

Immunizations for Preventable Diseases in Adults and Adolescents With HIV

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Overview

The Advisory Committee on Immunization Practices (ACIP) recommends immunizing people with HIV similarly to the general population, with a few key exceptions.

- The following live virus vaccines **are contraindicated** in people with HIV:
 - For CD4 T lymphocyte (CD4) cell count <200 cells/mm³:
 - Measles
 - Mumps
 - Rubella
 - Varicella (VAR)
 - Live attenuated typhoid Ty21a
 - Yellow fever
 - For any CD4 counts:
 - Live attenuated influenza vaccine (LAIV)
 - Live attenuated smallpox vaccine (ACAM2000)
- The following vaccines have specific recommendations related to HIV status:
 - COVID-19
 - Hepatitis A (HAV)
 - Hepatitis B (HBV)
 - Meningococcus serogroup A, C, W, Y (MenACWY)
 - Pneumococcal vaccines
 - Human papillomavirus

The National Institutes of Health/Infectious Diseases Society of America/HIV Medicine Association recommendations described here may differ from ACIP recommendations when the committees interpret data differently or when one guideline has been updated more recently than the other. Please see the [Recommended Adult Immunization Schedule by Medical Condition and Other Indications table](#) and [Recommended Immunization Schedule for Adults and Adolescents With HIV figure](#) at the end of this chapter for a full overview of vaccines for adults with HIV, including standard vaccines recommended for all individuals.

Specific Immunizations

COVID-19 Vaccine

Available Vaccines

- mRNA vaccines (Spikevax, Moderna; Comirnaty, Pfizer-BioNTech)
- Adjuvanted protein subunit vaccine (Novavax)

Summary of Recommendations

- For adults and children >5 years of age with HIV, administer a dose of the updated COVID-19 vaccine (once available) regardless of their CD4 count or HIV viral load **(AII)**.
- Individuals with advanced or untreated HIV are considered moderately or severely immunocompromised and may receive one additional dose at least 8 weeks after the last COVID-19 vaccine dose **(AIII)**.
 - Note: Advanced HIV is defined as people with CD4 count <200 cells/mm³, a history of an AIDS-defining illness without immune reconstitution, or clinical manifestations of symptomatic HIV.
- For current COVID-19 vaccination recommendations, please visit the Centers for Disease Control and Prevention (CDC) website on the [Use of COVID-19 Vaccines in the United States](#).

Evidence Summary

Worse outcomes for people with HIV and COVID-19, including high COVID-19 mortality rates, have been reported in cohort studies from the United States, the United Kingdom, and South Africa.¹⁻⁸ HIV was independently associated with an increased risk of severe and critical COVID-19 in a large trial from the World Health Organization's Global Clinical Platform, which included data from 38 countries.⁹ In a multicenter cohort study of 286 people with HIV and COVID-19 in the United States, a lower CD4 count (i.e., <200 cells/mm³) was associated with a higher risk for the composite endpoint of intensive care unit admission, invasive mechanical ventilation, or death. This increased risk was observed even in patients who had achieved virologic suppression of HIV.⁶ Similarly, a multisite clinical cohort of people with HIV in clinical care in the United States showed an association between lower current (<350 cells/mm³) and nadir (<200 cells/mm³) CD4 counts and risk of hospitalization, intubation, or death, without an association between viral load suppression and COVID-19 disease severity.¹⁰

Most people with HIV develop antibody responses to vaccination comparable to those measured in people without HIV.¹¹⁻¹⁶ However, responses may be lower and antibody titers decline faster, particularly for individuals¹³⁻¹⁵ with CD4 counts <200 cells/mm³. Rates of breakthrough infections after vaccination are higher among individuals with HIV, with vaccine efficacy declining sooner than in HIV-negative matched cohorts.¹⁷⁻¹⁹ Breakthrough infections showed no association with viral load suppression, though fewer breakthroughs¹⁷ were seen in individuals with CD4 counts \geq 500 cells/mm³. Vaccine efficacy against more severe outcomes (e.g., hospitalization, intensive care unit admission, death) has been more robust than protection against infection or mild disease.²⁰

For individuals with advanced or untreated HIV, the lower seroresponse rates and reduced vaccine effectiveness compared with individuals without immunocompromise support recommendations for additional booster doses.²¹

Three COVID-19 vaccines are available in the United States: two mRNA formulations (Moderna and Pfizer) and one adjuvanted recombinant protein (Novavax). Since 2023, the original vaccines are no longer authorized and have been replaced with updated versions that better match circulating variants. Primary and booster vaccines have been harmonized to a single strain, and annual assessments are anticipated to update vaccine composition and scheduling recommendations.²²

All adults and adolescents, regardless of their CD4 count or HIV viral load, should receive a dose of the newest updated COVID-19 vaccine when available (at least 4–8 weeks after last dose).^{21,23} Those with severe immunosuppression may have a diminished immune response to the vaccine and therefore may receive one additional dose at least 8 weeks after the last COVID-19 vaccine dose. For current COVID-19 vaccination recommendations, please visit the CDC website on the [Use of COVID-19 Vaccines in the United States](#).

Hepatitis A Vaccine

See the “Hepatitis A Virus (HAV)” section in the table below for detailed guidance on immunization against HAV.

Available Vaccines

- Single-antigen inactivated hepatitis A vaccines
 - HepA (Havrix, GSK)
 - HepA (Vaqta, Merck)
- Combination inactivated hepatitis A vaccine and recombinant hepatitis B vaccine
 - HepA-HepB (Twinrix, GSK)

Summary of Recommendations

For Vaccination

- Administer a two-dose series (dosing interval depends on the vaccine used: at 0 and 6–12 months for Havrix [**AII**] or 0 and 6–18 months for Vaqta [**AIII**]) of single-antigen hepatitis A vaccine (HepA) or a three-dose series (0, 1, and 6 months) of the combined hepatitis A and hepatitis B vaccine (HepA-HepB, Twinrix) to any person without evidence of immunity to HAV (and for the combined vaccine, without evidence of immunity to HAV or HBV) (**AII**).
- For travelers, some clinicians recommend a four-dose accelerated regimen (0, 7, 21–30 days, and 12 months) of HepA-HepB (**BII**).
- For people with HIV and CD4 count ≥ 200 cells/mm³, assess antibody response 1 to 2 months after completion of the series. If negative, a third dose may be administered (**BIII**).
- People with HIV with CD4 count < 200 cells/mm³ who have ongoing risk for HAV should be immunized at entry to care and assessed for antibody response 1 to 2 months after completion of the series. If negative, revaccinate when their CD4 count is > 200 cells/mm³ (**BIII**).

- For people with HIV with CD4 count <200 cells/mm³ who do not have ongoing risk for HAV, waiting for a CD4 count >200 cells/mm³ prior to immunization is an option (**BIII**).
- One study showed lower seroresponse to HAV when coadministered with pneumococcal conjugate vaccine. For patients who need both, clinicians may choose to separate by 1 month (**CIII**).²⁴

For Pre-Exposure Prophylaxis (Travel)

- For people with HIV who are nonimmune and traveling within 2 weeks to countries with endemic HAV, consider administering immunoglobulin G (IgG) 0.1 mL/kg if duration of travel is <1 month. If duration of travel is 1 to 2 months, administer IgG 0.2 mL/kg. If duration of travel is ≥ 2 months, IgG 0.2 mL/kg should be repeated every 2 months.

For Post-Exposure Prophylaxis

- For people with HIV who are nonimmune, administer HAV vaccine and IgG 0.1 mL/kg simultaneously in different anatomical sites as soon as possible, ideally within 2 weeks of exposure. Complete the HAV vaccine series following the dosing intervals for the selected vaccine.

Hepatitis B Vaccine

See the “Preventing Disease” section in [Hepatitis B Virus \(HBV\) Infection](#) for detailed guidance on immunization against HBV, as well as the evidence summary.

Available Vaccines

- Recombinant hepatitis B vaccine, CpG-adjuvanted
 - HepBCpG (HepBisav-B, Dynavax)
- Recombinant hepatitis B vaccines (conventional monovalent)
 - HepB (Engerix-B, GSK)
 - HepB (Recombivax HB, Merck)
- Combination inactivated hepatitis A and recombinant hepatitis B recombinant vaccine
 - HepA-HepB (Twinrix, GSK)

Summary of Recommendations

For Vaccination

- Indications for Hepatitis B Vaccination
 - People without chronic HBV infection and without immunity to HBV infection (negative for hepatitis B surface antigen, hepatitis B core antibody [anti-HBc], and hepatitis B surface antibody [anti-HBs]) (**AII**).
 - Although vaccine response is better in people with CD4 count >350 cells/mm³, vaccination should not be deferred in people with a lower CD4 count who are at increased risk of

acquiring HBV infection, because some people with CD4 <350 cells/mm³ do respond to vaccination (**AII**).

- Preferred
 - Heplisav-B intramuscularly (IM) at 0 and 4 weeks (**AII**)
 - Alternative (if HepBCpG [Heplisav-B] is unavailable)
 - Engerix-B 40 mcg (two simultaneous injections of 20 mcg each) at 0, 1, and 6 months (these doses are considered a “double-dose,” three-dose series) (**AII**); *or*
 - Recombivax HB 20 mcg (two injections of 10 mcg each) at 0, 1, and 6 months (these doses are considered a “double-dose,” three-dose series) (**AII**); *or*
 - Twinrix combined HepA and HepB vaccine (1 mL IM) as a three-dose series (at 0, 1, and 6 months) (**AII**)
 - Vaccination Schedule for Prior Non-Responders (Anti-HBs <10 mIU/ml) 1 Month After Complete Vaccine Series
 - If prior Engerix-B or Recombivax HB vaccination failed, administer HepBCpG (Heplisav-B) IM at 0 and 4 weeks (**AI**), with consideration for a third dose of HepBCpG at 24 weeks (**BIII**).
 - If prior two-dose HepBCpG (Heplisav-B) vaccination failed, there are no data but clinicians can consider a third dose of HepBCpG (Heplisav-B) IM at 24 weeks after first dose (**BIII**).
 - Assess for Vaccine Response
 - Anti-HBs should be obtained 4 weeks after completion of the vaccine series to document response to HepB vaccination, defined as anti-HBs ≥10 mIU/ml (**AII**).
 - Vaccination Schedule for People With Isolated Anti-HBc
 - One standard dose of any Hepatitis B vaccine followed by testing for quantitative anti-HBs 1 to 2 months post-dose
 - If the titer is >100 mIU/mL, no further vaccination is needed.*
 - If the titer is ≤100 mIU/mL, a complete series of hepatitis B vaccine should be completed (see above for Vaccination Schedule), followed by repeat anti-HBs testing (**BII**).
 - If an anti-HBs quantitative titer is not available, then a complete hepatitis B vaccine series is recommended, followed by qualitative anti-HBs testing (**BII**).
- * See text in the [Hepatitis B Virus \(HBV\) Infection](#) regarding rationale for >100 mIU/mL.

For Post-Exposure Prophylaxis

- For people who have been exposed and were vaccinated previously with a complete HepB vaccine series and have documented antibody response, no additional vaccine is needed.
- For people who have been exposed and who received a complete HepB vaccine series without documentation of antibody response, administer a single dose of HepB vaccine.
- For people who have been exposed and have not received any HepB vaccine or have not received a complete HepB vaccine series, administer or complete an HepB vaccine series and administer one dose of hepatitis B immune globulin at a separate anatomical site as soon as possible after

exposure (ideally within 24 hours, but up to 7 days after percutaneous exposure and up to 14 days after sexual exposure).

Human Papillomavirus Vaccine

See the “HPV Vaccine” section in [Human Papillomavirus \(HPV\) Disease](#) for detailed guidance on immunization against human papillomavirus (HPV), as well as the evidence summary.

Available Vaccine

- 9-valent inactivated recombinant vaccine (Gardasil 9, Merck)

Summary of Recommendations

- Routine HPV vaccination is recommended for people with HIV. Ideally, the series should be initiated at age 11 or 12 years but may be started as early as age 9 years. For all people with HIV who are aged 13 to 26 years and who were not vaccinated previously, regardless of sex, administer three doses of the recombinant HPV nonavalent vaccine (Gardasil 9) at 0, 1 to 2, and 6 months (**AIII**). The two-dose series **is not recommended** for people with HIV.
- Shared clinical decision-making regarding HPV vaccination is recommended for people with HIV who are aged 27 to 45 years and who were not adequately vaccinated previously (**AIII**).
- At present, vaccination with commercially available HPV vaccine **is not recommended** during pregnancy (**CIII**). However, in post-hoc analyses of clinical trials and population-based studies, HPV vaccines have not been linked to adverse pregnancy outcomes.²⁵⁻²⁸
- For people who have completed a vaccination series with the recombinant HPV bivalent or quadrivalent vaccine, some experts would consider additional vaccination with recombinant HPV nonavalent vaccine, but data are lacking for defining the efficacy and cost-effectiveness of this approach (**CIII**).

Influenza Vaccine

Available Vaccines*

- Inactivated Influenza vaccine (IIV3) (standard-dose, egg-based vaccine)
 - Afluria (Seqirus)
 - Fluarix (GSK)
 - FluLaval (GSK)
 - Fluzone (Sanofi Pasteur)
- ccIIV3 (standard-dose, cell culture–based vaccine)
 - Flucelvax (Seqirus)
- HD-IIV3 (high-dose, egg-based vaccine)
 - Fluzone High-Dose (Sanofi Pasteur)

- aIIV3 (standard-dose, egg-based vaccine with MF59 adjuvant)
 - Fluvad (Seqirus)
- RIV3 (recombinant hemagglutinin [HA] vaccine)
 - Flublok (Sanofi Pasteur)
- LAIV3 (live attenuated, egg-based vaccine)
 - FluMist (AstraZeneca)

* Vaccine formulations are updated yearly to reflect circulating strains.

Summary of Recommendations

- For all adults and adolescents with HIV, administer age-appropriate inactivated influenza vaccine or recombinant influenza vaccine annually (**AI**).
- For pregnant women with HIV, administer inactivated influenza or recombinant vaccine at any time during pregnancy (**AI**).
- LAIV administered via nasal spray **is contraindicated** in people with HIV (**AIII**).
- High-dose, recombinant, and adjuvanted influenza vaccines are recommended for people with HIV aged 65 years or older over standard-dose unadjuvanted inactivated vaccines (**AII**).²⁹

Evidence Summary

Influenza is a common respiratory disease in adults and adolescents. Annual epidemics of seasonal influenza typically occur in the United States between October and April. Influenza A and B are most frequently implicated in human epidemics. Influenza A viruses are categorized into subtypes based on characterization of two surface antigens: HA and neuraminidase (NA). Although vaccine-induced immunity to the surface antigens HA and NA reduces the likelihood of infection,^{30,31} the frequent emergence of antigenic variants through antigenic drift³² (i.e., point mutations and recombination events within a subtype) is the virologic basis for seasonal epidemics and necessitates revaccination each season.³³

Some studies of influenza have noted higher hospitalization rates³⁴⁻³⁷ and increased mortality^{37,38} among people with HIV; however, these findings have not been observed in all settings.³⁹ Increased morbidity may be greatest for people with HIV not on antiretroviral (ARV) drugs or with advanced disease. People with HIV are at high risk of serious influenza-related complications. For more information, see the CDC's website on [Flu and People Living With HIV](#).

In general, people with HIV with minimal AIDS-related symptoms and normal or near-normal CD4 counts who receive inactivated influenza vaccine (IIV) develop adequate antibody responses.⁴⁰⁻⁴² Among people with a low CD4 count or who have advanced HIV disease, IIV might not induce protective antibody titers.⁴²⁻⁴⁴ In one study, markers of inflammation in older people (≥ 60 years) with HIV were associated with lower post-vaccination influenza antibody titers.⁴⁵ In people with HIV, a second dose of vaccine does not improve immune response,^{43,46} and intradermal influenza vaccine dosing did not improve the immune response compared with intramuscular dosing.⁴⁷

Influenza vaccines are trivalent (two A components and one B component) with formulations that change from season to season. Two clinical studies have evaluated influenza vaccine efficacy in people with HIV. In an investigation of an influenza A outbreak at a residential facility for people with HIV,³⁴ vaccination was most effective at preventing influenza-like illness among people with a CD4 count >100 cells/mm³ and among those with HIV RNA <30,000 copies/mL. In a randomized placebo-controlled trial conducted in South Africa among 506 people with HIV, including 349 people on ARV treatment and 157 who were ARV treatment naive, efficacy of trivalent IIV for prevention of culture- or reverse transcription–polymerase chain reaction–confirmed influenza illness was 75% (95% confidence interval, 9% to 96%).⁴⁸

Several clinical studies also have evaluated the immunogenicity of influenza vaccine in people with HIV. In a randomized study⁴⁹ comparing the immunogenicity of high-dose (60 mcg of antigen per strain) versus standard-dose (15 mcg of antigen per strain) trivalent IIV among 195 adults with HIV aged ≥18 years (10% of whom had a CD4 count <200 cells/mm³), seroprotection rates were higher in the high-dose group for influenza A (96% vs. 87%; *P* = 0.029) and influenza B (91% vs. 80%; *P* = 0.030). However, in a comparative study of 41 children and young adults with HIV, high-dose trivalent IIV was no more immunogenic than the standard dose among the recipients with HIV.⁵⁰

Although booster doses can make the influenza vaccine more effective, that benefit is limited to specific groups, such as solid-organ transplant recipients.⁵¹ One study in people with HIV assessed the effectiveness of a two-dose regimen of IIV and found that the second dose of vaccine did not significantly increase the frequency or magnitude of antibody responses.⁴⁶ Based on this study, influenza booster immunizations **are not recommended** for people with HIV.

Optimally, influenza vaccination should occur before onset of influenza activity in the community because it takes about 2 weeks after vaccination for protective antibodies to develop.²⁹ Health care providers should offer vaccination by the end of October if possible, and vaccination should continue to be offered as long as influenza viruses are circulating. Information on currently available influenza vaccines is obtainable through the [CDC's recommendations on the 2024–2025 influenza season](#). For adults aged ≥65 years, high-dose IIV,⁵² adjuvanted IIV,⁵³ or recombinant influenza vaccine⁵⁴ are preferentially recommended over standard-dose unadjuvanted vaccines based on data suggesting higher efficacy in preventing invasive pneumococcal disease (IPD) in this age group.⁵⁵

Although a LAIV is available, it **is contraindicated** for people with HIV because of the paucity of safety data and the availability of alternative vaccines.⁵⁶ Although unintentional administration of LAIV to adults with HIV has been well tolerated,⁵⁷ **it is not recommended** for people with HIV.

IIVs can be administered to people receiving influenza antiviral drugs for treatment or chemoprophylaxis. Concurrent administration of influenza vaccine does not interfere with the immune response to other inactivated vaccines or to live vaccines.

Measles, Mumps, and Rubella Vaccine

Available Vaccines

- Live attenuated measles, mumps, and rubella (MMR) combination vaccine
 - M-M-R II (Merck)
 - Priorix (GSK)

Summary of Recommendations

For Vaccination

- Administer two doses of MMR vaccine at least 1 month apart to people with a CD4 count ≥ 200 cells/mm³ and who have no evidence of immunity to MMR (evidence of immunity is defined as: patient was born before 1957 and/or had documentation of receipt of MMR vaccine and/or has laboratory evidence of immunity or disease) (**AIII**).
- The MMR vaccine **is not recommended** during pregnancy.
- Women of childbearing potential who get the MMR vaccine should wait 4 weeks before getting pregnant.
- For pregnant women without immunity to rubella, **delay immunization until after pregnancy**, and then administer two doses of the MMR vaccine at least 1 month apart if the CD4 count is ≥ 200 cells/mm³ and on combination antiretroviral therapy (ART) (**AIII**).
- If no serologic evidence of immunity exists after two doses of MMR vaccine, consider repeating the two-dose MMR vaccine series, especially if the person is vaccinated while not virologically suppressed (**CIII**).
- **Do not administer** MMR vaccine to people with HIV with CD4 count < 200 cells/mm³ or uncontrolled HIV (not on ART or virologic failure) (**AIII**).

For Post-Exposure Prophylaxis

- For measles exposure of nonimmune individuals with CD4 count ≥ 200 cells/mm³, administer the MMR vaccine within 72 hours of exposure **or** immunoglobulin (IG) within 6 days of exposure. Do not administer the MMR vaccine and IG simultaneously.
- For measles exposure of nonimmune individuals with CD4 count < 200 cells/mm³ or who are pregnant, administer IG within 6 days of exposure.

Evidence Summary

Measles is a highly contagious and potentially life-threatening disease. Measles is particularly virulent in the immunocompromised host, with a reported mortality rate as high as 40% in people with advanced HIV.⁵⁸ Worldwide, the incidence of measles has continued to rise, with several ongoing outbreaks. The World Health Organization reported that its European region experienced greater than 30,000 cases in 2022, up from fewer than 1,000 in 2021, and 51 countries had large disruptive outbreaks in 2023. The increase in cases is largely attributable to decreased rates of vaccination. Current information regarding outbreaks can be found on the CDC website [Measles Cases and Outbreaks](#).⁵⁹

With a resurgence of measles both domestically⁶⁰ and globally,⁶¹ people with HIV should be assessed for immunity or prior vaccination. Acceptable evidence of immunity includes being born before 1957, documented evidence of two doses of the MMR vaccine, or presence of positive antibody titers.

Several studies from the 1990s found that 90% to 95% of adults with HIV were immune to measles.⁶²⁻⁶⁴ In these studies, serostatus did not vary by CD4 count, suggesting that people with HIV

retained protective immunity even in the context of advanced disease. However, in a more recent study, the measles seroprevalence rate was 70.3%. Similarly, people with HIV appear to retain immunity to mumps and rubella even after acquisition of HIV.⁶⁵

Individuals who do not fulfill any criteria for immunity and have CD4 counts ≥ 200 cells/mm³ should receive two doses of MMR vaccine separated by at least 28 days. The combination measles, mumps, rubella, and varicella (MMRV) vaccine has not been studied in immunocompromised hosts and should **not be administered** to people with HIV.

The MMR vaccine is **contraindicated** for people with HIV with CD4 counts < 200 cells/mm³ because the MMR vaccine is a live attenuated formulation that has been linked to fatal cases of measles-associated pneumonitis following administration to people with HIV with a low CD4 count.^{66,67} For people with HIV with CD4 count ≥ 200 cells/mm³, the vaccine has been shown to be safe, although antibody response may be lower than for patients without HIV.^{65,68,69} The MMR vaccine is also contraindicated for people with other immunocompromised conditions.

For more detailed information regarding post-exposure prophylaxis, please see the CDC webpage [Measles \(Rubeola\)](#).

Meningococcal Vaccine

Available Vaccines

- Quadrivalent meningococcal conjugate vaccine (MenACWY)
 - Menveo (GSK)
 - MenQuadfi (Sanofi Pasteur)
- Recombinant meningococcal group B vaccine (MenB)
 - Bexsero (GSK)
 - Trumenba (Pfizer)
- Pentavalent meningococcal vaccine (MenABCWY; combines conjugated MenACWY with recombinant MenB)
 - Penbraya (Pfizer)
 - Penmenvy (GSK)

Summary of Recommendations

- Administer two doses of quadrivalent meningococcal conjugate vaccine (MenACWY) at least 8 weeks apart to adolescents and adults with HIV who have not been vaccinated previously **(AII)**.
- For people with HIV who have been vaccinated previously, repeat vaccination every 5 years throughout life **(BIII)**.

- Serogroup B meningococcal vaccination (MenB) is not routinely indicated for all people with HIV unless they have additional risks for meningococcal disease (e.g., complement component deficiency, asplenia, or receipt of a complement inhibitor) or are at risk during a serogroup B outbreak.
- Adolescents and young adults with HIV (aged 16–23 years) can be offered MenB vaccination with shared decision-making (**CIII**).⁷⁰
- Adults may receive a single dose of pentavalent meningococcal conjugate vaccine (MenABCWY) as an alternative to separate administration of MenACWY and MenB when both vaccines would be given on the same clinic day (**BIII**).

Evidence Summary

Meningococcal meningitis, caused by *Neisseria meningitidis*, is the most common cause of bacterial meningitis among children and young adults in the United States. Surveillance data collected from 1998 to 2007 identified 2,262 cases of meningococcal disease from a sample of 13% of the U.S. population from several states. All available formulations of meningococcal vaccine are inactivated. Two quadrivalent MenACWY vaccines and two pentavalent MenABCWY meningococcal vaccines are currently licensed and available in the United States. The quadrivalent vaccines include (1) meningococcal groups A, C, W, and Y oligosaccharide diphtheria CRM197 conjugate vaccine (MenACWY-CRM, Menveo) and (2) meningococcal groups A, C, W, and Y polysaccharide tetanus toxoid conjugate vaccine (MenACWY-TT, MenQuadfi). The pentavalent vaccines include (1) a combination of MenACWY-TT plus meningococcal group B recombinant FHbp antigens (MenACWY-TT plus MenB-FHbp; Penbraya) and (2) MenACWY plus meningococcal group B four component recombinant protein vaccine (MenACWY plus MenB-4C; Penmenvy). Meningococcal groups ACWY polysaccharide diphtheria toxoid conjugate vaccine (MenACWY-D, Menactra) is no longer available. A two-dose series of quadrivalent meningococcal vaccination is recommended for all adolescents, with the first dose at age 11 or 12 years and a second dose at age 16 years. Adolescents and adults with HIV who have not had this primary meningococcal vaccination series should receive two doses of MenACWY vaccine at least 8 weeks apart (**AII**). Repeated MenACWY boosters are recommended every 5 years (**BIII**). MenACWY vaccines are licensed in the United States for one booster dose. Repeated boosters every 5 years is an off-label use but endorsed by ACIP.⁷¹

A growing body of evidence supports an increased risk of meningococcal disease in people with HIV. Studies have shown a fivefold to 24-fold increased risk of meningococcal disease in people with HIV compared with people without HIV⁷²⁻⁷⁴; low CD4 count and high HIV viral load are associated with increased risk.^{75,76} From 2000 to 2011, the average annual incidence rate of invasive meningococcal disease was 0.39 cases per 100,000 people. People with HIV with a lower CD4 count are at higher risk of invasive disease.⁷⁵ Most meningococcal infections among people with HIV in the United States have been caused by serogroups C, W, or Y.⁷⁶ In addition, a cohort study found that uptake of the MenACWY vaccine among people with a new diagnosis of HIV infection was low, and time to receipt of first vaccination was long.⁷⁷

The safety and immunogenicity of MenACWY-D vaccine have been evaluated only in people with HIV who are aged 11 to 24 years. Patients with CD4 percentage $\geq 15\%$ received either one or two doses (at 0 and 24 weeks) of vaccine, and those with CD4 percentage $< 15\%$ received two doses (at 0 and 24 weeks). Among people with HIV who received one dose of vaccine, 21% to 63% developed an antibody titer of $\geq 1:128$ at 72 weeks after vaccination. Antibody responses at 72 weeks in

individuals with CD4 percentage <15% were less robust,⁷⁸ with only 6% to 28% achieving titers $\geq 1:128$. Local site reactions—such as pain and tenderness at the injection site—were uncommon (3.1%), as were grade 3 or greater events (2.2%). No vaccine-related deaths or cases of meningitis were noted. No safety or immunogenicity studies are available for quadrivalent MenACWY-CRM vaccine or the pentavalent vaccine in people with HIV, and clinical outcome data for both vaccines in people with HIV are lacking, as well.

MenB is not routinely indicated for all people with HIV unless they have additional risks for meningococcal disease. Adolescents and young adults (aged 16–23 years) with HIV can be offered MenB vaccination with shared decision-making (**CIII**).⁷⁰ MenB vaccine provides short-term protection against most strains of serogroup B meningococcal disease and has been used for patients at increased risk (e.g., those living in dormitories or barracks) and during outbreaks. People with functional or anatomic asplenia (including sickle cell disease), with persistent complement component deficiency, or using a complement inhibitor (e.g., eculizumab, ravulizumab) should receive MenB vaccination.⁷¹ Two MenB vaccines are available: MenB-4C (Bexsero) and MenB-FHbp (Trumenba). People with HIV should receive the three-dose series for MenB, given at 0, 1–2, and 6 months, rather than the two-dose option recommended for healthy adolescents and young adults. MenB-FHbp consists of two purified recombinant lipidated FHbp antigens. MenB-4C consists of three recombinant proteins in addition to outer membrane vesicles that contain outer membrane protein porin A. MenB vaccines are not interchangeable; the same product must be used for all doses in the series. A MenB vaccine booster may be indicated if a person previously vaccinated is identified as being at increased risk during a MenB outbreak. In this situation, a single dose of the same vaccine is recommended ≥ 1 year after the MenB primary series completion and every 2 to 3 years thereafter.

Urban outbreaks of meningococcal meningitis have been reported in the United States among men both with and without HIV who have sex with men. Several outbreaks were associated with clubs and bathhouses. Some public health jurisdictions now recommend meningococcal vaccine for all men who have sex with men, regardless of HIV status; however, ACIP has not adopted this recommendation for men without HIV who have sex with men.⁷⁹

During pregnancy and when lactating, women with HIV should receive MenACWY vaccine if indicated (**AIII**). No safety signals related to maternal and neonatal adverse events (including spontaneous abortion and birth defects) with MenACWY vaccine are evident in clinical trials or post-licensure surveillance.⁸⁰⁻⁸⁴ Because only limited data are available for MenB vaccination during pregnancy, vaccination with MenB should be deferred unless the pregnant woman is at increased risk and, after consultation with their health care provider, the benefits of vaccination are considered to outweigh the potential risks (**CIII**).⁷¹

Mpox Vaccine

Available Vaccines

- Live nonreplicating smallpox and mpox vaccine
 - JYNNEOS (Bavarian Nordic)

Summary of Recommendations

For Vaccination

- Indications
 - Regardless of CD4 count, all people with HIV and no prior mpox infection should be offered mpox vaccination if they have or anticipate potential exposure to mpox, per [CDC clinical considerations](#) **(BII)**.⁸⁵
 - JYNNEOS should be provided to any other people with HIV who request vaccination **(CII)**.
 - People who have received smallpox vaccination should receive mpox vaccination **(CIII)**.
- Vaccine
 - Modified vaccinia Ankara-Bavarian Nordic (MVA-BN) vaccine, sold in the United States as JYNNEOS, is the preferred vaccine before mpox exposure for people with HIV because it uses a live attenuated, non-replicating virus **(AII)**.
 - Administer JYNNEOS in two doses 28 days apart either 0.5 mL subcutaneously (SQ) or 0.1 mL intradermally (ID). SQ administration is preferred for people with a history of keloids and recommended for people aged <18 years.
 - In situations where the second dose was not administered during the recommended interval, administer a second dose as soon as possible **(CIII)**. Restarting or adding doses to the series when an extended interval between doses occurs is not necessary **(CIII)**.
 - At this time, booster doses, including for people with prior mpox or who were vaccinated at CD4 counts <200 cells/mm³, are **not recommended** **(CIII)**.
 - Administration of the smallpox vaccine (ACAM2000, a live replicating vaccinia vaccine) to people with HIV **is contraindicated** **(AII)**.
 - Available human data on JYNNEOS administered to pregnant women are limited, and the risks and benefits of JYNNEOS should be discussed with the patient using shared decision-making **(CIII)**.
 - If mpox vaccination is sought during pregnancy or while breastfeeding, administer JYNNEOS because it contains nonreplicating virus **(AII)**.

For Post-Exposure Prophylaxis

- Indications
 - Post-exposure vaccination is recommended for all unvaccinated people with HIV who experience a known or presumed exposure **(BII)**.
 - Post-exposure vaccination is recommended as soon as possible, ideally within 4 days after exposure; however, administration 4 to 14 days after exposure may still provide some protection against mpox and should be offered **(BII)**.
- Vaccine
 - JYNNEOS is the preferred vaccine before mpox exposure for people with HIV because it uses a live attenuated, nonreplicating virus **(AII)**.

- Administer JYNNEOS in two doses 28 days apart either 0.5 mL SQ or 0.1 mL ID. SQ administration is preferred for people with a history of keloids and recommended for people aged <18 years.
- When there is adequate supply of JYNNEOS, clinicians may preferentially administer via SQ route. Local side effects may be less severe with SQ administration than with ID administration.
- People who have received smallpox vaccination should still receive mpox post-exposure vaccination (**CIII**).

Evidence Summary

Mpox (formerly monkeypox) is a zoonotic viral disease caused by monkeypox virus (MPXV) that belongs to the *Orthopoxvirus* genus of the Poxviridae family, which also includes the causative agent of smallpox. Two main clades of MPXV have been described in different geographic regions of Africa; clade I (previously called Congo Basin clade) was classically associated with more severe disease and more human-to-human transmission than clade II (previously called West African clade).⁸⁶⁻⁸⁸

Vaccination is the principal biomedical means of preventing mpox, regardless of clade. Vaccines active against clade II mpox are expected to be equally active against clade I. Indications for mpox vaccination are the same for people with and without HIV. Mpox vaccination should be offered to all people with HIV who have not had prior mpox and who have or anticipate potential exposure to mpox, regardless of CD4 count.⁸⁵

People with HIV who are eligible for vaccination against mpox should receive MVA-BN vaccines (**AII**). These are live attenuated, nonreplicating viral vaccines sold as JYNNEOS in the United States and as IMVANEX or IMVAMUNE elsewhere. JYNNEOS consists of two doses given 4 weeks (28 days) apart. The CDC's interim clinical considerations for mpox vaccination recommend either SQ or ID vaccine administration; both routes of administration have been shown to be similarly effective.⁸⁹ SQ administration of JYNNEOS is preferred for people with a history of keloids and recommended for people aged <18 years.

JYNNEOS has been demonstrated to be both safe for people with HIV and equally immunogenic compared with people without HIV.⁹⁰⁻⁹² Several studies indicate that JYNNEOS is effective against mpox.⁹³⁻⁹⁸ Matched case control study data indicate that vaccine effectiveness against symptomatic infection ranges from 36% to 75% after one dose to 66% to 89% after two doses.^{94,97,98}

However, these studies were limited to virologically suppressed people with CD4 counts ≥ 100 cells/mm³. Studies to date have had insufficient data to assess the effectiveness of JYNNEOS against mpox stratified by CD4 count, although one study reported high effectiveness regardless of CD4 count.⁹⁹ Immunogenicity among people with HIV who are not virologically suppressed or who have lower CD4 counts remains unknown.

The durability of immunity after mpox vaccination is unknown, including among people with HIV. Serological studies have shown declining antibody titers post-vaccination. However, the roles of innate and cell-mediated immunity remain unclear, and immunologic correlates of protection have not yet been established.¹⁰⁰ Breakthrough infections are rare but have been documented after vaccination.¹⁰¹ A global case study from nine countries described 29 individuals who experienced

mpox infections following completion of two appropriately spaced doses of JYNNEOS vaccine; of these individuals, eight had HIV and were virologically suppressed¹⁰² with a median CD4 count of 555 cells/mm³. Data collected from May 2022 to May 2024 during the clade II outbreak in the United States observed 271 cases (<1% of people vaccinated) occurring at disparate time intervals after vaccination; this low proportion of post-vaccination infections suggests that immunity is not waning to date.¹⁰³ In both reports, vaccine-breakthrough cases experienced less severe illness with fewer lesions. Hence, at this time, booster doses are **not recommended**, including for people who were vaccinated at CD4 counts <200 cells/mm³ (**CIII**).

People with a prior history of mpox infection, including people with HIV, are not recommended to be vaccinated because mpox infection confers immunity (**CIII**).⁸⁵ No clinical correlates of immunity have yet been established to guide when additional vaccination might be needed following prior mpox infection. Although the durability of immunity is unknown, reinfection with mpox remains very rare. Observational data indicate that people with acquired immunity after initial infection tend to have a self-limited illness with a lower burden of lesions that can be managed in outpatient settings.^{101,102} At this time, people who had mpox with moderate-to-severe immune suppression (CD4 <200 cells/mm³) are also **not recommended (CIII)** to receive additional vaccinations after they achieve immune reconstitution on HIV treatment.

Available human data on JYNNEOS administered during pregnancy are insufficient to determine vaccine-associated risks. Animal studies of JYNNEOS have shown no evidence of harm to the developing fetus.¹⁰⁴ The risks and benefits of JYNNEOS should be discussed with the patient using shared decision-making (**CIII**). If vaccination is sought during pregnancy or breastfeeding, JYNNEOS should be used because it contains nonreplicating virus (**AII**). Vaccination with ACAM2000, which contains a replication-competent virus, is **contraindicated** during pregnancy or while breastfeeding due to risk of pregnancy loss, congenital defects, and vaccinia virus infection in fetuses and newborns and the availability of an alternative nonreplicating viral vaccine (**AII**).¹⁰⁵

Pneumococcal Vaccine

Available Vaccines

- Pneumococcal conjugate vaccines (PCVs)
 - PCV15 (Vaxneuvance, Merck)
 - PCV20 (Prevnar 20, Pfizer)
 - PCV21 (Capvaxive, Merck)
- Pneumococcal polysaccharide vaccine (PPSV)
 - PPSV23 (Pneumovax, Merck)

Summary of Recommendations

Our recommendations are generally consistent with ACIP.¹⁰⁶ All people with HIV without history of pneumococcal vaccination or with unknown vaccine history should be vaccinated as follows:

- Administer PCV21, PCV20, or PCV15 (**AII**). After PCV21 or PCV20, no additional pneumococcal vaccine is currently recommended.

- In the expert opinion of the CAP Section Group of the Adult and Adolescent Opportunistic Infection Guidelines Panel, PCV21 is not recommended for adults with HIV if the prevalence of serotype 4 is over 30% in the region.¹⁰⁷ As of September 2024 high levels of serotype 4 have been reported in Alaska, Colorado, the Navajo Nation, New Mexico, and Oregon. In these locations, people with HIV should receive PCV20 or, if PCV20 is not available, PCV15 (**AIII**). This guidance will be reviewed and updated as pneumococcal disease epidemiology evolves and data from other geographic areas becomes available.
- If PCV15 is used, administer a dose of PPSV23 at least 8 weeks later (**AII**). No additional pneumococcal vaccine doses are recommended.
- For people with HIV who previously started or completed a pneumococcal vaccination series, there is no need to restart the series. Specific cases are as follows:
- Adults who have received both PCV13 and PPSV23:
 - Adults who received PPSV23 before the age of 65 can be administered PCV21 or PCV20 at least 5 years after the last pneumococcal vaccine dose
 - Adults who received PPSV23 at age 65 or older do not require further doses of PPSV23. Their pneumococcal vaccination can be considered complete.
 - Shared clinical decision-making is recommended regarding administration of PCV21 or PCV20 for immunocompromised persons aged ≥ 65 years who completed their vaccine series with both PCV13 and PPSV23. If a decision to administer PCV21 or PCV20 is made, it should be given at least 5 years after the last pneumococcal vaccine dose (**CIII**).
- Adults who previously received only PCV13 may receive one dose of PCV21 or PCV20 at least 1 year later (**BIII**)
- Adults who have only received PPSV23 may receive PCV21 or PCV20 (or PCV15 if the former are not available) at least 1 year after their last PPSV23 dose to complete their pneumococcal vaccination series (**BIII**).

Evidence Summary

Some observational studies have reported benefits of PPSV against IPD^{108,109} (e.g., bacteremia, meningitis) and all-cause pneumonia¹¹⁰⁻¹¹² in people with HIV; however, results have been variable.^{108,113-115} One randomized placebo-controlled trial of PPSV in Africa paradoxically found that vaccination was associated with an increased risk of pneumonia, and there was no evidence of reduced risk of IPD among vaccinated participants.¹¹⁶ Follow-up of this cohort confirmed the increase in pneumonia in vaccinated participants but also showed a decrease in all-cause mortality, although participants in this study were not treated with ART.¹¹⁷ A study¹¹⁸ evaluating the impact of PCV13 vaccination on the rates of IPD in adults with HIV between 2008 and 2018 found that IPD rates remained high despite reductions with the introduction of PCV13. However, use of higher-valent conjugate vaccines may reduce IPD: 11.2% of cases of IPD consisted of additional serotypes contained in PCV15 but not PCV13, and 16.5% of cases of IPD consisted of serotypes in PCV20 but not in PCV15.

In 2021, PCV15 and PCV20 were licensed by the U.S. Food and Drug Administration (FDA) for use in adults¹¹⁹ based on safety and immunogenicity data compared with data on PCV13 or PPSV23. Effectiveness data of these vaccines against pneumococcal disease or their durability in providing

immunoprotection in adults with HIV currently are not available. One Phase 3 clinical trial of PCV15 followed by PPSV23 8 weeks later in people with HIV demonstrated safety and immunogenicity of this approach.¹²⁰ No clinical data exist for the use of PCV20 in people with HIV.

In 2024, PCV21, which was developed specifically for adults, was approved in the United States. It includes the serotypes that are currently responsible for most cases of IPD in adults.¹²¹ Overall, 77% to 85% of IPD cases in adults are due to serotypes in PCV21, compared with 54% to 62% in PCV20 and 60% to 67% in PPSV23. However, PCV21 does not include some serotypes contained in previously approved vaccines. One example is serotype 4, which is included in all other PCV formulations and in PPSV23; serotype 4 has recently reemerged in certain geographic areas (Alaska, Colorado, the Navajo Nation, New Mexico, and Oregon), causing outbreaks of pneumococcal disease, especially among people with certain risk factors that often are more common in people with HIV (e.g., homelessness, alcoholism, cigarette smoking, injection drug use, chronic lung disease).

Immune responses to PCV21 were evaluated among adults aged ≥ 18 years with HIV in one study. When recipients of PCV15 followed by PPSV23 8 weeks later were compared with recipients of PCV21 followed by placebo 8 weeks later, immunogenicity for shared serotypes was comparable, and PCV21 was immunogenic for unique serotypes.¹²² There are currently no data on clinical effectiveness of PCV21 in people with HIV.

Recommendations for PCV and PPSV23 in people with HIV depend on their age, receipt of prior doses of pneumococcal vaccine, number of prior doses, and specific vaccines received. In addition, the region's prevalence of IPD ($>30\%$ of IPD cases) caused by serotype 4, patients' risk factors, and local health department recommendations need to be considered when deciding between PCV21 or PCV20 for vaccine-naïve individuals. For people with HIV and CD4 counts >200 cells/mm³, pneumococcal vaccination should not be delayed while awaiting a response to ART. For people with HIV who have a CD4 count <200 cells/mm³, immunogenicity may be improved if pneumococcal vaccination is administered when the CD4 count increases to 200 cells/mm³ or higher on ART. However, data are inconsistent. In some studies, immune responses have been shown to be decreased in response to PCV or to PPSV23 among people with HIV and lower CD4 counts (e.g., <200 or <350 cells/mm³);^{123,124} other studies have demonstrated no difference according to CD4 count at the time of vaccination or with delaying vaccinations until after 6 months of ART.¹²⁵⁻¹²⁷ Thus, delaying administration of pneumococcal vaccines to optimize immune response in those with CD4 counts <200 cells/mm³ must be considered against an increased risk of pneumococcal disease and IPD in this group and any potential barriers to retention in care.

Respiratory Syncytial Virus Vaccine

Available Vaccines

- Adjuvanted protein subunit vaccine (Arexvy, GSK)
- Bivalent protein subunit vaccine (Abrysvo, Pfizer)
- mRNA vaccine (mRESVIA, Moderna)

Summary of Recommendations

- Administration of a single respiratory syncytial virus (RSV) vaccine (Abrysvo, Arexvy, or mRESVIA) to all people with HIV aged ≥ 75 years is recommended (**III**).

- Administration of a single RSV vaccine for people ages 60 to 74 with HIV and CD4 count <200 cells/mm³ or with comorbid chronic [conditions that increase risk for severe RSV disease](#) is recommended.
- For pregnant women with HIV, administration of a single RSV vaccine (Abrysvo) between 32 and 36 weeks gestation with seasonal administration during September through January in most of the continental United States is recommended (**CIII**).
- No booster doses are currently recommended (**CIII**).

Evidence Summary

RSV is a significant cause of lower respiratory tract infection and bronchiolitis worldwide in children aged <5 years and adults aged ≥60 years. RSV vaccine development began in the 1960s; however, early formaldehyde-inactivated RSV vaccines induced a life-threatening inflammatory response during subsequent natural RSV infection in infants.¹²⁸ Following an improved understanding of the structure of RSV, modern vaccine research has developed a myriad of safer approaches, including live attenuated, chimeric, vector-based, subunit proteins, nanoparticle, and nucleic acid vaccines.¹²⁹ Currently, at least 19 RSV vaccines are in clinical trials evaluating efficacy in pediatric, maternal, and adult populations.¹³⁰

In May 2023, the FDA approved the first two RSV vaccines for adults aged ≥60 years: RSVPreF3 (Arexvy) and RSVpreF (Abrysvo). Both vaccines target the prefusion F protein on the viral surface.¹³¹

RSVPreF3 (Arexvy) is an AS01_E-adjuvanted RSV prefusion F protein–based vaccine, approved based on results of a large clinical trial comparing the candidate vaccine to placebo over a median follow-up of 6.7 months.¹³² The study included 17,922 participants. People with HIV were excluded from the study. Relative to placebo, RSVPreF3 was efficacious in reducing RSV-related lower respiratory tract disease, severe lower respiratory tract disease, and acute respiratory infection by 83%, 94%, and 72%, respectively. Further, this vaccine was generally safe, with most adverse events being transient, mild to moderate, and related to local pain and fatigue. Rare inflammatory neurologic events were reported in three trial participants within 42 days of receipt of the RSVPreF3; all events occurred in trials without a placebo arm. These included one case of Guillain-Barré syndrome (GBS) and two cases of acute disseminated encephalomyelitis (ADEM). Both ADEM cases were based on symptoms and clinical findings, and one case was fatal.

RSVpreF (Abrysvo) is a bivalent RSV prefusion F protein–based vaccine that demonstrated efficacy in a large, randomized clinical trial with a mean follow-up of 7 months.¹³³ Immunocompromised patients were excluded from this trial. People with well-controlled HIV (viral load <50 copies/mL and CD4 counts >200 cells/mm³ on ART) were eligible, but the number of people with HIV in the trial is not reported. Compared to placebo, RSVpreF reduced RSV-related lower respiratory tract illness with at least two signs or symptoms and with at least three signs or symptoms, by 67% and 86%, respectively. RSVpreF reduced RSV-associated acute respiratory illness by 62%. RSVpreF was relatively safe, with higher rates of local reactions in the vaccine (12%) versus placebo (7%), but rates of systemic events were similar. Rare inflammatory neurologic events were reported in three of 34,284 participants, including one case of GBS, one case of Miller Fisher syndrome (GBS variant), and one case of undifferentiated motor-sensory axonal polyneuropathy. A separate clinical trial evaluated maternal RSVpreF versus placebo to determine efficacy in reducing RSV-related illness in newborns and infants.¹³⁴ In interim analysis, RSVpreF was effective in reducing medically attended

severe RSV-associated lower respiratory tract illness in infants within 90 days after birth, and no safety concerns were identified. Pregnant women with HIV were excluded from this trial.

mRNA-1345 (mRESVIA) is an mRNA-based RSV vaccine encoding the stabilized RSV prefusion F glycoprotein. In a trial of more than 35,000 participants aged ≥ 60 years, the vaccine demonstrated greater than 80% efficacy against RSV-related lower respiratory tract disease.¹³⁵ Participants with HIV and CD4 count ≥ 350 cells/mm³ and an undetectable HIV viral load within the past year were permitted to enroll in the trial. The vaccine was generally well tolerated, and no cases of ADEM or GBS were observed.

In June 2024, ACIP recommended that adults aged ≥ 75 years and adults aged 60 to 74 years with comorbid conditions that increase risk for severe RSV disease receive a single dose of an approved RSV vaccine. A full list of qualifying conditions can be found on the [CDC's Clinical Overview of RSV webpage](#).¹³⁶ In September 2023, ACIP and the American College of Gynecology both recommended seasonal administration of one dose of RSV vaccine for pregnant women during weeks 32 through 36 of pregnancy, ideally at least 14 days before delivery.

In the absence of additional data regarding immunologic response, clinical efficacy, and safety in patients with HIV, these recommendations are aligned with the ACIP guidance for the general population. For people with HIV, offer a single RSV vaccine (Abrysvo, Arexvy, or mRESVIA) to individuals aged ≥ 75 years and those aged 60 to 74 years with qualifying comorbid conditions (**CIII**). Individuals aged 60 to 74 years with HIV and CD4 < 200 cells/mm³ are eligible for RSV vaccination, although the vaccines have not been studied in this population, and many clinicians may choose to wait for immune reconstitution prior to administering the vaccine (**CIII**). Optimally, vaccination should occur before the onset of the fall and winter RSV season.

For pregnant women with HIV, administer a single RSV vaccine (Abrysvo) between 32 to 36 weeks gestation with seasonal administration during September through January in most of the continental United States (**CIII**). The adjuvanted vaccine, Arexvy, and the mRNA vaccine, mRESVIA, have not been studied in pregnancy and should not be used as an alternative. In locations where the seasonality of RSV differs from the continental United States (e.g., tropical climates, the Southern hemisphere), providers should follow local guidance on timing of administration. Data regarding immunologic response to the vaccine and clinical outcomes are notably lacking in people with HIV.

Tetanus, Diphtheria, and Pertussis Vaccine

Available Vaccines

- Tdap: Tetanus, diphtheria, and pertussis
 - Adacel (Sanofi Pasteur)
 - Boostrix (GSK)
- Td: Tetanus and diphtheria
 - TENIVAC (Sanofi Pasteur)

Note: DTaP vaccines (diphtheria, tetanus, and pertussis) are only for babies and young children and therefore are not covered in these guidelines.

Summary of Recommendations

- Administer the combination tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis vaccine (Tdap) once if the person with HIV has not been vaccinated at age 11 or older, and then tetanus and diphtheria toxoids vaccine (Td) or Tdap every 10 years thereafter (**AII**).
- For pregnant women with HIV, administer one dose of Tdap during each pregnancy, preferably between 27 weeks and 36 weeks gestation (**AIII**).
- For adolescents and adults with HIV who have not received the primary vaccination series for tetanus, diphtheria, or pertussis, administer one dose of Tdap followed by one dose of Td or Tdap at least 4 weeks after Tdap, and another dose of Td or Tdap 6 months to 12 months after the last Td or Tdap. Tdap can be substituted for any Td dose and is always preferred as the first dose (**AIII**).

Evidence Summary

Antibody response to tetanus and diphtheria vaccination varies by CD4 count. For individuals with advanced HIV and a low CD4 count, immunologic response is attenuated for both tetanus and diphtheria when compared to HIV-uninfected controls.^{137,138} For people with CD4 count >300 cells/mm³, antibody response to tetanus vaccination is similar to the general population, whereas response to diphtheria remains diminished.¹³⁷⁻¹³⁹ Limited data exist on the efficacy of pertussis vaccination in this population.

Two Tdap vaccines for individuals aged ≥ 10 years are available in the United States (Adacel and Boostrix). Both vaccines are inactivated and considered safe to administer at any CD4 count. People with HIV should receive vaccination for tetanus, diphtheria, and pertussis on the same schedule as individuals without HIV. All adults not previously vaccinated should receive a single dose of Tdap, followed by a Td or Tdap booster every 10 years.

Varicella Vaccine

See “Vaccination to Prevent Primary Infection (Varicella)” in the [Varicella-Zoster Virus Disease](#) section for detailed guidance on immunization against varicella, as well as the evidence summary.

Available Vaccines

- Live attenuated varicella vaccine
 - Varivax (Merck)

Summary of Recommendations

- People with HIV with any of the following have presumed immunity to varicella: receipt of two doses of varicella vaccine (Varivax or MMRV), diagnosis of varicella or herpes zoster (shingles) by a health care provider, or laboratory evidence of immunity or disease.
- For people with HIV who are varicella nonimmune with CD4 count ≥ 200 cells/mm³, administer two doses of varicella vaccine (VAR) 4 to 8 weeks apart (**BIII**).
- VAR is **contraindicated** for people with HIV with CD4 count < 200 cells/mm³ (**AIII**).

- VAR is not recommended during pregnancy (AIII).

Herpes Zoster Vaccine

See “Vaccination to Prevent Reactivation Disease (Herpes Zoster)” in the [Varicella-Zoster Virus Disease](#) section for detailed guidance on immunization against zoster, as well as the evidence summary. Herpes zoster vaccine has not been studied for prevention against primary varicella infection.

Available Vaccines

- Recombinant adjuvanted zoster vaccine (RZV)
 - Shingrix (GSK)

Summary of Recommendations

- For people with HIV aged ≥ 18 years, administer two doses of RZV at 0 and 2 to 6 months (AIII).
- Consider delaying vaccination until the patient is virologically suppressed on ART (CIII) or until the CD4 count is ≥ 200 cells/mm³ to ensure a robust vaccine response (CIII).
- People with HIV aged ≥ 18 years should receive RZV regardless of previous history of herpes zoster or previous receipt of zoster vaccine live (no longer available).
- Do not give RZV (Shingrix) during an acute episode of herpes zoster (AIII).
- RZV is not recommended during pregnancy (AIII).

Recommended Adult Immunization Schedule by Medical Condition and Other Indications

Vaccine Preventable Infection	Indication	Recommendations	Additional Comments	ACIP Recommendations
COVID-19	All people regardless of CD4 count or viral load (AII)	<p>People with HIV should receive a complete COVID-19 vaccine series regardless of their CD4 count or HIV viral load or their pregnancy or breastfeeding status (AIII).</p> <p>Information on current COVID-19 vaccination recommendations are available on CDC's COVID-19 Vaccines webpage.</p>	People with advanced or untreated HIV are considered moderately or severely immunocompromised and may get a second dose of the updated vaccine at least 8 weeks after the first (AIII) .	No difference in recommendations
Hepatitis A Virus (HAV)	HAV nonimmune (AIII)	<p>Two-dose series of either single-antigen vaccine:</p> <ul style="list-style-type: none"> Havrix: 1.0 mL IM (0, 6–12 months) (AII); <i>or</i> Vaqta: 1.0 mL IM (0, 6–18 months) (AIII) <p>Alternative for individuals susceptible to both HAV and HBV:</p> <ul style="list-style-type: none"> Twinrix: 1.0 mL IM in three-dose series (0, 1, 6 months) (AII) 	<p>Assess total antibody response (IgG and IgM) 4 weeks after completion of the series, and if negative, revaccinate, preferably after the CD4 count is ≥ 200 cells/mm³ (BIII).</p> <p>For travelers, some clinicians recommend—</p> <ul style="list-style-type: none"> Twinrix: four-dose series (0, 7, 21–30 days, 12 months) (BII) <p>One study showed lower seroresponse to Hep A vaccine when co-administered with pneumococcal conjugate vaccine. For patients who need both, clinicians may choose to separate by 1 month.</p>	No difference in recommendations
	Post-exposure prophylaxis	Administer HAV vaccine and HepA IgG (0.1 mg/kg) simultaneously in different anatomical sites as soon as possible within 2 weeks of exposure to HAV to people who are nonimmune. Complete the HAV vaccine series following the dosing intervals for the selected vaccine.		

Recommended Adult Immunization Schedule by Medical Condition and Other Indications

Vaccine Preventable Infection	Indication	Recommendations	Additional Comments	ACIP Recommendations
Hepatitis B Virus (HBV)	HBV nonimmune and no active HBV (i.e., negative for HBsAg, anti-HBc, and anti-HBs)	<p>Preferred:</p> <ul style="list-style-type: none"> • Heplisav-B IM at 0 and 4 weeks (AII) <p>Alternative (if Heplisav-B is unavailable):</p> <ul style="list-style-type: none"> • Engerix-B (40 mcg): three-dose series (0, 1, 6 months) (AII); <i>or</i> • Recombivax HB (20 mcg): three-dose series (0, 1, 6 months) (AII); <i>or</i> • Twinrix 1.0 mL IM: three-dose series (0, 1, 6 months) (AII) 	<p>Anti-HBs should be obtained 4 weeks after completion of the vaccine series to document response to HepB vaccination, defined as anti-HBs ≥ 10 mIU/mL (AII).</p> <p>Vaccinate individuals with isolated anti-HBc with one standard dose of HepB (BII) and check anti-HBs titers 1–2 months afterward. If anti-HBs ≥ 100 mIU/mL, no further vaccination is needed, but if the titer is < 100 mIU/mL, then vaccinate with a complete series of HepB (double dose) followed by anti-HBs testing (BII). If titers are not available, then give a complete vaccine series followed by anti-HBs testing (BII).</p> <p>If a significant delay occurs between doses, there is no need to restart the series.</p> <p>For travelers, some clinicians recommend an accelerated schedule:</p> <ul style="list-style-type: none"> • Twinrix: four-dose series (0, 7, 21–30 days, 12 months) (BII). 	<p>ACIP does not recommend the use of double-dose Engerix-B or Recombivax HB high-dose for people with HIV.</p> <p>ACIP includes a four-dose series of Engerix-B 40 mcg at 0, 1, 2, and 6 months. This approach has not been demonstrated to be superior to a double-dose, three-dose series, so it is not included as a regimen in our guidelines.</p>
	Vaccine nonresponder (if anti-HBs < 10 mIU/mL after complete series)	<p>If failed prior Engerix-B or Recombivax HB:</p> <ul style="list-style-type: none"> • Heplisav-B IM at 0 and 4 weeks (AI) with consideration for third dose of HepBCpG at 24 weeks (BIII) <p>If failed two-dose Heplisav-B, there are no data but can consider:</p> <ul style="list-style-type: none"> • Third dose of Heplisav-B IM at 24 weeks after first dose (BIII) 		
	Post-exposure prophylaxis	For exposed people who have been previously vaccinated with a complete series and have documented antibody response, no additional vaccine is needed.		

Recommended Adult Immunization Schedule by Medical Condition and Other Indications

Vaccine Preventable Infection	Indication	Recommendations	Additional Comments	ACIP Recommendations
		<p>For exposed people who have received complete series without documentation of antibody response, administer a single dose of HepB vaccine.</p> <p>For exposed people who have not received a vaccine or have not received the complete series, administer or complete the HepB vaccine series and administer a dose of HBIG at a separate anatomical site as soon as possible after exposure (ideally within 24 hours but up to 7 days after percutaneous exposure and up to 14 days after sexual exposure).</p>		
Human Papillomavirus (HPV)	Adults and adolescents through age 26 years	<p>Recombinant 9-valent human papillomavirus vaccine (Gardasil 9):</p> <ul style="list-style-type: none"> 0.5 mL IM three-dose series (0, 1–2, and 6 months) (AIII) 	<p>If a significant delay occurs between doses, there is no need to restart the series.</p> <p>Some people with HIV ages 27–45 years may benefit from vaccination, and shared clinical decision-making between the provider and patient is recommended in these situations.</p> <p>Vaccination is not recommended during pregnancy (CIII). Delay until after pregnancy.</p>	No difference in recommendations

Recommended Adult Immunization Schedule by Medical Condition and Other Indications

Vaccine Preventable Infection	Indication	Recommendations	Additional Comments	ACIP Recommendations
	Adults and adolescents who previously received bivalent or quadrivalent vaccine	For patients who have completed a vaccination series with the recombinant bivalent or quadrivalent vaccine, no recommendations exist for additional vaccinations; some experts would give an additional full series of recombinant 9-valent vaccine, but no data currently define who might benefit or how cost effective this approach might be (CIII).		
Influenza	All	<p>One dose of age-appropriate IIV or RIV annually (AI)</p> <p>LAIV is contraindicated (AIII).</p>	<p>Influenza vaccines are trivalent, with formulations that change from season to season. Information on currently available influenza vaccines is available through the CDC's recommendations on the 2024–2025 influenza season.</p> <p>Adults aged ≥ 65 years are recommended to receive high-dose IIV (Fluzone High-Dose), RIV (Flublok), or adjuvanted IIV (FLUAD) over standard-dose unadjuvanted vaccine (AII).</p> <p>People aged ≥ 18 years also may use RIV (Flublok).</p> <p>For people with egg allergy, use IIV or RIV appropriate for age (if the allergy is more severe than hives, give the vaccine in a medical setting appropriate to manage severe allergic reaction).</p> <p>For pregnant women with HIV, administer IIV or RIV at any time during pregnancy (AI).</p>	No difference in recommendations

Recommended Adult Immunization Schedule by Medical Condition and Other Indications

Vaccine Preventable Infection	Indication	Recommendations	Additional Comments	ACIP Recommendations
Measles, Mumps, and Rubella (MMR)	CD4 count ≥ 200 cells/mm ³ and no evidence of immunity to MMR	Two-dose series (0.5 mL SQ) of MMR vaccine at least 1 month apart (AIII) MMR vaccine is contraindicated if CD4 count < 200 cells/mm ³ (AIII) . MMR vaccine is not recommended during pregnancy.	Evidence of immunity to MMR vaccine <ul style="list-style-type: none"> • Birth date before 1957, <i>or</i> • Documentation of receipt of MMR vaccine, <i>or</i> • Laboratory evidence of immunity or disease for each pathogen <p>For pregnant women without immunity to rubella, after pregnancy, administer two doses of MMR vaccine at least 1 month apart if CD4 count ≥ 200 cells/mm³ and on ART (AIII).</p>	No difference in recommendations
	Post-exposure prophylaxis	For measles, nonimmune individuals with CD4 count ≥ 200 cells mm ³ , administer MMR vaccine within 72 hours of exposure or IG within 6 days of exposure. Do not administer MMR vaccine and IG simultaneously. For measles, nonimmune individuals with CD4 count < 200 cells mm ³ or who are pregnant, administer IG within 6 days of exposure.		
Meningococcus Serogroup A, C, W, Y (MenACWY)	No prior polyvalent meningococcal vaccine	MenACWY vaccine (Menveo or MenQuadfi): <ul style="list-style-type: none"> • Two-dose series (0.5 mL IM) given at least 8 weeks apart (AII) 	MenACWY vaccine is routinely recommended. During pregnancy and when lactating, women with HIV should receive MenACWY vaccine if indicated (AIII) .	No difference in recommendations

Recommended Adult Immunization Schedule by Medical Condition and Other Indications

Vaccine Preventable Infection	Indication	Recommendations	Additional Comments	ACIP Recommendations
	Prior MenACWY vaccination	Administer a booster dose of MenACWY vaccine every 5 years (BIII) . MenABCWY vaccine should be used if MenACWY and MenB vaccines are both indicated (BIII) .	MenACWY vaccines are interchangeable; the same vaccine product is recommended, but not required, for all doses.	
Meningococcus Serogroup B (MenB)	No prior MenB vaccine and increased risk for serogroup B meningococcal disease from a medical condition (e.g., complement component deficiency, asplenia, receipt of a complement inhibitor) or an outbreak	Administer either MenB vaccine (Bexsero or Trumenba) as a three-dose series (0.5 mL IM) at 0, 1–2, and 6 months (AIII) <ul style="list-style-type: none"> • If the second dose was administered ≥ 6 months after the first dose, a third dose is not needed. • If the third dose is administered < 4 months after the second dose, the dose should be repeated ≥ 4 months after the last dose. 	Bexsero and Trumenba are not interchangeable. MenB vaccination during pregnancy should be deferred (CIII) .	No difference in recommendations
	Prior MenB vaccination (≥ 1 year) and at increased risk during an outbreak	Administer booster dose of same MenB vaccine (CIII) .	Licensed in the United States only for a primary series. Administration of booster doses is considered off-label.	
	Adolescents and young adults with HIV (aged 16–23 years) can be offered MenB vaccination with shared decision-making.	Administer either MenB vaccine as a three-dose series (0.5 mL IM) administered at 0, 1–2, and 6 months (CIII) .		

Recommended Adult Immunization Schedule by Medical Condition and Other Indications

Vaccine Preventable Infection	Indication	Recommendations	Additional Comments	ACIP Recommendations
Mpox	All people with HIV, regardless of CD4 count, with no prior mpox infection but who have or anticipate exposure to mpox per CDC clinical considerations (BII), or those who request vaccination (CII)	<p>Administer a two-dose series of JYNNEOS given 28 days apart (AII):</p> <ul style="list-style-type: none"> • 0.5 mL SQ (preferred for people with a history of keloids or aged <18 years), or • 0.1 mL ID (alternative) <p>In situations where the second dose was not administered during the recommended interval, administer a second dose as soon as possible (CIII).</p> <p>Administration of live replicating vaccinia vaccines (iACAM2000) is contraindicated in people with HIV (AII).</p>	<p>JYNNEOS can be coadministered with most other vaccines. Adolescent and young adult men might consider a 4-week interval between receiving JYNNEOS vaccine and a COVID-19 vaccine because of potential risk for myocarditis and pericarditis (CIII).</p> <p>People who have received smallpox vaccination should receive mpox vaccination (CIII).</p> <p>Booster doses, including for people with prior mpox or who were vaccinated at CD4 counts <200 cells/mm³, are not recommended (CIII).</p> <p>Data on JYNNEOS administered to pregnant women are limited; if mpox vaccination is indicated, the risks and benefits of JYNNEOS should be discussed using shared decision-making (CIII).</p>	No difference in recommendations
	Post-exposure prophylaxis	For unvaccinated people with HIV who experience a known or presumed exposure (BII), administer complete JYNNEOS series (see above), with the first dose given ideally as soon as possible or within 4 to 14 days after exposure (BII).		

Recommended Adult Immunization Schedule by Medical Condition and Other Indications

Vaccine Preventable Infection	Indication	Recommendations	Additional Comments	ACIP Recommendations
Pneumococcal	No prior pneumococcal vaccine or unknown vaccination history	Administer one of the following: <ul style="list-style-type: none"> • PCV21 (Capvaxive) 0.5 mL IM x 1 (AII); <i>or</i> • PCV20 (Prevnar20): 0.5 mL IM x 1 (AII); <i>or</i> • PCV15 (Vaxneuvance): 0.5 mL IM x 1 followed at least 8 weeks later by PPSV23 (Pneumovax) 0.5 mL IM x 1 (AII). 	PCV21 is not recommended for adults with HIV if local prevalence of serotype 4 is more than 30% (as of September 2024, high rates of serotype 4 have been reported in Alaska, Colorado, the Navajo Nation, New Mexico, and Oregon).	
	Previously received PCV13 and PPSV23	If <65 years when received dose of PPSV23: <ul style="list-style-type: none"> • Administer PCV21 <i>or</i> PCV20 0.5 mL IM x 1 at least 5 years after the last pneumococcal vaccine (CIII). 	PPSV23 is no longer recommended as preferred booster dose for patients who previously started the vaccine series.	
		If ≥65 years when received dose of PPSV23: <ul style="list-style-type: none"> • No further doses of PPSV23 are required. • Shared decision-making is recommended regarding administration of PCV21 or PCV20 for adults aged ≥65 years who have completed both PCV13 and PPSV23. If PCV21 or PCV20 given, administer at least 5 years after last pneumococcal vaccine dose (CIII). 		

Recommended Adult Immunization Schedule by Medical Condition and Other Indications

Vaccine Preventable Infection	Indication	Recommendations	Additional Comments	ACIP Recommendations
	Previously received only PCV13	Administer PCV21 <i>or</i> PCV20 0.5 mL IM x 1 at least 1 year after PCV13 (BIII) .	PPSV23 is no longer recommended as preferred booster dose for patients who previously started the vaccine series.	
	Previously received only PPSV23	Administer either of the following at least 1 year after last PPSV23 dose: <ul style="list-style-type: none"> • PCV21: 0.5 mL IM x1 (BIII); <i>or</i> • PCV20: 0.5 mL IM x 1 (BIII); <i>or</i> • PCV15: 0.5 mL IM x 1 (BIII) 	PPSV23 is no longer recommended as preferred booster dose for patients who previously started the vaccine series.	
Respiratory Syncytial Virus (RSV)	Age ≥75 years	One dose 0.5 mL IM of RSV vaccine (Arexvy, Abrysvo, or mRESVIA) (CIII)	Limited data on efficacy and safety for people with HIV.	No difference in recommendations
	Age 60–74 years with a comorbid condition increasing the risk for severe RSV disease	One dose 0.5 mL IM of RSV vaccine (Arexvy, Abrysvo, or mRESVIA) (CIII)	Individuals aged 60–74 years with CD4 count <200 cells/mm ³ are eligible, but limited data exist on immune response. Some clinicians may elect to wait for immune reconstitution prior to vaccination (CIII) .	
	Pregnant women between 32 and 36 weeks' gestation	One dose 0.5 mL IM of RSV vaccine (Abrysvo) (CIII)	Limited data exist on efficacy and safety for people with HIV. Seasonal administration recommended. RSV season in the continental United States is typically September–January but differs by year and geography.	

Recommended Adult Immunization Schedule by Medical Condition and Other Indications

Vaccine Preventable Infection	Indication	Recommendations	Additional Comments	ACIP Recommendations
			Ideally, dose should be given at least 14 days prior to delivery.	
Tetanus, Diphtheria, and Pertussis	Not previously vaccinated	One dose 0.5 mL IM Tdap (Adacel or Boostrix), followed by one dose of Td or Tdap at least 4 weeks after Tdap and another dose of Td or Tdap 6 months to 12 months later, then give Td or Tdap every 10 years (AII)	Tdap can be substituted for any Td dose and is always preferred as the first dose.	No difference in recommendations
	Did not receive Tdap at age 11 years or older	One dose 0.5 mL IM Tdap (Adacel or Boostrix), then Td or Tdap every 10 years (AII)	If indicated, give Tdap regardless of when the last dose of Td was given.	
	Pregnancy	Give Tdap preferably in early part of gestational weeks 27–36 (AIII) . One dose of Tdap is indicated for each pregnancy.	Give Td or Tdap booster every 10 years after Tdap.	
Varicella (Chickenpox)	CD4 count ≥ 200 cells/mm ³ with no evidence of immunity to varicella	Two-dose (0.5 mL SQ) series of VAR 4–8 weeks apart (BIII) Varivax is contraindicated if CD4 count < 200 cells/mm ³ (AIII) . Varivax is not recommended in pregnancy (AIII) .	Evidence of immunity to varicella: <ul style="list-style-type: none"> • Documented receipt of two doses of Varivax or MMRV; <i>or</i> • Diagnosis of varicella or zoster by a health care provider; <i>or</i> • Laboratory evidence of immunity or disease <p>If vaccination results in disease because of vaccine virus, treatment with acyclovir is recommended (AIII).</p>	No difference in recommendations

Recommended Adult Immunization Schedule by Medical Condition and Other Indications

Vaccine Preventable Infection	Indication	Recommendations	Additional Comments	ACIP Recommendations
Zoster	Age ≥ 18 years, regardless of a past episode of herpes zoster or receipt of attenuated ZVL (Zostavax)	Two-dose (0.5 mL IM) series of RZV (Shingrix) IM 2–6 months apart (AIII) . RZV is not recommended in pregnancy (AIII) .	To maximize immunologic response to the vaccine, consider delaying vaccination until patient is virologically suppressed on ART (CIII) or wait for immune reconstitution in those who had a CD4 count < 200 cells/mm ³ (CIII) . Do not give RZV (Shingrix) during an acute episode of herpes zoster (AIII) .	ACIP recommends RZV for adults aged ≥ 19 years who are or will be at risk for herpes zoster. (This difference in age selected by ACIP was made to align with the age range in the adult immunization schedule.)

Recommended Adult Immunization Schedule by Medical Condition and Other Indications

Vaccine Preventable Infection	Indication	Recommendations	Additional Comments	ACIP Recommendations
Immunizations for Travel				
Cholera	<p>Not routinely recommended for most travelers (CIII).</p> <p>Age 18–64 years with CD4 count >200 cells/mm³ and traveling to an area where cholera has been epidemic or endemic within the past year</p>	<p>Lyophilized CVD 103-HgR (Vaxchora) single oral dose at least 10 days prior to potential exposure (CIII)</p>	<p>Safety and efficacy have not been established in people with HIV.</p> <p>No adverse effects reported with older formulation of vaccine in people with HIV without an AIDS diagnosis.</p>	<p>No current recommendations for people with HIV</p>
Typhoid	<p>At risk of <i>Salmonella</i> serotype Typhi infection (e.g., through travel, intimate exposure to a chronic carrier, occupational exposure)</p> <p>Revaccination only if continued or renewed exposure to <i>Salmonella</i> serotype Typhi is expected.</p>	<p>One dose 0.5 mL (25 mcg) IM Vi capsular polysaccharide vaccine (Typhim Vi) via IM injection at least 1 week before exposure (AIII)</p> <p>Revaccinate every 2 years if risk remains (BIII).</p> <p>The live attenuated oral typhoid vaccine (Vivotif) is contraindicated in people with HIV (AIII).</p>	<p>Provide education on other preventive measures against foodborne illness in addition to typhoid vaccination (AIII).</p> <p>Safety of typhoid vaccination in pregnancy is unknown. Consider avoiding during pregnancy or, if necessary, give Vi capsular polysaccharide vaccine (AIII).</p>	<p>ACIP has no position on the use of typhoid vaccine in people with HIV except not to give immunocompromised people the oral live attenuated typhoid vaccine.</p>
Yellow Fever (YF)	<p>Age ≤59 years and at risk for YF virus acquisition (e.g., by traveling to or living in areas at risk based on season, location, activities, and duration)</p>	<p>If indicated, provide vaccination at least 10 days prior to expected exposure.</p> <p>Age <59 years and asymptomatic with CD4 count >500 cells/mm³: One dose of YF vaccine; revaccinate in >10 years if risk remains (BIII).</p>	<p>Provide vaccination as an adjunct to other protective measures against mosquito bites.</p> <p>Pregnancy and age ≥60 years may increase risk of complications from YF vaccine administration.</p>	<p>No difference in recommendations</p>


Recommended Adult Immunization Schedule by Medical Condition and Other Indications


		Any age and asymptomatic with CD4 count 200–499 cells/mm ³ : YF vaccine may be considered depending on risk (BIII) . YF vaccine is contraindicated for people with CD4 count <200 cells/mm ³ . This recommendation is based on a theoretic increased risk for encephalitis in this population (AII) .	If international travel requirements rather than an increased risk for acquiring YF infection are the only reason to vaccinate people with HIV, excuse the person from vaccination and issue a medical waiver to fulfill health regulations. Closely monitor people with HIV who have received YF vaccine for evidence of adverse events.	
Polio	Not routinely recommended (AIII)			No difference in recommendations
	Those at higher risk for exposure to poliovirus—such as those traveling to countries where polio is endemic—can be vaccinated with inactivated polio vaccine (IPV) (CIII) .	Three doses IPV 0.5 ml IM at 0 and 1–2 months, with third dose given 6–12 months after second dose (CIII)		
	Previously vaccinated with one to two doses of vaccine	Give remaining doses of vaccine at recommended intervals (CIII) .		


Key: ACIP = Advisory Committee on Immunization Practices; anti-HAV = hepatitis A virus antibody; anti-HBc = hepatitis B core antibody; anti-HBs = hepatitis B surface antibody; ART = antiretroviral therapy; CD4 = CD4 T lymphocyte; CDC = Centers for Disease Control and Prevention; HAV = hepatitis A virus; HBIG = hepatitis B immune globulin; HBsAg = hepatitis B surface antigen; HBV = hepatitis B virus; HepA = hepatitis A vaccine; HepB = hepatitis B vaccine; HPV = human papillomavirus; ID = intradermal; IG = immunoglobulin; IgG = immunoglobulin G; IgM = immunoglobulin M; IIV = inactivated influenza vaccine; IM = intramuscular; IPV = inactivated polio vaccine; LAIV = live attenuated influenza vaccine; MenACWY = meningococcus serogroup A, C, W, Y; MenB = serogroup B meningococcal vaccination; MMR = measles, mumps, and rubella; MMRV = measles, mumps, rubella, and varicella; PCV13 = 13-valent pneumococcal conjugate vaccine; PCV15 = 15-valent pneumococcal conjugate vaccine; PCV20 = 20-valent pneumococcal conjugate vaccine; PCV21 = 21-valent pneumococcal conjugate vaccine; PPSV23 = 23-valent pneumococcal polysaccharide vaccine; RIV = recombinant influenza vaccine; RSV = respiratory syncytial virus; RZV = recombinant zoster vaccine; SQ = subcutaneous; Td = tetanus and diphtheria toxoids vaccine; Tdap = combination tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis vaccine; VAR = varicella vaccine; YF = yellow fever; ZVL = zoster vaccine live

Recommended Immunization Schedule for Adults and Adolescents With HIV

Vaccine	All People With HIV	Where Varies by Age	Where Varies by Pregnancy Status	Where Varies by CD4 Cell Count (cells/mm ³)	
				<200	≥200
COVID-19	For current COVID-19 vaccination recommendations, please visit the CDC's COVID-19 Vaccines website .			Recommendations differ with advanced or untreated HIV infection	
Hepatitis A (HepA, HepA-HepB)	Two to three doses (varies by formulation)				
Hepatitis B (HepBCpG, HepB, HepA-HepB)	Two to three doses (varies by formulation and indication)				
Human Papillomavirus (HPV)		Three doses for ages 18–26 years Consider for ages 27–45 years with shared decision-making	Not recommended during pregnancy		
Influenza (Multiple Vaccines)	One dose annually				
Measles, Mumps, Rubella (MMR)			Not recommended during pregnancy	Contraindicated	Two doses if born after 1956 and no history of vaccination or positive antibody titer
Meningococcal A, C, W, Y Conjugate (MenACWY)	Three doses				
Meningococcal B (MenB)	Three doses		Not recommended during pregnancy		
Mpox (MVA-BN, Attenuated)	Two doses	Subcutaneous route preferred for people aged <18 years	Shared decision-making		
Pneumococcal Conjugate (PCV15, PCV20, PCV21)	One dose				
Pneumococcal Polysaccharide (PPSV23)	One dose (if conjugate vaccine was PCV-15)				
Respiratory Syncytial Virus (RSV)		One dose for people aged ≥75 years or those aged 60–74 years with a comorbid condition that increases risk for severe RSV disease	One dose between 32 and 36 weeks gestation		
Tetanus, Diphtheria, Pertussis (Tdap/Td)	Tdap once, then Td or Tdap booster every 10 years		Recommend booster with each pregnancy		
Varicella (VAR)			Not recommended in pregnancy	Contraindicated	Two doses
Zoster Recombinant (RZV)		Two doses for people aged ≥18 years	Not recommended in pregnancy		

 Recommended for all adults and adolescents with HIV who meet the age requirement or lack documentation of vaccination or evidence of past infection.

 Recommended for adults and adolescents with HIV with another risk factor (medical, occupational, or other indication) or in select circumstances.

 Contraindicated

Note: Recommendations may differ from the Advisory Committee on Immunization Practices.

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