



# CLINICAL GUIDELINES PROGRAM

NEW YORK STATE DEPARTMENT OF HEALTH AIDS INSTITUTE | HIV • HCV • STIs • SUBSTANCE USE • LGBTQ+ HEALTH

## Immunizations for Adults With HIV

### Updates, Authorship, and Related Resources

|                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
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| Highlights of changes, additions, and updates in the April 7, 2026 edition | <ul style="list-style-type: none"><li>• Meningococcal Serotype B (MenB) section: New text and references to note that existing data do not support use of MenB vaccine to prevent gonorrhea.</li><li>• Pneumococcal section: Capavaxive (PCV21; 21-valent pneumococcal conjugate vaccine) added to available vaccines.</li><li>• Links added to NYSDOH AI vaccine recommendations for hepatitis A virus, hepatitis B virus, human papillomavirus, and mpox (CDC vaccine schedules removed for these topics).</li></ul>                                                                                                                                             |
| Intended users                                                             | Clinicians who provide primary care to adults with HIV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
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| Development process                                                        | See <a href="#">Supplement: Guideline Development and Recommendation Ratings</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Related NYSDOH AI resources                                                | <b>Guidelines</b> <ul style="list-style-type: none"><li>• <a href="#">Prevention and Management of Hepatitis A Virus Infection in Adults With HIV</a></li><li>• <a href="#">Prevention and Management of Hepatitis B Virus Infection in Adults With HIV</a></li><li>• <a href="#">Prevention and Management of Human Papillomavirus Infection in Adults With HIV</a></li><li>• <a href="#">Screening for Anal Dysplasia and Cancer in Adults With HIV</a></li><li>• <a href="#">Screening for Cervical Dysplasia and Cancer in Adults With HIV</a></li></ul> <b>Podcast</b> <ul style="list-style-type: none"><li>• <a href="#">Viremic—Cases in HIV</a></li></ul> |

# Immunizations for Adults With HIV

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**Committee:** [Medical Care Criteria Committee](#)

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## Contents

|                                                                             |    |
|-----------------------------------------------------------------------------|----|
| Purpose of This Guideline .....                                             | 2  |
| Considerations and Contraindications .....                                  | 3  |
| COVID-19 .....                                                              | 4  |
| Haemophilus Influenzae Type B (Hib) .....                                   | 5  |
| Hepatitis A Virus (HAV) .....                                               | 5  |
| Hepatitis B Virus (HBV) .....                                               | 5  |
| Human Papillomavirus (HPV) .....                                            | 6  |
| Influenza .....                                                             | 6  |
| Measles, Mumps, Rubella (MMR) .....                                         | 7  |
| Meningococcal Serotypes A, C, W, and Y (MenACWY) .....                      | 8  |
| Meningococcal Serotype B (MenB) .....                                       | 8  |
| Mpox .....                                                                  | 9  |
| Pneumococcal .....                                                          | 9  |
| Tetanus, Diphtheria, and Pertussis (Tdap) and Tetanus-Diphtheria (Td) ..... | 10 |
| Varicella .....                                                             | 10 |
| Zoster .....                                                                | 11 |
| All Recommendations .....                                                   | 13 |
| References .....                                                            | 13 |
| Supplement: Guideline Development and Recommendation Ratings .....          | 18 |

## Purpose of This Guideline

This compendium of immunization recommendations for adults (≥18 years) with HIV was compiled by the New York State Department of Health AIDS Institute (NYSDOH AI) to assist clinical practitioners who provide primary care to adults with HIV. The goal is to present all routine vaccinations for adults with HIV recommended by the NYSDOH AI, Centers for Disease Control and Prevention (CDC), National Institutes of Health (NIH), HIV Medicine Association (HIVMA) [DHHS 2026], and Infectious Disease Society of America [Thompson, et al. 2021]. The European AIDS Clinical Society guidelines were also consulted [EACS 2021].

This document also discusses published literature related to specific vaccines and the rationale for recommendations for which there is no consensus among the referenced guidelines, no evidence specific to patients with HIV, or new data have been published.

## Considerations and Contraindications

### RECOMMENDATION

#### Immunizations

- Clinicians should follow the recommendations for routine vaccination of adults with HIV as presented here. (A3)

This document includes or links to NYSDOH AI vaccine recommendations, and includes tables and accompanying discussion compiling recommendations, vaccination schedules, clinical comments, and sources from the [Centers for Disease Control and Prevention \(CDC\)](#), U.S. Department of Health and Human Services [DHHS 2026], Infectious Diseases Society of America [Thompson, et al. 2021], and European AIDS Clinical Society [EACS 2021].

Immunizations against infectious diseases are a particularly important component of care for individuals with HIV. Immunodeficiency reduces natural defenses to vaccine-preventable diseases in people with HIV and places them at increased risk for disease and for severe disease [Thompson, et al. 2021; Crum-Cianflone and Wallace 2014]. However, there is concern that individuals with HIV-associated immunodeficiency may not be able to mount and maintain an appropriate immune response to vaccines and may be harmed by live virus vaccines. The strength of the immune response may be lower in adults with advanced HIV, especially those with CD4 counts  $<200$  cells/mm<sup>3</sup> and/or HIV RNA levels (viral loads)  $\geq 200$  copies/mL, and shorter in duration than in adults without HIV [Crum-Cianflone and Wallace 2014]. Immunogenicity, vaccine response monitoring, and requirements for additional booster doses for patients with HIV are discussed for individual vaccines.

Inactivated vaccines are generally considered safe, although data are insufficient to rule out rare adverse effects [ACIP 2022; Thompson, et al. 2021]. Live, attenuated vaccines are contraindicated for patients with CD4 counts  $<200$  cells/mm<sup>3</sup>, because of the risk of severe reactions in individuals who are immunosuppressed [CDC 1996; Redfield, et al. 1987; CDC 1985; Davis, et al. 1977]. For individuals with HIV and CD4 counts  $\geq 200$  cells/mm<sup>3</sup>, inactivated forms of vaccines such as those for polio, influenza, typhoid, and zoster are preferred over the live vaccine options. Live, attenuated vaccines should be administered only when there is no inactivated version and the risk of disease clearly outweighs the theoretical risk of vaccination.

### → KEY POINTS: USE OF LIVE, ATTENUATED VACCINES

- **Individuals with CD4 count  $<200$  cells/mm<sup>3</sup>:** The following live, attenuated vaccines are **contraindicated**: Bacillus Calmette-Guérin; measles, mumps, rubella; oral typhoid; rotavirus; varicella; yellow fever; zoster.
- **Individuals with CD4 count  $\geq 200$  cells/mm<sup>3</sup>:** Use live, attenuated vaccines only if an inactivated alternative is not available *and* the risk of disease is greater than the risk of vaccination.
- **Patient education:** Patients with HIV should avoid handling diapers of infants vaccinated against rotavirus in the previous 4 weeks, and all household members should wash their hands after changing diapers of an infant recently vaccinated against rotavirus. Those who lack varicella immunity should avoid direct contact with people who develop rash.

Transient increases in viral load and decreases in CD4 cell count caused by immune system activation have been described after vaccination in patients with HIV [Kolber, et al. 2002; Rey, et al. 2000]. The changes are less likely to occur in patients taking antiretroviral therapy and have not been found to have long-term negative effects [Thompson, et al. 2021; Sullivan, et al. 2000]. In people older than 5 years with HIV, effective ART is defined as ART taken for at least 6 months, with a CD4 percentage of 15% or higher and a CD4 count  $\geq 200$  cells/mm<sup>3</sup> for at least 6 months [McLean, et al. 2013]. Viral suppression is defined as an HIV RNA level (viral load)  $<200$  copies/mL.

Advise patients with HIV that family members, close contacts, and other household members should receive all age-appropriate vaccinations, including an annual influenza vaccine, to reduce the patients' exposure to vaccine-preventable diseases [Thompson, et al. 2021; Grohskopf, et al. 2019; Fiore, et al. 2011]. Live, attenuated virus vaccines may be safely administered to close contacts of individuals with HIV, with specific precautions for varicella and rotavirus vaccines. Transmission of live, attenuated virus after vaccination is rare [ACIP 2022]. However, patients with HIV who lack varicella immunity are advised to avoid direct contact with people who develop a rash after varicella or zoster vaccination [Thompson, et al. 2021; Fiore, et al. 2011; Cortese and Parashar 2009; Marin, et al. 2007].

Tables in this guideline present the recommended immunizations for adults with HIV, followed by discussion of each. See the [CDC Adult Immunization Schedule](#) and the vaccine manufacturers' package inserts for additional information.

**◇ RESOURCE: HOW TO FILE A CLAIM WITH THE VACCINE INJURY COMPENSATION PROGRAM**

- Tel: 1-800-338-2382
- Website: [hrsa.gov/vaccinecompensation](https://hrsa.gov/vaccinecompensation)
- Address to file a claim: US Court of Federal Claims, 717 Madison Place NW, Washington, DC 20439

## COVID-19

| Table 1: COVID-19 Vaccines                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Trade Names</b><br>See FDA <a href="#">COVID-19 Vaccines</a>                                                | <ul style="list-style-type: none"> <li>• Moderna COVID-19 Vaccine (mRNA vaccine)</li> <li>• Pfizer-BioNTech COVID-19 Vaccine (mRNA vaccine)</li> <li>• Novavax COVID-19 Vaccine, Adjuvanted (protein subunit vaccine)</li> </ul>                                                                                                                                                                                                 |
| <b>Indications</b>                                                                                             | <ul style="list-style-type: none"> <li>• At least 1 monovalent 2024–2025 COVID-19 vaccine for all individuals aged 18 years and older with HIV</li> <li>• <b>Clinical Guidelines Program recommendation:</b> Clinicians should vaccinate individuals with HIV and CD4 counts &lt;350 cells/mm<sup>3</sup> for COVID-19 according to the CDC schedule for individuals who are moderately or severely compromised. (A2)</li> </ul> |
| <b>Administration</b>                                                                                          | Administer according to Tables 1 and 2 in CDC <a href="#">Interim Clinical Considerations for Use of COVID-19 Vaccines in the United States</a> .                                                                                                                                                                                                                                                                                |
| <b>Comment</b>                                                                                                 | See also CDC <a href="#">Interim Clinical Considerations for Use of COVID-19 Vaccines in the United States &gt; Description of moderate and severe immunocompromising conditions and treatment</a> .                                                                                                                                                                                                                             |
| <b>Abbreviations:</b> CDC, Centers for Disease Control and Prevention; FDA, U.S. Food and Drug Administration. |                                                                                                                                                                                                                                                                                                                                                                                                                                  |

**Universal vaccination:** To reduce community transmission and protect individuals with HIV, this committee agrees with the Centers for Disease Control and Prevention (CDC) recommendation for universal vaccination against COVID-19 for adults (aged 18 years and older) with HIV, regardless of prior history of COVID-19 infection. All patients should be vaccinated with the most up-to-date seasonal vaccine.

The CDC recommends that people with advanced HIV (CD4 count <200 cells/mm<sup>3</sup>, history of an AIDS-defining illness without immune reconstitution, or clinical manifestations of symptomatic HIV) or untreated HIV be vaccinated as per the schedule for moderately or severely immunocompromised patients. However, given evidence that individuals with CD4 counts <350 cells/mm<sup>3</sup> are at high risk for breakthrough infection [Lang, et al. 2022], this committee recommends that this population also be vaccinated as per the CDC schedule for moderately or severely immunocompromised patients.

Schedules for all patients include at least 1 COVID-19 vaccine dose, regardless of prior vaccination.

**Discussion:** COVID-19 morbidity and mortality are increased among individuals of older age and who have comorbidities that put them at high risk of severe disease [Bhaskaran, et al. 2021; Costenaro, et al. 2021; Mirzaei, et al. 2021; Patel, et al. 2021; Tesoriero, et al. 2021; Cooper, et al. 2020; Nandy, et al. 2020; Ssentongo, et al. 2020]. Although initial studies of HIV and COVID-19-related mortality found conflicting results, a World Health Organization report based on results from 37 countries found a 30% increased risk of severe illness at time of hospital admission and an in-hospital mortality rate of 23.1% for people with HIV [WHO 2021]. Because there is also an increased risk of COVID-19 infection, whether due to overlapping comorbidities or disease-specific factors, people with HIV are a high-priority group for vaccination [Mellor, et al. 2021; Patel, et al. 2021; Ssentongo, et al. 2021; Byrd, et al. 2020].

More than 28 days after COVID-19 infection, individuals with HIV are at increased risk of death and post-acute sequelae of SARS-CoV-2 (PASC), also known as long COVID. Vaccination was associated with significantly lower all-cause mortality and PASC in individuals with HIV previously infected with COVID-19 [Yendewa, et al. 2024].

COVID-19 vaccines have been shown to be safe and highly effective at reducing severe illness, hospitalization, and mortality in the general population [Chenchula, et al. 2024; Grana, et al. 2022]. COVID-19 vaccines have also been shown to be safe and effective in people with HIV [Yin, et al. 2022]. There has been no evidence of decreased vaccine efficacy and no reports of

increased vaccine-related adverse effects in people with HIV, although antibody response may peak later and wane earlier [Fowokan, et al. 2023; Chambers, et al. 2022].

Common mild adverse vaccine-related effects include injection site pain, headache, fatigue, myalgias, fever, and nausea. Rarely, more serious allergic reactions can occur. Myocarditis has been reported primarily among young men, mostly after the second dose of an mRNA vaccine, and has been generally mild with spontaneous resolution (see CDC [Clinical Considerations Myocarditis and Pericarditis after Receipt of COVID-19 Vaccines Among Adolescents and Young Adults](#)).

→ KEY POINTS

- Medical mistrust may prevent people in high vaccine priority groups from seeking or agreeing to vaccination [Bogart, et al. 2021]; heightened awareness and open discussion of medical mistrust are essential to encouraging vaccination of people with HIV.
- The effects of systemic racism and associated health inequities made apparent by the U.S. COVID-19 pandemic may create barriers to vaccine access among some people with HIV. Clinicians who provide medical care for people with HIV are strongly encouraged to discuss and advocate for vaccination with all of their patients.

## Haemophilus Influenzae Type B (Hib)

|                                                                                                                   |                                                                                     |
|-------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>Trade Names</b>                                                                                                | <ul style="list-style-type: none"> <li>• Hiberix</li> <li>• ActHIB</li> </ul>       |
| <b>Indications</b>                                                                                                | Patients at risk of Hib infection                                                   |
| <b>Administration</b>                                                                                             | Administer according to CDC <a href="#">Adult Immunization Schedule</a> .           |
| <b>Revaccination</b>                                                                                              | None                                                                                |
| <b>Comment</b>                                                                                                    | Not routinely recommended for people with HIV in the absence of other risk factors. |
| <b>Abbreviations:</b> CDC, Centers for Disease Control and Prevention; Hib, <i>Haemophilus influenzae</i> type B. |                                                                                     |

**Discussion:** Hib vaccination is not routinely recommended for patients with HIV in the absence of other risk factors, such as anatomic or functional asplenia, sickle cell disease, or hematopoietic stem cell transplant, because there is a low risk of Hib infection in adults with HIV [CDC 2025; Thompson, et al. 2021; Briere, et al. 2014]. Data on the safety and efficacy of the Hib vaccine among adults with HIV indicate a strong immune response, similar to that in adults without HIV, except among those with severe immunosuppression [MacLennan, et al. 2016; Dockrell, et al. 1999; Kroon, et al. 1997; Steinhoff, et al. 1991].

## Hepatitis A Virus (HAV)

For HAV vaccination recommendations and discussion, including administration, dosing schedule, and follow-up, see the NYSDOH AI guideline [Prevention and Management of Hepatitis A Virus Infection in Adults With HIV > HAV Prevention](#).

## Hepatitis B Virus (HBV)

For HBV vaccination recommendations and discussion, including available vaccines, vaccination strategies, dosing schedules, and special considerations, see the NYSDOH AI guideline [Prevention and Management of Hepatitis B Virus Infection in Adults With HIV > HBV Vaccination](#).

## Human Papillomavirus (HPV)

For HPV vaccination recommendations and discussion, including available vaccine and dosing schedule, see the NYSDOH AI guideline [Prevention and Management of Human Papillomavirus Infection in Adults With HIV > HPV Prevention](#).

## Influenza

| Table 3: Influenza Vaccine                                                                                                 |                                                                                                                                                                                                                |
|----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Trade Names                                                                                                                | See Table 1 in CDC <a href="#">Prevention and Control of Seasonal Influenza with Vaccines: Recommendations of the Advisory Committee on Immunization Practices — United States, 2025–26 Influenza Season</a> . |
| Indications                                                                                                                | All adults with HIV                                                                                                                                                                                            |
| Administration                                                                                                             | Administer annually during flu season (October through May) according to CDC <a href="#">Adult Immunization Schedule</a> .                                                                                     |
| Revaccination                                                                                                              | None                                                                                                                                                                                                           |
| Comment                                                                                                                    | Covered by HRSA <a href="#">Vaccine Injury Compensation Program</a>                                                                                                                                            |
| <b>Abbreviations:</b> CDC, Centers for Disease Control and Prevention; HRSA, Health Resources and Services Administration. |                                                                                                                                                                                                                |

**Discussion:** People with HIV are at greater risk of severe morbidity from an influenza infection [Grohskopf, et al. 2019; Kunisaki and Janoff 2009] than people who do not have HIV and should be vaccinated annually during flu season (October through May) according to [standard CDC guidelines](#) for all adults [Thompson, et al. 2021; Grohskopf, et al. 2019]. Inactivated influenza vaccine offers protective immunity in adults with HIV [Grohskopf, et al. 2019; Remschmidt, et al. 2014; Beck, et al. 2012]. Live, attenuated influenza vaccine should not be used for individuals with HIV. Antibody titers lower than those observed in the general population have been reported among adults with HIV, especially among those with advanced HIV disease who are ≥35 years old, have low CD4 cell counts, and have detectable viremia [Garg, et al. 2016; Crum-Cianflone(a), et al. 2011; Evison, et al. 2009; Yamanaka, et al. 2005; Kroon, et al. 2000]. Studies comparing intradermal and intramuscular vaccines report no difference in immunogenicity, but intradermal vaccination is associated with increased likelihood of redness, swelling, and tenderness at the injection site [Garg, et al. 2016; Seo, et al. 2016].

The CDC does not recommend a second vaccination in individuals with HIV [Grohskopf, et al. 2019], although one study reported that a second dose of an adjuvanted vaccine significantly increased the rate of seroprotective responses [Bickel, et al. 2011]. There is some evidence that influenza seroprotection is higher for people ≥18 years old who are given a double-dose vaccine than for those given the standard dose vaccine, but the clinical significance of this remains unknown [McKittrick, et al. 2013; Cooper, et al. 2011]. A study among children and young adults (3 to 21 years old) found no increased immunity among participants with HIV who received the double-dose vaccine [Hakim, et al. 2016].

Results of 2 studies suggest a possible benefit to delaying influenza vaccination to after mid-November; patients vaccinated later in the flu season had lower rates of laboratory-confirmed influenza and influenza-like illnesses than those vaccinated earlier in the season [Glinka, et al. 2016; Werker, et al. 2014]. Monitoring regional influenza activity will help ensure appropriate timing of influenza vaccination. There is no recommendation for post-vaccination serologic testing to determine immune response [Grohskopf, et al. 2019].

## Measles, Mumps, Rubella (MMR)

| <b>Table 4: Measles, Mumps, Rubella Vaccine</b>                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Trade Name</b>                                                                                                                                        | M-M-R II                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Indications</b>                                                                                                                                       | For patients with CD4 counts $\geq 200$ cells/mm <sup>3</sup> for $\geq 6$ months who do not have evidence of MMR immunity                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Administration</b>                                                                                                                                    | Administer according to the CDC <a href="#">Adult Immunization Schedule</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Revaccination</b>                                                                                                                                     | Recommended only in the setting of an outbreak                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Comments</b>                                                                                                                                          | <ul style="list-style-type: none"> <li>• <b>Contraindicated</b> for patients with CD4 counts <math>&lt; 200</math> cells/mm<sup>3</sup></li> <li>• The MMR + varicella vaccine (ProQuad) should not be substituted for the MMR vaccine [McLean, et al. 2013].</li> <li>• Those who previously received 2 doses of a mumps-containing vaccine and are at increased risk for mumps in the setting of an outbreak should receive a third dose to improve protection against mumps disease and related complications [Marin, et al. 2018].</li> <li>• Covered by HRSA <a href="#">Vaccine Injury Compensation Program</a></li> </ul> |
| <b>Abbreviations:</b> CDC, Centers for Disease Control and Prevention; HRSA, Health Resources and Services Administration; MMR, measles, mumps, rubella. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

**Discussion:** Immunocompromised individuals are at increased risk of serious and life-threatening complications if infected with measles [McLean, et al. 2013]. Patients with HIV who have CD4 counts  $\geq 200$  cells/mm<sup>3</sup> for  $\geq 6$  months and who do not have evidence of immunity to MMR should be vaccinated with 2 doses of MMR vaccine  $\geq 4$  weeks apart. Documentation of previous age-appropriate vaccination or laboratory confirmation of prior disease is acceptable evidence of immunity. Serologic screening is required if other acceptable evidence of immunity is not available and to determine rubella immunity among individuals of childbearing potential. In the absence of other evidence of immunity, individuals with perinatally acquired HIV who received childhood vaccination with MMR before establishment of effective antiretroviral therapy (ART) should be revaccinated (2 doses) after effective ART is established [McLean, et al. 2013]. There is no recommendation for post-vaccination serologic testing to determine immune response [McLean, et al. 2013].

Two studies that examined the antibody response after MMR vaccination in adults with HIV taking ART reported high levels of protective antibodies post-vaccination, although the levels were lower than in adults without HIV. A study conducted in Mexico among adults with HIV who were seronegative for measles reported no significant difference in initial antibody response to measles vaccination between adults with and without HIV (81% vs. 85%). However, at 1 year, the observed decline in antibody response was faster in adults with HIV than in those without HIV [Belaunzaran-Zamudio, et al. 2009]. A study in Thailand reported protective antibodies to measles (74.1%), mumps (65.7%), and rubella (93.3%) among adults with HIV 8 to 12 weeks after MMR vaccination. Compared with adults without HIV, the seroconversion rates were lower but reached statistical significance only for mumps [Chaiwarith, et al. 2016].

No data are available on revaccination in adults with HIV. Revaccination has improved measles antibody response in children with HIV on ART who had an inadequate initial response to vaccination [Abzug, et al. 2012; Aupibul, et al. 2007]. If individuals previously vaccinated with 2 doses of a mumps-containing vaccine are identified as having increased risk for mumps by public health authorities because of an outbreak, these at-risk individuals should receive a third dose of a mumps-containing vaccine to improve protection against mumps disease and related complications [Marin, et al. 2018].

MMR vaccination contains live virus and is contraindicated for patients with CD4 counts  $< 200$  cells/mm<sup>3</sup> because of reports of adverse events, such as measles pneumonitis, in severely immunocompromised patients [Angel, et al. 1998; CDC 1996]. Serious adverse effects have not been reported in adults who were not severely immunocompromised [Chaiwarith, et al. 2016; McLean, et al. 2013; Belaunzaran-Zamudio, et al. 2009]. The MMR + varicella vaccine has not been adequately studied in individuals with HIV and is not recommended as a substitute for the MMR vaccine in this population [McLean, et al. 2013].

## Meningococcal Serotypes A, C, W, and Y (MenACWY)

| Table 5: Meningococcal Serotypes A, C, W, and Y Vaccine                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Trade Names</b>                                                                                                                                                          | <ul style="list-style-type: none"> <li>• Menactra (MenACWY-D)</li> <li>• Menveo (MenACWY-CRM)</li> <li>• MenQuadfi (MenACWY-TT)</li> </ul>                                                                                                                                                                                                                                       |
| <b>Indications</b>                                                                                                                                                          | All patients with HIV                                                                                                                                                                                                                                                                                                                                                            |
| <b>Administration</b>                                                                                                                                                       | <ul style="list-style-type: none"> <li>• Administer 2 doses of MenACWY vaccine ≥8 weeks apart in those not previously vaccinated.</li> <li>• For those previously vaccinated with 1 dose of MenACWY vaccine, administer the second dose at the earliest opportunity ≥8 weeks after the previous dose.</li> <li>• See CDC <a href="#">Adult Immunization Schedule</a>.</li> </ul> |
| <b>Revaccination</b>                                                                                                                                                        | Administer 1 booster dose of MenACWY vaccine every 5 years.                                                                                                                                                                                                                                                                                                                      |
| <b>Comments</b>                                                                                                                                                             | <ul style="list-style-type: none"> <li>• MenACWY-D should not be administered until ≥4 weeks after pneumococcal conjugate vaccine.</li> <li>• See <a href="#">Meningococcal Disease: NYSDOH Health Advisory and Vaccine Recommendations</a>.</li> <li>• Covered by HRSA <a href="#">Vaccine Injury Compensation Program</a></li> </ul>                                           |
| <b>Abbreviations:</b> CDC, Centers for Disease Control and Prevention; HRSA, Health Resources and Services Administration; MenACWY, meningococcal serotypes A, C, W, and Y. |                                                                                                                                                                                                                                                                                                                                                                                  |

**Discussion:** Adults with HIV are at increased risk of invasive meningococcal disease due to serogroups C, W, and Y [Mbaeyi, et al. 2020; Folaranmi, et al. 2017]. A study in New York City reported a 10-fold increased risk of invasive meningococcal disease in patients with HIV, with the highest risk among those with CD4 counts ≤200 cells/mm<sup>3</sup> [Miller, et al. 2014]. As of 2020, the CDC recommends vaccinating all previously unvaccinated adults with HIV with a 2-dose primary series of MenACWY vaccine (MenACWY-CRM, MenACWY-D, or MenACWY-TT) administered ≥8 weeks apart [Mbaeyi, et al. 2020].

Data on meningococcal vaccine efficacy among adults with HIV are not currently available [Mbaeyi, et al. 2020]. Among adolescents with HIV, available evidence indicates that the vaccine is immunogenic and serious adverse events are rare, but adolescents with HIV (and especially those with lower CD4 cell counts and higher viral loads) had reduced antibody levels compared with adolescents without HIV [Lujan-Zilbermann, et al. 2012; Siberry, et al. 2010]. Adding a second vaccine dose significantly improved antibody levels 28 and 72 weeks after immunization, particularly among adolescents with CD4% ≥15 [Lujan-Zilbermann, et al. 2012].

Booster doses every 5 years are needed to maintain immunity. There is no recommendation for post-vaccination serologic testing to determine immune response [Mbaeyi, et al. 2020].

## Meningococcal Serotype B (MenB)

| Table 6: MenB Vaccine for Prevention of MenB Infection                                                                                                     |                                                                                                                                                                                                                                                                                                    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Trade Names</b>                                                                                                                                         | <ul style="list-style-type: none"> <li>• Bexsero (4CMenB)</li> <li>• Trumenba (MenB-FHbp)</li> </ul>                                                                                                                                                                                               |
| <b>Indications</b>                                                                                                                                         | Patients at risk of MenB infection                                                                                                                                                                                                                                                                 |
| <b>Administration</b>                                                                                                                                      | Administer according to CDC <a href="#">Adult Immunization Schedule</a> .                                                                                                                                                                                                                          |
| <b>Revaccination</b>                                                                                                                                       | None                                                                                                                                                                                                                                                                                               |
| <b>Comments</b>                                                                                                                                            | <ul style="list-style-type: none"> <li>• Bexsero (4CMenB) and Trumenba (MenB-FHbp) are not interchangeable</li> <li>• Not routinely recommended for people with HIV in the absence of other risk factors</li> <li>• Covered by HRSA <a href="#">Vaccine Injury Compensation Program</a></li> </ul> |
| <b>Abbreviations:</b> CDC, Centers for Disease Control and Prevention; HRSA, Health Resources and Services Administration; MenB, meningococcal serotype B. |                                                                                                                                                                                                                                                                                                    |

**Discussion:** The MenB vaccine offers protection against MenB infection. MenB vaccine is not routinely recommended for adults with HIV unless they have another indication for immunization. No increased risk of serogroup B meningococcal disease among individuals with HIV has been reported [CDC 2025].

Existing data do not support the use of MenB vaccine for prevention of gonorrhea. Two randomized controlled trials (GoGoVax and ANRS DOXYVAC) have shown that MenB vaccine is not effective in preventing gonorrhea in men who have sex with men [Seib, et al. 2026; Molina, et al. 2024].

## Mpox

For mpox vaccination recommendations and discussion, including administration and dosing schedule, see the NYSDOH AI guideline [Prevention and Treatment of Mpox > Mpox Prevention](#).

## Pneumococcal

| Table 7: Pneumococcal Vaccine [a]                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Trade Names</b>                                                                                                                                                                     | <ul style="list-style-type: none"> <li>• Vaxneuvance (PCV15; 15-valent pneumococcal conjugate vaccine)</li> <li>• Prevnar 20 (PCV20; 20-valent pneumococcal conjugate vaccine)</li> <li>• Capavaxive (PCV21; 21-valent pneumococcal conjugate vaccine)</li> <li>• Pneumovax 23 (PPSV23; 23-valent pneumococcal polysaccharide vaccine)</li> </ul>                                                                                                                                                                                                                     |
| <b>Indications</b>                                                                                                                                                                     | All patients with HIV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Administration</b>                                                                                                                                                                  | <b>For patients who have not received a pneumococcal vaccine or whose vaccination status is unknown:</b> Vaccinate with 1 dose PCV15, PCV20, or PCV21. If PCV15 is used, follow with 1 dose of PPSV23, with a minimum interval of 8 weeks between the doses.                                                                                                                                                                                                                                                                                                          |
| <b>Revaccination</b>                                                                                                                                                                   | Consult the CDC <a href="#">PneumoRecs VaxAdvisor</a> tool.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Comments</b>                                                                                                                                                                        | <ul style="list-style-type: none"> <li>• Pneumococcal vaccination should not be deferred for patients with CD4 count &lt;200 cells/mm<sup>3</sup> and/or detectable viral load; however, the follow-up secondary administration of the PPSV23 vaccine may be deferred until the patient’s CD4 count is ≥200 cells/mm<sup>3</sup> and/or viral load is undetectable.</li> <li>• The Menactra (MenACWY-D) vaccine for meningococcal serotype groups A, C, W, and Y (MenACWY) should not be administered until ≥4 weeks after pneumococcal conjugate vaccine.</li> </ul> |
| <b>Abbreviation:</b> CDC, Centers for Disease Control and Prevention.                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Note:</b>                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| a. See also Tables 1 and 2 in CDC <a href="#">Recommended Adult Immunizations Schedule for Ages 19 Years or Older</a> and <a href="#">ACIP Recommendations: Pneumococcal Vaccine</a> . |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

**Discussion:** Individuals with HIV are at increased risk of serious disease due to *Streptococcus pneumoniae*, including bacteremia, meningitis, and pneumonia. Pneumococcal vaccination is recommended for all adults with HIV as soon as possible after HIV diagnosis [CDC 2025; Kobayashi, et al. 2022]. Patients who have not previously been vaccinated or whose vaccination status is unknown should receive 1 dose of PCV15, PCV20, or PCV21; if PCV15 is used, it should be followed with 1 dose of PPSV23, with a minimum interval of 8 weeks between the doses. There is no recommendation for post-vaccination serologic testing to determine immune response [CDC 2025; Kobayashi, et al. 2022]. See the CDC [PneumoRecs VaxAdvisor](#) tool for vaccination recommendations by age and pneumococcal immunization history.

Pneumococcal vaccination has been shown to reduce pneumococcal bacteremia and mortality among adults with HIV [Chowers, et al. 2017; Rodriguez-Barradas, et al. 2008; Grau, et al. 2005; Hung, et al. 2004]. Both polysaccharide and conjugate pneumococcal vaccines appear to be safe and immunogenic in adults with HIV who have CD4 counts ≥200 cells/mm<sup>3</sup> [Lombardi, et al. 2016; Bhorat, et al. 2015; Rodriguez-Barradas, et al. 2015; Ho, et al. 2013].

Individuals with CD4 counts <200 cells/mm<sup>3</sup> are at the highest risk of pneumococcal disease. Immunogenicity was demonstrated for individuals with HIV with CD4 counts <200 cells/mm<sup>3</sup> who received PCV7 [French, et al. 2010]. Patients with HIV who have not previously received any pneumococcal vaccine should receive a dose of PCV15 or PCV20, regardless of CD4 cell count. Although there is evidence of the effectiveness of PPSV23 among patients with CD4 counts <200 cells/mm<sup>3</sup>, the benefit appears to be greatest among patients with HIV RNA levels <100,000 copies/mL and among those who are on antiretroviral therapy [French, et al. 2010].

Contraindications to pneumococcal vaccination include a history of anaphylaxis caused by any vaccine component. Patients with a history of an anaphylactic reaction to any conjugate vaccines or diphtheria toxoid should not receive conjugate vaccine [CDC 2025].

## Tetanus, Diphtheria, and Pertussis (Tdap) and Tetanus-Diphtheria (Td)

| Table 8: Tdap and Td Vaccines                                                                                                                                                                |                                                                                                                                |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| <b>Trade Names</b>                                                                                                                                                                           | <ul style="list-style-type: none"> <li>• Tdap: Adacel; Boostrix</li> <li>• Td: Tenivac; TDVax</li> </ul>                       |
| <b>Indications</b>                                                                                                                                                                           | All adult patients                                                                                                             |
| <b>Administration</b>                                                                                                                                                                        | Administer according to CDC <a href="#">Adult Immunization Schedule</a> .                                                      |
| <b>Revaccination</b>                                                                                                                                                                         | Td is usually given as a booster dose every 10 years, but it can also be given earlier after a severe and dirty wound or burn. |
| <b>Comment</b>                                                                                                                                                                               | Covered by HRSA <a href="#">Vaccine Injury Compensation Program</a>                                                            |
| <b>Abbreviations:</b> CDC, Centers for Disease Control and Prevention; HRSA, Health Resources and Services Administration; Tdap, tetanus, diphtheria, and pertussis; Td, tetanus-diphtheria. |                                                                                                                                |

**Discussion:** The recommendations for Tdap and Td vaccination of adults with HIV are the same as for those in the general population [CDC 2025; Thompson, et al. 2021]. The safety and efficacy of vaccination with Tdap has not been studied in this population [Crum-Cianflone and Wallace 2014].

## Varicella

| Table 9: Varicella Vaccine |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Trade Name</b>          | Varivax                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Indications</b>         | For patients with CD4 counts ≥200 cells/mm <sup>3</sup> who do not have evidence of immunity to varicella                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Administration</b>      | Administer according to CDC <a href="#">Adult Immunization Schedule</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Revaccination</b>       | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Comments</b>            | <ul style="list-style-type: none"> <li>• <b>Contraindicated</b> for patients with CD4 counts &lt;200 cells/mm<sup>3</sup> (see CDC <a href="#">Adult Immunization Schedule</a>)</li> <li>• Anti-varicella IgG screening should be performed in patients with no known history of chickenpox or shingles [Marin, et al. 2007].</li> <li>• MMR + varicella (ProQuad) vaccine should not be used [McLean, et al. 2013].</li> <li>• Antiherpetic agents should be avoided ≥24 hours before and for 14 days after administration [CDC 2024; ACIP 2022].</li> <li>• An interval of ≥5 months is recommended between administration of post-exposure VariZIG and varicella vaccination [DHHS 2026; ACIP 2022; CDC 2006].</li> </ul> |

| Table 9: Varicella Vaccine                                                                                                                                                                                                        |                                                                                                                                                                                                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Clinical disease due to varicella after vaccination, a very rare event, should be treated with acyclovir [DHHS 2026].</li> <li>Covered by HRSA <a href="#">Vaccine Injury Compensation Program</a></li> </ul> |
| <p><b>Abbreviations:</b> CDC, Centers for Disease Control and Prevention; HRSA, Health Resources and Services Administration; IgG, immunoglobulin G; MMR, measles, mumps, rubella; VariZIG, varicella zoster immune globulin.</p> |                                                                                                                                                                                                                                                      |

**Discussion:** Patients with HIV who have CD4 counts  $\geq 200$  cells/mm<sup>3</sup> and do not have immunity to varicella should be vaccinated according to [CDC guidelines](#) for all adults, with 2 doses of single-antigen varicella vaccine administered 4 to 8 weeks apart or a second dose if they have received only 1 dose. Varicella vaccination contains live virus and is contraindicated for patients with CD4 counts  $< 200$  cells/mm<sup>3</sup> because of the risk of disseminated disease [CDC 2025; Marin, et al. 2007; Kramer, et al. 2001]. Data on the effectiveness of varicella vaccination among adults with HIV are lacking, but vaccination has been shown to be effective among children with HIV [Crum-Cianflone and Wallace 2014; CDC 2012; Marin, et al. 2007].

Because of the possibility of severe disease in individuals with HIV, clinicians should verify varicella immunity. Birth before 1980 is not accepted as evidence of immunity in immunocompromised individuals; anti-varicella immunoglobulin G screening should be performed in patients with HIV who have no known history of chickenpox or shingles [Marin, et al. 2007]. Post-vaccination serologic testing to determine immune response is not recommended because commercially available assays lack sensitivity and may give false-negative results [Marin, et al. 2007]. Clinical disease due to varicella after vaccination, a very rare event, should be treated with acyclovir [DHHS 2026; Marin, et al. 2007]. If household members or close contacts develop a rash after vaccination, people with HIV should avoid contact with the affected individual until after the rash resolves [ACIP 2022; Marin, et al. 2007]. Because they can interfere with vaccine virus replication and decrease vaccine effectiveness, all antiherpetic agents should be avoided for at least 24 hours before varicella vaccination through 14 days after [CDC 2024; ACIP 2022]. If post-exposure varicella zoster immune globulin is given, clinicians should wait  $\geq 5$  months before varicella vaccination [DHHS 2026; ACIP 2022; CDC 2006].

## Zoster

| Table 10: Zoster Vaccine                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Trade Names</b>                                                                                                                                                                                     | Shingrix: RZV, adjuvanted                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Indications</b>                                                                                                                                                                                     | MCCC recommendation: Patients with HIV $\geq 18$ years old (A2)                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Administration</b>                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>Two intramuscular doses, given 2 to 6 months apart, regardless of past receipt of ZVL (brand name Zostavax)</li> <li>Perform anti-varicella IgG screening in patients with no known history of chickenpox or shingles [Marin, et al. 2007].</li> <li>See CDC <a href="#">Adult Immunization Schedule</a>.</li> </ul>                                                                                                                                                        |
| <b>Comments</b>                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>RZV provides strong protection against shingles and post-herpetic neuralgia. Currently, there are no data on immunogenicity specific to people with HIV; however, superior efficacy and longer duration of protection have been demonstrated among the elderly, and a recombinant vaccine is preferred for people with HIV [Anderson, et al. 2022; Dooling, et al. 2018].</li> <li>As of November 2020, ZVL is no longer available for use in the United States.</li> </ul> |
| <p><b>Abbreviations:</b> CDC, Centers for Disease Control and Prevention; IgG, immunoglobulin G; MCCC, Medical Care Criteria Committee; RZV, recombinant zoster vaccine; ZVL, zoster vaccine live.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

**Discussion:** People with HIV are at increased risk of zoster (initial episodes and recurrences) at all stages of HIV disease; the risk is greater among those with severe immunodeficiency and lower CD4 cell counts [Blank, et al. 2012; Harpaz, et al. 2008]. Zoster vaccination may reduce disease burden in individuals with HIV; however, data on the use of zoster vaccine among adults with HIV are limited.

The Advisory Committee on Immunization Practices recommends 2 doses of recombinant zoster vaccine (RZV; brand name Shingrix) to prevent herpes zoster in adults  $\geq 19$  years old who are immunosuppressed [Anderson, et al. 2022]; the previous

recommendation was for vaccination of adults  $\geq 50$  years old [Dooling, et al. 2018]. On December 1, 2021, the MCCC updated its recommendation as well: Adults with HIV  $\geq 18$  years old should receive 2 doses of RZV, administered 2 to 6 months apart. RZV provides strong protection against shingles and post-herpetic neuralgia. There is no specific data on immunogenicity in people with HIV; however, superior efficacy and longer duration of seroprotection have been demonstrated in the elderly [Anderson, et al. 2022; Dooling, et al. 2018]. As of November 2020, the live, attenuated zoster vaccine (ZVL; brand name Zostavax) is no longer available for use in the United States.

Anti-varicella IgG screening should be performed in patients with no known history of chickenpox or shingles [Marin, et al. 2007] , and patients with a negative titer should be vaccinated for varicella if their CD4 count is  $>200$  cells/mm<sup>3</sup> as an initial step, and the series should be completed before zoster vaccination. There is no recommendation for post-vaccination serologic testing to determine immune response [Harpaz, et al. 2008].

# All Recommendations

## ✓ ALL RECOMMENDATIONS: IMMUNIZATIONS FOR ADULTS WITH HIV

### Immunizations

- Clinicians should follow the recommendations for routine vaccination of adults with HIV as presented here. (A3)

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# Supplement: Guideline Development and Recommendation Ratings

**Table S1: Guideline Development: New York State Department of Health AIDS Institute Clinical Guidelines Program**

|                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Developer</b>                                          | <a href="#">New York State Department of Health AIDS Institute (NYSDOH AI) Clinical Guidelines Program</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Funding source</b>                                     | NYSDOH AI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Program manager</b>                                    | Clinical Guidelines Program, Johns Hopkins University School of Medicine, Division of Infectious Diseases. See <a href="#">Program Leadership and Staff</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Mission</b>                                            | To produce and disseminate evidence-based, state-of-the-art clinical practice guidelines that establish uniform standards of care for practitioners who provide prevention or treatment of HIV, viral hepatitis, other sexually transmitted infections, and substance use disorders for adults throughout New York State in the wide array of settings in which those services are delivered.                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Expert committees</b>                                  | The NYSDOH AI Medical Director invites and appoints committees of clinical and public health experts from throughout New York State to ensure that the guidelines are practical, immediately applicable, and meet the needs of care providers and stakeholders in all major regions of New York State, all relevant clinical practice settings, key New York State agencies, and community service organizations.                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Committee structure</b>                                | <ul style="list-style-type: none"> <li>• Leadership: AI-appointed chair, vice chair(s), chair emeritus, clinical specialist(s), JHU Guidelines Program Director, AI Medical Director, AI Clinical Consultant, AVAC community advisor</li> <li>• Contributing members</li> <li>• Guideline writing groups: Lead author, coauthors if applicable, and all committee leaders</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Disclosure and management of conflicts of interest</b> | <ul style="list-style-type: none"> <li>• Annual disclosure of financial relationships with commercial entities for the 12 months prior and upcoming is required of all individuals who work with the guidelines program, and includes disclosure for partners or spouses and primary professional affiliation.</li> <li>• The NYSDOH AI assesses all reported financial relationships to determine the potential for undue influence on guideline recommendations and, when indicated, denies participation in the program or formulates a plan to manage potential conflicts. Disclosures are listed for each committee member.</li> </ul>                                                                                                                                                                                   |
| <b>Evidence collection and review</b>                     | <ul style="list-style-type: none"> <li>• Literature search and review strategy is defined by the guideline lead author based on the defined scope of a new guideline or update.</li> <li>• A comprehensive literature search and review is conducted for a new guideline or an extensive update using PubMed, other pertinent databases of peer-reviewed literature, and relevant conference abstracts to establish the evidence base for guideline recommendations.</li> <li>• A targeted search and review to identify recently published evidence is conducted for guidelines published within the previous 3 years.</li> <li>• Title, abstract, and article reviews are performed by the lead author. The JHU editorial team collates evidence and creates and maintains an evidence table for each guideline.</li> </ul> |
| <b>Recommendation development</b>                         | <ul style="list-style-type: none"> <li>• The lead author drafts recommendations to address the defined scope of the guideline based on available published data.</li> <li>• Writing group members review the draft recommendations and evidence and deliberate to revise, refine, and reach consensus on all recommendations.</li> <li>• When published data are not available, support for a recommendation may be based on the committee’s expert opinion.</li> <li>• The writing group assigns a 2-part rating to each recommendation to indicate the strength of the recommendation and quality of the supporting evidence. The group reviews the evidence, deliberates, and may revise recommendations when required to reach consensus.</li> </ul>                                                                      |

**Table S1: Guideline Development: New York State Department of Health AIDS Institute Clinical Guidelines Program**

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Review and approval process</b> | <ul style="list-style-type: none"> <li>• Following writing group approval, draft guidelines are reviewed by all contributors, program liaisons, and a volunteer reviewer from the AI Community Advisory Committee.</li> <li>• Recommendations must be approved by two-thirds of the full committee. If necessary to achieve consensus, the full committee is invited to deliberate, review the evidence, and revise recommendations.</li> <li>• Final approval by the committee chair and the NYSDOH AI Medical Director is required for publication.</li> </ul>                                                                                                                                                                                                                                           |
| <b>External reviews</b>            | <ul style="list-style-type: none"> <li>• External review of each guideline is invited at the developer’s discretion.</li> <li>• External reviewers recognized for their experience and expertise review guidelines for accuracy, balance, clarity, and practicality and provide feedback.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Update process</b>              | <ul style="list-style-type: none"> <li>• JHU editorial staff ensure that each guideline is reviewed and determined to be current upon the 3-year anniversary of publication; guidelines that provide clinical recommendations in rapidly changing areas of practice may be reviewed annually. Published literature is surveilled to identify new evidence that may prompt changes to existing recommendations or development of new recommendations.</li> <li>• If changes in the standard of care, newly published studies, new drug approval, new drug-related warning, or a public health emergency indicate the need for immediate change to published guidelines, committee leadership will make recommendations and immediate updates and will invite full committee review as indicated.</li> </ul> |

**Table S2: Recommendation Ratings and Definitions**

| Strength                                | Quality of Evidence |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A: Strong<br>B: Moderate<br>C: Optional | 1                   | Based on published results of at least 1 randomized clinical trial with clinical outcomes or validated laboratory endpoints.                                                                                                                                                                                                                                                                                                                                                                                                        |
|                                         | *                   | Based on either a self-evident conclusion; conclusive, published, in vitro data; or well-established practice that cannot be tested because ethics would preclude a clinical trial.                                                                                                                                                                                                                                                                                                                                                 |
|                                         | 2                   | Based on published results of at least 1 well-designed, nonrandomized clinical trial or observational cohort study with long-term clinical outcomes.                                                                                                                                                                                                                                                                                                                                                                                |
|                                         | 2†                  | Extrapolated from published results of well-designed studies (including nonrandomized clinical trials) conducted in populations other than those specifically addressed by a recommendation. The source(s) of the extrapolated evidence and the rationale for the extrapolation are provided in the guideline text. One example would be results of studies conducted predominantly in a subpopulation (e.g., one gender) that the committee determines to be generalizable to the population under consideration in the guideline. |
|                                         | 3                   | Based on committee expert opinion, with rationale provided in the guideline text.                                                                                                                                                                                                                                                                                                                                                                                                                                                   |