

Primary Prophylaxis of Opportunistic Infections in HIV

Currently-used antiretroviral regimens are very effective at reducing HIV viral load. Because these drugs are so effective at reducing viral load and increasing CD4 counts, the risk of opportunistic infections is lower than in the past. Consequently, recommendations for primary prophylaxis for opportunistic infections (e.g., MAC) is changing. The chart below summarizes primary prophylaxis of opportunistic infections in HIV patients, including preferred regimen(s), indications, and other helpful information.

Abbreviations: ART = antiretroviral therapy; MAC = *Mycobacterium avium* complex; PCP = *Pneumocystis pneumonia*; PCV = pneumococcal conjugate vaccine (*Prevnar 13*); PPV = pneumococcal polysaccharide vaccine (*Pneumovax 23*); TMP/SMX = trimethoprim/sulfamethoxazole

--Information in chart is from reference 1, unless otherwise noted.--

| Infection | Regimen/Indications (Adults, Adolescents, non-pregnant) for Primary Prophylaxis |
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| Coccidioidomycosis | <p>Preferred Regimen</p> <ul style="list-style-type: none"> Fluconazole 400 mg once daily. <p>Indication</p> <ul style="list-style-type: none"> Patients with a CD4 count <250 cells/mm³ who live in an endemic area who have new positive serology. Continue until CD4 count ≥250 cells/mm³ and HIV replication is fully suppressed with ART. <p>Comments</p> <ul style="list-style-type: none"> Yearly or twice yearly serologic testing is reasonable for patients who live in endemic areas. Testing is also advised for patients who traveled to or lived in an endemic area in the past. Both IgG and IgM testing with enzyme immune assay or immunodiffusion assays are recommended. Before starting prophylaxis, rule out active disease that needs treatment. |
| Cryptococcosis | <p>Preferred Regimen</p> <ul style="list-style-type: none"> Fluconazole 400 mg once daily for 12 months. <p>Indication</p> <ul style="list-style-type: none"> Patients positive for cryptococcal antigen. In the U.S., typically, only newly diagnosed patients with CD4 count ≤100 cells/mm³ are tested. |

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| Hepatitis A | <p>Regimen</p> <ul style="list-style-type: none"> Two doses of hepatitis A vaccine six to 12 months apart. Check IgG one month after vaccination. Revaccinate nonresponders with CD4 count >200 cells/mm³. <p>Indications</p> <ul style="list-style-type: none"> Hepatitis A-susceptible patients: who have chronic liver disease; who inject drugs of abuse; or who are men who have sex with men. <p>Comments</p> <ul style="list-style-type: none"> If the patient also needs to be vaccinated against hepatitis B, can use <i>Twinrix</i> at 0, 1, and 6 months, or days 0, 7, 21 to 30, and 12 months. |
| Hepatitis B | <p>Preferred Regimen</p> <ul style="list-style-type: none"> <i>Engerix-B</i> 20 mc/mL or <i>Recombivax HB</i> 10 mcg/mL at 0, 1, and 6 months. <i>Engerix-B</i> 40 mcg/mL or <i>Recombivax HB</i> 20 mcg/mL at 0, 2, and 6 months. <i>Heplisav-B</i> (U.S.) at 0 and 1 month (do not substitute other vaccines) Check anti-hepatitis B surface antigen antibodies one to two months after completion of the series. Titer <10 IU/mL indicates vaccine non-responder. Revaccinate non-responders with a second series. Consider delaying revaccination until CD4 counts increase and are sustained on ART. See reference 1 for alternate regimens for non-responders. <p>Indications</p> <ul style="list-style-type: none"> Patients without chronic hepatitis B infection who are not immune (hepatitis B surface antigen antibody <10 IU/mL) Patients with isolated hepatitis B core antibody: give one standard-dose hepatitis B vaccination, then check for hepatitis B surface antigen antibody one to two months later. If the titer is <100 IU/mL, give the complete vaccine series and retest. <p>Comments</p> <ul style="list-style-type: none"> If the patient also needs to be vaccinated against hepatitis A, can use <i>Twinrix</i> at 0, 1, and 6 months, or days 0, 7, 21 to 30, and 12 months. Vaccination is recommended before the CD4 count drops below 350 cells/mm³, but do not defer vaccination until CD4 count reaches 350 cells/mm³. |

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| Histoplasmosis | <p>Preferred Regimen</p> <ul style="list-style-type: none"> Itraconazole 200 mg once daily. <p>Indications</p> <ul style="list-style-type: none"> Consider for patients with CD4 count <150 cells/mm³ who live in an area with hyperendemic histoplasmosis (>10 cases/100 patient-years), or occupational risk. Continue until CD4 count remains ≥150 cells/mm³ for six months on ART. Restart if CD4 count falls to <150 cells/mm³. <p>Comments</p> <ul style="list-style-type: none"> Prophylaxis prevents disease but not mortality. |
| Human Papillomavirus (HPV) | <p>Preferred Regimen</p> <ul style="list-style-type: none"> 9-valent HPV vaccine (<i>Gardasil 9</i>) at 0, 1 to 2, and 6 months. <p>Indications</p> <ul style="list-style-type: none"> HIV patients 13 to 26 years of age. <p>Comments</p> <ul style="list-style-type: none"> For patients who have been previously vaccinated with the bi- or quadrivalent vaccine (i.e., <i>Cervarix</i> or original <i>Gardasil</i>, respectively), experts suggest repeating vaccination with the 9-valent series. |
| Influenza | <p>Preferred Regimen</p> <ul style="list-style-type: none"> Annual influenza vaccine. <p>Indication</p> <ul style="list-style-type: none"> All HIV positive patients. |
| MAC <i>Continued...</i> | <p>Preferred Regimen</p> <ul style="list-style-type: none"> Azithromycin 1,200 mg once weekly, or 600 mg twice weekly. Clarithromycin 500 mg twice daily. See footnote “a” regarding additional regimens. <p>Indication</p> <ul style="list-style-type: none"> For patients with CD4 count <50 cells/mm³ AND a delay in starting ART, or who cannot tolerate fully suppressive ART due to side effects, etc. Continue until effective ART is initiated. |

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| MAC, continued | <p>Comments</p> <ul style="list-style-type: none">• Not needed for patients who start ART right away; MAC infection rates have dropped with effective ART, so benefit/risk does not favor prophylaxis.• Patients on effective ART with undetectable viral load (regardless of CD4 count) can stop MAC prophylaxis.• Before starting prophylaxis, rule out disseminated MAC disease that requires treatment. |
| PCP | <p>Preferred Regimen</p> <ul style="list-style-type: none">• TMP/SMX 160/800 mg once daily (preferred) or 80/400 mg once daily (better tolerated). See footnote “a” regarding additional regimens. <p>Indications</p> <ul style="list-style-type: none">• For patients with CD4 count <200 cells/mm³. If ART is delayed and CD4 counts cannot be monitored frequently (e.g., quarterly) some experts recommend starting prophylaxis if CD4 count is ≥200 to ≤250 cells/mm³.• Also consider for CD4 cell percentage <14%.• Continue until CD4 count increases on ART from <200 cells/mm³ to ≥200 cells/mm³ for ≥3 months. Also consider discontinuing if CD4 count is 100 to 200 cells/mm³ and plasma HIV RNA levels remain undetectable for three to six months. Restart if CD4 count drops to <100 cells/mm³, or CD4 count is 100 to 200 cells/mm³ and plasma HIV RNA becomes detectable. <p>Comments</p> <ul style="list-style-type: none">• TMP/SMX 160/800 mg once daily also protects against toxoplasmosis. TMP/SMX 80/400 mg once daily is also likely protective.• Patients taking pyrimethamine/sulfadiazine for treatment or suppression of toxoplasmosis do not need additional PCP prophylaxis.• For patients who cannot take TMP/SMX, the following regimens protect against both PCP and toxoplasmosis: dapsone plus pyrimethamine plus leucovorin; atovaquone (with or without pyrimethamine plus leucovorin). See reference 1 for dosing. |

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| <i>Penicilliosis marneffei</i> | <p>Preferred Regimen</p> <ul style="list-style-type: none"> • Itraconazole 200 mg once daily. See footnote “a” regarding additional regimens. <p>Indications</p> <ul style="list-style-type: none"> • For patients with CD4 counts <100 cells/mm³ who stay for an extended time in northern Thailand, Vietnam, or southern China, especially in rural areas. Consider discontinuing if CD4 count remains >100 cells/mm³ for ≥6 months on ART. Restart if CD4 count reaches <100 cells/mm³. |
| <i>Streptococcus pneumoniae</i> | <p>Regimen</p> <ul style="list-style-type: none"> • If no previous pneumonia vaccination, preferred regimen is one dose of PCV13, then, PPV23 at least eight weeks later. If CD4 count is <200 cells/mm³, can delay PPV23 until CD4 count ≥200 cells/mm³ on ART. • If previously received PPV23, give one dose of PCV13 at least one year after having received PPV23. • Revaccinate with a second PPV23 dose ≥5 years after the first in patients 19 to 64 years of age. Give another dose in patients ≥65 years of age if at least five years have passed since the previous dose, and the previous dose was given before age 65. Total max number of PPV23 doses any patient should get is three. <p>Indication</p> <ul style="list-style-type: none"> • All HIV positive patients |
| <i>Toxoplasma gondii</i> encephalitis | <p>Preferred Regimen</p> <p>TMP/SMX 160/800 mg once daily. See footnote “a” regarding additional regimens.</p> <p>Indications</p> <ul style="list-style-type: none"> • Indicated for patients seropositive for <i>Toxoplasma</i> IgG who have CD4 count <100 cells/mm³. • Continue until CD4 count remains >200 cells/mm³ for >3 months on ART. Also consider discontinuing if CD4 count is 100 to 200 cells/mm³ and plasma HIV RNA levels remain undetectable for three to six months on ART. Restart if CD4 count reaches <100 to 200 cells/mm³. <p>Comments</p> <ul style="list-style-type: none"> • TMP/SMX 160/800 mg once daily also protects against PCP. • Patients taking pyrimethamine/sulfadiazine for treatment or suppression of toxoplasmosis do not need additional PCP |

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|--|---|
| <i>Toxoplasma gondii</i> encephalitis, continued | prophylaxis. <ul style="list-style-type: none"> For patients who cannot take TMP/SMX, the following regimens protect against both PCP and toxoplasmosis: dapsone plus pyrimethamine plus leucovorin; atovaquone (with or without pyrimethamine plus leucovorin). See reference 1 for dosing. |
| Varicella zoster | <p>Regimen</p> <ul style="list-style-type: none"> Two doses of <i>Varivax</i> (<i>Varivax III</i>, Canada) given three months apart. <p>Indications</p> <ul style="list-style-type: none"> Patients with CD4 count ≥ 200 cells/mm³ who have not been previously vaccinated and have no history of varicella or herpes zoster. Routine serologic testing is not recommended, but if the patient is known to be seronegative, vaccination is indicated. <p>Comments</p> <ul style="list-style-type: none"> If vaccination causes disease, treat with acyclovir. |

- a. For more information on these regimens, as well as alternatives, secondary prophylaxis, and treatment, see https://aidsinfo.nih.gov/contentfiles/lvguidelines/adult_oi.pdf.

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References

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