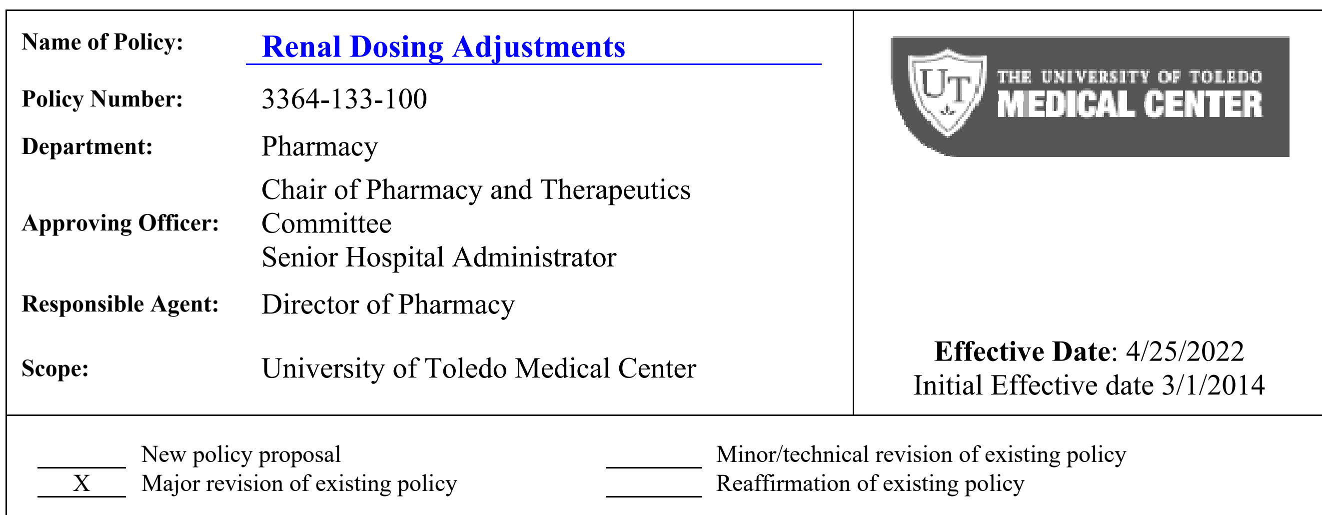

Name of Policy:	**Renal Dosing Adjustments**
Policy Number:	3364-133-100
Department:	Pharmacy
Approving Officer:	Chair of Pharmacy and Therapeutics Committee Senior Hospital Administrator
Responsible Agent:	Director of Pharmacy
Scope:	University of Toledo Medical Center

THE UNIVERSITY OF TOLEDO MEDICAL CENTER

Effective Date: 4/25/2022
Initial Effective date 3/1/2014

________	New policy proposal	________	Minor/technical revision of existing policy
X	Major revision of existing policy	________	Reaffirmation of existing policy

(A) Principle Statement

Licensed pharmacists will automatically adjust doses of medications included in the approved list of medications for adult inpatients ($\geq$ 18 years old).

(B) Procedure

- Automatic dosing adjustments should **not** be done for patients receiving intermittent or continuous dialysis. If dosing adjustments are needed for these patients, pharmacists should communicate recommendations with nephrology fellow.
- Automatic dosing adjustments should **not** be done if the physician indicates "do not adjust" in the comments section of the original order.
- Automatic dosing adjustments should **not** be done for patients on long term suppression antimicrobials as home medications. The primary team should be contacted to suggest dosing adjustments in these patients.
- Dosing adjustments should be based on estimated creatinine clearance using the Cockcroft-Gault equation.
  - Cockcroft-Gault equation:

    $$CrCl\ (ml/min) = \frac{(140-age)x(IBW)}{72xSCr}\ \ x\ 0.85\ (\text{for females only})$$

    - **SCr**= serum creatinine concentration in mg/dL
    - **IBW**= ideal body weight
      - IBW (males)= 50+(2.3 x inches > 5ft in height)
      - IBW (females= 45.5+(2.3 x inches > 5ft in height)
      - Use actual body weight if less than ideal body weight
  - Estimating renal function based on the Cockcroft-Gault equation requires serum creatinine to be at steady state and renal function to be stable. Acute and/or rapid fluctuations in renal function render the Cockcroft-Gault equation unreliable.
  - Estimating creatinine clearance using Cockcroft-Gault equation may also overestimate renal function in patients with decreased muscle mass.
  - The pharmacist should use their clinical judgment regarding these adjustments and communicate with physicians if clarification is needed.
- When an automatic dosing adjustment is made, the pharmacist will discontinue the existing order, and enter a **protocol** order for the same drug with adjusted dosing. Orders for antimicrobial agents should be entered to reflect the remaining doses from the previous orders stop date.
- Normal dosing and dose adjustments may be based on specific indications. The indication specific dosing listed is a guide and may vary depending on the drug reference used. The pharmacist must verify the indication for antimicrobial use and normal dose and/or dosing adjustment before making automatic changes.
- All automatic dosing adjustments or recommendations should be documented in the "pharmacy interventions" system for follow up and tracking purposes.

Section 1: Medications that may be adjusted by credentialed pharmacist

Drug	**Normal Dose**	**Renal Adjustment**	**HD / PD / CRRT** **(Requires permission from team to adjust)**
Acyclovir (**IV**) [3, 24, 19, 32, 51] Use ABW for adult dosing Use IBW if overweight (>130-190% IBW) Use AdjBW if obese (>190% IBW) [49]	**HSV suppression/prophylaxis:** 2.5 mg/kg q8h **Mucocutaneous HSV:** • **Esophagitis:** 5 mg/kg q8h x7 days • **Genital:** 5-10 mg/kg q8h x2-7 days (follow with oral therapy to complete 10 days) • **Orolabial**: 5 mg/kg q8h **HSV Encephalitis**: 10 mg/kg q8h x14-21 days **Herpes Zoster (shingles):** • **Immunocompromised:** 10-15 mg/kg q8h x7 days (10-14 days if HIV-infected) **Varicella (chickenpox) in HIV:** • **Immunocompromised:** 10-15 mg/kg q8h x7-10 days (10-14 days if retinal involvement)	**CRCL >50:** No adjustment **CRCL 25 – 50:** Same dose q12h **CRCL 10 - <25:** Same dose q24h **CRCL <10:** 50% of usual dose q24h	**Intermittent Hemodialysis:** 2.5-5 mg/kg q24h * (5 mg q24h for meningoencephalitis and varicella-zoster) **Peritoneal Dialysis:** 2.5-5 mg/kg q24h ** **CRRT:** Loading Dose: None Maintenance Dose: 5-10 mg/kg q12-24h ** * To avoid HD removal, schedule administration time post-HD every 24 hours ** 10 mg q12h for meningoencephalitis and varicella-zoster

Acyclovir (**PO**) [1, 16, 24, 32, 51]	**HSV suppression/prophylaxis:** 400 mg q12h **Genital HSV:** • **Initial episode:** 400 mg q8h x7-10 days • **Recurrence:** 400 mg q8h or 800 mg q12h x5 days • **Chronic Suppression:** 400 mg q12h **Orolabial HSV:** • **HIV-Infected:** 400 mg q8h x5-10 days • **Immunocompromised:** 400 mg five times daily x5 days • **Chronic Suppression:** 400 mg q12h **Herpes Zoster (shingles)** 800 mg 5 times daily x7-10 day **Varicella (chickenpox):** • **Immunocompetent:** 800 mg q6h x5 days • **Recurrence:** 800 mg five times daily x5-7 days	**CRCL >25:** No Adjustment **CRCL 10 – 25:** • If the usual dose is **800 mg five times daily**: 800 mg q8h • All other indications: No adjustment **CRCL <10:** • If the usual dose is **800 mg five times daily**: 800 mg q12h • All other indications: 200 mg q12h	**Intermittent Hemodialysis:** If the indication is 800 mg five times daily: • 400 mg load now, then 200 mg q12h maintenance, plus an additional 400 mg dose immediately after each HD session All other indications: • 200 mg q12h **Peritoneal Dialysis:** 600-800 mg q24h **CRRT:** Insufficient Data
Amantadine (PO) [3, 14, 17, 24]	**Drug-Induced Extrapyramidal Symptoms:** 100 mg q12h (MDD: 300 mg) **Parkinson Disease:** 100 mg q12h (MDD 400 mg) * *Patients receiving other anti-Parkinson medications or having serious concomitant	**CRCL >50:** No adjustment **CRCL 30 – 50:** 200 mg on day 1, then 100 mg q24h **CRCL 15 – 29:** 200 mg on day 1, then 100 mg q48h	**Intermittent Hemodialysis:** 200 mg every 7 days **Peritoneal Dialysis:** 200 mg every 7 days **CRRT:** Loading Dose: None Maintenance Dose: 100 mg q24-48h

	illnesses should be started at 100 mg q24h (MDD 200 mg) **Traumatic Brain Injury:** 100 mg q12h (MDD: 400 mg)	**CRCL <15:** 200 mg every 7 days	
Amoxicillin (PO) 3, 10, 24, 28, 34, 38, 43, 45	**Streptococcal Pharyngitis (Group A):** IR: 500 mg q12h or 1 g q24h x10 days **Rhinosinusitis, Otitis Media, Cystitis (uncomplicated), SSTI:** IR: 500 mg q8h or 875 mg q12h **CAP:** IR: 1 g q8h in combination with a macrolide or doxycycline x5 days ***H. pylori* Infection:** IR: 1 g q12h in combination IR: 1 g q8h* *for *high-dose dual therapy regimen*	**CRCL >30:** No adjustment **CRCL 10 – 30: *** 500 mg q12h **CRCL <10: *** 500 mg q24h * Use of 875 mg IR tablets is not recommended	**Intermittent Hemodialysis:** 250-500 mg q24h * **Peritoneal Dialysis:** 250-500 mg q12h **CRRT:** Insufficient Data * To avoid HD removal, schedule administration time post-HD every 24 hours
Amoxicillin/ Clavulanate (PO) 3, 16, 24, 28, 43	**UTI (uncomplicated):** IR: 500 mg q12h **SSTI, UTI (complicated), Rhino-sinusitis, Otitis Media, Lower Respiratory Tract Infections:** IR: 875 mg q12h or 500 mg q8h **CAP:** XR: 2,000 mg q12h* in combination with a macrolide or doxycycline x5-10 days * The XR formulation should not be administered to patients with CrCl <30 mL/min	**CRCL >30:** No adjustment **CRCL 10 – 30: *** 500 mg q12h **CRCL <10: *** 500 mg q24h *Use of 875 mg IR tablets is not recommended	**Intermittent Hemodialysis:** 250-500 mg q24h (with a supplemental dose being given both during and after HD) **Peritoneal Dialysis:** 250-500 mg q24h **CRRT:** Insufficient Data
Ampicillin (**<u>IV</u>**) 3, 5, 19, 24, 48	**Standard Dose (GI, GU, URI):** 1-2 g q 4-6h **High Dose (Bacteremia, Meningitis,**	**CRCL >50:** No adjustment **CRCL 30 – 50:**	**Intermittent Hemodialysis:** 1-2 g q12-24h * **Peritoneal Dialysis:**

	Endocarditis): 2 g q4-6h	Same dose q6-8h **CRCL 10 – 30:** Same dose q8-12h **CRCL <10:** Same dose q12	250 mg q12h **CRRT:** Loading Dose: 2 g Maintenance Dose: 1-2 g q6-8h * To avoid HD removal, schedule administration time post-HD every 24 hours
Ampicillin (**<u>PO</u>**) [24]	**Standard Dose (GI, GU, URI):** 500 mg q6h	**CRCL >50:** No adjustment **CRCL 30 – 50:** Same dose q6-8h **CRCL 10 – <30:** Same dose q8-12h **CRCL <10:** Same dose q12h	**Intermittent Hemodialysis:** Insufficient Data **Peritoneal Dialysis:** Insufficient Data **CRRT:** Insufficient Data
Ampicillin/ Sulbactam (IV) [5, 19, 24, 29, 47, 51]	**SSTI/URI:** 1.5-3 g q6-8h **Bacteremia, Endocarditis, GI/GU, PID:** 3 g q6h	**CRCL >50:** No adjustment **CRCL 30 – 50:** Same dose q8h **CRCL 15 – >30:** Same dose q12h **CRCL 5 – 14:** Same dose q24h	**Intermittent Hemodialysis:** Same dose q12-24h **Peritoneal Dialysis:** Insufficient Data **CRRT:** Loading Dose: 3 g Maintenance Dose: 1.5-3 g q6-8h
Apixaban (PO) [24]	**VTE Treatment:** 10 mg q12h x7days, then 5 mg q12h (can be reduced to 2.5 mg q12h after at least 6-12 months of therapy in some patients) **Non-Valvular Atrial Fibrillation, VTE Prophylaxis:** 5 mg q12h	**Non-Valvular Atrial Fibrillation:** If patient meets 2 of 3 below criteria, adjust dose to 2.5 mg q12h: 1) SCr ≥ 1.5 2) Age ≥80 3) Body weight ≤60 kg **All other indications:**	**Intermittent Hemodialysis:** Same as for non-HD patients **Peritoneal Dialysis:** Insufficient Data **CRRT:** Insufficient Data

	TKA/THA DVT Prophylaxis: 2.5 mg q12h for up to 35 days	No adjustment provided (Not studied in patients with **CRCL <25** for VTE prophylaxis and **CRCL <30** for THA/TKA VTE Prophyalxis)	
Aztreonam (IV) 3, 19, 24, 47	**Cystitis:** 1 g q8h **Moderately severe systemic infections (SSTI, intra-abdominal, CAP, etc.)** 1-2 g q8h **Severe systemic or life-threatening infections (or infections potentially or actually involving *P. aeruginosa*:):** 2 g q6-8h	**CRCL >30:** No adjustment **CRCL 10 – 30:** Same initial dose, then 50% of the usual dose at the same interval for maintenance **CRCL <10:** Same initial dose, then 25% of the usual dose at the same interval for maintenance	**Intermittent Hemodialysis:** Same initial dose then, 25% of the usual dose at the same interval for maintenance* **Peritoneal Dialysis:** Same initial dose then, 25% of the usual dose at the same interval for maintenance **CRRT:** Loading Dose: 2 g Maintenance Dose: 1 g q8h or 2 g q12h * For severe systemic or life-threatening infections, give an additional 12.5% of the usual dose after each HD session in addition to the above dose adjustment
Cefazolin (IV) 5, 6, 19, 24, 29, 44, 47	**Prophylaxis:** 1 g q8h **Standard Dose (Cystitis, PNA, Osteomyelitis, Bacteremia, Endocarditis):** 2 g q8h	**CRCL >35:** No adjustment **CRCL 11 – 34:** Same dose q12h **CRCL ≤10:** 1 g 24h	**Intermittent Hemodialysis:** • **No schedule:** 1 g q24h • **HD on MWF:** 2 g on Monday 2 g on Wednesday 3 g on Friday • **HD on TThSat:** 2 g on Tuesday 2 g on Thursday 3 g on Saturday **Peritoneal Dialysis:** 500 mg q12h

<table>
<tr><td></td><td></td><td></td><td>CRRT:
Loading Dose: 2 g
Maintenance Dose: 1-2 g q8h</td></tr>
<tr><td rowspan="2">Cefepime (IV)
[9, 22, 24, 29, 31, 35, 48]</td><td>Standard Dose (mild/moderate infections):
1 g q8h

Bacteremia, Meningitis, Febrile Neutropenia, Endocarditis, HAP/VAP, SSTI, (or infections potentially or actually involving P. aeruginosa):
2 g q8h</td><td><table><tr><th>CRCL</th><th colspan="2">Recommended Regimen</th></tr><tr><th>>60</th><th>1 g q8h
(normal dose)</th><th>2 g q8h
(normal dose)</th></tr><tr><td>30-60</td><td>1 g q12h</td><td>1 g q8h</td></tr><tr><td>11-29</td><td>1 g q24h</td><td>1 g q12h</td></tr><tr><td><11</td><td>1 g q24h</td><td>1 g q24h</td></tr></table></td><td rowspan="2">Intermittent Hemodialysis:
1 g q24h or
2 g three times weekly after dialysis

Peritoneal Dialysis:
Usual dose q48h

CRRT:
Loading Dose: 2 g
Maintenance Dose: 2 g q8h</td></tr>
<tr><td>Extended-infusion:
2 g q8h over 3 hours</td><td>CRCL >50:
No adjustment

CRCL 30 – 50:
1 g q8h over 3 hours

CRCL 10 – 30:
1 g q12h (Extended Infusion not needed)

CRCL <10:
1 g q24h (Extended Infusion not needed)</td></tr>
<tr><td>Cefixime (PO)</td><td>UTI/URI:
400 mg q24h or 200 mg q12h

Gonorrhea (uncomplicated): *</td><td>CRCL >50:
No adjustment

CRCL 30 – 50:</td><td>Intermittent Hemodialysis:
200 mg q24h

Peritoneal Dialysis:</td></tr>
</table>

	400 mg x1 **Gonorrhea (disseminated): *** 400 mg q12h *Only if ceftriaxone is not an option	300 mg q24h **CRCL 10 – 30:** 200 mg q24h	200 mg q24h **CRRT:** Insufficient data
Cefoxitin (IV) [24, 51]	**Uncomplicated SSTI, Urinary or Lower Respiratory Tract Infections:** 1 g q6-8h **Moderately Severe or Severe Infections (IAI):** 2 g q6-8h **PID:** 2 g q6h (with doxycycline)	**CRCL >50:** No adjustment **CRCL 30 – 50:** 1-2 g q8h **CRCL 10 – 29:** 1-2 g q12h **CRCL <10:** 1 g q24h	**Intermittent Hemodialysis:** Dose for CRCL plus additional 1-2 g after each dialysis session **Peritoneal Dialysis:** Insufficient Data **CRRT** Insufficient Data
Cephalexin (PO) [3, 24]	**AOM:** 250 mg q6h **Streptococcal Pharyngitis, Cystitis (uncomplicated):** 500 mg q12h **SSTI:** 500 mg q6h	**CRCL >50:** No adjustment **CRCL 30 – 50:** 500 mg q6h **CRCL 15 – 29:** 500 mg q8 **CRCL <10:** 500 mg q12h	**Intermittent Hemodialysis:** 500 mg q12h **Peritoneal Dialysis:** 500 mg q12h **CRRT:** Insufficient Data
Ciprofloxacin (**IV**) [5, 6, 16, 19, 20, 24, 26, 36, 43, 47, 48]	**Standard Dose (Anthrax (non-systemic), Bite Wound, Diabetic Foot Infection, IAI, IE, Osteomyelitis, PJI, Prostatitis, SBP, Septic Arthritis, SSTI, Cystitis (complicated)) :** 400 mg q12h **High Dose (Anthrax (systemic), Diabetic Foot Infection, PNA, Meningitis, and any systemic infection potentially (i.e. empirically covering) or actually involving *P. aeruginosa*):** 400 mg q8h	**CRCL >30:** No adjustment **CRCL 10 – 30:** 400 mg q24h or 400 mg q12h **CRCL <10:** 400 mg q24h	**Intermittent Hemodialysis:** 400 mg q24h **Peritoneal Dialysis:** 200 mg q8h **CRRT:** Loading Dose: None Maintenance Dose: 400 mg q12-24h

Ciprofloxacin (**PO**) 5, 6, 16, 19, 20, 24, 26, 36, 43, 47, 48	**Prophylaxis/Chronic Suppression:** 500 mg q12h **Anthrax (non-systemic), Diabetic Foot Infection, IAI, IE, Prostatitis, SBP, SSTI, Cystitis (complicated):** 500 mg q12h **Bite Wound, Osteomyelitis, Septic Arthritis:** 500-750 mg q12h **PNA, PJI, SSTI, and any systemic infection potentially (i.e. empirically covering) or actually involving *P. aeruginosa*:** 750 mg q8-12h	**CRCL >50:** No adjustment **CRCL 30 – 50:** 500 mgq12h **CRCL 10 – 30:** 500 mg q24h **CRCL <10:** 250 mg q24h	**Intermittent Hemodialysis:** 500 mg q24h * **Peritoneal Dialysis:** 250 mg q8h **CRRT:** Insufficient Data * To avoid HD removal, schedule administration time post-HD every 24 hours
Clarithromycin (PO) 3, 24, 32, 11,	**URI, H. pylori, MACT (treatment and prophylaxis), SSTI:** 500 mg q12h	**CRCL >50:** No Adjustment **CRCL 30 – 50:** No adjustment **CRCL <30:** Same dose q24h	**Intermittent Hemodialysis:** 500 mg q24h * **Peritoneal Dialysis:** Insufficient Data **CRRT:** Insufficient Data * To avoid HD removal, schedule administration time post-HD every 24 hours
Dabigatran (PO) 24	**VTE Treatment, VTE Prophylaxis:** Following x5 days of parenteral anticoagulation: 150 mg q12h **Non-Valvular Atrial Fibrillation:** 150 mg q12h or 110 mg q12h* *110 mg = high risk of bleed (*off-label*) **TKA/THA DVT Prophylaxis:** 220 mg q24h for up to 35 days	**VTE Treatment/Prophylaxis:** • No adjustment recommendations provided • If **CRCL <50** and patient receiving a P-gp inhibitor, then avoid coadministration • **CRCL <30**, not studied **Non-Valvular Atrial Fibrillation:** • **CRCL 30 – 50**, adjust to 75 mg q12h **if** patient receiving dronedarone or ketoconazole • **CRCL 15 – 30**, adjust to 75 mg q12h **unless** patient receiving concomitant P-gp inhibitor, then avoid use • **CRCL <15**, not studied	**Intermittent Hemodialysis:** Insufficient Data **Peritoneal Dialysis:** Insufficient Data **CRRT:** Insufficient Data

		VTE Prophylaxis for THA/TKA: • If **CRCL <50** and is receiving concomitant P-gp inhibitor, then avoid coadministration • **CRCL <30**, not studied	
Enoxaparin (**SQ**) 24	**Prophylaxis:** 40 mg q24h or 30 mg q12h **Treatment,** 1 mg/kg q12h or 1.5 mg/kg q24h* *Do not use 1.5 mg/kg for outpatient use, STEMI/NSTEMI or bridging for mechanical heart valves	**CRCL >50:** No adjustment **CRCL <30:** • **Prophylaxis:** 30 mg q24h • **Treatment:** 1 mg/kg q24h	**Intermittent Hemodialysis:** Insufficient Data **Peritoneal Dialysis:** Insufficient Data **CRRT:** Insufficient Data
Famotidine (IV/PO) 24, 46	**Duodenal/Gastric Ulcer, GERD, Heartburn, SUP:** 20 mg q12h **NSAID-Induced Ulcer Prophylaxis:** 40 mg q12h **GI Hyper-Secretory Disorder:** 20 mg q6h	**CRCL >50:** No Adjustment **CRCL <50:** • **GI Hyper-secretory Disorder:** Avoid Use • **All Other Indications**: 20 mg q24 or 40 mg q48	**Intermittent Hemodialysis:** Insufficient Data **Peritoneal Dialysis:** Insufficient Data **CRRT:** Insufficient Data
Fluconazole (IV/PO) 3, 24, 33, 47, 51	**Vulvovaginits (uncomplicated):** 150 mg x1 dose **Vulvovaginits (complicated):** 150 mg q72h x2-3 doses **Oropharyngeal Candidiasis:** 200 mg load on day 1 then, 100 – 200 mg q24h **Esophageal Candidiasis:** 400 mg load on day 1 then, 200 – 400 mg q24h **Cystitis:**	**CRCL >30:** No adjustment **CRCL <30:** 50% of usual dose q24h (or 3 mg/kg/day based on ABW) * *Doses for vulvovaginitis do not require adjustments. Do not reduce loading doses for other indications.	**Intermittent Hemodialysis:** 100-200 mg q24h or post-HD three times weekly or 6 mg/kg post-HD three times weekly **Peritoneal Dialysis:** 50% of usual dose q24h **CRRT:** Loading Dose: 400-800 mg Maintenance Dose: 400-800 mg q24h

	200 mg q24h **Candidemia, Invasive Candidiasis:** 800 mg load on day 1 then, 400 mg q24h (or 12 mg/kg x 1, then 6 mg/kg/day based on ABW) * *Note: doses up to 1200 mg/day have been reported		
Fondaparinox (**SQ**) 13, 24	**VTE Prophylaxis:** 2.5 mg q24h **VTE Treatment:** <50 kg: 5 mg q24h 50-100 kg: 7.5 mg q24h >100 kg: 10 mg q24h	**CRCL >50** No adjustment **CRCL 30 – 50:** 50% of usual dose q24h **CRCL <30:** Contraindicated	**Intermittent Hemodialysis:** Insufficient Data **Peritoneal Dialysis:** Insufficient Data **CRRT:** Insufficient Data
Gemfibrozil (PO) 12, 24	**Hyperlipidemia, hypertriglyceridemia:** 600 mg q12h	**CRCL 10 – 60:** 50% of dose q12h **CRCL <10:** Contraindicated	**Intermittent Hemodialysis:** Insufficient Data **Peritoneal Dialysis:** Insufficient Data **CRRT:** Insufficient Data
Ketorolac (**IV**) 24	**Pain Management:** 30 mg q6h (MDD: 120 mg)	The specific degree of renal impairment where use is permitted is not defined in the product labeling; however, **use is contraindicated** in patients with advanced renal impairment or those at risk for renal failure due to volume depletion.	**Intermittent Hemodialysis:** Insufficient Data **Peritoneal Dialysis:** Insufficient Data **CRRT:** Insufficient Data
Ketorolac (**PO**) 24	**Pain Management:** 20 mg x1 then, 10 mg q4-6h (MDD: 40 mg)	The specific degree of renal impairment where use is permitted is not defined in the product labeling; however, **use is contraindicated** in patients with advanced renal impairment or those at risk for renal failure due to volume depletion.	**Intermittent Hemodialysis:** Insufficient Data **Peritoneal Dialysis:** Insufficient Data **CRRT:** Insufficient Data

Levofloxacin (IV/PO) [2, 3, 16, 24, 43, 47]	**GI/GU, H. pylori, COPD exacerbation, Neutropenia prophylaxis:** 500 mg q24h **Rhinosinusitis:** 500-750 mg q24h **Cystitis, Pyelonephritis, SSTI, CAP, IAI and any systemic infection potentially (i.e. empirically covering) or actually involving *P. aeruginosa*:** 750 mg q24h	**CRCL >50:** No Adjustment **CRCL 20 – 49:** • If usual dose is **500 mg**: 500 mg load, then 250 q24h • If usual dose is **750 mg**: 750 mg q48h **CRCL 10 – 19:** • If usual dose is **500 mg**: 500 mg load, then 250 q48h • If usual dose is **750 mg**: 750 mg load, then 500 mg q48h	**Intermittent Hemodialysis:** • If usual dose is **500 mg**: 500 mg load, then 250 mg q48h • If usual dose is **750 mg**: 750 mg load, then 500 mg q48h **Peritoneal Dialysis:** • If usual dose is **500 mg**: 500 mg load, then 250 mg q48h • If usual dose is **750 mg**: 750 mg load, then 500 mg q48h **CRRT:** Loading Dose: 500 to 750 mg Maintenance Dose: 250-750 mg q24h
Metoclopramide (**IV**) [8, 24, 30]	**Gastroparesis:** 5-10 mg q6-12h (MDD: 30 mg/day) **GERD:** 5-10 mg q6-8h **Nausea/Vomiting:** 10 mg q4-6h	**CRCL >40:** No adjustment **CRCL <40:** 50% of the usual dose at same interval	**Intermittent Hemodialysis:** Insufficient Data **Peritoneal Dialysis:** Insufficient Data **CRRT:** Insufficient Data
Metoclopramide (**PO**) [8, 24, 30]	**Gastroparesis:** 5-10 mg q6-12h (MDD: 40 mg/day) **GERD:** 5-10 mg q6-8h **Nausea/Vomiting:** 10 mg q4-6h	**CRCL <61:** • For **Gastroparesis only:** 5 mg q6h (MDD: 20 mg/day) **CRCL <40:** • For all other indications: 50% of the usual dose at same interval	**Intermittent Hemodialysis:** • For **GERD**: 5 mg q6h or 10 mg q12h • For **Gastroparesis**: 5 mg q12h

<table>
<tr>
<td></td>
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<td>• For Nausea:
Insufficient Data

Peritoneal Dialysis:

• For GERD:
5 mg q6h or 10 mg q12h

• For Gastroparesis:
5 mg q12h

• For Nausea:
Insufficient Data

CRRT:
Insufficient Data</td>
</tr>
<tr>
<td>Meropenem (IV)
3, 24, 29, 31, 41, 43, 47, 48</td>
<td>SSTI, IAI, PNA, Bacteremia:
500 mg q6h

Febrile Neutropenia:
1 g q8h

Meningitis:
2 g q8h

Extended-Infusion (EI) Dosing:
2 g q8h over 3 hours</td>
<td>
<table>
<tr><th>CRCL</th><th colspan="4">Recommended Regimen</th></tr>
<tr><th>>50</th><th>500 m q6h (usual dose)</th><th>1 g q8h (usual dose)</th><th>2 g q8h (usual dose)</th><th>EI (usual dose)</th></tr>
<tr><td>26-50</td><td>500 mg q8h</td><td>1 g q12h</td><td>2 g q12h</td><td>1 g q8h</td></tr>
<tr><td>10-25</td><td>500 mg q12h</td><td>500 mg q12h</td><td>1 g q12h</td><td>1 g q12h</td></tr>
<tr><td><10</td><td>500 mg q24h</td><td>500 mg q24h</td><td>1 g q24h</td><td>1 g q24h *</td></tr>
</table>
* Extended infusion not required</td>
<td>Intermittent Hemodialysis:
500 mg q24h
• For Meningitis or MDR organisms:
1 g q24

Peritoneal Dialysis:
Same dose q24h

CRRT:
Loading Dose: 1 g
Maintenance Dose: 500 mg q6-8h or
1 g q8-12h</td>
</tr>
<tr>
<td>Oseltamivir (PO)</td>
<td>Treatment:</td>
<td>CRCL >30:</td>
<td>Intermittent Hemodialysis:</td>
</tr>
</table>

[18, 22, 24]	75 mg q12h x5 days **Prophylaxis:** 75 mg q24h x7 days	No adjustment **CRCL 11 – 29** • **Treatment:** 75 mg q24h • **Prophylaxis:** 75 mg q48h **CRCL <u><</u>10:** Use not recommended	• **Treatment:** 30 mg load, then 30 mg after each dialysis session • **Prophylaxis:** 30 mg load, then 30 mg dose after **every other** dialysis session **Peritoneal Dialysis:** • **Treatment:** 30 mg once, immediately after an exchange • **Prophylaxis:** 30 mg once immediately after an exchange, then 30 mg dose once weekly (or twice weekly if significant residual renal function) for 7-day duration **CRRT:** Same as for CRCL >30
Penicillin G (IV) [3, 5, 19, 24, 43]	**Endocarditis (*S. Viridans* or *S. bovis*):** • Native valve and MIC <0.12 mcg/mL: 12-18 million units in divided doses q4h (i.e. 2 million units q4h) • All other types: 24 million units in divided doses q4-6h (i.e. 4 million units q4h)	**CRCL > 50** No adjustment **CRCL 30 – 50** • If usual dose is 2 million units q4h: 2 million units q6h • If usual dose is 4 million units q4h: No adjustment **CRCL 10 – 30** • If usual dose is 2 million units q4h:	**Intermittent Hemodialysis:** Administer usual dose as load, then: • **Mild/Mod Infection**: 2 million units q8h • **Severe Infection:** 4 million units q8h

	Streptococcal Skin Infection: 2-4 million units q4-6h **Group A *Streptococcus* Invasive Infection:** 3-4 million units q4h	2 million units q8h • If usual dose is 4 million units q4h: 4 million units q6h **CRCL <10** • If usual dose is 2 million units q4h: 2 million units q8h • If usual dose is 4 million units q4h: 4 million units q8h	**Peritoneal Dialysis:** Dose for CRCL < 10 **CRRT:** Loading Dose: 4 million units Maintenance Dose: 2-4 million units q4-6h
Piperacillin/ Tazobactam (IV) 24, 27, 34, 37	**Extended Infusion Dosing (Preferred) All Indications:** 3.375 g q8h *Give a 4.5 g loading dose over 30 minutes, especially when rapid attainment of therapeutic drug concentrations is necessary (e.g. sepsis) **Maintenance dose should be scheduled 4 hours post loading dose, or 8 hours post loading dose if CRCL is <20	**CRCL >50:** No adjustment **CRCL ≤20:** 3.375 g q12h	**Intermittent Hemodialysis:** 3.375 g q12h **Peritoneal Dialysis:** Insufficient Data **CRRT:** 3.375 g q8h
	Non-Extended-Infusion Dosing: 4.5 g q6h	**CRCL >30:** No adjustment **CRCL 10 – 30:** 4.5 g q8h **CRCL <10:** 4.5 g q12h	**Intermittent Hemodialysis:** 2.25 g q8-12h (0.75 g supplemental dose after HD if next schedule dose is not after HD) **Peritoneal Dialysis:** 2.25 g q8-12h **CRRT:** 4.5 g q8h
Ranitidine (**PO**) 4, 23, 24, 39	**Stress Ulcer Prophylaxis:** 150 mg q12h **GERD:** 75-150 mg q12h	**CRCL ≥50:** No Adjustment **CRCL <50:** Same dose q24h	**Intermittent Hemodialysis:** Same dose q24h **Peritoneal Dialysis:** Same dose q24h

			CRRT: Insufficient Data
Rivaroxaban (PO) [24]	**VTE Treatment:** 15 mg q12 x21 days, then 20 mg q24h **VTE Prophylaxis:** 20 mg q24h **THA/TKA VTE Prophylaxis:** 10 mg q24h x10-35 days **Non-Valvular Atrial Fibrillation:** 20 mg q24h	**Non-Valvular Atrial Fibrillation:** • **CRCL >50**, no adjustment required • **CRCL 15 – 50**, 15 mg q24h • **CRCL <15**, not studied **VTE Treatment/Prophylaxis** • **CRCL ≥30**, no adjustment required • **CRCL <30**, avoid use **VTE Prophylaxis in THA/TKA** • **CRCL >50**, no adjustment required • **CRCL 30 – 50**, use with caution • **CRCL <30**, avoid use	**Intermittent Hemodialysis:** Insufficient Data **Peritoneal Dialysis:** Insufficient Data **CRRT:** Insufficient Data
Sitagliptan (PO) [24]	**Diabetes Mellitus, Type 2:** 100 mg q24h	**CRCL >50:** No Adjustment **CRCL ≥30 - <50:** 50 mg q24h **CRCL <30:** 25 mg q24h	**Intermittent Hemodialysis:** 25 mg q24h **Peritoneal Dialysis:** 25 mg q24h **CRRT:** Insufficient Data
Tramadol (PO) [24]	**Acute/Chronic Pain:** 25-100 mg q4-6 (MDD: 400 mg/day)	**CRCL >50:** No Adjustment **CRCL <30:** Same dose q12h (MDD: 200 mg/day)	**Intermittent Hemodialysis:** Same dose q12 (MDD: 200 mg/day) **Peritoneal Dialysis:** Insufficient Data **CRRT:** Insufficient Data
Trimethoprim/ Sulfamethoxazole (**IV**) [15, 19, 24, 32]	**PCP Pneumonia (treatment) or other severe respiratory/CNS infections (ie; *Stenotrophomons*, nocardia):** 15-20 mg/kg in 3-4 divided doses **Severe Cystitis:**	**PCP Pneumonia (treatment):** • **CRCL 30 – 50,** no adjustment • **CRCL 10 – 30**, 5 mg/kg q12h • **CRCL <10**, 5 mg/kg q24h	**Intermittent Hemodialysis:** • For **PCP (treatment)**: 5 mg/kg q24h

	2.5 mg/kg q12h **SSTI:** 5 mg/kg q12h *Note: dosing is based on **trimethoprim component using ideal body weight**	**All Other Indications:** • **CRCL 30 – 50,** no adjustment • **CRCL 10 – 30**, 2.5-5 mg/kg q12h • **CRCL <10**, avoid use* * If necessary, 2.5-5 mg/kg q24h	• For **Other Indications**: 2.5-5 mg/kg q24h **Peritoneal Dialysis:** • **Trimethoprim Component:** Dose for CRCL < 10 • **Sulfamethoxazole Component:** 1 g q24h max **CRRT:** Loading Dose: None Maintenance Dose: 2.5-10 mg/kg q12h * * 10 mg/kg for PCP
Trimethoprim/ Sulfamethoxazole (**PO**) 15, 16, 19, 24, 32, 43, 50	**PCP Pneumonia (treatment) or other severe respiratory/CNS infections (ie; *Stenotrophomons*, nocardia):** 15-20 mg/kg in 3 divided doses or 320 mg q8h **PCP Pneumonia (prophylaxis):** 160 mg q24h (1 DS q24h)* or 80 mg q24h (1 SS Q24h) or 160 mg thrice weekly (1 DS TIW) **Lower Respiratory Tract Infections:** 160 mg (1 DS) q12h **Cystitis (uncomplicated):** 160 mg (1 DS) q12h **SSTI:** 160-320 mg (1 – 2 DS) q12h *Preferred if patient also requires toxoplasmosis prophylaxis	**PCP Pneumonia (treatment):** • **CRCL 30 – 50,** no adjustment • **CRCL 10 – 30**, 320 mg (2 DS or 5 mg/kg) q12h • **CRCL <10** 320 mg (2 DS or 5 mg/kg) q24h **PCP Pneumonia (prophylaxis):** • **CRCL 30 – 50,** no adjustment • **CRCL 10 – 30**, 160 mg (1 DS or 2.5 mg/kg) TIW • **CRCL <10**, 160 mg (1 DS or 2.5 mg/kg) TIW **All Other Indications:** • **CRCL 30 – 50,** no adjustment • **CRCL 10 – 30**, 160 mg (1 DS or 2.5 mg/kg) q12h • **CRCL <10**, avoid use* * If necessary, 160 mg (1 DS or 2.5 mg/kg) q24h	**Intermittent Hemodialysis:** • For **PCP (treatment)**: 320 mg (2 DS or 5 mg/kg) q24h • For **PCP (prophylaxis)**: 160 mg (1 DS or 2.5 mg/kg) TIW • For **Other Indications**: 160 mg (1 DS or 2.5 mg/kg) q24h **Peritoneal Dialysis:** • **Trimethoprim Component:** Dose for CRCL < 10

	Note: dosing is based on **<u>trimethoprim component using ideal body weight</u>		• **Sulfamethoxazole Component:** 1 g q24h max **CRRT:** Loading Dose: None Maintenance Dose: 2.5-10 mg/kg q12h (10 mg/kg for PCP)
Valacyclovir (PO) [24, 32, 51]	**Herpes Zoster (shingles):** 1 g q8h x7 days (7-14 days if immunocompromised) **Genital Herpes (initial episode):** 1 g q12h x7-10 days (5-10 days if immunocompromised) **Genital Herpes (recurrent episode):** • **If Immunocompetent:** 500 mg q12h x 3 days or 1 g q24 x 5 days • **If Immunocompromised:** 1 g q12h x 5-10 days **Genital Herpes (suppressive therapy):** • **If Immunocompetent:** 500 mg or 1 g q24h * • **If Immunocompromised:** 500 mg q12h **Herpes Labialis (immunocompetent):** 2 g q12h x1 day *1 g dose more effective for patients experiencing >9 recurrences per year	**Herpes Zoster (shingles):** • **CRCL 30 – 50**, 1 g q12h • **CRCL 10 – 30**, 1 g q24h • **CRCL <10**, mg q24h **Genital Herpes:** • **Initial Episode:** **CRCL 30 – 50**, no adjustment **CRCL 10 – 30**, 1 g q24h **CRCL <10**, 500 mg q24h • **Recurrent Episode (500 mg q12h or 1 g q24h):** **CRCL 30 – 50**, no adjustment **CRCL <30**, 500 mg q24h • **Recurrent Episode (1 g q12h):** **CRCL 30 – 50**, no adjustment **CRCL 10 – 30**, 1 gm q24h **CRCL < 10**, 500 mg q24h	**Intermittent Hemodialysis:** Dose for CRCL <10 **Peritoneal Dialysis:** Dose for CRCL <10 (unless significant residual renal function remains, then adjust for CRCL <29) **CRRT:** Insufficient Data

		• **Suppressive Therapy:** **CRCL 30 – 50**, no adjustment **CRCL <30**: If usual dose 500 mg q24h, then adjust to 500 mg q48h, **otherwise**: 500 mg q24h **Herpes Labialis** • **CRCL 30 – 50**, 1 g q12h x1 day • **CRCL 10 – 30**, 500 mg q12h x1 day • **CRCL <10**, 500 mg as single dose	

IHD Drug Dosing:
Assumes regular thrice weekly sessions.

CRRT Drug Dosing:
Drug clearance is highly dependent on the method of renal replacement, filter type, and flow rate. Appropriate dosing requires close monitoring of pharmacologic response, signs of adverse reactions due to drug accumulation, as well as drug concentrations in relation to target trough (if appropriate), and considerations for drug-resistant organisms. The presented doses are general recommendations only **(based on dialysate flow/ultrafiltration rates of 1 to 2 L/hour and minimal residual renal function)** and should not supersede clinical judgment.

Section 2: Recommended renal dose of select pharmacologic agents.

- ***Require communication to medical team with recommendation*** (NOT part of automatic adjustment procedure)

Drug	**Normal Dose**	**Renal Dose Adjustment**	**HD / PD / CRRT**
Amikacin (IV)	*Dosing per pharmacokinetics*		
Amphotericin B deoxycholate (IV)	0.5 -1.5 mg/kg q24h	Not renally eliminated but may consider reduction in total daily dose by 50% if renal dysfunction due to the drug	Poorly dialyzed; no supplemental dose or dosage adjustment necessary
Amphotericin B liposomal (IV)	3-5 mg/kg q24h	Not renally eliminated but may consider reduction in total daily dose to reduce risk of further nephrotoxicity	Poorly dialyzed; no supplemental dose or dosage adjustment necessary
Atovaquone (PO)	**PCP treatment:** 750 mg q12h **PCP prophylaxis:** 1500 mg q24h	No renal dose adjustment	
Azithromycin (IV)	500mg q24h	No renal dose adjustment	
Azithromycin (PO)	**URI:** 500 mg q24h x3 days or 500 mg x1, then 250mg q24h on days 2-5 **MAC prophylaxis:** 1200 mg once weekly or 600 mg twice weekly **Chlamydia trachomatis:** 1 g x 1	No renal dose adjustment	
Cefotaxime (IV) [3, 19, 24, 41, 48]	**SSTI (uncomplicated), Cystitis (uncomplicated):** 1 g q12h **CAP:** 1-2 g q8h **Septic Arthritis:** 1-2 g q8h **Intra-abdominal:**	**CRCL >50** No adjustment **CRCL <20** 50% of usual dose at same interval	**Intermittent Hemodialysis:** 1-2 g q24h **Peritoneal Dialysis:** 1 g q24h **CRRT:** Loading Dose: None Maintenance Dose: 1-2 g q6-8h

	1-2 g q6-8h **Sepsis, Bacteremia, HAP/VAP:** 2 g q6-8h **Meningitis:** 2 g q4-6h		
Cefotetan (IV) [24, 51]	**SSTI (mild to moderate):** 1 g q12h **Cystitis:** 1-2 g q12h **PID SSTI (severe):** 2 g q12h **Life-threatening Infections:** 3 g q12h	**CRCL >50** No adjustments **CRCL 10 – 30** 50% of dose at same interval **CRCL <10** 25% of dose at same interval	**Intermittent Hemodialysis:** Give 25% of the usual dose q24h on non-HD days, and 50% of the dose on HD days **Peritoneal Dialysis:** 1 g q24h **CRRT:** Same dose q24h
Cefpodoxime (PO)	**URI/SSTI/UTI:** 100 – 400 mg q12h	**CRCL >50** No adjustments **CRCL 30 – 50** No adjustment **CRCL 10 – 30** Same dose q24h **CRCL <10** Same dose q24h	**Intermittent Hemodialysis:** Same dose after HD on HD days **Peritoneal Dialysis:** Same dose q24h **CRRT:** Insufficient Data
Ceftaroline (IV)	**SSTI/CAP:** 600 mg q12h **MRSA Bacteremia/Endocarditis:** 600 mg q8h	**CRCL >50** No adjustments **CRCL 30 – 50** 400 mg at same interval **CRCL 10 – 30** 300 mg at same interval **CRCL <10** • If usual dose is **600 mg q12h**, then:	**Intermittent Hemodialysis:** Dose for CRCL <10 **Peritoneal Dialysis:** Insufficient Data **CRRT:** Insufficient Data

		200 mg q12h • If usual dose is **600 mg q8h**, then: 400 mg q12h	
Ceftriaxone (IV)	**Standard Dose:** 1 g q24h **Obesity, Deep-seated Infections:** 2 g q24h **Meningitis, Endocarditis:** 2 g q12h	No renal dose adjustment	
Cefuroxime (**IV**) [3, 24]	**Cystitis (uncomplicated), SSTI, pneumonia (uncomplicated):** 750 mg q8h **Intra-abdominal, Bone and Joint Infections:** 1.5 g q8h **Life-threatening Infections:** 1.5 g q6h	**CRCL >50** No adjustment **CRCL 10 – 20** Same dose q12h **CRCL <10** Same dose q24h	**Intermittent Hemodialysis:** Dose for CRCL and administer an additional recommended dose at the end of HD **Peritoneal Dialysis:** Same dose q24h **CRRT:** 1 g q12h
Cefuroxime (**PO**) [3, 24]	**Streptococcal Pharyngitis, Cystitis (uncomplicated):** 250 mg q12h **COPD Exacerbation:** 250-500 mg q12h **Lyme Disease, AOM, CAP:** 500 mg q12h	**CRCL >50** No adjustment **CRCL 10 - <30** Same dose q24h **CRCL <10** Same dose q48h	**Intermittent Hemodialysis:** Dose for CRCL and administer an additional recommended dose at the end of HD **Peritoneal Dialysis:** No Data **CRRT:** Insufficient Data
Cidofovir (IV)	Consult Infectious Diseases Physician or Pharmacist		
Clindamycin (IV)	**All indications:** 600 – 900 mg q8h	No renal dose adjustment	
Clindamycin (PO)	**All indications:** 300 – 450 mg q6h	No renal dose adjustment	

Drug	Dose	Renal adjustment	Dialysis
Colistin (IV)	**Loading Dose:** C_{ssavg}target*x 2.0 x ideal body weight (kg) (max dose 300 mg CBA**) **Maintenance Dose:** C_{ssavg}target x ([1.5 x CRCL] + 30) divided 2-3 times per day * C_{ssavg}target is typically 2.5 mcg/mL ** Dosing is in colistin base activity (CBA)	**CRCL > 70** Dose q8 – 12h **CRCL 10 – 70** Dose q8h – 12h **CRCL < 10** Dose q12h	**Intermittent Hemodialysis:** Daily dose of CBA on a NON-HD day to achieve each 1.0 mcg/mL colistin (C_{ssavg}target = 30 mg) Supplemental dose on HD days = add 30% to the daily maintenance dose and administer after the HD session Q12h dosing is suggested **Peritoneal Dialysis:** Insufficient data **CRRT:** Daily dose of CBA to achieve each 1.0 mcg/mL colistin C_{xxabg}target = 192 mg. Q8-12h dosing is suggested
Daptomycin (IV)	**See Daptomycin Dosing and Batch Printing Policy**		
Dicloxacillin (PO)	**SSTI:** 500 mg q6h	No renal dose adjustment	
Doxycycline (IV/PO)	**SSTI/URI:** 100 mg q12h	No renal dose adjustment	
Ertapenem (IV)	**IAI/SSTI:** 1 g q24h	**CRCL >50** No Adjustment **CRCL 10 - 30** 500 mg q24h **CRCL <10** 500 mg q24h	**Intermittent Hemodialysis:** 500 mg q24h; supplemental dose of 150 mg is required if dose is given within 6 hours of HD **Peritoneal Dialysis:** 500 mg q24h **CRRT:** 1 g q24h
Ethambutol (PO)	**Tuberculosis:** 15 – 25 mg/kg (max 2.5 gm) q24h based on IBW 40 – 55 kg: 800 mg 56 – 75 kg: 1,200 mg	**CRCL ≥10** No adjustment **CRCL <10** Same dose q48h	**Intermittent Hemodialysis:** Same dose q48h * **Peritoneal Dialysis:** Same dose q48h

	76 – 90 kg: 1,600 mg		**CRRT:** Same dose q24h * To avoid HD removal, administer dose after HD on HD days when required
Flucytosine (PO)	**Cryptococcal meningitis:** 12.5 – 37.5 mg/kg q6h based on ideal body weight (50 – 150 mg/kg/day divided q6h) *Note: Monitoring of serum flucytosine concentrations (2 hours after administration of a dose after 3 – 5 days of treatment) should be considered to achieve a therapeutic range of 30 – 80 mcg/mL (concentrations over 100 mcg/mL are associated with bone marrow toxicity and hepatotoxicity)	**CRCL >50** No adjustment **CRCL 30 – 50** Same dose q12h **CRCL 10 - 30** Same dose q24h **CRCL <10** Same dose q48h	**Intermittent Hemodialysis:** Same dose q48-72h * **Peritoneal Dialysis:** 0.5 – 1 gm/day **CRRT:** Same dose q12h * To avoid HD removal, administer dose after HD on HD days when required
Foscarnet (IV)	**HSV Induction:** 40 mg/kg q8h **HSV Maintenance:** 40 mg/kg q12h **CMV Induction:** 90 mg/kg q12h **CMV Maintenance:** 90 mg/kg q24h	For patients with CRCL <70, consult infectious diseases physician or pharmacist	
Fosfomycin (PO)	**UTI:** 3 g sachet x 1 dose **Complicated UTI:** 3 g sachet q2-3 days x3 doses	No renal dose adjustments	
Ganciclovir (IV)	**Induction:** 5 mg/kg q12h	**CRCL 50 – 70:** 2.5 mg/kg q12h **CRCL 30 – 50:** 2.5 mg/kg q24h **CRCL 10 – 30:**	**Intermittent Hemodialysis:** 1.25 mg/kg TIW * **Peritoneal Dialysis:** 1.25 mg/kg q48h **CRRT:**

		1.25 mg/kg q24h **CRCL <10:** 1.25 mg/kg q48h	2.5 mg/kg q12-24h * To avoid HD removal, administer dose after HD on HD days when required
	Maintenance: 5 mg/kg q24h	**CRCL 50 – 70:** 2.5 mg/kg q24h **CRCL 30 – 50:** 1.25 mg/kg q24h **CRCL 10 – 30:** 0.625 mg/kg q24h **CRCL <10:** 0.625 mg/kg q48h	**Intermittent Hemodialysis:** 0.625 mg/kg TIW * **Peritoneal Dialysis:** 0.625 mg/kg q48h **CRRT:** 1.25 – 2.5 mg/kg q24h * To avoid HD removal, administer dose after HD on HD days when required
Gentamicin IV	Dosing per pharmacokinetics		
Isoniazid (PO)	**Tuberculosis:** 5 mg/kg (max 300 mg) q24h * *Supplement with 50 – 100 mg pyridoxine daily to prevent neurotoxicity	No renal dose adjustment	
Itraconazole (PO)	**Fungal infections:** 200 – 400 mg q12h – 24h	No renal dose adjustment	
Ketoconazole (PO)	**Fungal infections:** 200 – 400 mg q24h **Prostate cancer/Cushing syndrome:** 200-400 mg q8h-12h	No renal dose adjustment	
Linezolid IV/PO	**SSTI/PNA:** 600 mg q12h	No renal dose adjustment	
Metronidazole IV/PO	**BV, PID, Trichomoniasis:** 500 mg q12h x7-14 days **IAI, SSTI, all others:** 500 mg q8h	No renal dose adjustment	
Moxifloxacin IV/PO	**URI/SSTI/IAI:** 400 mg q24h	No renal dose adjustment	
Nafcillin IV	**All indications:** 2 g q4h	No renal dose adjustment	

Drug	Dosing	Renal dose adjustment	Dialysis
Nitrofurantoin PO	**UTI prophylaxis:** 50-100 mg q24h at bedtime **UTI treatment:** 50-100 mg q6h (Macrodantin) x7 days 100 mg q12h (Macrobid) x7 days	No renal dose adjustment Use not recommended in age >65 years or CRCL <30	
Penicillin V (PO)	**URI/SSTI:** 500 mg q6h	No renal dose adjustments; use caution in renal impairment (excretion is prolonged) Consider: 500mg q8h if CRCL 10-30; 500 mg q12h if CRCl <10	
Pentamidine (IV)	**PCP Pneumonia:** 4 mg/kg q24h	No renal dose adjustments Consider: 4 mg/kg q 24-36h if CRCL <10	
Pentamidine (inhaled)	**PCP Prophylaxis:** 300 mg q4 weeks	No renal dose adjustment	
Posaconazole (PO)	**Aspergillus/Candida Prophylaxis and Treatment:** ➢ DR tablets ○ 300 mg q12h x2 doses then 300 mg q24h ➢ Suspension ○ 200 mg q8h (may consider 200 mg q6h or 400 mg q12h for treatment of aspergillosis or other fungal infections) **Oropharyngeal Candidiasis:** ➢ Suspension ○ 100 mg q12h x 2 doses then 100 mg q24h; up to 400 mg q12h for cases refractory to fluconazole	No renal dose adjustment	
Posaconazole (IV)	**All indications:** 300 mg q12h x 2 doses then 300 mg q24h	No renal dose adjustment	
Pyrazinamide (PO)	**Tuberculosis:** Dose based on IBW 40 – 55 kg: 1,000 mg 56 – 75 kg: 1,500 mg 76 – 90 kg: 2,000 mg	No renal dose adjustment	**Intermittent Hemodialysis:** 25-30 mg/kg TIW * **Peritoneal Dialysis:** No adjustment **CRRT:** No adjustment

			* To avoid HD removal, administer dose after HD on HD days when required
Pyrimethamine (PO)	**PCP or Toxoplasmosis Prophylaxis:** 50 – 75 mg qweek (in combination with dapsone and leucovorin) or 25 mg qweek (in combination with atovaquone and leucovorin) **Toxoplasmosis Treatment:** 200 mg x1 then 50 mg (if < 60kg) or 75 mg (if ≥ 60 kg) q24h (in combination with sulfadiazine and leucovorin)	No renal dose adjustment	
Rifabutin (PO)	**Tuberculosis:** 5 mg/kg (typically 300 mg) q24h	No renal dose adjustment	
Rifampin (PO)	**Mycobacterial infections:** 10 mg/kg (typically 600 mg) q24h **Maximum dose:** 600 mg q12h (doses may range from 300 mg q8h to 300 – 600 mg q12h)	**CRCL ≥10** No adjustment **CRCL <10** 600 mg q24h	**Intermittent Hemodialysis:** 600 mg q24h or 600 mg TIW * **Peritoneal Dialysis:** 600 mg q24h **CRRT:** No adjustment * To avoid HD removal, administer dose after HD on HD days when required
Rifapentine (PO)	**Tuberculosis (initial):** 10-20 mg/kg (600 mg) twice weekly x2 months **Tuberculosis (maintenance):** 10-20 mg/kg (600 mg) weekly x4 months	No renal dose adjustment	
Rimantidine (PO)	**Treatment:** 100 mg q12h x5-7 days **Prophylaxis:** 100 mg q12h x7 days after last known exposure	**CRCL ≥30** No adjustment **CRCL 10 - 30** 100 mg q24h **CRCL <10** 100 mg q24h	**Intermittent Hemodialysis:** Insufficient data **Peritoneal Dialysis:** Insufficient data **CRRT:** Insufficient data

Tigecycline (IV)	**All indications:** 100 mg x1 then 50 mg q12h	No renal dose adjustment Adjust for liver dysfunction (Child-Pugh 7-9): 100 mg x1 then 25 mg q12h
Tobramycin (IV)	Dosing per pharmacokinetics	
Tobramycin (inhaled)	**PNA:** 300 mg q12h	No renal dose adjustment
Vancomycin (IV)	Dosing per pharmacokinetics	
Vancomycin (PO)	***C. difficile* (nonsevere)** 125 mg q6h ***C. difficile* (fulminant)** 500 mg q6h	No renal dose adjustment
Voriconazole (IV)	**All indications:** 6 mg/kg q 12h x2 doses, then 4 mg/kg q12h (based on ideal or adjusted body weight)	No renal dose adjustment; due to potential for accumulation of intravenous beta-cyclodextrin vehicle, avoid in patients with renal dysfunction Therapeutic drug monitoring is suggested; goal is a steady state trough of 2 – 5 mcg/mL
Voriconazole (PO)	**All indications:** 200 mg q 12h, may increase to 300 mg q12h if inadequate response or based on trough concentrations	No renal dose adjustment Therapeutic drug monitoring is suggested; goal is a steady state trough of 2 – 5 mcg/mL

Section 3: Antiretroviral Dosage Adjustments

Require communication to medical team with recommendation (NOT part of automatic adjustment procedure)

		Creatinine Clearance (mL/min)			
Antiretroviral		≥ 50	30-49	10-29	< 10
		NRTIs			
Abacavir PO (*Ziagen*)		300 mg BID or 600 mg q24h	No Renal Adjustment		
Didanosine EC PO (*Videx EC*)		25 kg to <60 kg: 250 mg once daily	CrCl 30-59: 125 mg daily	125 mg daily	<10, HD, CAPD: 75 mg oral solution (see below)
		≥60 kg: 400 mg once daily	CrCl 30-59: 200 mg daily	125 mg daily	<10, HD, CAPD: 125 mg daily
Didanosine PO Solution (*Videx*)		<60 kg: 125 mg twice daily or 250 mg once daily	150 mg daily or 75 mg twice daily	100 mg daily	<10, HD, CAPD: 75 mg daily
		≥60 kg: 200 mg twice daily or 400 mg once daily	200 mg daily or 100 mg twice daily	150 mg daily	<10, HD, CAPD: 100 mg daily
Emtricitabine PO (*Emtriva*)		Capsule: 200 mg daily	200 mg q48hr	200 mg q72hr	< 15 or HD: 200 mg q96hr
		Solution: 240 mg daily	120 mg q24h	80 mg q24h	< 15 or HD: 60 mg q24hr
Lamivudine PO (*Epivir*)		150 mg BID or 300 mg once daily	150 mg daily	CrCl 15-29: 100 mg daily	CrCl 5 - 15: 50 mg daily < 5 or HD: 25 mg daily
Stavudine PO (*Zerit*)		<60 kg: 30 mg every 12 hours	CrCl 26 – 50: 15 mg q12hr	CrCl <25 or HD: 15 mg q24hr	
		≥60 kg: 40 mg every 12 hours	CrCl 26 – 50: 20 mg q12hr	CrCl <25 or HD: 20 mg q24hr	

Tenovofir Disoproxil Fumarate (TDF) PO (*Viread*)		300 mg once daily	300 mg q48hr	300 mg q72-96hr (twice weekly)	<10 and NOT on HD: Avoid Use HD: 300 mg q7 days
Zidovudine PO (*Retrovir*)		300 mg twice daily			< 15 or HD: 100 mg q8hr or 300 mg daily
	NNRTIs				
Efavirenz PO (*Sustiva*)		600 mg once daily	No studied dosing adjustments Undergoes minimal renal elimination		
Etravirine PO (*Intelence*)		200 mg BID	No Renal Adjustment Extensive protein binding		
Nevirapine PO (*Viramune* or *Viramune XR*)		200 mg BID or 400 mg once daily (XR)	No Renal Adjustment HD: Limited data; 200 mg IR after dialysis		
Rilpivirine PO (*Edurant*)		25 mg once daily w/ food	No Renal Adjustment ESRD/HD: Use with caution; extensive protein binding		

Antiretroviral	≥ 50	30-49	10-29	< 10
PIs				
Atazanavir PO (*Reyataz*)	Antiretroviral-naïve: 400 mg once daily w/ food Antiretroviral-naïve, experienced, or pregnant: 300 mg once daily PLUS ritonavir 100 mg or cobicistat 150 mg once daily (if not pregnant) w/ food	No Renal Adjustment except for HD Atazanavir-naïve patients on HD: 300 mg plus ritonavir 100 mg once daily Atazanavir-experienced patients on HD: Not recommended		
Darunavir PO (*Prezista*)	Antiretroviral-naïve or experienced AND no darunavir resistance: 800 mg once daily PLUS ritonavir 100 mg or cobicistat 150 mg once daily w/ food Antiretroviral-experienced w/ ≥1 darunavir resistance mutation or genotypic testing unavailable: 600 mg twice daily PLUS ritonavir 100 mg twice daily w/ food	No Renal Adjustment		
Fosamprenavir PO	Antiretroviral-naïve:			

(*Lexiva*)	Unboosted: 1,400 mg twice daily Ritonavir-boosted: 1,400 mg PLUS ritonavir 100 to 200 mg once daily Or 700 mg PLUS ritonavir 100 mg BID <u>Protease inhibitor (PI)-experienced:</u> 700 mg PLUS ritonavir 100 mg BID	No Renal Adjustment
Indinavir PO (*Crixivan*)	800 mg q8h	No Renal Adjustment

Antiretroviral	≥ 50	30-49	10-29	< 10
Lopinavir PO/ritonavir PO (*Kaletra*)	<u>Twice-daily dosing</u>: Antiretroviral-naïve or experienced: Lopinavir 400 mg/ritonavir 100 mg twice daily <u>Once-daily dosing:</u> Antiretroviral-naïve or experienced with <3 lopinavir resistance mutations: Lopinavir 800 mg/ritonavir 200 mg once daily	No Renal Adjustment Avoid once daily dosing in HD patients		
Nelfinavir PO (*Viracept*)	750 mg TID w/ food or 1250 mg BID w/ food	No Renal Adjustment Safety/efficacy not established in renal impairment		
Ritonavir PO (*Norvir*)	<u>As a PI-Boosting Agent:</u> 100 – 400 mg daily	No Renal Adjustment No longer used as sole PI, see corresponding PI for dosing recs		
Saquinavir PO (*Invirase*)	1,000 mg BID PLUS ritonavir 100 mg BID w/ food	No Renal Adjustment Safety/efficacy not established in renal impairment/ESRD		
Tipranavir PO	500 mg BID PLUS ritonavir 200 mg BID	No Renal Adjustment		
INSTIs				
Dolutegravir PO (*Tivicay*)	50 mg once daily or 50 mg BID	Use with caution in CrCl <30 Safety/efficacy not established in ESRD/HD		

Elvitegravir PO (*Vitekta*)	With concomitant atazanavir and ritonavir or lopinavir and ritonavir: 85 mg once daily With concomitant darunavir and ritonavir, fosamprenavir and ritonavir, or tipranavir and ritonavir: 150 mg once daily	No Renal Adjustment
Raltegravir PO (*Isentress*)	400 mg BID	No Renal Adjustment
Fusion Inhibitor		
Enfuvirtide SQ (*Fuzeon*)	90 mg BID	No Renal Adjustment
CCR5 Antagonist		
Maraviroc PO	300 mg BID 150 mg BID (concomitant potent CYP3A inhibitors) 600 mg BID (concomitant potent CYP3A inducer)	CrCl <30 or HD: 300 mg BID without concomitant potent CYP3A inhibitors/inducer (150 mg BID if postural hypotension occurs) Use contraindicated with concomitant potent CYP3A inhibitors/inducer
CYP3A Inhibitor		
Cobicistat PO (*Tybost*)	150 mg once daily with concomitant atazanavir or darunavir	No Renal Adjustment (Use not recommended if used with concomitant tenofovir disoproxil fumarate and CrCl < 70 mL/min)

Antiretroviral	≥ 50	30-49	10-29	< 10
Combination Products				
Truvada (emtricitabine 200mg/tenofovir (TDF) 300mg)	1 tab once daily	1 tab q48hr	≤ 30 or on HD: Fixed dose combination not recommended, see dosing for individual agents	
Atripla (emtricitabine 200mg/tenofovir (TDF) 300mg/efavirenz 600mg)	1 tab once daily	Fixed dose combination not recommended, see dosing for individual agents		
Complera (emtricitabine 200mg/tenofovir (TDF) 300mg/rilpivirine 25mg)	1 tab once daily w/ food	Fixed dose combination not recommended, see dosing for individual agents		
Evotaz (atazanavir 300mg/cobicistat 150mg)	1 tab once daily	If used with tenofovir disoproxil fumarate (TDF): Do not administer if CrCl <70 mL/min If not used with tenofovir disoproxil fumarate(TDF): No renal adjustment unless on HD ESRD/HD: Avoid use		
Prezcobix (darunavir 800mg/cobicistat 150mg) *Only for patients without darunavir-associated resistance	1 tab once daily	If used with tenofovir disoproxil fumarate (TDF): Do not administer if CrCl <70 mL/min If not used with tenofovir disoproxil fumarate (TDF): No renal adjustment		
Stribild (emtricitabine 200mg/tenofovir (TDF) 300mg/elvitegravir 150mg/cobicistat 150mg)	1 tab once daily	CrCl <70 mL/min: do not initiate CrCl <50 during therapy: discontinue ESRD/HD: avoid use		

<table>
<tr><td>Triumeq
(abacavir 600mg/dolutegravir 50mg/lamivudine 300mg)</td><td>1 tab once daily</td><td colspan="2">Fixed dose combination not recommended, see dosing for individual agents</td></tr>
<tr><td>Genvoya
(elvitegravir 150mg/cobicistat 150mg/emtricitabine 200mg/tenofovir alafenamide fumarate (TAF) 10mg)</td><td colspan="2">1 tab once daily</td><td>CrCl <30: not recommended</td></tr>
<tr><td>Combivir
(lamivudine 150mg/zidovudine 300mg)</td><td>1 tab twice daily</td><td colspan="2">Fixed dose combination not recommended, see dosing for individual agents</td></tr>
<tr><td>Trizivir
(abacavir 300mg/lamivudine 150mg/zidovudine 300mg)</td><td>1 tab twice daily</td><td colspan="2">Fixed dose combination not recommended, see dosing for individual agents</td></tr>
<tr><td>Epzicom
(lamivudine 300mg/abacavir 600mg)</td><td>1 tab once daily</td><td colspan="2">Fixed dose combination not recommended, see dosing for individual agents</td></tr>
<tr><td>Odefsey
(emtricitabine 200mg/tenofovir alefenamide (TAF) 25mg/rilpivirine 25mg)</td><td colspan="2">1 tab once daily w/ food</td><td>CrCl <30: not recommended</td></tr>
<tr><td>Descovy (emtricitabine 200mg/tenofovir alafenamide (TAF) 25mg)</td><td colspan="2">1 tab once daily</td><td>CrCl <30: not recommended</td></tr>
</table>

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Approved by:	Review/Revision Date:
/s/ ______ 04/25/2022 Lindsey Eitniear, PharmD, BCPS, AAHIVP — Date Director of Pharmacy /s/ ______ 04/25/2022 Russell Smith, PharmD, MBA, BCPS — Date Senior Hospital Administrator /s/ ______ 04/25/2022 Dr. Zohaib Ahmed, MD — Date Chair Pharmacy and Therapeutics Committee *Review/Revision Completed By:* *Pharmacy*	4/18 4/22 **Next Review Date:** 4/1/2025
Policies Superseded by This Policy:	

It is the responsibility of the reader to verify with the responsible agent that this is the most current version of the policy.