Table 6. Dosing Recommendations for Drugs Used to Treat or Prevent Opportunistic Infections that Require Dosage Adjustment in Adults With Renal Insufficiency

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Individuals with reduced renal function are at risk of drug accumulation and concentration-dependent toxicities when taking medications that are primarily excreted by the kidneys. The dosage adjustment recommendations in Table 6 are based on estimates of renal function using either creatinine clearance (CrCl) or estimated glomerular filtration rate (eGFR). Although both methods are commonly used to determine dosage adjustments, it is important to note that CrCl and eGFR are not interchangeable and may yield differing results.

Renal clearance, though critical, is only one of several pharmacokinetic parameters that influence disposition of drugs that are primarily excreted by the kidneys. Other factors, such as alterations in volume of distribution or reduction in oral absorption, can also impact drug concentrations. For instance, although reduced renal clearance may necessitate a dose reduction to prevent drug accumulation, increased volume of distribution or impaired oral absorption might require a dose increase to achieve therapeutic concentrations.

Therapeutic drug monitoring (TDM), if available and appropriate, allows the clinician to make informed, individualized decisions in complicated scenarios, leading to dose adjustments that are more precise than those based on estimated CrCl or eGFR. When TDM is desired, clinicians should contact their clinical laboratory to determine assay availability and turnaround time for their institution. Drugs in this table that are used for the prevention or treatment of opportunistic infections and that are known to have assays (for clinical and/or research purposes) available within the United States and typically in Europe include the following:

- Acyclovir
- Amikacin
- Ciprofloxacin
- Clarithromycin
- Cycloserine
- Emtricitabine
- Ethambutol
- Ethionamide
- Famciclovir
- Fluconazole
- Flucytosine
- Ganciclovir
- Levofloxacin
- Posaconazole
- Pyrazinamide
- Quinine
- Rifabutin
- Tenofovir
- Trimethoprim
- Valacyclovir
- Voriconazole

Note: The dosing recommendations provided for people on hemodialysis (HD) specifically apply to those receiving intermittent HD several times weekly. Guidance for other forms of renal replacement therapy (RRT), such as peritoneal dialysis or continuous RRT, is beyond the scope of these guidelines. Given the complexities of drug dosing in people receiving other forms of RRT, clinicians should consult specialists and consider TDM to ensure optimal management.

Table 6. Dosing Recommendations for Drugs Used to Treat or Prevent Opportunistic Infections That Require Dosage Adjustment in Adults With Renal Insufficiency

Drug(s)	Usual Dose	Dosage Adjustment in Renal Insufficiency	
		CrCl^ or eGFR# (mL/min)	Dose
Acyclovir *For IV acyclovir, administer IV fluid hydration to reduce the risk of nephrotoxicity.*	IV Dose for Serious HSV Infections • 5 mg/kg IV every 8 hours IV Dose for Serious VZV Infections or HSV Encephalitis • 10 mg/kg IV every 8 hours	26–50	100% of dose IV every 12 hours
		10–25	100% of dose IV every 24 hours
		<10 or HD	50% of dose IV every 24 hours For people on HD, administer dose after HD on dialysis days.
	PO Dose for Herpes Zoster: 800 mg PO five times per day	10–25	800 mg PO every 8 hours
		<10 or HD	800 mg PO every 12 hours For people on HD, administer dose after HD on dialysis days.
Amikacin *Administer IV fluid hydration to reduce the risk of nephrotoxicity.*	For Mycobacterial Infections: • 15 mg/kg IV per day • Target peak concentration 35–45 mcg/mL; target trough concentration <5 mcg/mL *or* • 25 mg/kg IV three times per week • Target peak concentration 65–80 mcg/mL; target trough concentration <5 mcg/mL	<60 or HD Use with caution in people with renal insufficiency and ototoxicity.	Perform TDM to adjust dose and interval as needed to attain target concentrations. Doses likely needed only 2–3 times per week. Consider consulting local pharmacokinetic dosing services if available. For people on HD, administer dose after HD on dialysis days.
Cidofovir *Administer IV fluid hydration and oral probenecid to reduce the risk of nephrotoxicity (see Table 2 for dosing instructions).*	5 mg/kg IV on Day 0, repeat 5 mg/kg IV dose on Day 7, then 5 mg/kg IV every 2 weeks	Pretreatment SCr >1.5 mg/dL *or* CrCl ≤55 mL/min *or* Urine protein ≥100 mg/dL (≥2+ proteinuria)	Cidofovir is not recommended unless benefits outweigh risks. See "Pharmacokinetics of cidofovir in renal insufficiency and in continuous ambulatory peritoneal dialysis or high-flux hemodialysis" for recommendations on renal dose adjustments.

Table 6. Dosing Recommendations for Drugs Used to Treat or Prevent Opportunistic Infections That Require Dosage Adjustment in Adults With Renal Insufficiency

Drug(s)	Usual Dose	Dosage Adjustment in Renal Insufficiency	
		CrCl^ or eGFR# (mL/min)	Dose
		If SCr increases by 0.3–0.4 mg/dL above baseline	Decrease to 3 mg/kg IV per dose.
		If SCr increases by ≥0.5 mg/dL above baseline *or* ≥3+ proteinuria	Discontinue therapy.
Ciprofloxacin	500–750 mg PO every 12 hours *or* 400 mg IV every 8–12 hours	30–50	500–750 mg PO every 12 hours *or* 400 mg IV every 12 hours
		<30	250–500 mg PO every 24 hours *or* 400 mg IV every 24 hours
		HD	250–500 mg PO every 24 hours *or* 200–400 mg IV every 24 hours; administer dose after HD on dialysis days.
Clarithromycin	500 mg PO every 12 hours	30–60	Usual dose unless used with an HIV PI or with COBI, then reduce dose by 50% (or consider using azithromycin as alternative).
		<30 or HD	250 mg PO twice daily *or* 500 mg PO once daily If used with an HIV PI or COBI, reduce dose by 75% (or consider using azithromycin as alternative).

Table 6. Dosing Recommendations for Drugs Used to Treat or Prevent Opportunistic Infections That Require Dosage Adjustment in Adults With Renal Insufficiency

Drug(s)	Usual Dose	Dosage Adjustment in Renal Insufficiency		
		CrCl^ or eGFR# (mL/min)	Dose	
Cycloserine	10–15 mg/kg/day PO in two divided doses (maximum 1,000 mg/day); start at 250 mg once daily and increase dose per tolerability. Target peak concentration 20–35 mcg/mL	30–80	Usual dose; consider TDM and monitor for toxicities.	
		<30 or HD	250 mg once daily or 500 mg three times per week Perform TDM and adjust dose accordingly. Monitor for toxicities. Use with caution in people with ESRD who are not on dialysis.	
Emtricitabine[a] (FTC) Note: Please refer to Appendix B in the Adult and Adolescent Antiretroviral Guidelines for dosing recommendations for ARV FDC products containing FTC.	One 200 mg capsule PO once daily *or* 240 mg solution PO once daily	CrCl^ or eGFR# (mL/min)	Oral Capsules	Oral Solution
		15–29 (see footnote[b])	200 mg every 72 hours	80 mg every 24 hours
		<15	200 mg every 96 hours	60 mg every 24 hours
		HD (administer dose after HD on dialysis days)	No dose adjustment necessary.	No dose adjustment necessary.
Emtricitabine/ Tenofovir Alafenamide (FTC/TAF) (FDC Trade Name: Descovy) Note: Please refer to Appendix B in the Adult and Adolescent Antiretroviral Guidelines for dosing recommendations for other ARV FDC products containing FTC/TAF.	One tablet (FTC 200 mg/TAF 25 mg) PO once daily	15–29	Coformulated tablet is not recommended. See footnote[b] for more information.	
		<15	Coformulated tablet is not recommended.	
		HD	One tablet daily; on dialysis days, administer dose after HD.	
Emtricitabine/ Tenofovir		30–49	One tablet PO every 48 hours (monitor for worsening renal function or consider switching to TAF)	

Table 6. Dosing Recommendations for Drugs Used to Treat or Prevent Opportunistic Infections That Require Dosage Adjustment in Adults With Renal Insufficiency

Drug(s)	Usual Dose	Dosage Adjustment in Renal Insufficiency		
		CrCl^ or eGFR# (mL/min)	Dose	
Disoproxil Fumarate (FTC/TDF) (FDC Trade Name: Truvada) Note: Please refer to Appendix B in the Adult and Adolescent Antiretroviral Guidelines for dosing recommendations for other ARV FDC products containing FTC/TDF.	One tablet (FTC 200 mg/TDF 300 mg) PO once daily	<30 or HD	Do not use coformulated tablet. Use formulation for each component drug and adjust dose according to recommendations for the individual drugs.	
Entecavir	Usual Dose: 0.5 mg PO once daily For Treatment of 3TC-Refractory HBV or for Decompensated Liver Disease: 1 mg PO once daily	CrCl^ or eGFR# (mL/min)	Usual Renal Dose Adjustment	3TC-Refractory or Decompensated Liver Disease
		30 to <50	• 0.25 mg PO once daily, *or* • 0.5 mg PO every 48 hours	• 0.5 mg PO once daily, *or* • 1 mg PO every 48 hours
		10 to <30	• 0.15 mg PO once daily, *or* • 0.5 mg PO every 72 hours	• 0.3 mg PO once daily, *or* • 1 mg PO every 72 hours
		<10 or HD (for people on HD, administer dose after HD on dialysis days.)	• 0.05 mg PO once daily, *or* • 0.5 mg PO once every 7 days	• 0.1 mg PO once daily, *or* • 1 mg PO once every 7 days
Ethambutol	For MAI: 15 mg/kg PO daily For MTB: 15–25 mg/kg PO daily (See the *Mycobacterium tuberculosis* section for additional MTB dosing recommendations.)	<30 or HD	For MAI: 15 mg/kg PO three times weekly For MTB: 15–25 mg/kg PO three times weekly For people on HD, administer dose after HD. Perform TDM to guide optimal dosing.	

Table 6. Dosing Recommendations for Drugs Used to Treat or Prevent Opportunistic Infections That Require Dosage Adjustment in Adults With Renal Insufficiency

Drug(s)	Usual Dose	Dosage Adjustment in Renal Insufficiency	
		CrCl^ or eGFR# (mL/min)	Dose
Ethionamide	15–20 mg/kg PO daily (usually 250–500 mg PO once or twice daily)	<30 or HD	250–500 mg PO once daily Consider TDM.
Famciclovir	For Herpes Zoster: 500 mg PO every 8 hours For HSV: 500 mg PO every 12 hours	40–59	500 mg PO every 12 hours
		20–39	500 mg PO every 24 hours
		<20	250 mg PO every 24 hours
		HD	250 mg PO only on HD days; administer dose after HD.
Fluconazole	200–1,200 mg PO or IV every 24 hours (dose and route of administration depends on type of OI)	≤50	Administer 100% of the indication-specific initial dose, then adjust maintenance doses to 50% of dose every 24 hours.
		HD	Administer 100% of the indication-specific initial dose, then adjust maintenance doses to full dose three times per week after HD.
Flucytosine	25 mg/kg PO every 6 hours TDM is recommended to guide optimal dosing (target peak serum concentration 2 hours after dose: 25–100 mcg/mL). If TDM is not possible, monitor CBC twice weekly.	21–40	25 mg/kg PO every 12 hours
		10–20	25 mg/kg PO every 24 hours
		<10	25 mg/kg PO every 48 hours
		HD	25–50 mg/kg PO every 48–72 hours; administer dose after HD.
Foscarnet *Administer IV fluid hydration to reduce the risk of nephrotoxicity.*	Induction Therapy for CMV Infection: 180 mg/kg/day IV in two divided doses Maintenance Therapy for CMV Infection or for Treatment of HSV Infections: 90–120 mg/kg IV once daily	Dosage adjustment needed according to calculated CrCl/kg; consult product label for dosing table.	Dosage adjustment needed according to calculated CrCl/kg; consult product label for dosing table.

Table 6. Dosing Recommendations for Drugs Used to Treat or Prevent Opportunistic Infections That Require Dosage Adjustment in Adults With Renal Insufficiency

Drug(s)	Usual Dose	Dosage Adjustment in Renal Insufficiency		
		CrCl^ or eGFR# (mL/min)	Dose	
Ganciclovir	Induction Therapy: 5 mg/kg IV every 12 hours	50–69	2.5 mg/kg IV every 12 hours	
		25–49	2.5 mg/kg IV every 24 hours	
		10–24	1.25 mg/kg IV every 24 hours	
		<10 or HD	1.25 mg/kg IV three times per week For people on HD, administer dose after HD.	
	Maintenance Therapy: 5 mg/kg IV every 24 hours	50–69	2.5 mg/kg IV every 24 hours	
		25–49	1.25 mg/kg IV every 24 hours	
		10–24	0.625 mg/kg IV every 24 hours	
		<10 or HD	0.625 mg/kg IV three times per week. For people on HD, administer dose after HD.	
Lamivudine (3TC) Note: Please refer to Appendix B in the Adult and Adolescent Antiretroviral Guidelines for dosing recommendations for ARV FDC products containing 3TC.	300 mg PO every 24 hours See footnote[d] for more information on alternative dosing.	CrCl^ or eGFR# (mL/min)	Epivir Label[c]	Alternative Dose
		15–29	150 mg PO once, then 100 mg PO every 24 hours	100–150 mg every 24 hours
		5–14	150 mg PO once, then 50 mg PO every 24 hours	100–150 mg every 24 hours
		<5 or HD (for people on HD, administer dose after HD on dialysis days)	50 mg PO once, then 25 mg PO every 24 hours	100–150 mg every 24 hours

Table 6. Dosing Recommendations for Drugs Used to Treat or Prevent Opportunistic Infections That Require Dosage Adjustment in Adults With Renal Insufficiency

Drug(s)	Usual Dose	Dosage Adjustment in Renal Insufficiency		
		CrCl^ or eGFR# (mL/min)	Dose	
Lamivudine/ Tenofovir Disoproxil Fumarate (3TC/TDF) (FDC Trade Name: Cimduo) Note: Please refer to Appendix B in the Adult and Adolescent Antiretroviral Guidelines for dosing recommendations for other ARV FDC products containing 3TC/TDF.	One tablet (3TC 300 mg/TDF 300 mg) PO once daily	<50 or HD	Coformulated tablet is not recommended.	
Levofloxacin	500 mg (low dose) or 750–1,000 mg (high dose) IV or PO daily Dose can be adjusted based on serum concentrations	CrCl^ or eGFR# (mL/min)	Low Dose	High Dose
		20–49	500 mg once, then 250 mg every 24 hours, IV or PO	750 mg every 48 hours IV or PO
		<20 or HD (for people on HD, administer dose after HD on dialysis days)	500 mg once, then 250 mg every 48 hours, IV or PO	750 mg once, then 500 mg every 48 hours, IV or PO
Paromomycin	500 mg PO every 6 hours	<10 or HD	Minimal systemic absorption. No dosage adjustment necessary but monitor for worsening renal function and ototoxicity in people with ESRD.	
Penicillin G (Potassium or Sodium)	Neurosyphilis, Ocular Syphilis, or Otosyphilis • 3–4 million units IV every 4 hours, *or* • 18–24 million units IV daily as continuous infusion	10–50	2–3 million units IV every 4 hours *or* 12–18 million units IV as continuous infusion	
		<10	2 million units IV every 4–6 hours *or* 8–12 million units IV as continuous infusion	
		HD	2 million units IV every 4–6 hours *or* 8 million units IV as continuous infusion	
Pentamidine	4 mg/kg IV every 24 hours May reduce dose to 3 mg/kg IV daily in the event of toxicities.	<10 or HD	4 mg/kg IV every 48 hours	

Table 6. Dosing Recommendations for Drugs Used to Treat or Prevent Opportunistic Infections That Require Dosage Adjustment in Adults With Renal Insufficiency

Drug(s)	Usual Dose	Dosage Adjustment in Renal Insufficiency	
		CrCl^ or eGFR# (mL/min)	Dose
Posaconazole	IV: 300 mg twice daily on Day 1; then 300 mg once daily Delayed-Release Tablet: 300 mg (three 100 mg delayed-release tablets) PO once daily Oral Suspension: 400 mg PO twice daily	<50 or HD	The manufacturer recommends that IV posaconazole be avoided because of potential toxicity due to accumulation of SBECD (vehicle of IV product), unless benefits outweigh risks. An observational study did not find worsening in renal function in people with CrCl <50 ml/min given SBECD. Switch people with CrCl <50 mL/min to oral posaconazole when feasible. No dosage adjustment of oral dose in people with renal insufficiency. Higher variability in serum concentrations observed in people with CrCl <20 mL/min. Perform posaconazole TDM (target trough concentration >1.25 mcg/mL for treatment).
Pyrazinamide	See the *Mycobacterium tuberculosis* section for weight-based dosing guidelines.	<30 or HD	25–35 mg/kg/dose three times per week For people on HD, administer dose after HD. Perform TDM to guide optimal dosing.
Quinine Sulfate	650 mg salt (524 mg base) PO every 8 hours	<10 or HD	650 mg once, then 325 mg PO every 12 hours
Rifabutin	5 mg/kg PO daily (usually 300 mg PO daily) See the *Mycobacterium tuberculosis* section and Drug–Drug Interactions in the Adult and Adolescent Antiretroviral Guidelines for dosage adjustment based on interactions with ARVs.	<30	Perform rifabutin TDM. If rifabutin-associated neutropenia is suspected, consider 50% of dose once daily.
Streptomycin	15 mg/kg IM or IV every 24 hours *or* 25 mg/kg IM or IV three times per week	Use with caution in people with renal insufficiency.	TDM is no longer available. Consider an alternative aminoglycoside, as clinically appropriate. If used: 15 mg/kg two to three times weekly. Administer dose after HD.
Sulfadiazine *Administer oral or IV fluid hydration to reduce the risk for nephrotoxicity.*	1,000–1,500 mg PO every 6 hours (1,500 mg every 6 hours for people >60 kg)	≤50 or HD	No data. Use alternative anti-toxoplasma therapy.

Table 6. Dosing Recommendations for Drugs Used to Treat or Prevent Opportunistic Infections That Require Dosage Adjustment in Adults With Renal Insufficiency

Drug(s)	Usual Dose	Dosage Adjustment in Renal Insufficiency	
		CrCl^ or eGFR# (mL/min)	Dose
Tecovirimat	IV *35 to <120 kg* • 200 mg every 12 hours *≥120 kg* • 300 mg every 12 hours	30–89	No dosage adjustment necessary. Use with caution because of potential accumulation of hydroxypropyl-β-cyclodextrin.
		<30	Contraindicated because of potential accumulation of hydroxypropyl-β-cyclodextrin. Note: IV formulation may be considered in people with CrCl <30 only if drug absorption via enteral administration is expected to be problematic based on an individual risk–benefit assessment in consultation with CDC. In these circumstances, use with caution and monitor renal function continuously. Switch to the oral formulation as soon as possible.
	PO *40 to <120 kg* • 600 mg every 12 hours *≥120 kg* • 600 mg every 8 hours	Any eGFR	No dosage adjustment necessary.
Tenofovir Alafenamide (TAF) Note: Please refer to Appendix B in the Adult and Adolescent Antiretroviral Guidelines for dosing recommendations for ARV FDC products containing TAF.	25 mg PO daily	<15	Not recommended
		HD	No dosage adjustment necessary. Administer dose after HD on dialysis days.

Table 6. Dosing Recommendations for Drugs Used to Treat or Prevent Opportunistic Infections That Require Dosage Adjustment in Adults With Renal Insufficiency

Drug(s)	Usual Dose	Dosage Adjustment in Renal Insufficiency	
		CrCl^ or eGFR# (mL/min)	Dose
Tenofovir Disoproxil Fumarate (TDF) Note: Please refer to Appendix B in the Adult and Adolescent Antiretroviral Guidelines for dosing recommendations for ARV FDC products containing TDF.	300 mg PO daily	30–49	300 mg PO every 48 hours (consider switching to TAF for treatment of HBV)
		10–29	300 mg PO every 72–96 hours (consider switching to alternative agent for treatment of HBV)
		<10	Not recommended
		HD	300 mg PO once weekly; administer dose after dialysis.
Trimethoprim/ Sulfamethoxazole (TMP-SMX) *Encourage oral hydration when using oral TMP-SMX.*	For PCP Treatment: • 5 mg/kg (of TMP component) IV every 6–8 hours, *or* • Two TMP-SMX DS tablets PO every 8 hours	15–30	5 mg/kg (TMP) IV every 12 hours, or two TMP-SMX DS tablets PO every 12 hours
		<15	5 mg/kg (TMP) IV every 24 hours, or one TMP-SMX DS tablet PO every 12 hours (or two TMP-SMX DS tablets every 24 hours)
		HD	5 mg/kg (TMP) IV every 24 hours, or two TMP-SMX DS tablets PO daily; on dialysis days, administer dose after HD. Consider TDM to optimize therapy (target TMP concentrations: 5–8 mcg/mL).
	For PCP Prophylaxis: • One TMP-SMX DS tablet PO daily, *or* • One TMP-SMX DS tablet PO three times per week, *or* • One TMP-SMX SS tablet PO daily	15–30	Reduce dose by 50% (e.g., 1 SS tablet PO daily).
		<15 or HD	Reduce dose by 50% or use alternative agent. For people on HD, administer dose after HD on dialysis days.
	For TE Treatment: 5 mg/kg (TMP component) IV or PO every 12 hours	15–30	5 mg/kg (TMP component) IV or PO every 24 hours
		<15 or HD	5 mg/kg (TMP component) IV or PO every 24 hours or use alternative agent. For people on HD, administer dose after HD on dialysis days).
	For TE Chronic Maintenance Therapy: • One TMP-SMX DS tablet twice daily, *or* • One TMP-SMX DS tablet daily	15–30	Reduce dose by 50%.
		<15 or HD	Reduce dose by 50% or use alternative agent. For people on HD, administer dose after HD on dialysis days).

Table 6. Dosing Recommendations for Drugs Used to Treat or Prevent Opportunistic Infections That Require Dosage Adjustment in Adults With Renal Insufficiency

Drug(s)	Usual Dose	Dosage Adjustment in Renal Insufficiency		
		CrCl^ or eGFR# (mL/min)	Dose	
	For Toxoplasmosis Primary Prophylaxis: One TMP-SMX DS tablet PO daily	15–30	Reduce dose by 50%.	
		<15 or HD	Reduce dose by 50% or use alternative agent. For people on HD, administer dose after HD on dialysis days.	
Valacyclovir *Encourage oral fluid hydration to reduce the risk for nephrotoxicity.*	For Herpes Zoster: 1 g PO three times daily	30–49	1 g PO every 12 hours	
		10–29	1 g PO every 24 hours	
		<10 or HD	500 mg PO every 24 hours For people on HD, administer dose after HD on dialysis days).	
	For HSV Treatment: 1 g PO twice daily For HSV Chronic Suppressive Therapy: 500 mg PO twice daily	30–49	No dosage adjustment necessary.	
		10–29	For Treatment: 1 g PO every 24 hours For Suppressive Therapy: 500 mg PO every 24 hours	
		<10 or HD	500 mg PO every 24 hours For people on HD, administer dose after HD on dialysis days).	
Valganciclovir *Encourage oral fluid hydration to reduce the risk for nephrotoxicity.*	Induction Therapy: 900 mg PO twice daily Maintenance Therapy: 900 mg PO once daily	CrCl^ or eGFR# (mL/min)	Induction	Maintenance
		40–59	450 mg PO twice daily	450 mg PO daily
		26–39	450 mg PO daily	450 mg PO every 48 hours
		10–25	450 mg PO every 48 hours	450 mg PO twice weekly

Table 6. Dosing Recommendations for Drugs Used to Treat or Prevent Opportunistic Infections That Require Dosage Adjustment in Adults With Renal Insufficiency

Drug(s)	Usual Dose	Dosage Adjustment in Renal Insufficiency		
		CrCl^ or eGFR[#] (mL/min)	Dose	
		<10 or HD (for people on HD, administer dose after HD on dialysis days)	Not recommended Use IV ganciclovir. May consider: • 200 mg (oral powder for solution) PO three times per week If oral powder formulation is not available, consider: • 450 mg (tablet) PO three times weekly	Not recommended Use IV ganciclovir. May consider: • 100 mg (oral powder for solution) PO three times per week If oral powder formulation is not available, consider: • 450 mg (tablet) PO twice weekly
Voriconazole	6 mg/kg IV every 12 hours for two doses, then 4 mg/kg IV every 12 hours *or* 200–300 mg PO every 12 hours	<50 or HD	IV voriconazole is not recommended by the manufacturer for CrCl <50 ml/min because of potential toxicity from accumulation of SBECD (vehicle of IV product). Observational studies did not find worsening in renal function in people with CrCl <50 ml/min. Switch people with CrCl <50 ml/min or on HD to oral voriconazole when feasible. No need for dosage adjustment when the oral dose is used. Perform TDM to adjust dose.	

[a] The prescribing information for emtricitabine (Emtriva) recommends adjusting doses for people with CrCl 30–49 mL/min and for people on hemodialysis. However, the prescribing information for certain FDC products that contain emtricitabine (including Descovy, Biktarvy, Genvoya, and Odefsey) recommends that the standard dose (emtricitabine 200 mg) can be given once daily in these individuals (for people on HD, administer dose after HD on dialysis days). The recommendations in this table incorporate the dosing guidance from the FDC products.

[b] To allow people to remain on certain TAF-containing FDC products, some clinicians may use full-dose, daily emtricitabine in people with CrCl 15–29 mL/min who are not on HD. For more information, see the Adult and Adolescent Antiretroviral Guidelines.

[c] The prescribing information for lamivudine (Epivir) recommends dosage adjustment from 300 mg once daily to 150 mg once daily for people with CrCl 30–49 mL/min. However, the prescribing information for certain FDC products that contain lamivudine (including Dovato and Triumeq) recommends no dose adjustment for CrCl 30–49 mL/min. The recommendations in this table incorporate the dosing guidance from the FDC products.

[d] Clinicians may consider using the nearest available lamivudine tablet strength (100 mg or 150 mg) to avoid the need for 3TC oral solution, thereby simplifying regimens and facilitating adherence. Some clinicians may use full-dose 3TC to allow people to remain on certain FDC antiretroviral products. For more information, see the Adult and Adolescent Antiretroviral Guidelines.

^ CrCl based on the Cockroft-Gault formula can be determined using this CrCl calculator. Please refer to the drug's prescribing information and to the National Institute of Diabetes and Digestive and Kidney Diseases Determining Drug Dosing in Adults with Chronic Kidney Disease page for a discussion on using CrCl based on the Cockcroft-Gault equation versus eGFR.

Table 6. Dosing Recommendations for Drugs Used to Treat or Prevent Opportunistic Infections That Require Dosage Adjustment in Adults With Renal Insufficiency

[#] eGFR based on the 2021 CKD-EPI equation can be determined using this eGFR calculator. Please refer to the drug's prescribing information and to the National Institute of Diabetes and Digestive and Kidney Diseases Determining Drug Dosing in Adults With Chronic Kidney Disease page for a discussion on using CrCl based on the Cockcroft-Gault equation versus eGFR.

Key: 3TC = lamivudine; ARV = antiretroviral; CBC = complete blood count; CDC = Centers for Disease Control and Prevention; CMV = cytomegalovirus; COBI = cobicistat; CrCl = creatinine clearance; DS = double strength; eGFR = estimated glomerular filtration rate; ESRD = end-stage renal disease; FDC = fixed-dose combination; FTC = emtricitabine; HBV = hepatitis B virus; HD = hemodialysis; HSV = herpes simplex virus; IM = intramuscular; IV = intravenous; MAI = *Mycobacterium avium intracellulare;* MTB = *Mycobacterium tuberculosis*; OI = opportunistic infection; PCP = *Pneumocystis* pneumonia; PI = protease inhibitor; PO = orally; SCr = serum creatinine; SBECD = sulfobutylether cyclodextrin; SS = single strength; TAF = tenofovir alafenamide; TDF = tenofovir disoproxil fumarate; TDM = therapeutic drug monitoring; TE = *Toxoplasma gondii* encephalitis TMP-SMX = trimethoprim-sulfamethoxazole; VZV = varicella zoster virus