

Table 2. Treatment of HIV-Associated Opportunistic Infections (Includes Recommendations for Acute Treatment and Secondary Prophylaxis/Chronic Suppressive/Maintenance Therapy)

Updated: May 27, 2026

Reviewed: May 27, 2026

Opportunistic Infection		Preferred Therapy	Alternative Therapy	Other Comments
Bacterial Enteric Infections	Empiric Therapy Pending Definitive Diagnosis	<p>For People With HIV and CD4 Count >500 Cells/mm³, 1–2 Days of Loose Stool Without Fever or Blood in Stool</p> <ul style="list-style-type: none"> • Oral hydration, no further workup, and no antibiotics <p>For People With HIV and CD4 Count 200–500 Cells/mm³ With Diarrhea Severe Enough to Compromise Quality of Life or the Ability to Work</p> <ul style="list-style-type: none"> • Azithromycin 500 mg PO daily for 5 days (BIII), or • Ciprofloxacin 500–750 mg PO every 12 hours for 5 days (BIII) <p>For People With HIV and Severe Disease (e.g., CD4 Count <200 Cells/mm³ or Concomitant AIDS-Defining Illness and With Clinically Severe Diarrhea [≥ 6 Liquid Stools Per Day or Bloody Stool and/or Accompanying Fever or Chills])</p> <ul style="list-style-type: none"> • Hospitalization for diagnostic evaluation and IV antibiotics • Ceftriaxone IV 1–2 g every 24 hours (BIII) <p>Note: If <i>Campylobacter</i> or <i>Shigella</i> bacteremia is suspected, a carbapenem is preferred (BIII).</p> <p>Therapy and duration should be adjusted based on microbiology and antibiotic sensitivity results.</p> <p>If no pathogen is identified and the patient recovers quickly, 5 days of therapy is recommended.</p>		<p>Diagnostic fecal specimens should be obtained before initiation of empiric antimicrobial therapy.</p> <p>If a pathogen is identified, antibiotic susceptibilities should be performed to confirm and inform antibiotic choices, given increased reports of antibiotic resistance.</p> <p>Oral or IV rehydration (if indicated) should be given to patients with diarrhea (AIII).</p> <p>Antimotility agents should be avoided if there is concern about inflammatory diarrhea, including CDI (BIII).</p> <p>Risk of bacteremia increases with decreasing CD4 count.</p> <p>If no clinical response is observed after 3–4 days, consider a follow-up stool culture with antibiotic susceptibility testing or alternative diagnostic tests (e.g., toxin assays, molecular testing) to evaluate alternative diagnoses, antibiotic resistance, or drug–drug interaction (BIII).</p> <p>MSM may be at increased risk for antibiotic-resistant enteric infections.</p>

Table 2. Treatment of HIV-Associated Opportunistic Infections (Includes Recommendations for Acute Treatment and Secondary Prophylaxis/Chronic Suppressive/Maintenance Therapy)

Opportunistic Infection		Preferred Therapy	Alternative Therapy	Other Comments
		For patients with persistent diarrhea (>14 days) without severe clinical signs, antibiotics therapy can be withheld until a diagnosis is made.		
	Campylobacteriosis	<p>For Mild Disease If CD4 Count >200 Cells/mm³</p> <ul style="list-style-type: none"> No therapy unless symptoms persist for more than several days (CIII) <p>For Mild to Moderate Disease (If Susceptible)</p> <ul style="list-style-type: none"> Azithromycin 500 mg PO daily for 5 days (BIII) (not recommended for patients with bacteremia [AIII]), or Ciprofloxacin 500–750 mg PO (or 400 mg IV) every 12 hours for 7–10 days (BIII) <p>For <i>Campylobacter</i> Bacteremia</p> <ul style="list-style-type: none"> Ciprofloxacin 500–750 mg PO (or 400 mg IV) every 12 hours for ≥14 days if the isolate is sensitive (BIII) plus an aminoglycoside (BIII) to limit the emergence of antibiotic resistance <p>For Recurrent Infections</p> <ul style="list-style-type: none"> Duration of therapy may be extended to 2–6 weeks (BIII). 	<p>For Mild to Moderate Disease (If Susceptible)</p> <ul style="list-style-type: none"> Levofloxacin 750 mg (PO or IV) every 24 hours (BIII) Add an aminoglycoside to fluoroquinolone in bacteremic patients (BIII) to limit the emergence of antibiotic resistance. 	<p>Oral or IV rehydration if indicated (AIII)</p> <p>Antimotility agents should be avoided (BIII).</p> <p>Third-generation cephalosporins are not reliably active, and use of alternative cell wall-active agents, such as carbapenems, may be necessary in severely ill people who require empiric IV therapy until antimicrobial susceptibilities return.</p> <p>In the United States in 2018, 29% of <i>C. jejuni</i> isolates were resistant to ciprofloxacin and 2% were resistant to azithromycin; among <i>C. coli</i> isolates, 40.5% were resistant to fluoroquinolone and 13.3% were resistant to azithromycin.</p> <p>Effective ART may reduce the frequency, severity, and recurrence of <i>Campylobacter</i> infections.</p>
	<i>Clostridium difficile</i> Infection (CDI)	<p>For Severe or Non-severe CDI</p> <ul style="list-style-type: none"> Fidaxomicin 200 mg PO twice daily for 10 days (AI) <p>For Recurrent CDI</p> <ul style="list-style-type: none"> 2021 IDSA CDI Guidelines suggest use of fidaxomicin over oral vancomycin because it has a greater likelihood for a sustained clinical response at 30 days (AI). 	<p>For Severe or Non-severe CDI</p> <ul style="list-style-type: none"> Vancomycin 125 mg PO four times daily for 10 days (AI) <p>For Non-severe CDI</p> <p>If Neither Fidaxomicin nor Vancomycin Is Available</p> <ul style="list-style-type: none"> Metronidazole 500 mg (PO) three times daily for 10 days (CI) 	<p>Severe CDI: white blood cell count ≥15,000 cells/mL or serum creatinine concentrations >1.5 mg/dL; non-severe CDI: white blood cell count <15,000 cells/mL and serum creatinine concentrations <1.5 mg/dL</p>

Table 2. Treatment of HIV-Associated Opportunistic Infections (Includes Recommendations for Acute Treatment and Secondary Prophylaxis/Chronic Suppressive/Maintenance Therapy)

Opportunistic Infection		Preferred Therapy	Alternative Therapy	Other Comments
			<p>Recurrent CDI</p> <ul style="list-style-type: none"> • Vancomycin is an acceptable option (see IDSA Guideline for tapered and pulsed regimens) (AI). • For patients with CD4 counts >200 cells/mm³, FMT may be considered after three CDI episodes (i.e., an initial and two recurrent episodes) (CIII). 	
	Salmonellosis	<p>All people with HIV and salmonellosis should receive antimicrobial treatment due to an increase of bacteremia (by 20-fold to 100-fold) and mortality (by up to sevenfold) compared with individuals without HIV (AIII).</p> <p>For Invasive Disease (Suspected or Confirmed)</p> <ul style="list-style-type: none"> • Ceftriaxone IV 1–2 g every 24 hours pending susceptibilities (BIII) <p>For Nontyphoidal Salmonella Gastroenteritis (With or Without Bacteremia) (If Susceptible)</p> <ul style="list-style-type: none"> • Ciprofloxacin 500–750 mg PO (or 400 mg IV) every 12 hours (AIII) <p>Duration of Therapy</p> <p><i>For Gastroenteritis Without Bacteremia</i></p> <ul style="list-style-type: none"> • If CD4 count ≥200 cells/mm³: 7–14 days (BIII) • If CD4 count <200 cells/mm³: minimum of 2 weeks (may extend to up to 6 weeks if with severe disease) (BIII) <p><i>For Gastroenteritis With Bacteremia</i></p> <ul style="list-style-type: none"> • If CD4 count ≥200/mm³: 14 days or longer duration if bacteremia persists or if the infection is complicated (e.g., if metastatic foci of infection are present) (BIII) 	<p>For Nontyphoidal Salmonella Gastroenteritis (With or Without Bacteremia) (If Susceptible)</p> <ul style="list-style-type: none"> • Levofloxacin 750 mg (PO or IV) every 24 hours (BIII), or • Moxifloxacin 400 mg (PO or IV) every 24 hours (BIII), or • TMP-SMX (160 mg/800 mg) PO (or IV) every 12 hours (BIII), or • Ceftriaxone 1–2 g IV every 24 hours (BIII) 	<p>Oral or IV rehydration if indicated (AIII)</p> <p>Antimotility agents should be avoided (BIII).</p> <p>The role of long-term secondary prophylaxis in patients with recurrent <i>Salmonella</i> bacteremia is not well established. Must weigh the benefits against the risks of long-term antibiotic exposure (BIII).</p> <p>Effective ART may reduce the frequency, severity, and recurrence of salmonella infections.</p>

Table 2. Treatment of HIV-Associated Opportunistic Infections (Includes Recommendations for Acute Treatment and Secondary Prophylaxis/Chronic Suppressive/Maintenance Therapy)

Opportunistic Infection		Preferred Therapy	Alternative Therapy	Other Comments
		<ul style="list-style-type: none"> If CD4 count <200 cells/mm³: 2–6 weeks (BIII) <p>Secondary Prophylaxis Should Be Considered for Patients With—</p> <ul style="list-style-type: none"> Recurrent <i>Salmonella</i> bacteremia (BIII), or Recurrent gastroenteritis (with or without bacteremia) with CD4 count <200 cells/mm³ with severe diarrhea (BIII) 		
	Shigellosis	<ul style="list-style-type: none"> Ciprofloxacin 500–750 mg PO (or 400 mg IV) every 12 hours (if MIC <0.12 mcg/mL) (AIII) <p>Duration of Therapy</p> <ul style="list-style-type: none"> Gastroenteritis: 5–7 days (AIII) (except ciprofloxacin [5–10 days] and azithromycin [5 days]) Bacteremia: ≥14 days (BIII) Recurrent infections: Up to 6 weeks (BIII) <p><i>In Severely Ill Patients Requiring Empiric Parenteral Therapy While Awaiting Susceptibility</i></p> <ul style="list-style-type: none"> Consider initiating a carbapenem until antimicrobial susceptibilities are available (BIII). <p>Note: Increased resistance of <i>Shigella</i> to fluoroquinolones in the United States. Alternative antibiotics should be considered if ciprofloxacin MIC is ≥0.12 mcg/mL (BIII).</p>	<ul style="list-style-type: none"> Levofloxacin 750 mg (PO or IV) every 24 hours (BIII), or Trimethoprim 160 mg/sulfamethoxazole 800 mg PO or IV every 12 hours for 5–7 days (BIII), or Azithromycin 500 mg PO daily for 5 days (BIII), or Ceftriaxone 1–2 g IV every 24 hours (BIII) <p>Note: Azithromycin and TMP-SMX are not recommended for treatment of bacteremia.</p> <p>Note: Azithromycin-resistant <i>Shigella</i> spp. have been reported in MSM with HIV.</p>	<p>Therapy may slightly shorten the duration of illness and/or prevent the spread of infection (AIII).</p> <p>Oral or IV rehydration if indicated (AIII)</p> <p>Antimotility agents should be avoided (BIII).</p> <p>Many <i>Shigella</i> strains that are resistant to fluoroquinolones exhibit resistance to other commonly used antibiotics. Antibiotic sensitivity testing of <i>Shigella</i> isolates from individuals with HIV should be performed routinely.</p> <p>Given increasing antimicrobial resistance and limited data showing that antibiotic therapy limits transmission, antibiotic treatment may be withheld in patients with CD4 count >500 cells/mm³ whose diarrhea resolves prior to culture confirmation of <i>Shigella</i> infection (CIII).</p> <p>Effective ART may decrease the risk of recurrence of <i>Shigella</i> infections.</p>

Table 2. Treatment of HIV-Associated Opportunistic Infections (Includes Recommendations for Acute Treatment and Secondary Prophylaxis/Chronic Suppressive/Maintenance Therapy)

Opportunistic Infection	Preferred Therapy	Alternative Therapy	Other Comments
Bartonellosis	<p>For Bacillary Angiomatosis, Peliosis Hepatis, Bacteremia, and Osteomyelitis</p> <ul style="list-style-type: none"> • Doxycycline 100 mg PO or IV every 12 hours (AII), or • Erythromycin 500 mg PO or IV every 6 hours (AII) <p>CNS Infections</p> <ul style="list-style-type: none"> • (Doxycycline 100 mg +/- RIF 300 mg) PO or IV every 12 hours (AIII) <p>Confirmed <i>Bartonella</i> Endocarditis</p> <ul style="list-style-type: none"> • (Doxycycline 100 mg IV plus RIF 300 mg PO or IV) every 12 hours for 6 weeks, then continue with doxycycline 100 mg IV or PO every 12 hours (BII) <p>Other Severe Infections</p> <ul style="list-style-type: none"> • (Doxycycline 100 mg PO or IV +/- RIF 300 mg PO or IV) every 12 hours (BIII), or • (Erythromycin 500 mg PO or IV every 6 hours) +/- RIF 300 mg PO or IV every 12 hours (BIII) <p>Duration of Therapy</p> <ul style="list-style-type: none"> • At least 3 months (AII) 	<p>For Bacillary Angiomatosis, Peliosis Hepatis, Bacteremia, Osteomyelitis, and Other Severe Infection</p> <ul style="list-style-type: none"> • Azithromycin 500 mg PO daily (BIII) • Clarithromycin 500 mg PO twice a day (BIII) <p>Confirmed <i>Bartonella</i> Endocarditis</p> <ul style="list-style-type: none"> • (Doxycycline 100 mg IV every 12 hours plus gentamicin 1 mg/kg IV every 8 hours) for 2 weeks, then continue with doxycycline 100 mg IV or PO every 12 hours (BII) 	<p>When RIF is used, take into consideration the potential for significant interaction with ARV drugs and other medications (see Table 4 for dosing recommendations).</p> <p>If relapse occurs after initial (>3 month) course of therapy, long-term suppression with doxycycline or a macrolide is recommended as long as the CD4 count is <200 cells/mm³ (AIII).</p>
Candidiasis (Mucocutaneous)	<p>For Oropharyngeal Candidiasis—Initial Episodes (For 7–14 Days)</p> <ul style="list-style-type: none"> • Fluconazole 200 mg PO loading dose, followed by 100–200 mg PO daily (AI) <p>For Esophageal Candidiasis (For 14–21 Days)</p> <ul style="list-style-type: none"> • Fluconazole 200-mg loading dose, followed by 100–200 mg (up to 400 mg) PO or IV daily (AI). (Consider oral suspension for people with difficulty swallowing.) 	<p>For Oropharyngeal Candidiasis—Initial Episodes (For 7–14 Days)</p> <p>Oral Therapy</p> <ul style="list-style-type: none"> • Itraconazole oral solution 200 mg PO daily (BI), or • Posaconazole oral suspension 400 mg PO twice a day for 1 day, then 400 mg daily (BI), or • Posaconazole tablet 300 mg PO twice a day for 1 day, then 300 mg daily (BI) 	<p>Chronic or prolonged use of azoles may promote the development of resistance.</p> <p>Systemic azoles may have significant drug–drug interactions with ARV drugs.</p> <p>A higher relapse rate for esophageal candidiasis is seen with echinocandins use than with fluconazole.</p>

Table 2. Treatment of HIV-Associated Opportunistic Infections (Includes Recommendations for Acute Treatment and Secondary Prophylaxis/Chronic Suppressive/Maintenance Therapy)

Opportunistic Infection	Preferred Therapy	Alternative Therapy	Other Comments
	<p>For Uncomplicated Vulvovaginal Candidiasis</p> <ul style="list-style-type: none"> Fluconazole 150 mg PO for one dose (AII), or Topical azoles (clotrimazole, butoconazole, miconazole, tioconazole, or terconazole) for 3–7 days (AII), or Ibrexafungerp 300 mg PO twice daily for 1 day (BI) <p>For Severe or Recurrent Vulvovaginal Candidiasis</p> <ul style="list-style-type: none"> Fluconazole 100–200 mg PO daily for ≥7 days (AII), or Topical antifungal ≥7 days (AII) <p>For Recurrent Vulvovaginal Candidiasis Only (<i>The following regimens include treatment for the acute episode plus treatment to reduce recurrence.</i>)</p> <ul style="list-style-type: none"> Oteseconazole 600 mg PO at Day 1, 450 mg at Day 2, followed by once-weekly 150-mg dosing starting at Day 14 for 11 weeks (AI) (for those who are not of reproductive potential); or Fluconazole 150 mg PO at Days 1, 4, and 7, followed by oteseconazole 150 mg PO daily at Days 14–20, followed by oteseconazole 150 mg once weekly starting at Day 28 for 11 weeks (Weeks 4–14) (AI) (for those who are not of reproductive potential); or Fluconazole 150 mg PO every 72 hours for three doses, followed by ibrexafungerp 300 mg PO twice daily 1 day per month for 6 months (BI). (Use an effective form of contraception during treatment and for 4 days after the last dose.) 	<p><i>Topical Therapy</i></p> <ul style="list-style-type: none"> Miconazole mucoadhesive buccal 50-mg tablet once daily; apply to mucosal surface over the canine fossa once daily (do not swallow, chew, or crush tablet.) (BI), or Clotrimazole troches 10 mg PO five times daily (BI), or Nystatin suspension 4–6 mL four times a day (BII) <p>For Esophageal Candidiasis (For 14–21 Days)</p> <ul style="list-style-type: none"> Itraconazole oral solution 200 mg PO daily (AI), or Isavuconazole 400 mg PO loading dose, followed by 100 mg PO daily (BI), or Isavuconazole 400 mg PO once weekly (BI), or Voriconazole 200 mg PO or IV twice a day (BI), or Posaconazole oral suspension 400 mg PO twice a day for 1 day, then 400 mg daily (BI), or Posaconazole tablet 300 mg PO twice a day for 1 day, then 300 mg daily (BI), or Lipid formulation of amphotericin B 3–4 mg/kg IV daily (BI), or Caspofungin 70 mg IV loading dose, followed by 50 mg IV daily (BI), or Micafungin 150 mg IV daily (BI), or Anidulafungin 100 mg IV once, then 50 mg IV daily (BI) 	<p>Suppressive therapy is usually not recommended (CIII) unless patients have frequent or severe recurrences.</p> <p>If the Decision Is to Use Suppressive Therapy</p> <p><i>Oropharyngeal Candidiasis</i></p> <ul style="list-style-type: none"> Fluconazole 100 mg PO once daily or three times weekly (BI) <p><i>Esophageal Candidiasis</i></p> <ul style="list-style-type: none"> Fluconazole 100–200 mg PO daily (BI), or Posaconazole oral suspension 400 mg PO twice a day (BII), or Posaconazole tablet 300 mg PO daily (BII) <p><i>Vulvovaginal Candidiasis</i></p> <ul style="list-style-type: none"> Fluconazole 150 mg PO once weekly (BII), or Oteseconazole 600 mg at Day 1 and 450 mg at Day 2 for treatment of the acute episode, followed by once-weekly 150-mg doses starting at Day 14 for 11 weeks (AI) (for those who are not of reproductive potential); or

Table 2. Treatment of HIV-Associated Opportunistic Infections (Includes Recommendations for Acute Treatment and Secondary Prophylaxis/Chronic Suppressive/Maintenance Therapy)

Opportunistic Infection	Preferred Therapy	Alternative Therapy	Other Comments
		<p>For Azole-Refractory <i>Candida glabrata</i> Vaginitis</p> <ul style="list-style-type: none"> Boric acid vaginal suppository 600 mg once daily for 14 days (BII) 	<ul style="list-style-type: none"> Fluconazole 150 mg at Days 1, 4, and 7 for treatment of the acute episode, followed by oteseconazole 150 mg daily at Days 14–20, followed by oteseconazole 150 mg once weekly starting at Day 28 for 11 weeks (Weeks 4–14) (AI) (for those who are not of reproductive potential); or Ibrexafungerp 300 mg twice daily 1 day per month for 6 months (BI). (Use an effective form of contraception during treatment and for 4 days after the last dose.)
Chagas Disease (American Trypanosomiasis)	<p>For Acute or Reactivated Disease</p> <ul style="list-style-type: none"> Benznidazole 5–8 mg/kg/day PO in two divided doses for 60 days (BIII) (commercially available at https://www.benznidazoletablets.com/en; most experts recommend a daily maximum of 300 mg), or Nifurtimox (Lampit) 8–10 mg/kg/day PO in three divided doses for 60 days (BIII) (commercially available through retail sources) 	None	<p>Treatment is effective in reducing parasitemia and preventing clinical symptoms or slowing disease progression; however, these drugs have limited efficacy in achieving parasitological cure.</p> <p>Treatment is not recommended for patients with advanced chagasic cardiomyopathy.</p> <p>Duration of therapy has not been studied in patients with HIV.</p> <p>Initiation or optimization of ART is recommended for all people with HIV with concomitant <i>Trypanosoma cruzi</i> (AIII).</p>

Table 2. Treatment of HIV-Associated Opportunistic Infections (Includes Recommendations for Acute Treatment and Secondary Prophylaxis/Chronic Suppressive/Maintenance Therapy)

Opportunistic Infection	Preferred Therapy	Alternative Therapy	Other Comments
Coccidioidomycosis	<p>Mild to Moderate Pulmonary Infection</p> <ul style="list-style-type: none"> Fluconazole 400 mg PO daily (AII), or Itraconazole 200 mg PO three times a day for 3 days, then 200 mg PO twice a day (AII) Duration of therapy: clinical response to 3–6 months of therapy, CD4 count ≥ 250 cells/mm³, and viral suppression on ART (AII) <p>Severe Pulmonary or Extrapulmonary Infection (Except Meningitis)</p> <ul style="list-style-type: none"> Amphotericin B deoxycholate 0.7–1.0 mg/kg IV daily (AII), or Lipid formulation amphotericin B 3–5 mg/kg IV daily (AIII) Continue until clinical improvement, then switch to an azole (fluconazole 400 mg PO daily or itraconazole 200 mg PO twice daily) (BIII). Therapy should be continued for at least 12 months, and usually much longer, and should be continued in patients with HIV viremia or with CD4 count < 250 cells/mm³ (BIII). <p>Meningeal Infections</p> <ul style="list-style-type: none"> Fluconazole 800–1,200 mg PO daily (AII) Duration of therapy: lifelong (AII) 	<p>Mild to Moderate Pulmonary Infection</p> <p><i>For Patients Who Failed to Respond to Fluconazole or Itraconazole</i></p> <ul style="list-style-type: none"> Voriconazole 400 mg PO twice daily on Day 1, then 200 mg PO twice a day (BIII) Posaconazole delayed release tablet 300 mg PO twice a day on Day 1, then 300 mg PO once daily (BIII), or Isavuconazole sulfate 372 mg PO every 8 hours for six doses, then 372 mg once daily (BIII) <p>Severe Pulmonary or Extrapulmonary Infection (Except Meningitis)</p> <ul style="list-style-type: none"> Some specialists will combine amphotericin B with a triazole (fluconazole or itraconazole, with itraconazole preferred for bone disease) as initial therapy and continue triazole once amphotericin B is stopped (CIII). <p>Meningeal Infections</p> <ul style="list-style-type: none"> Itraconazole 200 mg PO two or three times daily (BII), or Voriconazole 200–400 mg PO twice daily (BIII), or Posaconazole delayed release tablet 300 mg PO twice on Day 1, then 300 mg PO once daily (CIII), or Isavuconazole sulfate 372 mg PO every 8 hours for six doses, then 372 mg once daily (CIII) Intrathecal amphotericin B deoxycholate when triazole antifungals are ineffective (AIII) 	<p>Some patients with meningitis may develop hydrocephalus and require CSF shunting.</p> <p>Therapy should be lifelong in patients with meningeal infections because relapse occurs in 80% of patients with HIV after discontinuation of triazole therapy (AII).</p> <p>See Table 4 for drug–drug interactions or triazole antifungal drugs and other drugs for treatment or prevention of OIs.</p> <p>Itraconazole, posaconazole, and voriconazole may have significant interactions with certain ARV agents. These interactions are complex and can be bidirectional. Refer to Drug–Drug Interactions in the Adult and Adolescent Antiretroviral Guidelines for dosage recommendations.</p> <p>Therapeutic drug monitoring and dosage adjustment may be necessary to ensure triazole antifungal and antiretroviral efficacy and reduce concentration-related toxicities.</p> <p>Intrathecal amphotericin B should be given only in consultation with a specialist and administered by an individual with experience with the technique.</p>

Table 2. Treatment of HIV-Associated Opportunistic Infections (Includes Recommendations for Acute Treatment and Secondary Prophylaxis/Chronic Suppressive/Maintenance Therapy)

Opportunistic Infection	Preferred Therapy	Alternative Therapy	Other Comments
Community-Acquired Bacterial Pneumonia (CAP)	<p>Empiric Outpatient Therapy for Non-severe CAP</p> <ul style="list-style-type: none"> A PO beta-lactam (see below) plus a PO macrolide (azithromycin or clarithromycin) (AI), or A PO respiratory fluoroquinolone (levofloxacin or moxifloxacin) (AI) [recommended for penicillin-allergic patients (AI)] <p>Note:</p> <ul style="list-style-type: none"> Preferred PO beta-lactams: High-dose amoxicillin or amoxicillin/clavulanate Alternative PO beta-lactams: Cefpodoxime or cefuroxime <p>Empiric Therapy for Hospitalized Patients With Non-severe CAP</p> <ul style="list-style-type: none"> An IV beta-lactam (see below) plus a PO or IV macrolide (azithromycin or clarithromycin) (AI), or A PO or IV respiratory fluoroquinolone (levofloxacin or moxifloxacin) (AI) [recommended for penicillin-allergic patients (AI)] <p>Note:</p> <ul style="list-style-type: none"> Preferred IV Beta-Lactams: Ceftriaxone, cefotaxime, or ampicillin-sulbactam Corticosteroids are not recommended for people with HIV who have non-severe CAP (BII). <p>Empiric Therapy for Patients With Severe CAP</p> <ul style="list-style-type: none"> Prompt therapy with combination antibiotic therapy active against the range of potential pathogens is needed (AI). An IV beta-lactam (see below) plus IV macrolide (azithromycin or clarithromycin) (AI), or 	<p>Empiric Outpatient Therapy for Non-severe CAP</p> <ul style="list-style-type: none"> A PO beta-lactam (see below) plus PO doxycycline (BIII) <p>Note:</p> <ul style="list-style-type: none"> Preferred PO beta-lactams: High-dose amoxicillin or amoxicillin/clavulanate Alternative PO beta-lactams: Cefpodoxime or cefuroxime <p>Empiric Therapy for Hospitalized Patients With Non-severe CAP</p> <p><i>For Patients in Whom Macrolides or Fluroquinolones Are Contraindicated</i></p> <ul style="list-style-type: none"> An IV beta-lactam (see below) plus PO or IV doxycycline (BIII) <p>Note:</p> <ul style="list-style-type: none"> Preferred IV beta-lactams: Ceftriaxone, cefotaxime, or ampicillin-sulbactam Corticosteroids are not recommended for people with HIV who have non-severe CAP (BII). <p>Empiric Therapy for Patients With Severe CAP</p> <p><i>For Penicillin-Allergic Patients</i></p> <ul style="list-style-type: none"> Aztreonam IV plus an IV respiratory fluoroquinolone (levofloxacin or moxifloxacin) (BIII) <p><i>Adjunctive Therapy</i></p> <ul style="list-style-type: none"> Systemic corticosteroids should be considered for patients with severe CAP, especially those who have well-controlled HIV and have increased C-reactive protein (BII). 	<p>Consider not initiating antibiotics in people who are stable enough to be treated as outpatients and have well-controlled HIV and no other significant comorbidities (BIII).</p> <p>Consider initiating empiric antibiotics to cover bacterial pathogens in CAP in people who are able to be treated as outpatients if they have significant immunocompromise (CD4 count <200 cells/mm³, noncontrolled viremia) or other comorbidities that place them at risk for progression of disease (BIII).</p> <p>Initiate empiric antibiotics to cover bacterial pathogens in non-severe CAP (AIII) or severe CAP (AIII) in people who are hospitalized.</p> <p>Empiric antimicrobial therapy should be initiated promptly for patients with clinical and radiographic evidence consistent with bacterial pneumonia. The recommendations listed are suggested empiric therapy. The regimen should be modified as needed once microbiologic and antimicrobial susceptibility testing results are available. Providers should also consider the risk of opportunistic lung infections (e.g., PCP, TB), which could affect the selection of empiric therapy.</p>

Table 2. Treatment of HIV-Associated Opportunistic Infections (Includes Recommendations for Acute Treatment and Secondary Prophylaxis/Chronic Suppressive/Maintenance Therapy)

Opportunistic Infection	Preferred Therapy	Alternative Therapy	Other Comments
	<ul style="list-style-type: none"> An IV beta-lactam (see below) plus an IV respiratory fluoroquinolone (levofloxacin or moxifloxacin) (AI) <p><i>Adjunctive Therapy</i></p> <ul style="list-style-type: none"> Systemic corticosteroids should be considered for patients with severe CAP, especially those who have well-controlled HIV and have increased C-reactive protein (BII). <p>Note:</p> <ul style="list-style-type: none"> Preferred IV Beta-Lactams: Ceftriaxone, cefotaxime, or ampicillin-sulbactam <p>Empiric Therapy for Patients With Severe CAP at Risk of <i>Pseudomonas</i> Pneumonia</p> <ul style="list-style-type: none"> An IV antipneumococcal, antipseudomonal beta-lactam (see below) plus an IV antipseudomonal fluoroquinolone (ciprofloxacin or levofloxacin) (AI) <p>Note:</p> <ul style="list-style-type: none"> Preferred IV Beta-Lactams: Piperacillin-tazobactam, cefepime, imipenem, or meropenem <p>Empiric Therapy for Patients With Severe CAP at Risk for Methicillin-Resistant <i>Staphylococcus aureus</i> Pneumonia</p> <ul style="list-style-type: none"> Add vancomycin IV or linezolid (IV or PO) to the antibiotic regimen (AII). Although not routinely recommended, for patients with severe necrotizing pneumonia, clindamycin plus vancomycin or the use of linezolid alone can be used to minimize bacterial toxin production (CII). 	<p>Empiric Therapy for Patients With Severe CAP at Risk of <i>Pseudomonas</i> Pneumonia</p> <ul style="list-style-type: none"> An IV antipneumococcal, antipseudomonal beta-lactam (see below) plus IV azithromycin (BII), or An IV antipneumococcal, antipseudomonal beta-lactam (see below) plus an IV antipneumococcal fluoroquinolone (levofloxacin or moxifloxacin) (BII) <p>Note:</p> <ul style="list-style-type: none"> Preferred IV Beta-Lactams: Piperacillin-tazobactam, cefepime, imipenem, or meropenem <p><i>For Penicillin-Allergic Patients</i></p> <ul style="list-style-type: none"> Replace the beta-lactam with IV aztreonam plus an IV antipneumococcal, antipseudomonal quinolone (levofloxacin) (BII). 	<p>Empiric monotherapy with a macrolide is not routinely recommended because of increasing pneumococcal resistance (up to 30% for erythromycin) (BIII). Patients receiving a macrolide for MAC prophylaxis may have macrolide-resistant <i>S. pneumoniae</i> due to chronic exposure (BIII).</p> <p>Fluoroquinolones should be used with caution in patients in whom TB is suspected but who are not being treated with concurrent standard four-drug TB therapy (BIII).</p> <p>Consider drug interaction potential when selecting macrolide therapy. Azithromycin, in general, has less risk for drug–drug interactions compared to clarithromycin.</p> <p>High dose levofloxacin (750 mg) is recommended for treating serious pneumonia.</p> <p>Clinical stability is defined as resolution of vital signs abnormalities (temperature, heart rate, respiratory rate, arterial oxygen saturation or partial pressure, and systolic blood pressure), and normal mentation.</p> <p>A nasal swab for MRSA can help inform whether a need exists for initial empiric coverage for MRSA (see CAP chapter for details).</p> <p>Duration</p> <ul style="list-style-type: none"> At least 5 days for most patients following

Table 2. Treatment of HIV-Associated Opportunistic Infections (Includes Recommendations for Acute Treatment and Secondary Prophylaxis/Chronic Suppressive/Maintenance Therapy)

Opportunistic Infection	Preferred Therapy	Alternative Therapy	Other Comments
			<p>assessment of clinical stability (AII).</p> <ul style="list-style-type: none"> At least 7 days for patients with MRSA or <i>Pseudomonas</i> pneumonia (AII). Longer duration may be needed in those who are likely to take longer to achieve clinical stability, such as those with advanced HIV and CD4 count <100 cells/mm³. Longer duration of antibiotics (e.g., 7–14 days) may be necessary for patients who have severe CAP. <p>For patients begun on IV antibiotic therapy, switching to PO should be considered if improved clinically, can swallow and tolerate oral medications, and have intact gastrointestinal function (BIII).</p>
Cryptococcosis	<p>For CNS and/or Disseminated Disease</p> <p><i>Induction Therapy (For ≥2 Weeks, Followed by Consolidation Therapy)</i></p> <ul style="list-style-type: none"> In the United States and other settings where daily electrolytes and kidney function monitoring and electrolyte and IV fluid administration is possible— <ul style="list-style-type: none"> Liposomal amphotericin B 3–4 mg/kg IV daily plus flucytosine 25 mg/kg PO four times a day for 2 weeks (AII) (Note: Flucytosine dose should be adjusted in patients with renal dysfunction.) In resource-limited settings, as recommended by WHO— <ul style="list-style-type: none"> Liposomal amphotericin B 10 mg/kg IV as a single dose 	<p>For CNS and/or Disseminated Disease</p> <p><i>Induction Therapy (For ≥2 Weeks, Followed by Consolidation Therapy)</i></p> <ul style="list-style-type: none"> Amphotericin B lipid complex 5 mg/kg IV daily plus flucytosine 25 mg/kg PO four times a day for 2 weeks (BII), or Amphotericin B deoxycholate 1 mg/kg IV daily plus flucytosine 25 mg/kg PO four times a day for 1 week, followed by fluconazole 1,200 mg PO daily for an additional week (BI) 	<p>Addition of flucytosine to amphotericin B has been associated with more rapid sterilization of CSF and decreased risk for subsequent relapse.</p> <p>Patients receiving flucytosine should have either blood levels monitored (peak level 2 hours after dose should be 25–100 mcg/mL) or at least twice weekly monitoring of complete blood counts for cytopenia. Dosage should be adjusted in patients with renal insufficiency (BII).</p>

Table 2. Treatment of HIV-Associated Opportunistic Infections (Includes Recommendations for Acute Treatment and Secondary Prophylaxis/Chronic Suppressive/Maintenance Therapy)

Opportunistic Infection	Preferred Therapy	Alternative Therapy	Other Comments
	<p>on Day 1, followed by flucytosine 25 mg/kg four times a day plus fluconazole 1,200 mg daily for 2 weeks (AI)</p> <ul style="list-style-type: none"> If not improved clinically or remain clinically unstable, continue induction therapy until the CSF culture is confirmed to be negative (BII). <p><i>Consolidation Therapy (for ≥8 Weeks, Followed by Maintenance Therapy)</i></p> <ul style="list-style-type: none"> Fluconazole 800 mg PO daily (AI) For clinically stable patients with negative CSF cultures and ART has been started, dose can be reduced to 400 mg PO daily (AII) If CSF remains positive (but clinically stable) after 2 weeks of induction therapy, use one of the following two options for an additional 2 weeks before reducing the dose of fluconazole to 800 mg PO daily: <ul style="list-style-type: none"> Fluconazole 1,200 mg PO daily with flucytosine 25 mg/kg PO four times a day for 2 weeks (BIII) Fluconazole 1,200 mg PO daily for 2 weeks (BIII), or <p>Note: Duration of consolidation therapy should be at least 8 weeks from the time of negative CSF culture (AII).</p> <p><i>Maintenance Therapy</i></p> <ul style="list-style-type: none"> Fluconazole 200 mg PO daily for ≥1 year from initiation of antifungal therapy (AI) 	<p><i>Additional Studied Induction Regimens (For 2 Weeks)</i></p> <ul style="list-style-type: none"> Amphotericin B deoxycholate 0.7–1.0 mg/kg IV daily plus flucytosine 25 mg/kg PO four times a day (BI) Liposomal amphotericin B 3–4 mg/kg IV daily plus fluconazole 800–1,200 mg PO daily (BIII) Amphotericin B deoxycholate 0.7–1.0 mg/kg IV daily plus fluconazole 800–1,200 mg PO or IV daily (BI) Fluconazole 1,200 mg PO or IV daily plus flucytosine 25 mg/kg PO four times a day (BII) <p><i>Consolidation Therapy (for ≥8 Weeks, Followed by Maintenance Therapy)</i></p> <ul style="list-style-type: none"> If fluconazole is not available or not well tolerated: Itraconazole 200 mg PO twice a day for 8 weeks (CI) <p><i>Maintenance Therapy</i></p> <ul style="list-style-type: none"> If fluconazole is not available or not well tolerated: Itraconazole 200 mg PO twice a day (CI) If susceptibility studies have been performed and the fluconazole MIC is ≥16 mcg/mL, the fluconazole dose may be increased to 400 mg daily (BIII). 	<p>Irrespective of which regimen is used, patients must be followed carefully in hospital for at least 7 days and ideally 14 days (AII). For patients with CNS disease, LP should be performed at Day 7 and Day 14 to ensure an appropriate clinical response and culture sterility. If increased ICP is documented, daily LP should be performed until the pressure is decreased into the normal range and symptoms have abated (AII).</p> <p>Opening pressure should always be measured when an LP is performed. Repeated LPs or CSF shunting are essential to effectively managing increased intracranial pressure.</p> <p>Corticosteroids and mannitol are ineffective in reducing ICP and are not recommended (AIII).</p> <p>Some specialists recommend a brief course of tapering dose of corticosteroid for management of severe IRIS symptoms (BIII).</p> <p>All people with non-CNS extrapulmonary symptoms and cryptococcal antigenemia should have their CSF sampled to rule out CNS disease.</p>

Table 2. Treatment of HIV-Associated Opportunistic Infections (Includes Recommendations for Acute Treatment and Secondary Prophylaxis/Chronic Suppressive/Maintenance Therapy)

Opportunistic Infection	Preferred Therapy	Alternative Therapy	Other Comments
	<p>For Non-CNS Extrapulmonary (BIII) or Diffuse Pulmonary Disease (BIII) or People With Non-CNS Symptoms With Normal CSF and Serum CrAg $\geq 1:640$ by LFA (or $\geq 1:160$ by EIA or Latex Agglutination) (BII)</p> <ul style="list-style-type: none"> Treatment is the same as for CNS cryptococcosis. <p>For Non-CNS Focal Pulmonary Infiltrates (With Mild Symptoms)</p> <ul style="list-style-type: none"> Fluconazole 400 mg daily for 6 to 12 months (duration guided by symptom resolution) (BIII) <p>For Asymptomatic Antigenemia Without Meningitis and Serum CrAg $< 1:640$ by LFA (or $< 1:160$ by EIA or Latex Agglutination)</p> <ul style="list-style-type: none"> Fluconazole: 800–1,200 mg PO daily for 2 weeks, followed by 400–800 mg PO daily for a total of 10 weeks, then fluconazole 200 mg PO daily for a total of 6 months plus effective ART (BIII) 	<p>For Non-CNS Extrapulmonary (BIII) or Diffuse Pulmonary Disease (BIII) or People With Non-CNS Symptoms With Normal CSF and Serum CrAg $\geq 1:640$ by LFA (or $\geq 1:160$ by EIA or Latex Agglutination) (BII)</p> <ul style="list-style-type: none"> Alternative treatment options are the same as for CNS cryptococcosis. 	<p>People with asymptomatic cryptococcal antigenemia, lower risk, and serum CrAg titer $< 1:80$ by LFA (or $< 1:20$ by EIA or latex agglutination) can be safely treated without lumbar puncture (AI). All others with asymptomatic cryptococcal antigenemia should undergo CSF sampling to rule out CNS disease.</p>
Cryptosporidiosis	<ul style="list-style-type: none"> Aggressive oral and/or IV rehydration and replacement of electrolyte loss (AIII), <i>and</i> Symptomatic treatment of diarrhea with antimotility agents (AIII), <i>and</i> ART initiation to achieve immune restoration to CD4 count > 100 cells/mm³ (AII). 	<p>No therapy has been shown to be effective without ART. Consider a trial of these agents in conjunction with ART, rehydration, and symptomatic treatment:</p> <ul style="list-style-type: none"> Nitazoxanide 500–1,000 mg PO twice a day with food for at least 14 days (CIII), <i>or</i> Paromomycin 500 mg PO four times daily for 14–21 days (CIII) 	<p>Tincture of opium may be more effective than loperamide in management of diarrhea (CIII).</p> <p>Because diarrhea can cause lactase deficiency, patients should avoid milk products (CIII).</p>

Table 2. Treatment of HIV-Associated Opportunistic Infections (Includes Recommendations for Acute Treatment and Secondary Prophylaxis/Chronic Suppressive/Maintenance Therapy)

Opportunistic Infection	Preferred Therapy	Alternative Therapy	Other Comments
Cystoisosporiasis	<p>For Acute Infection</p> <ul style="list-style-type: none"> • TMP-SMX (160 mg/800 mg) PO (or IV) four times daily for 10 days (AII), or • TMP-SMX (160 mg/800 mg) PO (or IV) twice daily for 7 days (BI) • In patients with persistent or worsening symptoms while on twice-daily dosing, consider increasing the daily dose and/or the duration to 3–4 weeks (BIII). • IV TMP-SMX may be used for patients with potential or documented malabsorption. <p>Chronic Maintenance Therapy (Secondary Prophylaxis)</p> <p><i>In People With CD4 Count <200 Cells/mm³</i></p> <ul style="list-style-type: none"> • TMP-SMX (160 mg/800 mg) PO three times weekly (AI), or • TMP-SMX (160 mg/800 mg) PO daily (AIII) 	<p>For Acute Infection</p> <ul style="list-style-type: none"> • Pyrimethamine^b 50–75 mg PO daily plus leucovorin 10–25 mg PO daily for 4 weeks (BIII), or • Ciprofloxacin 500 mg PO or 400 mg IV twice daily for 7 days (CI) <p>Chronic Maintenance Therapy (Secondary Prophylaxis)</p> <p><i>In People With CD4 Count <200 Cells/mm³</i></p> <ul style="list-style-type: none"> • TMP-SMX (320 mg/1,600 mg) three times weekly (BIII), or • Pyrimethamine^b 25 mg PO daily plus leucovorin 5–10 mg PO daily (BIII), or • Ciprofloxacin 500 mg three times weekly (CI) as a second-line alternative 	<p>Fluid and electrolyte management in patients with dehydration (AIII)</p> <p>Nutritional supplementation for patients who are malnourished (AIII)</p> <p>Immune reconstitution with ART may result in fewer relapses; therefore, ART initiation should not be deferred (AIII).</p>

Table 2. Treatment of HIV-Associated Opportunistic Infections (Includes Recommendations for Acute Treatment and Secondary Prophylaxis/Chronic Suppressive/Maintenance Therapy)

Opportunistic Infection	Preferred Therapy	Alternative Therapy	Other Comments
Cytomegalovirus (CMV) Disease	<p>CMV Retinitis Induction Therapy (Followed by Maintenance Therapy)</p> <ul style="list-style-type: none"> Valganciclovir 900 mg PO every 12 hours for minimum 14–21 days, then maintenance therapy with valganciclovir 900 mg PO once daily (AI), <i>or</i> Ganciclovir 5 mg/kg IV every 12 hours for minimum 14–21 days, then maintenance therapy with valganciclovir 900 mg PO once daily (AI), <i>or</i> Ganciclovir 5 mg/kg IV every 12 hours for minimum 14–21 days, then maintenance therapy with ganciclovir 5 mg/kg IV daily (AI) <p>Note: Many clinicians prefer the IV formulation when retinitis is more central and sight-threatening or when adequate GI absorption is a concern; transition to oral valganciclovir can be considered when there is evidence of clinical response.</p> <p>CMV Retinitis—Immediate Sight-Threatening Lesions (Within 1,500 Microns of the Fovea or Optic Disc)</p> <ul style="list-style-type: none"> In addition to systemic therapy (as listed above): intravitreal injections of ganciclovir (2 mg/injection) <i>or</i> foscarnet (2.4 mg/injection), repeated weekly during the induction period until lesion inactivity is achieved (BIII), followed by systemic treatment alone for maintenance therapy. <p>CMV Retinitis—Peripheral Lesions</p> <ul style="list-style-type: none"> Valganciclovir 900 mg PO every 12 hours for minimum 14–21 days, then maintenance therapy with valganciclovir 900 mg PO once daily (AI) 	<p>CMV Retinitis Induction Therapy (Followed by Maintenance Therapy)</p> <ul style="list-style-type: none"> Foscarnet 60 mg/kg IV every 8 hours or 90 mg/kg IV every 12 hours for 14–21 days, then maintenance therapy with foscarnet 90 mg/kg or 120 mg/kg IV every 24 hours (BI), <i>or</i> Cidofovir 5 mg/kg IV every week for 2 weeks, then maintenance therapy with cidofovir 5 mg/kg IV every other week. Administer 1 L of normal saline before and, if additional fluid load can be tolerated, administer another 1 L of normal saline after each cidofovir infusion. Administer probenecid 2 g PO 3 hours before each cidofovir dose followed by 1 g PO 2 hours after the dose, and 1 g PO 8 hours after the dose (total of 4 g) (CI). <p>CMV Retinitis—Immediate Sight-Threatening Lesions (Within 1,500 Microns of the Fovea or Optic Disc)</p> <ul style="list-style-type: none"> In addition to systemic therapy (as listed above): intravitreal therapy as listed in the Preferred section <p>CMV Esophagitis or Colitis</p> <ul style="list-style-type: none"> Foscarnet 60 mg/kg IV every 8 hours or 90 mg/kg IV every 12 hours (BIII)—for patients with treatment-limiting toxicities to ganciclovir or with ganciclovir resistance; <i>or</i> Cidofovir (dosing as listed above) (CI) Duration: 21–42 days or until signs and symptoms have resolved (AIII) 	<p>CMV retinitis treatment should be individualized based on tolerance of systemic medications, prior exposure to anti-CMV drugs, and location of lesions as well as with the active participation of an ophthalmologist who is familiar with diagnosis and management of this retinal disease.</p> <p>Systemic therapy must be administered to prevent disease in the contralateral eye until immune reconstitution has occurred.</p> <p>After resolution of the acute non-ocular CMV disease and initiation of effective ART, chronic maintenance therapy is not routinely recommended for CMV GI disease, pneumonia, and central nervous system disease unless there is concurrent retinitis, there have already been recurrent infections, or severe disease was present initially</p> <p>Ophthalmologic monitoring is recommended during treatment and after discontinuation of maintenance therapy and is continued after immune reconstitution. See CMV chapter for ophthalmic monitoring recommendations and frequency of follow-up.</p> <p>Initiate ART within 1–2 weeks after starting anti-CMV therapy for retinitis, esophagitis, colitis, or other end-organ diseases caused by CMV (BIII).</p>

Table 2. Treatment of HIV-Associated Opportunistic Infections (Includes Recommendations for Acute Treatment and Secondary Prophylaxis/Chronic Suppressive/Maintenance Therapy)

Opportunistic Infection	Preferred Therapy	Alternative Therapy	Other Comments
	<p>Duration of Maintenance Therapy</p> <ul style="list-style-type: none"> Continue maintenance therapy for at least 3 months, and lesions are inactive, and CD4 count ≥ 100 cells/mm³ for at least 3 months in response to ART (AII) <p>CMV Esophagitis or Colitis</p> <ul style="list-style-type: none"> Ganciclovir 5 mg/kg IV every 12 hours (AI); may switch to valganciclovir 900 mg PO every 12 hours when the patient can absorb and tolerate oral therapy (AIII). Valganciclovir 900 mg PO every 12 hours can be used in patients with mild disease (AIII). Duration: 21–42 days or until signs and symptoms have resolved (AIII) <p>CMV Pneumonia</p> <ul style="list-style-type: none"> Ganciclovir 5 mg/kg IV every 12 hours (BIII) Duration: ≥ 21 days or until signs and symptoms have resolved (CII) <p>CMV Neurological Disease</p> <ul style="list-style-type: none"> Ganciclovir 5 mg/kg IV every 12 hours plus foscarnet (60 mg/kg IV every 8 hours or 90 mg/kg IV every 12 hours) (BIII). Duration: ≥ 21 days based on clinical response (AIII) 	<p>CMV Pneumonia</p> <ul style="list-style-type: none"> Foscarnet 60 mg/kg IV every 8 hours or 90 mg/kg IV every 12 hours (BIII) Duration: ≥ 21 days or until signs and symptoms have resolved (CII) 	<p>With neurologic disease, including CMV encephalitis, ventriculitis, and radiculitis, the Panel recommends initiating ART within 2 weeks, although clinical judgment based on individual cases is needed (BIII).</p> <p>Immune recovery uveitis (IRU) may develop in the setting of immune reconstitution. See CMV chapter for information on the treatment of IRU.</p> <p>Cidofovir should be avoided in patients with sulfonamide allergy because of cross-hypersensitivity with probenecid.</p> <ul style="list-style-type: none"> For people with renal insufficiency, see Table 6 for information on dosing adjustments for valganciclovir, ganciclovir, foscarnet, and cidofovir.

Table 2. Treatment of HIV-Associated Opportunistic Infections (Includes Recommendations for Acute Treatment and Secondary Prophylaxis/Chronic Suppressive/Maintenance Therapy)

Opportunistic Infection	Preferred Therapy	Alternative Therapy	Other Comments
Hepatitis B Virus (HBV) Disease	<p>ART is recommended for all people with HIV/HBV coinfection regardless of CD4 count and HBV DNA level (AII).</p> <p>The ART regimen must include drugs that are active against both HBV and HIV (AII).</p> <p>If CrCl ≥ 60 mL/min</p> <ul style="list-style-type: none"> ART with (TAF [10 or 25 mg]^a plus FTC 200 mg) or (TAF 25 mg plus 3TC 300 mg) PO once daily (AII), <i>or</i> ART with (TDF 300 mg plus [FTC 200 mg or 3TC 300 mg]) once daily (AII) <p>If CrCl 30–59 mL/min</p> <ul style="list-style-type: none"> ART with TAF (10 or 25 mg)^a plus FTC 200 mg PO once daily (AII) ART with TAF 25 mg plus 3TC 300 mg PO once daily (AII) <p>If CrCl <30 mL/min, Not on HD</p> <ul style="list-style-type: none"> Renally dose-adjusted entecavir (in place of TDF/[FTC or 3TC] or TAF/FTC or 3TC) with a fully suppressive ART regimen (AIII), <i>or</i> ART with renally dose-adjusted TDF and renally dose adjusted FTC or 3TC can be used (AIII) if recovery of renal function is unlikely. If CrCl ≥ 15 to 29 mL/min, then ART with TAF (10 or 25 mg)^a once daily plus renally dose-adjusted FTC or 3TC is an option (AIII). <ul style="list-style-type: none"> Some clinicians may continue full-dose FTC to allow people to remain on fixed-dose TAF/FTC products. 	<p>For People on Tenofovir-Sparing ART</p> <ul style="list-style-type: none"> Entecavir may be used in place of (TAF or TDF) plus (3TC or FTC) (AIII). However, entecavir should not be used in individuals with 3TC-resistant HBV, as prior 3TC resistance reduces susceptibility to entecavir (AI). Consultation with an expert is recommended. 	<p>Directly acting HBV drugs—such as FTC, entecavir, 3TC, and tenofovir—must not be given in the absence of a fully suppressive ART regimen to avoid selection of drug-resistant HIV (AI).</p> <p>Chronic administration of 3TC or FTC as the only HBV-active drug should be avoided because of the high rate of selection of HBV drug-resistance mutations (AI).</p> <p>People with 3TC-resistant HBV will have cross-resistance to FTC and partial resistance to entecavir, these agents should not be used (AI). If 3TC resistance is suspected or documented, TDF or TAF should be added to the ART regimen (AIII).</p> <p>When changing ART regimens, continue agents with anti-HBV activity (AIII).</p> <p>See Table 6 for dosing recommendation for TDF, TAF, FTC, and 3TC for people with renal impairment.</p> <p>If anti-HBV therapy is discontinued and a flare occurs, therapy should be reinstituted because it can be potentially lifesaving (AIII).</p>

Table 2. Treatment of HIV-Associated Opportunistic Infections (Includes Recommendations for Acute Treatment and Secondary Prophylaxis/Chronic Suppressive/Maintenance Therapy)

Opportunistic Infection	Preferred Therapy	Alternative Therapy	Other Comments
	<p>If on HD</p> <ul style="list-style-type: none"> ART with renally dose-adjusted TDF plus [FTC 200 mg or renally dose-adjusted 3TC once daily] (AII) ART TAF [10 or 25 mg]^a plus FTC 200 mg PO once daily (given after HD on dialysis days) (AII) <p>Duration</p> <ul style="list-style-type: none"> Continue treatment indefinitely if HBsAg remains positive (AIII). 		<p>Because HBV reactivation can occur during treatment for HCV with direct-acting antivirals in the absence of anti-HBV therapy, all people with HIV/HBV coinfection who will be treated for HCV infection should be on HBV-active ART at the time of HCV treatment initiation (AIII).</p> <p>If immunosuppressive therapy is given, HBV reactivation can occur. For people who are HBsAg-positive, treatment for HBV infection should be administered regardless of HBV DNA level (AII). For detailed recommendations, including for those who are HBsAg negative, see Hepatitis B Virus Infection.</p>
Hepatitis C Virus (HCV) Disease	<p>For Treatment-Naive Patients Without Cirrhosis (Any Genotype or No Pre-treatment Genotype)</p> <ul style="list-style-type: none"> Glecaprevir/pibrentasvir FDC (100 mg/40 mg per tablet), three tablets daily for 8 weeks (AI), or Sofosbuvir/velpatasvir FDC (400 mg/100 mg per tablet), one tablet daily for 12 weeks (AI) <p>Characteristics that exclude patients from receiving simplified approach to therapy are outlined in Box 1 of the Hepatitis C Virus section.</p> <p>For Treatment-Naive Patients With Compensated Cirrhosis (Recommendations Based on Genotypes)</p> <p>Genotypes 1, 2, 4–6</p> <ul style="list-style-type: none"> Glecaprevir/pibrentasvir FDC (100 mg/40 mg per tablet), three tablets daily for 8 weeks (AIII), or 	<p>For Treatment-Naive Patients With Compensated Cirrhosis (Recommendations Based on Genotypes)</p> <p>Genotypes 1, 2, 4–6</p> <ul style="list-style-type: none"> Glecaprevir/pibrentasvir FDC (100 mg/40 mg per tablet), three tablets daily for 12 weeks (CI) <p>Genotype 3</p> <ul style="list-style-type: none"> Glecaprevir/pibrentasvir FDC (100 mg/40 mg per tablet), three tablets daily for 12 weeks (CI), or Sofosbuvir/velpatasvir FDC (400 mg/100 mg per tablet), one tablet daily with or without ribavirin for 12 weeks, pending results of nonstructural protein 5A RAS testing (CI) 	<p>A simplified approach to HCV treatment can be used in treatment-naive patients with any genotype and without cirrhosis. This approach includes standardized treatment with no on-treatment testing or in-person follow-up and limited follow-up to confirm SVR.</p> <p>See the Hepatitis C Virus section to review a summary of drug–drug interactions between HCV therapy and ARV drugs.</p> <p>HCV treatment should not be withheld solely due to perceived lack of adherence to ART or untreated HIV (BIII).</p>

Table 2. Treatment of HIV-Associated Opportunistic Infections (Includes Recommendations for Acute Treatment and Secondary Prophylaxis/Chronic Suppressive/Maintenance Therapy)

Opportunistic Infection	Preferred Therapy	Alternative Therapy	Other Comments
	<ul style="list-style-type: none"> Sofosbuvir/velpatasvir FDC (400 mg/100 mg per tablet), one tablet daily for 12 weeks (AI) <p><i>Genotype 3</i></p> <ul style="list-style-type: none"> Glecaprevir/pibrentasvir FDC (100 mg/40 mg per tablet), three tablets daily for 8 weeks (AIII) <p>For Treatment of Acute HCV Infection</p> <ul style="list-style-type: none"> Glecaprevir/pibrentasvir FDC (100 mg/40 mg per tablet), three tablets daily for 8 weeks (AI), <i>or</i> Sofosbuvir/velpatasvir FDC (400 mg/100 mg per tablet), one tablet daily for 12 weeks (AI) 		<p>Effort should be made to document SVR (HCV RNA less than lower limits of quantification) at least 12 weeks after completion of therapy (AI). Patients without cirrhosis who achieve SVR do not require continued liver disease monitoring.</p> <p>Recommendations for treatment after DAA failure are not provided. The reader is referred to the corresponding section in the AASLD/IDSA HCV treatment guidance.</p>
Herpes Simplex Virus (HSV) Disease	<p>Orolabial Lesions (For 5–10 Days)</p> <ul style="list-style-type: none"> Valacyclovir 1 g PO twice a day (AIII), <i>or</i> Famciclovir 500 mg PO twice daily (AIII), <i>or</i> Acyclovir 400 mg PO three times daily (AIII) <p>Initial Genital Lesions (For 7–10 Days) or Recurrent Genital Lesions (For 5–10 Days)</p> <ul style="list-style-type: none"> Valacyclovir 1 g PO twice daily (AI), <i>or</i> Famciclovir 500 mg PO twice daily (AI), <i>or</i> Acyclovir 400 mg PO three times daily (AI) <p>Severe Mucocutaneous and Visceral or Disseminated HSV</p> <ul style="list-style-type: none"> Initial therapy: Acyclovir 10 mg/kg IV every 8 hours for 10–14 days (AIII) 	<p>For Acyclovir-Resistant HSV (Based on Clinical Response, Typically for 21–28 Days or Longer)</p> <p><i>Preferred Therapy</i></p> <ul style="list-style-type: none"> Foscarnet 40 mg/kg IV every 8–12 hours until clinical response (AI) <p><i>Alternative Therapy</i></p> <ul style="list-style-type: none"> Topical imiquimod 5% three times weekly (BIII), <i>or</i> Topical cidofovir 1% once daily (BIII), <i>or</i> Topical trifluridine 1% three times daily (BIII), <i>or</i> Topical foscarnet 1% five times daily (BIII), <i>or</i> IV cidofovir once weekly for 2 weeks, then every other week (CIII). See CMV Retinitis for information on concomitant probenecid and hydration. 	<p>HSV infection can be treated with episodic therapy when symptomatic lesions occur or with daily suppressive therapy to prevent recurrences.</p> <p>For ophthalmic HSV disease, consultation with an ophthalmologist experienced with HSV ocular disease is strongly recommended (AIII).</p> <p>Topical formulations of trifluridine, cidofovir, and foscarnet are not commercially available but can be extemporaneously compounded.</p> <p>An expanded access program of oral pritelivir is available for immunocompromised patients with acyclovir-resistant HSV infection. See the AiCuris Pritelivir website.</p>

Table 2. Treatment of HIV-Associated Opportunistic Infections (Includes Recommendations for Acute Treatment and Secondary Prophylaxis/Chronic Suppressive/Maintenance Therapy)

Opportunistic Infection	Preferred Therapy	Alternative Therapy	Other Comments
	<ul style="list-style-type: none"> For mucocutaneous lesions, change to PO therapy (dose as above) once lesions begin to regress (AIII); continue PO therapy until lesions have completely healed (AIII). Some clinicians will extend the course of treatment for visceral or disseminated disease based on clinical response and degree of immunosuppression. <p>Epithelial Keratitis</p> <ul style="list-style-type: none"> Valacyclovir 1 g PO twice daily for 5–10 days (BIII), <i>or</i> Acyclovir 400 mg PO five times daily for 5–10 days (BIII), <i>or</i> Trifluridine eye drops (BIII) (see Mpox for dosing), <i>or</i> Ganciclovir 0.15% gel: 1 drop into the affected eye five times a day (every 3 hours while awake) until re-epithelialization has occurred; then 1 drop three times a day for an additional 7 days (BIII) <p>Stromal Keratitis (For ≥1 Year)</p> <ul style="list-style-type: none"> Acyclovir 400 mg PO twice daily (AII) <i>or</i> valacyclovir 500 mg once daily (AIII), <i>plus</i> Prednisolone 1%: 1 drop into the affected eye six to eight times per day for at least 10 weeks followed by taper; exact course should be managed by ophthalmologist and based on individual patient course (AIII). <p>HSV Meningitis (For 10–14 Days) (AIII)</p> <ul style="list-style-type: none"> Initial therapy: Acyclovir 10 mg/kg IV every 8 hours After clinical improvement, change to valacyclovir 1 g PO three times a day 	<p>Chronic Suppressive Therapy</p> <ul style="list-style-type: none"> Acyclovir 400 mg PO twice daily (AI), <i>or</i> Famciclovir 500 mg PO twice daily (AI), <i>or</i> Valacyclovir 500 or 1,000 mg PO once daily (CIII). See the HSV chapter section for additional information. May continue indefinitely, regardless of CD4 count; re-evaluate at least annually, particularly if immune reconstitution has occurred (BIII). 	<p>Chronic suppressive therapy is indicated for people with severe or frequent recurrences of genital herpes (AI), for people who want to minimize frequency of recurrences (AI), and to reduce the risk of genital ulcer disease in people with CD4 counts <250 cells/mm³ who are starting ART (BI).</p> <p>Recurrences following episodes of acyclovir-resistant HSV can be caused by either acyclovir-resistant or acyclovir-sensitive strains; after resolution of the acyclovir-resistant episode, suppressive therapy with acyclovir can be considered to prevent additional recurrences (CIII).</p>

Table 2. Treatment of HIV-Associated Opportunistic Infections (Includes Recommendations for Acute Treatment and Secondary Prophylaxis/Chronic Suppressive/Maintenance Therapy)

Opportunistic Infection	Preferred Therapy	Alternative Therapy	Other Comments
	<p>HSV Encephalitis (For 14–21 Days) (CIII)</p> <ul style="list-style-type: none"> Acyclovir 10 mg/kg IV every 8 hours Some clinicians will elect to extend the course based on clinical response and degree of immunosuppression. <p>Chronic Suppressive Therapy</p> <ul style="list-style-type: none"> Valacyclovir 500 mg PO twice daily (AI) May continue indefinitely, regardless of CD4 count; re-evaluate annually, particularly if immune reconstitution has occurred (BIII). 		
Histoplasmosis	<p>Severe Disseminated Disease</p> <p><i>Induction Therapy (For ≥ 2 Weeks or Until Clinically Improved)</i></p> <ul style="list-style-type: none"> Liposomal amphotericin B 3 mg/kg IV daily (AI) <p><i>Maintenance Therapy (For ≥ 12 Months)</i></p> <ul style="list-style-type: none"> Itraconazole 200 mg PO three times a day for 3 days, then 200 mg PO twice a day (AI) <p>Mild to Moderate Disseminated Disease or Acute Pulmonary Histoplasmosis in Persons With CD4 < 300 Cells/mm³</p> <p><i>Both Induction and Maintenance Therapy (For ≥ 12 Months)</i></p> <ul style="list-style-type: none"> Itraconazole 200 mg PO three times a day for 3 days, then 200 mg PO twice a day (AI) <p>Meningitis</p> <p><i>Induction Therapy (4–6 Weeks Depending on Symptom Resolution and Improvement of CSF Findings)</i></p> <ul style="list-style-type: none"> Liposomal amphotericin B 5 mg/kg IV daily (AIII) 	<p>Severe Disseminated Disease</p> <p><i>Induction Therapy</i></p> <ul style="list-style-type: none"> Amphotericin B lipid complex 5 mg/kg IV daily (AIII) <p><i>Maintenance Therapy (For ≥ 12 Months)</i></p> <ul style="list-style-type: none"> Posaconazole extended-release tablet 300 mg PO twice a day for 1 day, then 300 mg PO once daily (BIII) Voriconazole 400 mg PO twice a day for 1 day, then 200 mg PO twice a day (BIII), or Fluconazole 800 mg PO daily (CII) <p>Mild to Moderate Disseminated Disease or Acute Pulmonary Histoplasmosis in People With CD4 Count < 300 Cells/mm³</p> <p><i>Both Induction and Maintenance Therapy (For ≥ 12 Months)</i></p> <ul style="list-style-type: none"> Posaconazole extended-release tablet 300 mg PO twice a day for 1 day, then 300 mg PO once daily (BIII) 	<p>Itraconazole, posaconazole, and voriconazole may have significant interactions with certain ARV agents. These interactions are complex and can be bidirectional. Refer to Drug–Drug Interactions in the Adult and Adolescent Antiretroviral Guidelines for dosage recommendations.</p> <p>Therapeutic drug monitoring and dosage adjustment may be necessary to ensure triazole antifungal and ARV efficacy and reduce concentration-related toxicities.</p> <p>Random serum concentration of itraconazole between 1–2 mcg/mL is recommended. Frequency and severity of toxicities increase when concentration is ≥ 5 mcg/mL.</p>

Table 2. Treatment of HIV-Associated Opportunistic Infections (Includes Recommendations for Acute Treatment and Secondary Prophylaxis/Chronic Suppressive/Maintenance Therapy)

Opportunistic Infection	Preferred Therapy	Alternative Therapy	Other Comments
	<p><i>Maintenance Therapy (For ≥ 12 Months and Until Resolution of Abnormal CSF Findings)</i></p> <ul style="list-style-type: none"> Itraconazole 200 mg PO two to three times a day (AIII), with dose adjustment based on serum itraconazole concentration <p>Long-Term Suppression Therapy</p> <p><i>For Patients With Severe Disseminated or CNS Infection After Completion of ≥ 12 Months of Therapy (AIII) or Who Relapse Despite Appropriate Therapy (after reinduction therapy) (BIII)</i></p> <ul style="list-style-type: none"> Itraconazole 200 mg PO daily (AIII) 	<ul style="list-style-type: none"> Voriconazole 400 mg PO twice a day for 1 day, then 200 mg PO twice a day (BIII), or Fluconazole 800 mg PO daily (CII) <p>Meningitis</p> <p><i>Induction Therapy (4–6 Weeks Depending on Symptom Resolution and Improvement of CSF Findings)</i></p> <ul style="list-style-type: none"> Amphotericin B deoxycholate 0.7–1.0 mg/kg IV daily (BIII) <p><i>Maintenance Therapy (For ≥ 12 Months and Until Resolution of Abnormal CSF Findings)</i></p> <ul style="list-style-type: none"> Voriconazole 400 mg PO twice a day for 1 day, then 200 mg twice a day (BIII), or For people who cannot tolerate itraconazole and voriconazole: Fluconazole 800 mg PO daily (CII) <p>Long-Term Suppression Therapy</p> <ul style="list-style-type: none"> Fluconazole 400 mg PO once daily (CII) Voriconazole 200 mg PO twice daily (BIII) Posaconazole 300 mg extended-release tablet PO once daily (BIII) 	<p>The recommendations for posaconazole, voriconazole, and fluconazole are based on very limited clinical data and for people who are only moderately ill.</p>

Table 2. Treatment of HIV-Associated Opportunistic Infections (Includes Recommendations for Acute Treatment and Secondary Prophylaxis/Chronic Suppressive/Maintenance Therapy)

Opportunistic Infection	Preferred Therapy	Alternative Therapy	Other Comments
<p>Human Herpesvirus-8 (HHV-8) Associated Diseases (Kaposi Sarcoma [KS], Primary Effusion Lymphoma [PEL], Multicentric Castleman's Disease [MCD])</p>	<p>KS</p> <p><i>ACTG Stage T0 (Localized Involvement of Skin and/or Lymph Nodes and/or Minimal Oral Disease Only)</i></p> <ul style="list-style-type: none"> • ART (AII) alone, or • ART plus liposomal doxorubicin (AIII), if disease does not respond to ART alone <p><i>ACTG Stage T1 (Extensive and/or Symptomatic KS Skin Lesions, Extensive Oral Disease, Tumor-Associated Edema and/or Ulceration, or Any Visceral Involvement)</i></p> <ul style="list-style-type: none"> • ART plus liposomal doxorubicin (AI) <p>MCD</p> <ul style="list-style-type: none"> • MCD without KS: ART plus rituximab (BII) • MCD with KS: ART plus rituximab with liposomal doxorubicin (AII) <p>PEL or HHV-8 DLBCL (With or Without KS)</p> <ul style="list-style-type: none"> • PEL or HHV-8-associated DLBCL: ART plus combination chemotherapy, such as EPOCH (AIII) • PEL or HHV-8-associated DLBCL with MCD: ART plus dose-adjusted EPOCH plus rituximab (CII) <p>KSHV-Associated Inflammatory Cytokine Syndrome</p> <ul style="list-style-type: none"> • After excluding MCD and PEL, ART plus rituximab with combination chemotherapy for concurrent KS (CII) 	<p>KS</p> <p><i>ACTG Stage T1 (Extensive and/or Symptomatic KS Skin Lesions, Extensive Oral Disease, Tumor-Associated Edema and/or Ulceration, or Any Visceral Involvement)</i></p> <ul style="list-style-type: none"> • ART plus paclitaxel, if liposomal doxorubicin is not available (AI), or to treat recurrence after treatment with liposomal doxorubicin (AII), or • ART with oral pomalidomide plus thromboprophylaxis (e.g., low-dose aspirin 81 mg daily) (BII) <p>MCD</p> <ul style="list-style-type: none"> • ART plus IV ganciclovir (or oral valganciclovir) with or without high-dose zidovudine—not for use in cases of multi-organ failure, such as renal and/or hepatic failure (CII) 	<p>Treatment should be undertaken in consultation with both oncology and infectious disease specialists, with additional input from centers specifically caring for people with HIV and cancer (AIII).</p> <p>All HHV-8–specific treatments should be given with ART (AI).</p> <p>ART given concurrently with chemotherapy should be chosen to minimize drug–drug interactions and additive toxicities (AIII).</p> <p>Systemic corticosteroids or other immunosuppressants in patients with KS should either be avoided or used under close observation, given the potential for exacerbation of KS (AIII).</p> <p>Although corticosteroids appear to be effective as an adjunctive therapy for MCD, they should be used with caution or avoided, especially in patients with concurrent KS, given potential for exacerbation of life-threatening KS (AIII).</p> <p>One-third of patients receiving rituximab may have subsequent exacerbations or emergence of KS.</p>

Table 2. Treatment of HIV-Associated Opportunistic Infections (Includes Recommendations for Acute Treatment and Secondary Prophylaxis/Chronic Suppressive/Maintenance Therapy)

Opportunistic Infection		Preferred Therapy	Alternative Therapy	Other Comments
Human Papillomavirus (HPV) Disease		Treatment of Genital Warts		<p>Patients with HIV may have larger or more numerous warts and may not respond as well to therapy for genital warts when compared to individuals without HIV.</p> <p>Intralesional interferon is usually not recommended because of high cost, difficult administration, and potential for systemic side effects (CIII).</p> <p>In patients with HIV, the rate of recurrence of genital warts despite treatment is high.</p> <p>There is no consensus on the treatment of oral warts. Many treatments for anogenital warts cannot be used in the oral mucosa. Surgery is the most common treatment for oral warts that interfere with function or for aesthetic reasons.</p>
		<p>Patient-Applied Treatment Options for Uncomplicated External Warts That Can Be Easily Identified by Patients</p> <ul style="list-style-type: none"> • Topical imiquimod 5% cream: Apply to genital warts at bedtime on three nonconsecutive nights per week for up to 16 weeks, until lesions are no longer visible. Each treatment should be washed with soap and water 6–10 hours after application (BII); or • Topical podophyllotoxin (e.g., podofilox 0.5% solution or 0.5% gel): Apply to genital warts twice a day for 3 days, followed by 4 days of no therapy. Can be repeated weekly for up to four cycles (BIII); or • Topical sinecatechins 15% ointment: Apply to affected areas three times a day for up to 16 weeks, until warts are completely cleared and not visible (BIII); or • Topical cidofovir 1%: Daily for 5 days per week for 8 weeks (CIII). Topical formulation is not commercially available but may be compounded. 	<p>Provider-Applied Therapy for Complex or Multicentric Lesions, or Lesions Inaccessible to Patient, or Due to Patient or Provider Preference</p> <ul style="list-style-type: none"> • Cryotherapy (liquid nitrogen or cryoprobe): Apply until each lesion is thoroughly frozen. Repeat every 1–2 weeks for up to 4 weeks, until lesions are no longer visible (BIII). Some specialists allow the lesion to thaw, then freeze a second time in each session (BIII); or • Trichloroacetic acid or bichloroacetic acid cauterization (80–90% aqueous solution): Apply to warts only and allow to dry until a white frost develops. Repeat weekly for up to 6 weeks, until lesions are no longer visible (BIII); or • Intralesional cidofovir (15 mg/mL solution) injected directly into the wart (maximum 1 mL per session). May be repeated every 4 weeks for total of 3–4 treatments (CIII). • Surgical excision (BIII) or laser surgery (CIII) for external or anal warts 	
Leishmaniasis	Visceral	<p>For <i>Leishmania infantum/chagasi</i></p> <ul style="list-style-type: none"> • Liposomal amphotericin B 3–5 mg/kg IV daily (AII), or • Liposomal amphotericin B interrupted schedule (e.g., 4 mg/kg on Days 1–5, 10, 17, 24, 31, 38) (AII) • To achieve total dose of 20–60 mg/kg (AII) 	<p>For <i>Leishmania infantum/chagasi</i> or <i>donovani</i></p> <ul style="list-style-type: none"> • Amphotericin B deoxycholate 0.5–1.0 mg/kg IV daily for total dose of 1.5–2.0 g (BII), or • Pentavalent antimony (meglumine antimoniate) 20 mg/kg IV or IM daily for 28 days (BII) 	<p>ART should be initiated or optimized as soon as possible (AIII).</p> <p>Pentavalent antimony is for investigational use only.</p> <p>For miltefosine, visit www.profounda.com.</p>

Table 2. Treatment of HIV-Associated Opportunistic Infections (Includes Recommendations for Acute Treatment and Secondary Prophylaxis/Chronic Suppressive/Maintenance Therapy)

Opportunistic Infection		Preferred Therapy	Alternative Therapy	Other Comments
		<p>For <i>Leishmania donovani</i></p> <ul style="list-style-type: none"> Liposomal amphotericin B 5 mg/kg on Days 1, 3, 5, 7, 9, and 11 plus miltefosine 50 mg PO twice daily (for 28 days if from East Africa or 14 days if from Southeast Asia) (BI) <p>Chronic Maintenance Therapy</p> <p>For Patients With CD4 Count <200 Cells/mm³ (AII)</p> <ul style="list-style-type: none"> Liposomal amphotericin B 4 mg/kg IV every 2–4 weeks (AII) 	<p>For <i>Leishmania donovani</i></p> <ul style="list-style-type: none"> Liposomal amphotericin B 3–5 mg/kg IV daily to achieve total dose of 20–60 mg/kg (AII), or Liposomal amphotericin B interrupted schedule (e.g., 4 mg/kg on Days 1–5, 10, 17, 24, 31, 38) to achieve total dose of 20–60 mg/kg (AII), or For Indian <i>L. donovani</i>: Miltefosine ~2.5–3.0 mg/kg PO daily in two or three divided doses (maximum 150 mg daily) for 28 days (BII) <p>Chronic Maintenance Therapy (Secondary Prophylaxis)</p> <ul style="list-style-type: none"> Amphotericin B lipid complex 3 mg/kg IV every 21 days (BII), or Pentavalent antimony (meglumine antimoniate) 20 mg/kg IV or IM every 4 weeks (BII), or Pentamidine 4 mg/kg (maximum 300 mg) IV every 2–4 weeks (BII) 	
	Cutaneous	<p>For Initial Infection</p> <ul style="list-style-type: none"> Liposomal amphotericin B 4 mg/kg IV daily for 10 days (BIII) to achieve total dose of 20–60 mg/kg, or Liposomal amphotericin B interrupted schedule (e.g., 4 mg/kg on Days 1–5, 10, 17, 24, 31, 38) to achieve total dose of 20–60 mg/kg (BIII), or Miltefosine 2.5 mg/kg/day PO in two or three divided doses for 28 days (maximum 150 mg per day) (BIII), or 	<p>Possible Options</p> <ul style="list-style-type: none"> Cryotherapy, or Topical paromomycin, or Intralesional pentavalent antimony (meglumine antimoniate) or pentamidine, or PO or IV fluconazole (<i>L. major</i> and <i>L. mexicana</i>) IV pentamidine Local heat therapy 	<p>ART should be initiated or optimized as soon as possible (AIII).</p> <p>Pentavalent antimony is for investigational use only.</p> <p>For miltefosine, visit www.profounda.com.</p>

Table 2. Treatment of HIV-Associated Opportunistic Infections (Includes Recommendations for Acute Treatment and Secondary Prophylaxis/Chronic Suppressive/Maintenance Therapy)

Opportunistic Infection		Preferred Therapy	Alternative Therapy	Other Comments
		<ul style="list-style-type: none"> Pentavalent antimony (meglumine antimoniate) 20 mg/kg IV or IM daily for 28 days (BIII) <p>Chronic Maintenance Therapy</p> <ul style="list-style-type: none"> May be indicated in immunocompromised patients with multiple relapses (CIII) Drugs and doses same as for visceral leishmaniasis 	No data exist for any of these agents in patients with HIV; choice and efficacy are dependent on species of <i>Leishmania</i> .	
Malaria		<p>Because <i>Plasmodium falciparum</i> malaria can progress within hours from mild symptoms or low-grade fever to severe disease or death, all people with HIV with confirmed or suspected <i>P. falciparum</i> infection should be hospitalized for evaluation, initiation of treatment, and observation (AIII).</p> <p>Treatment recommendations for people with HIV, regardless of CD4 count, are the same as for patients without HIV (AIII).</p> <p>Choice of therapy is guided by the degree of parasitemia, the species of <i>Plasmodium</i>, the person's clinical status, and the antimalarial susceptibility profile of the local <i>Plasmodium</i> species. Guidance can be found at CDC's Clinical Guidance: Malaria Diagnosis & Treatment in the U.S. webpage.</p>	When suspicion for malaria is low and the individual is not severely ill, antimalarial treatment can often be deferred until the diagnosis is confirmed by laboratory investigation (AIII).	For treatment recommendations for specific regions, clinicians should refer to CDC's Clinical Guidance: Malaria Diagnosis & Treatment in the U.S. webpage or call the CDC Malaria Hotline: 770-488-7788, Monday–Friday, 8 a.m.–4:30 p.m. ET, or 770-488-7100 after hours.
Microsporidiosis		<p>For GI Infections Caused by <i>Enterocytozoon bienuesi</i></p> <ul style="list-style-type: none"> Initiate or optimize ART with immune restoration to CD4 count >100 cells/mm³ (AII), <i>plus</i> Manage dehydration and diarrhea with fluid support (AII) and malnutrition and wasting with nutritional supplements (AIII). 	<p>For GI Infections Caused by <i>E. bienuesi</i></p> <ul style="list-style-type: none"> Fumagillin 60 mg/day (BII) and TNP-470 (a synthetic analog of fumagillin) (BIII) may be effective, but neither is available in the United States. Nitazoxanide (1,000 mg twice daily) may have some effect, but response may be minimal in patients with low CD4 counts (CIII). 	Antimotility agents can be used for diarrhea control if required (BIII).

Table 2. Treatment of HIV-Associated Opportunistic Infections (Includes Recommendations for Acute Treatment and Secondary Prophylaxis/Chronic Suppressive/Maintenance Therapy)

Opportunistic Infection	Preferred Therapy	Alternative Therapy	Other Comments
	<p>For Intestinal and Disseminated (Not Ocular) Infections Caused by Microsporidia Other Than <i>E. bienuesi</i> and <i>Vittaforma corneae</i></p> <ul style="list-style-type: none"> Albendazole 400 mg PO twice daily (AII), continue until CD4 count >200 cells/mm³ for >6 months after initiation of ART (BIII) <p>For Disseminated Disease Caused by <i>Trachipleistophora</i> or <i>Anncaliia</i></p> <ul style="list-style-type: none"> Itraconazole 400 mg PO daily plus albendazole 400 mg PO twice daily (CIII) <p>For Ocular Infection</p> <ul style="list-style-type: none"> Topical fumagillin bicyclohexylammonium (Fumidil B) eye drops 3 mg/mL in saline (fumagillin 70 mcg/mL): Two eye drops every 2 hours for 4 days, then two eye drops four times daily (investigational use only in United States) (BII) plus albendazole 400 mg PO twice daily, for management of systemic infection (BIII) <p>If CD4 Count >200 Cells/mm³</p> <ul style="list-style-type: none"> Continue until symptoms resolve (CIII). <p>If CD4 Count ≤200 Cells/mm³</p> <ul style="list-style-type: none"> Continue until resolution of ocular symptoms and CD4 count increases to >200 cells/mm³ for >6 months in response to ART (BIII). 		

Table 2. Treatment of HIV-Associated Opportunistic Infections (Includes Recommendations for Acute Treatment and Secondary Prophylaxis/Chronic Suppressive/Maintenance Therapy)

Opportunistic Infection	Preferred Therapy	Alternative Therapy	Other Comments
Mpox	<p>For People With Mild to Moderate Disease Who Are Not at Risk for Severe Disease</p> <ul style="list-style-type: none"> Supportive care, including adequate pain control (BIII), and referral to clinical trials, if available (CIII). CDC can provide additional guidance to clinicians with patient management questions (see Other Comments for contact information). <p>For Severe Disease or People at Risk for Severe Disease (See Other Comments for Definition)</p> <ul style="list-style-type: none"> Tecovirimat 600 mg PO every 12 hours (40 to <120 kg) or every 8 hours (≥120 kg) for 14 days (BIII) within 30 minutes of a fatty meal, <i>or</i> Tecovirimat 200 mg IV every 12 hours for 14 days (35 to <120 kg) or 300 mg IV every 12 hours (≥120 kg) infused over 6 hours (BIII) if concern exists regarding altered GI absorption capacity, inability to take PO, or severity of illness <p><i>Adjunctive Therapy</i></p> <ul style="list-style-type: none"> Cidofovir 5 mg/kg/week IV for two doses with saline hydration before and after therapy and probenecid 2 g PO 3 hours before the dose followed by 1 g PO 2 hours after the dose and 1 g PO 8 hours after the dose (total of 4 g) (BIII), <i>or</i> Brincidofovir 200 mg PO once weekly for two doses (BIII), <i>or</i> VIGIV 6,000–9,000 units/kg IV single dose (BIII) 	None	<p>People with severe mpox or are at high risk for severe mpox should receive directed mpox antiviral treatment (BIII) with early consultation with CDC or an expert in mpox treatment and prompt use of combination therapy, ideally at the time of the first medical encounter and after considering the risks and benefits (CIII). Contact: poxvirus@cdc.gov or 770-488-7100</p> <p>Tecovirimat, brincidofovir, and VIGIV are available via expanded access or emergency IND.</p> <p>People with severe immunocompromise might benefit from extended treatment (i.e., >14 days) if new confirmed mpox lesions occur or existing lesions or symptoms worsen despite treatment (CIII).</p> <p>Effective ART should be initiated as soon as possible (AIII).</p>

Table 2. Treatment of HIV-Associated Opportunistic Infections (Includes Recommendations for Acute Treatment and Secondary Prophylaxis/Chronic Suppressive/Maintenance Therapy)

Opportunistic Infection	Preferred Therapy	Alternative Therapy	Other Comments
	<p><i>For Ocular Mpox</i></p> <ul style="list-style-type: none"> • Tecovirimat 600 mg PO every 12 hours (40 to <120 kg) or every 8 hours (≥120 kg) for 14 days (BIII) within 30 minutes of a fatty meal, <i>plus</i> • Trifluridine (Viroptic) 1 drop into affected eye(s) every 2 hours when awake (max: 9 drops/day) until re-epithelialization, then every 4 hours (min: 5 drops/day) for 7 days, or until all periocular lesions have healed (BIII) in consultation with an ophthalmologist (BIII) <ul style="list-style-type: none"> o Prolonged use of trifluridine beyond 21 days might cause corneal epithelial toxicity and should be avoided (AII). 		<p>Definition for Severe Disease: Hemorrhagic disease; lesions affecting ≥25% of body surface that may be confluent, necrotic, and/or hemorrhagic in appearance or cause sepsis; disease resulting in airway compromise or affecting the nervous system; cardiac and/or neurologic disease; ocular or periorbital infections; other conditions requiring hospitalization. Consult the CDC's Tecovirimat webpage for more details.</p> <p>Definition for at Risk for Severe Disease: Not virologically suppressed, CD4 counts <200 cells/mm³, have another immunocompromising condition, have atopic dermatitis/other conditions affecting skin integrity, or are children, pregnant, or breastfeeding. Consult the CDC's Tecovirimat webpage for more details.</p>
<i>Mycobacterium avium</i> Complex (MAC) Disease	<p>At Least Two Drugs as Initial Therapy to Prevent or Delay Emergence of Resistance (AII)</p> <ul style="list-style-type: none"> • Clarithromycin 500 mg PO twice daily (AI) plus ethambutol 15 mg/kg PO daily (AI), <i>or</i> • Azithromycin 500–600 mg (AII) (when drug interactions, intolerance, or adherence issues preclude the use of clarithromycin [AII]) plus ethambutol 15 mg/kg PO daily (AI) 	<p>A third or fourth drug should be used if more severe disease is present, the risk of mortality is high, emergence of drug resistance is likely (e.g., after failure of MAC prophylaxis), if mycobacterial loads are high (>2 log₁₀ CFU/mL of blood), if the patient is not on ART, or if there is an absence of viral suppression on ART (CIII).</p> <ul style="list-style-type: none"> • Third Drug: <ul style="list-style-type: none"> o Rifabutin 300 mg PO daily (dose adjustment may be necessary based on drug interactions) (CI) 	<p>Testing of susceptibility to clarithromycin and azithromycin is recommended.</p> <p>NSAIDs may be used for people with HIV who experience mild or moderate symptoms attributed to IRIS (BIII).</p> <p>If IRIS symptoms are more severe or unremitting, a short-term course (4–8 weeks) of systemic corticosteroid therapy (equivalent to prednisone 20–40 mg/day) can be used (BII).</p>

Table 2. Treatment of HIV-Associated Opportunistic Infections (Includes Recommendations for Acute Treatment and Secondary Prophylaxis/Chronic Suppressive/Maintenance Therapy)

Opportunistic Infection	Preferred Therapy	Alternative Therapy	Other Comments
	<p>Duration</p> <ul style="list-style-type: none"> At least 12 months (All) Shorter duration may be considered. CD4 count should be >100 cells/mm³ for ≥ 6 months in response to ART before discontinuation of MAC therapy (CIII). 	<ul style="list-style-type: none"> Refer to the Dosing Recommendations for Use of ARV and Anti-TB Drugs for Treatment of Active Drug Sensitive TB table of the <i>Mycobacterium tuberculosis</i> section for dosing recommendations. Fourth Drug: <ul style="list-style-type: none"> A fluoroquinolone (CIII) (levofloxacin 500 mg PO daily or moxifloxacin 400 mg PO daily), or An injectable aminoglycoside (CIII) (amikacin 10–15 mg/kg IV daily) 	<p>Bedaquiline, tedizolid, linezolid, and omadacycline have demonstrated <i>in vitro</i> activity against clinical isolates of MAC; these might also be considered in people with refractory MAC disease.</p> <p>For information on drug–drug interactions between antimycobacterial agents (e.g. clarithromycin, rifabutin, bedaquiline) and concomitant antiretrovirals, refer to the Liverpool HIV Drug Interaction Checker.</p> <p>See Table 6 for renal dosing recommendations (e.g. clarithromycin, rifabutin, levofloxacin, and aminoglycosides).</p>
<i>Mycobacterium tuberculosis</i> (TB) Disease: Drug-Susceptible TB	<p>Refer to the Dosing Recommendations for Use of ARV and Anti-TB Drugs for Treatment of Active Drug Sensitive TB table in the <i>Mycobacterium tuberculosis</i> section for dosing recommendations.</p> <p>Intensive Phase (8 Weeks)</p> <ul style="list-style-type: none"> INH (plus pyridoxine) plus (RIF or RFB) plus PZA plus EMB PO daily (AI) If drug-susceptibility report shows sensitivity to INH and RIF, then EMB may be discontinued before the end of 2 months (AI). <p>Continuation Phase (Duration Depends on Site and Severity of Infection as Noted Below)</p> <ul style="list-style-type: none"> INH (plus pyridoxine) plus (RIF or RFB) PO daily (All) <p>Total Duration of Therapy for Drug-Susceptible TB</p> <ul style="list-style-type: none"> <i>Pulmonary, uncomplicated TB</i>: 6 months (BII) 	<p>Only for Patients Receiving an Efavirenz-Based ARV Regimen; Not Recommended for Extrapulmonary TB</p> <p><i>Intensive Phase (8 Weeks)</i></p> <ul style="list-style-type: none"> INH plus RPT 1,200 mg plus moxifloxacin 400 mg plus PZA plus pyridoxine 25–50mg PO daily (AI)^c <p><i>Continuation Phase (9 Weeks)</i></p> <ul style="list-style-type: none"> INH plus RPT 1200 mg plus moxifloxacin 400 mg plus pyridoxine 25–50mg PO daily (AI) 	<p>DOT is recommended for all patients (All).</p> <p>All rifamycins may have significant pharmacokinetic interactions with ARV drugs; please refer to the Dosing Recommendations for Use of ARV and Anti-TB Drugs for Treatment of Active Drug Sensitive TB table in the <i>Mycobacterium tuberculosis</i> section and the Drug–Drug Interactions section of the Adult and Adolescent Antiretroviral Guidelines for dosing recommendations.</p> <p>Therapeutic drug monitoring should be considered in patients receiving rifamycin and interacting ART.</p>

Table 2. Treatment of HIV-Associated Opportunistic Infections (Includes Recommendations for Acute Treatment and Secondary Prophylaxis/Chronic Suppressive/Maintenance Therapy)

Opportunistic Infection	Preferred Therapy	Alternative Therapy	Other Comments
	<ul style="list-style-type: none"> <i>Pulmonary TB with positive culture at 8 weeks of TB treatment, or severe cavitory or disseminated extrapulmonary TB: 9 months (BII)</i> <i>TB meningitis: 9–12 months (BII)</i> <i>Extrapulmonary TB in Other sites: 6 months (BII)</i> 		<p>Adjunctive corticosteroids for TB meningitis (AII): Dexamethasone 0.3–0.4mg/kg/day for 2–4 weeks, then taper by 0.1 mg/kg per week until 0.1 mg/kg, then 4 mg per day, and taper by 1 mg/week for total of 12 weeks.</p>
<i>Mycobacterium tuberculosis</i> (TB) Disease: Drug-Resistant TB	<p>Refer to the Dosing Recommendations for Use of ARV and Anti-TB Drugs for Treatment of Active Drug Sensitive TB table in the <i>Mycobacterium tuberculosis</i> section for dosing recommendations.</p> <p>Empiric Therapy for Suspected Resistance to Rifamycin^d +/- Resistance to Other Drugs</p> <ul style="list-style-type: none"> INH (plus pyridoxine) plus PZA plus EMB plus (moxifloxacin or levofloxacin) plus (linezolid or amikacin^e) (BII) <p>Confirmed Resistance to INH</p> <ul style="list-style-type: none"> (Moxifloxacin or levofloxacin) plus (RIF or RFB) plus EMB plus PZA for 6 months (BII) <p>Confirmed Resistance to Rifamycin +/- Other Drugs (AI)</p> <p><i>For 14 Days</i></p> <ul style="list-style-type: none"> Pretomanid 200 mg plus linezolid 600 mg plus moxifloxacin 400 mg daily plus bedaquiline 400 PO daily, <i>followed by</i> <p><i>For 24 Weeks</i></p> <ul style="list-style-type: none"> Pretomanid 200 mg plus linezolid 600 mg plus moxifloxacin 400 mg daily, <i>and</i> Bedaquiline 200 mg PO three times per week <p>Omit moxifloxacin if resistant to fluoroquinolones (AI).</p>	<p><i>Confirmed Resistance to Rifamycin +/- Other Drugs</i></p> <ul style="list-style-type: none"> Therapy should be individualized based on drug-susceptibility results and clinical and microbiologic responses, to include ≥5 active drugs, and with close consultation with experienced specialists (BIII). 	<p>At doses above 16 mg, dexamethasone is a CYP3A4 inducer and can decrease certain ARVs that are substrates of CYP3A4 (e.g., DOR, RPV, and protease inhibitors). Consultation with a pharmacist is recommended.</p> <p>Adjunctive corticosteroid is not recommended for patients with TB pericarditis (AI).</p> <p>See text for recommendations on preventing and managing paradoxical TB-IRIS, including prednisone dosing recommendations.</p>

Table 2. Treatment of HIV-Associated Opportunistic Infections (Includes Recommendations for Acute Treatment and Secondary Prophylaxis/Chronic Suppressive/Maintenance Therapy)

Opportunistic Infection	Preferred Therapy	Alternative Therapy	Other Comments
	<p>Duration</p> <ul style="list-style-type: none"> 6–24 months (see Managing Drug-Resistant TB in the Mycobacterium tuberculosis section for discussion) 		
<i>Pneumocystis Pneumonia</i> (PCP)	<p>People with HIV who develop PCP despite TMP-SMX prophylaxis can usually be treated with standard doses of TMP-SMX (BIII).</p> <p>Duration of PCP treatment: 21 days (AII)</p> <p>For Moderate to Severe PCP</p> <ul style="list-style-type: none"> TMP-SMX: (TMP 15–20 mg/kg/day and SMX 75–100 mg/kg/day) IV given in divided doses every 6 or 8 hours (AI); may switch to PO formulations after clinical improvement (AI). <p>For Mild to Moderate PCP</p> <ul style="list-style-type: none"> TMP-SMX: (TMP 15–20 mg/kg/day and SMX 75–100 mg/kg/day) PO given in three divided doses (AI), <i>or</i> TMP-SMX: (160 mg/800 mg or DS) two tablets PO three times daily (AI) <p>Secondary Prophylaxis, After Completion of PCP Treatment</p> <ul style="list-style-type: none"> TMP-SMX DS: one tablet PO daily (AI), <i>or</i> TMP-SMX (80 mg/400 mg or SS): one tablet PO daily (AI) 	<p>For Moderate to Severe PCP</p> <ul style="list-style-type: none"> Primaquine 30 mg (base) PO daily plus (clindamycin 600 mg IV every 6 hours or 900 mg IV every 8 hours) or (clindamycin 450 mg PO every 6 hours or 600 mg PO every 8 hours) (AI) (some clinicians prefer this option because it is more effective and less toxic than pentamidine), <i>or</i> Pentamidine 4 mg/kg IV daily infused over ≥60 minutes (AI); can reduce dose to 3 mg/kg IV daily in the event of toxicities (BI) <p>For Mild to Moderate PCP</p> <ul style="list-style-type: none"> Dapsone 100 mg PO daily plus TMP 15 mg/kg/day PO given in three divided doses (BI), <i>or</i> Primaquine 30 mg (base) PO daily plus (clindamycin 450 mg PO every 6 hours or 600 mg PO every 8 hours) (BI), <i>or</i> Atovaquone 750 mg PO twice daily with food (BI) <p>Secondary Prophylaxis, After Completion of PCP Treatment</p> <p>The following regimens can be used for people who are seropositive or seronegative for <i>Toxoplasma gondii</i>:</p> <ul style="list-style-type: none"> TMP-SMX DS: one tablet PO three times weekly (BI), <i>or</i> 	<p>Indications for Adjunctive Corticosteroids for Moderate to Severe PCP (AI)</p> <ul style="list-style-type: none"> PaO₂ <70 mmHg at room air, <i>or</i> A-a gradient ≥35 mmHg <p>Prednisone Doses (Beginning as Early as Possible and Within 72 Hours of PCP Therapy) (AI)</p> <ul style="list-style-type: none"> Days 1–5: 40 mg PO twice daily Days 6–10: 40 mg PO daily Days 11–21: 20 mg PO daily <p>IV methylprednisolone can be administered as 80% of prednisone dose.</p> <p>Benefit of using a corticosteroid if started after 72 hours of treatment is unknown, but some clinicians will use it for moderate to severe PCP (BIII).</p> <p>Whenever possible, patients should be tested for G6PD before use of dapsone or primaquine. Alternative therapy should be used in patients found to have G6PD deficiency.</p>

Table 2. Treatment of HIV-Associated Opportunistic Infections (Includes Recommendations for Acute Treatment and Secondary Prophylaxis/Chronic Suppressive/Maintenance Therapy)

Opportunistic Infection	Preferred Therapy	Alternative Therapy	Other Comments
		<ul style="list-style-type: none"> • Dapsone 50 mg PO daily with pyrimethamine^b 50 mg plus leucovorin 25 mg PO weekly (BI), or • Dapsone 200 mg plus pyrimethamine^b 75 mg plus leucovorin 25 mg PO weekly (BI), or • Atovaquone 1,500 mg PO daily with food (BI) <p>The following regimens should only be used if the person is seronegative for <i>Toxoplasma gondii</i>:</p> <ul style="list-style-type: none"> • Dapsone 100 mg PO daily (BI), or • Aerosolized pentamidine 300 mg monthly via Respirgard II nebulizer (BI), or • Intravenous pentamidine 300 mg every 28 days (CIII) 	<p>Patients who are receiving pyrimethamine^b/sulfadiazine for the treatment or suppression of toxoplasmosis do not require additional PCP prophylaxis (AII).</p> <p>If TMP-SMX is discontinued because of a mild adverse reaction, reinstitution should be considered after the reaction resolves (AII). The dose can be increased gradually (desensitization) (BI) or the drug can be given at a reduced dose or frequency (CIII).</p> <p>TMP-SMX should be permanently discontinued in patients with possible or definite Stevens-Johnson syndrome or toxic epidermal necrosis (AIII). See alternative options.</p>
Progressive Multifocal Leukoencephalopathy (PML)/JC Virus Infections	<p>There is no specific antiviral therapy for JC virus infection. The main treatment approach is to reverse the immunosuppression caused by HIV.</p> <p>Initiate ART immediately in ART-naïve patients (AII).</p> <p>Optimize ART to achieve viral suppression in patients who develop PML and receive ART but remain viremic (AIII).</p>	None	<p>Corticosteroids may be used for PML-IRIS (BIII). The optimal corticosteroid regimen has not been established but should be tailored to individual patients.</p> <p>ART should not be discontinued during PML-IRIS (AIII).</p>

Table 2. Treatment of HIV-Associated Opportunistic Infections (Includes Recommendations for Acute Treatment and Secondary Prophylaxis/Chronic Suppressive/Maintenance Therapy)

Opportunistic Infection	Preferred Therapy	Alternative Therapy	Other Comments
Syphilis (<i>Treponema pallidum</i> Infection)	<p>Primary, Secondary, and Early Latent Syphilis (≤ 1 Year)</p> <ul style="list-style-type: none"> Benzathine penicillin G 2.4 million units IM for one dose (AII) <p>Late Latent Disease (>1 Year) or Latent of Unknown Duration</p> <ul style="list-style-type: none"> Benzathine penicillin G 2.4 million units IM weekly for three doses (AII) <p>Tertiary–Cardiovascular or Gummatous Disease (Without Neurosyphilis)</p> <ul style="list-style-type: none"> Benzathine penicillin G 2.4 million units IM weekly for three doses (AII) Note: Consider CSF examination. People with CSF abnormalities should be treated with a regimen for neurosyphilis (AII). <p>Neurosyphilis, Ocular Syphilis, or Otic Syphilis</p> <ul style="list-style-type: none"> Aqueous crystalline penicillin G 18–24 million units per day (administered as 3–4 million units IV every 4 hours or by continuous IV infusion) for 10–14 days (AII) <p>For Penicillin-Allergic Patients</p> <ul style="list-style-type: none"> Desensitization to penicillin 	<p>Primary, Secondary, and Early Latent Syphilis (≤ 1 Year)</p> <ul style="list-style-type: none"> Doxycycline 100 mg PO twice daily for 14 days (BII), or Ceftriaxone 1 g IM or IV daily for 10–14 days (BII) <p>For Penicillin-Allergic Patients</p> <ul style="list-style-type: none"> If adherence or follow-up cannot be ensured, desensitize and treat with benzathine penicillin G (AIII). <p>Late Latent Disease (>1 Year) or Latent of Unknown Duration</p> <ul style="list-style-type: none"> Doxycycline 100 mg PO twice a day for 28 days (BIII) 	<p>The efficacy of non-penicillin alternatives has not been well evaluated in people with HIV, and they should be used only with close clinical and serologic monitoring. Azithromycin should not be used as treatment for syphilis (AII).</p> <p>In the setting of drug shortages, refer to the FDA's Drug Shortages and CDC's Availability of STI Testing and Treatment Products webpages for information and alternatives.</p> <p>For pregnancy considerations, please see the Syphilis chapter.</p> <p>Skin testing for penicillin allergy can be useful, if available. Among people for whom the only option is penicillin (e.g., syphilis in pregnancy) and among those with a positive skin test, desensitization to penicillin in consultation with a specialist is the preferred approach. Skin testing, challenge, and desensitization may be contraindicated in certain individuals.</p>

Table 2. Treatment of HIV-Associated Opportunistic Infections (Includes Recommendations for Acute Treatment and Secondary Prophylaxis/Chronic Suppressive/Maintenance Therapy)

Opportunistic Infection	Preferred Therapy	Alternative Therapy	Other Comments
		<p><i>For Penicillin-Allergic Patients</i></p> <ul style="list-style-type: none"> • If adherence or follow-up cannot be ensured, desensitize and treat with benzathine penicillin G (AIII). <p>Tertiary–Cardiovascular or Gummatous Disease (Without Neurosyphilis)</p> <p><i>For Penicillin-Allergic Patients</i></p> <ul style="list-style-type: none"> • Treat in consultation with infectious diseases specialist. <p>Neurosyphilis, Ocular Syphilis, or Otis Syphilis</p> <ul style="list-style-type: none"> • Procaine penicillin 2.4 million units IM daily plus probenecid 500 mg PO four times a day for 10–14 days (BII). However, procaine penicillin has been discontinued by the manufacturer as of June 2023. • Note: People who are allergic to sulfa-containing medications should not be given probenecid. <p><i>For Penicillin-Allergic Patients</i></p> <ul style="list-style-type: none"> • Ceftriaxone 2 g IM or IV daily for 10–14 days (BII) • Note: Limited data suggest ceftriaxone may be an option for neurosyphilis treatment with shared decision-making. The risk for penicillin cross-reactivity between third-generation cephalosporins is low; see Alternative Regimens for details. 	<p>The Jarisch-Herxheimer reaction is an acute febrile reaction accompanied by headache, fever, and myalgia that can occur within the first 24 hours after therapy. This reaction occurs most frequently in people with early syphilis and can induce early labor or cause fetal distress during pregnancy. Patients should be informed about this potential reaction to treatment and that it is not an allergic reaction to penicillin.</p>

Table 2. Treatment of HIV-Associated Opportunistic Infections (Includes Recommendations for Acute Treatment and Secondary Prophylaxis/Chronic Suppressive/Maintenance Therapy)

Opportunistic Infection	Preferred Therapy	Alternative Therapy	Other Comments
Talaromycosis (Penicilliosis)	<p>Induction Therapy</p> <ul style="list-style-type: none"> Liposomal amphotericin B 3–5 mg/kg/day IV (AIII) <p><i>Duration</i></p> <ul style="list-style-type: none"> 2 weeks (AIII), followed by consolidation therapy <p>Consolidation Therapy</p> <ul style="list-style-type: none"> Itraconazole 200 mg PO every 12 hours for 10 weeks (AI), followed by chronic maintenance therapy <p>Chronic Maintenance Therapy</p> <ul style="list-style-type: none"> Itraconazole 200 mg PO once daily (AI) 	<p>Induction Therapy</p> <ul style="list-style-type: none"> Amphotericin B deoxycholate 0.7 mg/kg/day IV (if liposomal amphotericin B is not available) (AI) <p><i>Duration</i></p> <ul style="list-style-type: none"> 2 weeks (AI), followed by consolidation therapy <p><i>If Amphotericin B Is Not Available, Contraindicated, or Not Tolerated</i></p> <ul style="list-style-type: none"> Voriconazole 6 mg/kg IV every 12 hours on Day 1 (loading dose), then 4 mg/kg IV every 12 hours (BII), or Voriconazole 600 mg PO every 12 hours on Day 1 (loading dose), then 400 mg PO every 12 hours (BII) <i>Duration:</i> 2 weeks (BII), followed by consolidation therapy with itraconazole (preferred) or voriconazole <p>Consolidation Therapy</p> <ul style="list-style-type: none"> Voriconazole 200 mg PO every 12 hours for 10 weeks (BII), followed by chronic maintenance therapy <p>Chronic Maintenance Therapy</p> <ul style="list-style-type: none"> Itraconazole should be used (AI). Optimal dose of voriconazole for maintenance therapy has not been studied. 	<p>Itraconazole is not recommended as induction therapy for talaromycosis (AI).</p> <p>ART should be initiated as early as 1 week after initiation of treatment for talaromycosis (AII).</p> <p>Itraconazole and voriconazole may have significant interactions with certain ARV agents. These interactions are complex and can be bidirectional. Refer to Drug–Drug Interactions in the Adult and Adolescent Antiretroviral Guidelines for dosage recommendations.</p> <p>Itraconazole and voriconazole concentrations should be monitored beginning at 5 days and dose adjusted as needed to obtain serum trough concentrations for itraconazole should be >0.5 mcg/mL (for a combined itraconazole plus hydroxyitraconazole level) and >1 mcg/mL for voriconazole (BIII).</p> <p>Itraconazole solution is generally preferred over the capsule formulation because of improved bioavailability.</p>

Table 2. Treatment of HIV-Associated Opportunistic Infections (Includes Recommendations for Acute Treatment and Secondary Prophylaxis/Chronic Suppressive/Maintenance Therapy)

Opportunistic Infection	Preferred Therapy	Alternative Therapy	Other Comments
<i>Toxoplasma gondii</i> Encephalitis	<p>Treatment of Acute Infection</p> <ul style="list-style-type: none"> Pyrimethamine^b 200 mg PO one time, followed by weight-based therapy (AI): <ul style="list-style-type: none"> If ≤60 kg: Pyrimethamine^b 50 mg PO once daily plus sulfadiazine 1,000 mg PO every 6 hours plus leucovorin 10–25 mg PO once daily If >60 kg: Pyrimethamine^b 75 mg PO once daily plus sulfadiazine 1,500 mg PO every 6 hours plus leucovorin 10–25 mg PO once daily Note: Leucovorin dose can be increased to 50 mg daily or twice a day. TMP-SMX (TMP 5 mg/kg and SMX 25 mg/kg) IV or PO twice a day (AI) <p>Duration for Acute Therapy</p> <ul style="list-style-type: none"> At least 6 weeks (BII); longer duration if clinical or radiologic disease is extensive or response is incomplete at 6 weeks After completion of acute therapy, all patients should be initiated on chronic maintenance therapy. <p>Chronic Maintenance Therapy</p> <ul style="list-style-type: none"> Pyrimethamine^b 25–50 mg PO daily plus sulfadiazine 2,000–4,000 mg PO daily (in 2–4 divided doses) plus leucovorin 10–25 mg PO daily (AI), or TMP-SMX DS one tablet twice a day (AI) 	<p>Treatment of Acute Infection</p> <ul style="list-style-type: none"> Pyrimethamine^b (leucovorin)* plus clindamycin 600 mg IV or PO every 6 hours (AI), or Atovaquone 1,500 mg PO twice a day with food plus pyrimethamine^b (leucovorin)* (BII), or Atovaquone 1,500 mg PO twice a day with food plus sulfadiazine 1,000–1,500 mg PO every 6 hours (weight-based dosing, as in preferred therapy) (BII), or Atovaquone 1,500 mg PO twice a day with food (BII) <p>Chronic Maintenance Therapy</p> <ul style="list-style-type: none"> (Pyrimethamine^b 25–50 mg plus leucovorin 10–25 mg) PO daily plus clindamycin 600 mg PO every 8 hours plus (BI), or Atovaquone 750–1,500 mg PO twice a day plus (pyrimethamine^b 25 mg plus leucovorin 10 mg) PO daily (BII), or Atovaquone 750–1,500 mg PO twice a day plus sulfadiazine 2,000–4,000 mg PO daily (in two to four divided doses) (BII), or Atovaquone 750–1,500 mg PO twice a day with food (BII) <p>* Pyrimethamine^b and leucovorin doses are the same as for preferred therapy.</p>	<p>If pyrimethamine is unavailable or there is a delay in obtaining it, TMP-SMX should be used in place of pyrimethamine-sulfadiazine (AI).</p> <p>For patients with a history of sulfa allergy, sulfa desensitization should be attempted using one of several published strategies (BI).</p> <p>Atovaquone should be administered until therapeutic doses of TMP-SMX are achieved (CIII).</p> <p>Adjunctive corticosteroids (e.g., dexamethasone) should only be administered when clinically indicated to treat mass effect associated with focal lesions or associated edema (BIII); discontinue as soon as clinically feasible.</p> <p>Antiseizure medications should be administered to patients with a history of seizures (AI) and continued through acute treatment (BII) but should not be used as seizure prophylaxis (BII).</p> <p>If clindamycin is used in place of sulfadiazine, additional therapy must be added to prevent PCP (AI).</p>

Table 2. Treatment of HIV-Associated Opportunistic Infections (Includes Recommendations for Acute Treatment and Secondary Prophylaxis/Chronic Suppressive/Maintenance Therapy)

Opportunistic Infection	Preferred Therapy	Alternative Therapy	Other Comments
Varicella Zoster Virus (VZV) Disease	<p>Primary Varicella Infection (Chickenpox)</p> <p><i>Uncomplicated Cases</i></p> <ul style="list-style-type: none"> Initiate as soon as possible after lesion onset and continue for 5–7 days: <ul style="list-style-type: none"> Valacyclovir 1 g PO three times a day (AII), or Famciclovir 500 mg PO three times a day (AII) <p><i>Severe or Complicated Cases</i></p> <ul style="list-style-type: none"> Acyclovir 10 mg/kg IV every 8 hours for 7–10 days (AIII) May switch to oral valacyclovir, famciclovir, or acyclovir after defervescence and clinical improvement if no evidence of visceral involvement (BIII). <p>Herpes Zoster (Shingles)</p> <ul style="list-style-type: none"> Initiate therapy as soon as possible and within 1 week of rash onset, or any time prior to full crusting of lesions (AIII). <p><i>Acute, Localized, Dermatomal</i></p> <ul style="list-style-type: none"> For 7–10 days. Consider longer duration if lesions are slow to resolve (CIII). Valacyclovir 1 g PO three times a day (AII), or Famciclovir 500 mg PO three times a day (AII) <p><i>Extensive Cutaneous Lesion or Visceral Involvement</i></p> <ul style="list-style-type: none"> Acyclovir 10 mg/kg IV every 8 hours until clinical improvement is evident (AII) 	<p>Primary Varicella Infection (Chickenpox)</p> <p><i>Uncomplicated Cases</i></p> <ul style="list-style-type: none"> Initiate as soon as possible after lesion onset and continue for 5–7 days: <ul style="list-style-type: none"> Acyclovir 800 mg PO five times a day (BII) <p>Herpes Zoster (Shingles)</p> <ul style="list-style-type: none"> Initiate therapy as soon as possible and within 1 week of rash onset, or any time prior to full crusting of lesions (AIII). <p><i>Acute, Localized, Dermatomal</i></p> <ul style="list-style-type: none"> For 7–10 days. Consider longer duration if lesions are slow to resolve (CIII). Acyclovir 800 mg PO five times a day (BII) <p>ARN</p> <p><i>Suppressive Therapy</i></p> <ul style="list-style-type: none"> Following initial therapy, acyclovir 800 mg PO twice daily (CIII) for ≥6 months 	<p>Consultation with an ophthalmologist experienced in the management of patients with VZV ocular disease is strongly recommended (AIII).</p> <p>People with V1 herpes zoster should have an ophthalmologic exam; patients with normal eye examinations initially should receive follow-up eye examinations, even after the skin lesions heal (AIII).</p> <p>All people with HIV should receive ART as soon as possible after diagnosis of HIV infection (AIII). The presence of disease caused by VZV is not an indication to defer or discontinue ART.</p>

Table 2. Treatment of HIV-Associated Opportunistic Infections (Includes Recommendations for Acute Treatment and Secondary Prophylaxis/Chronic Suppressive/Maintenance Therapy)

Opportunistic Infection	Preferred Therapy	Alternative Therapy	Other Comments
	<ul style="list-style-type: none"> May switch to PO therapy (valacyclovir, famciclovir, or acyclovir) after clinical improvement (i.e., when no new vesicle formation and improvement of signs and symptoms of visceral VZV) to complete a total 10- to 14-day course (BIII). <p>Herpes Zoster Ophthalmicus</p> <p><i>Late Dendriform Lesions of the Corneal Epithelium</i></p> <ul style="list-style-type: none"> Oral antiviral treatment as stated above for "Acute, Localized, Dermatomal" herpes zoster, followed by suppressive therapy. If/when patient is not receiving oral antivirals, topical antivirals should be administered until resolution of lesions (AIII). <ul style="list-style-type: none"> Trifluridine 1% eye drops: see Mpox for dosing (BIII) Ganciclovir 0.15% gel: see HSV for dosing (BIII) <p><i>Stromal Keratitis and Anterior Uveitis</i></p> <ul style="list-style-type: none"> Oral antiviral treatment as stated above for "Acute, Localized, Dermatomal" herpes zoster, followed by suppressive therapy. Alongside initial systemic antiviral treatment, topical corticosteroids should be administered (AII). Typical regimen using prednisolone acetate 1% drops: 1 drop in affected eye every 2 hours while awake (maximum eight times daily) until clinical response, then slow taper over many weeks if clinical improvement continues, eventually decreasing to 1–2 drops daily for at least 1 year (AII). 		

Table 2. Treatment of HIV-Associated Opportunistic Infections (Includes Recommendations for Acute Treatment and Secondary Prophylaxis/Chronic Suppressive/Maintenance Therapy)

Opportunistic Infection	Preferred Therapy	Alternative Therapy	Other Comments
	<p><i>Suppressive Therapy</i></p> <ul style="list-style-type: none"> Valacyclovir 1 g PO daily for 12 months to prevent development of new, or exacerbations of existing, keratitis lesions and uveitis (AII). <p>ARN</p> <p><i>Initial Therapy</i></p> <ul style="list-style-type: none"> Acyclovir 10 mg/kg IV every 8 hours for 10–14 days or until lesion healing (AIII), followed by suppressive therapy. A single adjunctive intravitreal injection of ganciclovir (2 mg/0.05 mL) can also be given as a part of induction treatment (BIII). Additional injections can be given if there is a concern for lack of treatment response, but injections should not be given more frequently than twice weekly (BIII). <p><i>Suppressive Therapy</i></p> <ul style="list-style-type: none"> Valacyclovir 1 g PO daily (AIII) for ≥6 months <p>PORN</p> <ul style="list-style-type: none"> Optimal antiviral therapy and duration of therapy remains undefined and should be managed by an ophthalmologist experienced in the management of VZV ocular disease (AIII). Acyclovir 10 mg/kg IV every 8 hours or ganciclovir 5 mg/kg IV every 12 hours (AIII), <i>plus</i> Intravitreal ganciclovir 2 mg/0.05 mL or intravitreal foscarnet 1.2 mg/0.05 mL weekly (BIII) 		

^a TAF 10-mg dose is in the FDC tablets of EVG/c/TAF/FTC and DRV/c/TAF/FTC; when TAF is used with other antiretrovirals, the dose is 25 mg.

^b Refer to [Daraprim Direct](#) for information on accessing pyrimethamine.

^c This regimen was not studied and is not recommended during pregnancy or breastfeeding or for people who are <40 kg or who have most types of extrapulmonary TB (other than pleural TB or lymphadenitis).

Table 2. Treatment of HIV-Associated Opportunistic Infections (Includes Recommendations for Acute Treatment and Secondary Prophylaxis/Chronic Suppressive/Maintenance Therapy)

^d Many patients with RIF resistance also have resistance to isoniazid. Susceptibility should be confirmed in any patient with RIF resistance to determine if isoniazid can be included in the treatment regimen.

^e Given the risk of ototoxicity and nephrotoxicity with aminoglycosides, use of amikacin should generally be restricted to bridging regimens while awaiting availability of less toxic medications and/or results of drug-susceptibility testing.

For information regarding the evidence ratings, refer to the [Rating System for Prevention and Treatment Recommendations](#) in the Introduction section of the Adult and Adolescent Opportunistic Infection Guidelines.

Key: +/- = with or without; 3TC = lamivudine; A-a = alveolar-arterial; AASLD = American Association for the Study of Liver Diseases; ACTG = AIDS Clinical Trials Group; ARN = acute retinal necrosis; ART = antiretroviral therapy; ARV = antiretroviral; CAP = community-acquired pneumonia; CD4 = CD4 T lymphocyte; CDC = Centers for Disease Control and Prevention; CDI = *Clostridium difficile* infection; CFU = colony-forming unit; CMV = cytomegalovirus; CNS = central nervous system; CrAg = cryptococcal antigen; CrCl = creatinine clearance; CSF = cerebrospinal fluid; CYP3A = cytochrome P450 3A; DAA = direct-acting antiviral; DOR = doravirine; DOT = directly observed therapy; DLBCL = diffuse large B-cell lymphoma; DRV = darunavir; DRV/c = darunavir/cobicistat; DS = double strength; EIA = enzyme immunoassay; EMB = ethambutol; EPOCH = etoposide, prednisone, vincristine, cyclophosphamide, and doxorubicin combination therapy; EVG = elvitegravir; FDA = U.S. Food and Drug Administration; FDC = fixed-dose combination; FMT = fecal microbiota therapy; FTC = emtricitabine; G6PD = glucose-6-phosphate dehydrogenase; GI = gastrointestinal; HBsAg = hepatitis B surface antigen; HBV = hepatitis B virus; HCV = hepatitis C virus; HD = hemodialysis; HHV-8 = human herpesvirus 8; HPV = human papillomavirus; HSV = herpes simplex virus; ICP = intracranial pressure; IDSA = Infectious Diseases Society of America; IM = intramuscular; IND = investigational new drug; INH = isoniazid; IRIS = immune reconstitution inflammatory syndrome; IRU = immune recovery uveitis; IV = intravenous; KS = Kaposi sarcoma; KSHV = Kaposi sarcoma–associated herpesvirus; LFA = lateral flow assay; LP = lumbar puncture; MAC = *Mycobacterium avium* complex; MCD = multicentric Castleman's disease; MIC = minimum inhibitory concentration; MRSA = methicillin-resistant *Staphylococcus aureus*; MSM = men who have sex with men; NSAID = nonsteroidal anti-inflammatory drugs; OI = opportunistic infection; PaO₂ = partial pressure of oxygen; PCP = *Pneumocystis pneumonia*; PEL = primary effusion lymphoma; PML = progressive multifocal leukoencephalopathy; PO = oral; PORN = progressive outer retinal necrosis; PZA = pyrazinamide; RAS = resistance-associated substitution; RFB = rifabutin; RIF = rifampin; RPT = rifapentine; RPV = rilpivirine; SMX = sulfamethoxazole; SS = single strength; SVR = sustained virologic response; TAF = tenofovir alafenamide; TB = tuberculosis; TDF = tenofovir disoproxil fumarate; TMP = trimethoprim; TMP-SMX = trimethoprim-sulfamethoxazole; VIGIV = vaccinia immune globulin intravenous; VZV = varicella zoster virus; WHO = World Health Organization