completed with the 9-valent *(Gardasil 9)* vaccine ▸ Duration of immunity appears to be at least 10 years ▸ **Pregnancy:** not recommended, but no evidence that the vaccine is harmful ▸ **Special Populations:** recommended	329.10

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Expanded Table: Some Vaccines for Adults (continued)						
Vaccine	**Dose**	**Schedule**	**General Recommendations[1]**	**Some Adverse Effects**	**Comments/Recommendations for Special Populations[1,2]**	**Cost[3]**
Respiratory Syncytial Virus (RSV)						
Abrysvo (Pfizer) *Arexvy* (GSK) *mResvia* (Moderna)	0.5 mL IM 0.5 mL IM 0.5 mL IM	1 dose 1 dose 1 dose	▸ Adults ≥75 yrs old or 50-74 yrs old at increased risk of severe RSV disease[8,9]	▸ Injection-site reactions ▸ Atrial fibrillation and Guillain-Barré syndrome with *Arexvy* and *Abrysvo* ▸ Urticaria with mResvia	▸ *Abryso* and *Arexvy* are recombinant vaccines ▸ *mResvia* is an mRNA-based vaccine ▸ **Pregnancy:** *Abrysvo* for women at 32-36 weeks' gestation from September through January ▸ **Special Populations:** Recommended (specific recommendation based on age and risk factors)	$319.10 321.10 319.00
Pneumococcal						
Capvaxive (PCV21; Merck) *Prevnar20* (PCV20; Pfizer) *Vaxneuvance* (PCV15; Merck) *Pneumovax 23* (PPSV23; Merck)	0.5 mL IM 0.5 mL IM 0.5 mL IM 0.5 mL IM or SC	1 dose 1 dose 1 dose 1-3 doses[10]	▸ **Vaccine-naïve or previous PCV7 only at any age:** ≥50 yrs or 19-49 yrs with risk factors[12]: PCV20 or PCV21 x 1 dose OR PCV15 x 1 dose followed by PPSV23 ≥1 yr later[11] ▸ **Previous PCV15 only at any age:** ≥50 yrs or 19-49 yrs with risk factors[12]: PPSV23 x 1 dose ≥1 yr[11] after PCV15 ▸ **Previous PPSV23 only at any age:** ≥50 yrs or 19-49 yrs with risk factors[12]: PCV20, PCV21, or PCV15 x 1 dose ≥1 yr after PPSV23 ▸ **Previous PCV13 only at any age:** ≥50 yrs: PCV20 or PCV21 x 1 dose ≥1 yr after PCV13[13] 19-49 yrs with risk factors[12]: PCV20 or PCV21 x 1 dose ≥1 yr after PCV13[14]	▸ Mild to moderate soreness and erythema at the injection site, headache, fatigue, and myalgia are common	▸ PCV20, PCV21, and PCV15 are conjugate vaccines ▸ PPSV23 is a polysaccharide vaccine that induces attenuated antibody production after repeat doses ▸ **Pregnancy:** no recommendation; PPSV23 has been used in the second and third trimesters with no evidence of increased risk ▸ **Special Populations:** Recommended (specific recommendation based on vaccination status, age, and risk factors)	302.10 299.30 240.60 117.10
Hepatitis A (HepA)						
Havrix (GSK) *Vaqta* (Merck)	1 mL IM 1 mL IM	2 doses (0 and 6-12 mos) 2 doses (0 and 6-18 mos)	▸ Previously unvaccinated adults with medical, occupational, or behavioral risk factors[13] ▸ Adults who lack a risk factor but want protection	▸ Injection-site pain is common; swelling and erythema can occur ▸ Mild systemic complaints such as headache, low-grade fever, and fatigue can occur	▸ Both are inactivated vaccines ▸ Antibodies reach protective levels 2-4 wks after the first dose ▸ A series started with one HepA vaccine can be completed with another ▸ **Pregnancy:** recommended only for women with specific risk factors[15] ▸ **Special Populations:** recommended for adults with chronic liver disease or HIV and for MSM	89.60 83.70

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Expanded Table: Some Vaccines for Adults (continued)						
Vaccine	**Dose**	**Schedule**	**General Recommendations[1]**	**Some Adverse Effects**	**Comments/Recommendations for Special Populations[1,2]**	**Cost[3]**
Hepatitis B (HepB)						
Heplisav-B (Dynavax)	0.5 mL IM	2 doses (0 and 1 mo)	▸ All adults 19-59 yrs old ▸ Previously unvaccinated adults ≥60 yrs old with medical, occupational, or behavioral risk factors[16] ▸ Should also be offered to adults ≥60 yrs old who lack a risk factor but want protection	▸ Injection-site pain (more common with *Heplisav-B* than with *Engerix-B*) ▸ Fatigue, headache, fever	▸ All are recombinant vaccines ▸ If possible, the same vaccine should be used for all doses of a HepB series[15] ▸ **Pregnancy:** women who are at risk should be vaccinated[17] ▸ **Special Populations:** recommended for adults with immunocompromising conditions, HIV infection, ESRD on HD, chronic liver disease, or diabetes, and for healthcare workers and MSM	$165.90
Engerix-B (GSK)	1 mL IM	3 doses (0, 1, and 6 mos; minimum interval between doses 1 and 2 is 4 wks, between doses 2 and 3 is 8 wks, between doses 1 and 3 is 16 wks) **Alternative schedules:** 4 doses (0, 1, 2, and 12 mos) FDA- approved for recent exposures and travelers to high-risk areas; 3 doses (0, 1, and 4 mos or 0, 2, and 4 mos) recommended by ACIP				75.10
	Hemodialysis: 2 mL	**Hemodialysis:** 4 doses (0, 1, 2, and 6 mos)				
Recombivax HB (Merck)	1 mL IM	3 doses (0, 1, and 6 mos; minimum interval between doses 1 and 2 is 4 wks, between doses 2 and 3 is 8 wks, between doses 1 and 3 is 16 wks) **Alternative schedule:** 3 doses (0, 1, and 4 mos or 0, 2, and 4 mos) recommended by ACIP				72.20
	Hemodialysis: 40 mcg/mL (dialysis formulation)	**Hemodialysis:** 3 doses (0, 1, and 6 mos); can also be considered for immunocompromised persons				
Hepatitis A/B (HepA/HepB)						
Twinrix (GSK)	1 mL IM	3 doses (0, 1, and 6 mos; minimum interval between doses 1 and 2 is 4 wks, between doses 2 and 3 is 5 mos) **Accelerated schedule:** 4 doses (0, 7, 21-30 days, and 12 mos) is also FDA-approved	▸ Adults who require both HepA and HepB vaccine	▸ See HepA and HepB vaccines	▸ Inactivated/recombinant vaccine ▸ Contains the same hepatitis A component as in *Havrix*, but half the dose	141.60

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Expanded Table: Some Vaccines for Adults (continued)						
Vaccine	**Dose**	**Schedule**	**General Recommendations[1]**	**Some Adverse Effects**	**Comments/Recommendations for Special Populations[1,2]**	**Cost[3]**
Meningococcal						
serogroup ACWY (MenACWY) *Menveo* (GSK) *MenQuadfi* (Sanofi)	 0.5 mL IM 0.5 mL IM	 1 or 2 doses (≥8 wks apart); whether to administer 1 or 2 doses depends on risk factors[18]	▸ **MenACWY** is recommended for previously unvaccinated adults with specific risk factors[18] ▸ Revaccination with MenACWY every 5 yrs for those who remain at high risk	▸ **MenACWY:** headache, fatigue, malaise, and injection-site reactions (pain, redness, induration); rates are similar to those with tetanus toxoid ▸ **MenB:** fatigue, headache, myalgia, injection-site reactions (pain, erythema, induration)	▸ All are conjugate vaccines ▸ MenACWY vaccines are FDA-approved for adults ≤55 years old *(Menveo)* or all adults *(MenQuadfi)* ▸ MenB vaccines are FDA-approved for persons 10-25 years old ▸ *Bexsero* and *Trumenba* are not interchangeable ▸ **Pregnancy:** MenACWY may be used if otherwise indicated; MenB should be deferred unless the benefits are considered to outweigh the risks ▸ **Special Populations:** MenACWY is recommended for adults with HIV infection; MenACWY and MenB are recommended for those with asplenia/complement deficiencies	\$176.70 177.10
serogroup B (MenB) *Bexsero* (GSK) *Trumenba* (Pfizer)	 0.5 mL IM 0.5 mL IM	 2 doses (≥1 mo apart) 2-3 doses[19]	▸ **MenB** is recommended for all persons ≥10 years old with specific risk factors[20]; may be administered to persons 16-23 yrs old (preferred age 16-18 years) not at increased risk ▸ Revaccination with same MenB vaccine 1 yr after completing primary series and every 2-3 yrs thereafter for those who remain at high risk			 251.30 225.90
serogroup ABCWY (MenABCWY) *Penbraya* (Pfizer) *Penmenvy* (GSK)	 0.5 mL IM 0.5 mL IM	 2 doses (0 and 6 mos) 2 doses (0 and 6 mos)	▸ **MenABCWY** is recommended for adults for whom both MenACWY and MenB are indicated[21] ▸ Booster dose can be given to those who previously received MenABCWY or MenB ≥6 mos earlier[21]			 251.90 265.80
***Haemophilus Influenzae* type b (Hib)**						
ActHIB (Sanofi) *PedvaxHIB* (Merck) *Hiberix* (GSK)	0.5 mL IM	1 or 3 doses[22]	▸ Previously unvaccinated adults with functional or anatomic asplenia or scheduled for elective splenectomy and for hematopoietic stem cell transplant recipients	▸ No data in adults; in children, erythema, pain, and swelling at the injection site, mild fever, irritability, vomiting, and diarrhea have occurred	▸ All are conjugate vaccines ▸ Not FDA-approved for use in adults ▸ **Pregnancy:** no recommendation	13.90 31.50 13.50

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Expanded Table: Some Vaccines for Adults (continued)						
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Inactivated Polio Vaccine (IPV)						
Ipol (Sanofi)	0.5 mL IM or SC	3 doses (0, 1-2, and 6-12 mos)[23]	▸ Adults known or suspected to be unvaccinated or incompletely vaccinated ▸ 1 booster for those at increased risk of exposure to poliovirus	▸ Injection-site erythema, swelling, and tenderness	▸ Inactivated vaccine ▸ **Pregnancy:** should be given only if clearly needed ▸ **Special Populations:** recommended	$47.80

ESRD on HD = end-stage renal disease on hemodialysis; HAV = hepatitis A virus; MSM = men who have sex with men

1. Based on recommendations from the US Advisory Committee on Immunization Practices (ACIP): age ranges may differ from FDA-approved age ranges for some vaccines.
2. Special populations that need additional considerations include persons with asplenia/complement deficiencies, immunocompromising conditions (HIV infection, leukemia, lymphoma, Hodgkin's Disease, multiple myeloma, generalized malignancy, chronic renal failure, nephrotic syndrome, solid organ transplant, diseases requiring immunosuppressive drugs), HIV infection, chronic diseases (ESRD on HD, heart or lung disease, alcoholism, chronic liver disease, diabetes), healthcare workers, and MSM.
3. Approximate private sector cost (including excise tax) for 1 dose as of July 1, 2026, according to the CDC Vaccine Price List. Available at: www.cdc.gov/vaccines/programs/vfc/awardees/vaccine-management/price-list/index.html.
4. One to 2 doses for no evidence of immunity to measles and mumps (one dose for most adults; 2 doses recommended for adults previously vaccinated with killed measles vaccine [1963-1967]; students in postsecondary educational institutions; international travelers; household contacts of immunocompromised persons) and 1 dose for no evidence of immunity to rubella.
5. Persons with leukemia, lymphoma, or other malignancies in remission with no recent history (≥3 months) of chemotherapy are not considered severely immunocompromised for the purpose of receiving live-virus vaccines.
6. Wait at least 1 month after discontinuing long-term administration of high-dose corticosteroids before giving a live-virus vaccine. High-dose corticosteroid therapy is usually defined as ≥20 mg/day of prednisone or its equivalent for ≥14 days. Short-term (<2 weeks) treatment, low to moderate doses, long-term alternate day treatment with short-acting preparations, maintenance physiologic doses (replacement therapy), or steroids administered topically, by aerosol, or by intra-articular, bursal, or tendon injection are not considered contraindications to live-virus vaccines.
7. A 3-dose series is recommended for previously unvaccinated persons 15-26 years old. For those who started a series at age 9-14 years, but only received 1 dose or 2 doses <5 months apart, 1 additional dose is recommended.
8. Risk factors for severe RSV disease include pulmonary, cardiac, renal, hepatic, neurologic, or hematologic chronic medical conditions, diabetes, severe obesity, moderate or severe immune compromise, frailty, and residence in a long-term care facility or a rural or remote community.
9. The Infectious Diseases Society of America and the American Medical Association recommend RSV vaccination for immunocompromised persons ≥18 years old.
10. The number of doses is determined by the presence of specific risk factors (see footnote 12).
11. In adults with immunocompromising conditions (see footnote 12), cochlear implant, or CSF leak, PPSV23 may be administered ≥8 weeks later. If PPSV is not available, PCV20 or PCV21 my be used.
12. Risk factors include certain underlying medical conditions (alcoholism, chronic heart/liver/lung disease, cigarette smoking, diabetes) or immunocompromising conditions (HIV infection, leukemia, lymphoma, Hodgkin's disease, multiple myeloma, generalized malignancy, chronic renal failure, nephrotic syndrome, solid organ transplant, or diseases requiring treatment with immunosuppressive drugs), functional or anatomic asplenia, cochlear implants, or cerebrospinal fluid leaks.
13. An additional dose is also recommended for those who received PCV13 and either PPSV23 at <65 yrs (give PCV20 or PCV21 ≥5 yrs later) or PPSV23 at ≥65 yrs (may give PCV20 or PCV21 ≥5 yrs later).
14. A dose of PCV20 or PCV21 is recommended ≥5 yrs after PCV13 for those who received PCV13 and 1 or 2 doses of PPSV23.
15. Travel to or work in countries with high or intermediate hepatitis A endemicity; MSM; injection or noninjection drug use; work with HAV in laboratory or with primates infected with HAV; clotting factor disorders; chronic liver disease; close contact with an international adoptee; persons experiencing homelessness; healthy adults ≤40 years old recently exposed to HAV (adults >40 years old if hepatitis A immunoglobulin cannot be obtained).
16. Chronic liver disease; HIV infection; percutaneous or mucosal risk of exposure to blood; risk of sexual exposure; receive care in settings where a high proportion of adults have risks for hepatitis B infection; travel to countries with high or intermediate hepatitis B endemicity.
17. If the same vaccine is not available, a different vaccine can be used to complete the series. Minimum intervals between doses must be observed. Two doses of *Heplisav-B* should be given after a single dose of another vaccine; one dose of *Heplisav-B* can be given as part of a 3-dose series.
18. **Should receive 2 doses**: Functional or anatomic asplenia (including sickle cell disease and other hemoglobinopathies); HIV infection; persistent complement component deficiencies; eculizumab use. **Should receive 1 dose**: Travel to or live in countries where meningococcal disease is hyperendemic or epidemic (including African meningitits belt or during the Hajj); at risk from a meningococcal disease outbreak; microbiologists routinely exposed to *Neisseria meningitidis*; military recruits; first-year college students living in dormitories.
19. Healthy young adults 16-23 years old not at increased risk for meningococcal disease may receive a 2-dose series (0 and 6 months) of *Trumenba*. Those with specific risk factors should receive a 3-dose series (0, 1-2, and 6 months).
20. Functional or anatomic asplenia (including sickle cell disease); persistent complement component deficiency; eculizumab use; at risk from a meningococcal disease outbreak; microbiologists routinely exposed to *Neisseria meningitidis*.
21. Only recommended if MenACWY and MenB would be administered as separate vaccines at the same visit.
22. One dose for previously unvaccinated asplenic persons and those undergoing elective splenectomy (preferably ≥14 days before the procedure). Three doses (at least 4 weeks apart) for all recipients of hematopoietic stem cell transplants (beginning 6-12 months after transplant), even if previously vaccinated.
23. Incompletely vaccinated adults at increased risk of exposure should receive at least one dose (additional doses needed to complete a 3-dose primary series should be given if time permits).