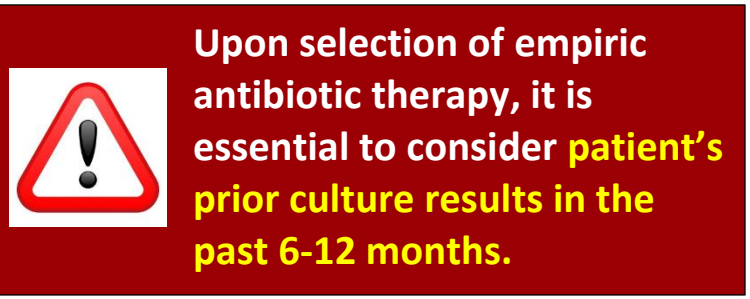
TUH-Inc. Empiric Antimicrobial Therapy Recommendations for Common Infections in Hospitalized Adults

These guidelines are consensus recommendations from Infectious Disease and the Antimicrobial Stewardship Subcommittee.

This document is intended as a guideline only & should NOT replace sound clinical judgment.

Culture and antibiotic history should be taken into account whenever available

Antibiotics should be administered after collection of cultures, except when it is anticipated that there will be a delay in obtaining them. Re-assess empiric regimen after 48-72hrs for de-escalation of therapy.



Click on the antibiotic name for recommended doses.

Pneumonia (PNA)

Obtain MRSA nares swab if vancomycin is started. Negative MRSA nares swab has a >95% negative predictive value for MRSA PNA.
If covering MRSA or Pseudomonas (PSA), **obtain sputum cultures**, and if no microbiologic confirmation of MRSA or PSA, discontinue extended coverage.
(1st) indicates the medication that should be given first by nursing staff to be compliant with sepsis core measures

Review patient's microbiology history within the last 12 months*	NO Penicillin (PCN) ALLERGY	Mild to moderate PCN allergy Rash, itching Unknown reaction (>10yrs) Intolerance, PEN-FAST score ≤ 2	Severe PCN Allergy Anaphylaxis in the last 10yrs Stevens-Johnson syndrome (SJS)/DRESS	Expected Duration Consider ID consult if no clinical improvement past the expected duration
Community Acquired Pneumonia (CAP)	Ceftriaxone IV **(1st)** **OR** Ampicillin-sulbactam IV **(1st)** (preferred if aspiration related empyema or lung abscess suspected) **PLUS** Azithromycin IV/PO (Doxycycline IV/PO if contraindication to azithromycin) **ADD** Vancomycin IV if: • ICU admission • History of MRSA in the last 12months • Suspected lung abscess, empyema, or septic emboli • Influenza/RSV diagnosis in the last 14d	Ceftriaxone IV **(1st)** **ADD** Metronidazole IV/PO if: Aspiration related empyema or lung abscess suspected **PLUS** Azithromycin IV/PO (Doxycycline IV/PO if contraindication to azithromycin) **ADD** Vancomycin IV if: • ICU admission • History of MRSA in the last 12months • Suspected lung abscess, empyema, or septic emboli • Influenza/RSV diagnosis in the last 14d	Levofloxacin IV/PO **(1st)** **ADD** Vancomycin IV if: • ICU admission • History of MRSA in the last 12months • Suspected lung abscess, empyema, or septic emboli • Influenza/RSV diagnosis in the last 14d **ADD** Aztreonam IV if: • ICU admission **ADD** Metronidazole IV/PO If: Aspiration related empyema or lung abscess suspected	**5 days** Longer duration may be needed if: • Severe CAP • Empyema • Complicated by extra-pulmonary infection **Discontinue azithromycin at** **3 days – if dosed 500 mg daily** **5 days - if dosed 500 mg, then 250mg daily** regardless of the total antibiotic duration (Due to prolonged half-life, it will stay in the system beyond discontinuation).

***Discuss empiric regimen with ID if patient has a history of organisms that are resistant to the recommended empiric regimen (e.g. Carbapenem resistant Enterobacteriaceae or Pseudomonas that is only sensitive to aminoglycosides).**

Pneumonia (PNA)

Obtain MRSA nares swab if vancomycin is started. Negative MRSA nares swab has a >95% negative predictive value for MRSA PNA.
If covering MRSA or Pseudomonas (PSA), **obtain sputum cultures**, and if no microbiologic confirmation of MRSA or PSA, discontinue extended coverage.
(1st) indicates the medication that should be given first by nursing staff to be compliant with sepsis core measures

Review patient's microbiology history within the last 12 months*	**NO Penicillin (PCN) ALLERGY**	**Mild to moderate PCN allergy** **Rash, itching** **Unknown reaction (>10yrs)** **Intolerance, PEN-FAST score ≤ 2**	**Severe PCN Allergy** **Anaphylaxis in the last 10yrs** **Stevens-Johnson syndrome (SJS)/DRESS**	**Expected Duration** Consider ID consult if no clinical improvement past the expected duration
CAP w/ risk factors for Pseudomonas or other multidrug resistant organisms (MDRO) **Hospital acquired pneumonia (HAP)** **Ventilator associated pneumonia (VAP)** Risk factors to consider: • History of Pseudomonas or other MDRO in the last year • IV antibiotic use within last 90 days • Prolonged mechanical ventilation/tracheostomy • Immunocompromised • Advanced/end stage structural lung disease	Cefepime IV (1st) **OR** Piperacillin-tazobactam IV (1st) (Preferred in aspiration related empyema or lung abscess suspected) **ADD if CAP** Azithromycin IV/PO (Doxycycline IV/PO if contraindication to azithromycin) **ADD** vancomycin IV if: • HAP/VAP • ICU admission • History of MRSA in the last 12months • Suspected lung abscess, empyema, or septic emboli • Influenza/RSV diagnosis in the last 14d **Consider** Tobramycin IV** if: • Septic shock **5mg/kg (IBW) x 1 dose, or 2mg/kg (IBW) if HD or CrCl <20	Cefepime IV (1st) **ADD** Metronidazole IV/PO if: Aspiration related empyema or lung abscess suspected **ADD if CAP** Azithromycin IV/PO (Doxycycline IV/PO if contraindication to azithromycin) **ADD** vancomycin IV if: • HAP/VAP • ICU admission • History of MRSA in the last 12months • Suspected lung abscess, empyema, or septic emboli • Influenza/RSV diagnosis in the last 14d **Consider** Tobramycin IV** if: • Septic shock	Levofloxacin IV/PO (1st) **PLUS** Aztreonam IV (1st) **ADD** vancomycin IV if: • HAP/VAP • ICU admission • History of MRSA in the last 12months • Suspected lung abscess, empyema, or septic emboli • Influenza/RSV diagnosis in the last 14d **ADD** Metronidazole IV/PO If: • Aspiration related empyema or lung abscess suspected **Consider** Tobramycin IV** if: • Septic shock	**CAP: 5 days** **HAP/VAP: 5-7 days** **Ultra short course (≤3 days) can be considered in patients with suspected VAP but minimal and stable ventilator settings (PEEP ≤5 cm H_2O and FiO_2 ≤40%).** **Discontinue azithromycin at 3 days – if dosed 500 mg daily** **5 days - if dosed 500 mg, then 250mg daily** regardless of the total antibiotic duration (Due to prolonged half-life, it will stay in the system beyond discontinuation).

***Discuss empiric regimen with ID if patient has a history of organisms that are resistant to the recommended empiric regimen (e.g. Carbapenem resistant Enterobacteriaceae or Pseudomonas that is only sensitive to aminoglycosides).**

Click on the antibiotic name for recommended doses.

Urinary Tract Infections (UTI)

Pyuria on urinalysis (UA) alone is not an indication for antibiotic therapy. Always assess for symptoms (urinary symptoms, fever, hemodynamic instability) unless pregnant, planned urologic procedure, recent kidney transplant, neutropenia.

Obtain UA with reflex to urine culture (Ucx) prior to antibiotic initiation whenever possible.

(1st) indicates the medication that should be given first by nursing staff to be compliant with sepsis core measures.

Review patient's microbiology history within the last 12 months*	**NO Penicillin (PCN) ALLERGY**	**Mild to moderate PCN allergy** **Rash, itching** **Unknown reaction (>10yrs)** **Intolerance, PEN-FAST score ≤ 2**	**Severe PCN Allergy** **Anaphylaxis in the last 10yrs** **Stevens-Johnson syndrome (SJS)/DRESS**	**Expected Duration** Consider ID consult if no clinical improvement past the expected duration
Cystitis **Urinary symptoms only!!** **(no fever or other systemic signs/symptoms suggestive of upper tract infection)** **For patients with systemic signs/symptoms of infection, please refer to "Febrile UTI" section** NOTE: Cefazolin MIC ≤16 is considered susceptible to cefazolin and can also be used as a surrogate to predict results for the oral agents such as cefpodoxime and cephalexin, when used for therapy of cystitis due to *E. coli, K. pneumoniae*, and *P. mirabilis*.	Nitrofurantoin PO **OR** Fosfomycin PO **OR** Trimethoprim/sulfamethoxazole PO (TMP/SMX) If the above preferred regimen is contraindicated: Cephalexin PO **OR** Cefpodoxime PO **OR** Cefazolin IV	Nitrofurantoin PO **OR** Fosfomycin PO **OR** Trimethoprim/sulfamethoxazole PO (TMP/SMX) If the above preferred regimen is contraindicated: Cefpodoxime PO **OR** Cefazolin IV	Nitrofurantoin PO **OR** Fosfomycin PO **OR** TMP/SMX PO **OR** **If unable to take po:** Ciprofloxacin IV **OR** Discuss with ID if alternative regimen needed.	**1-5 days** Nitrofurantoin: 5 days TMP/SMX: 3 days Fosfomycin: 1 day Cefazolin: 3-5 days Cephalexin/Cefpodoxime: 5-7 days In patients with functional or structural GU abnormalities, duration of therapy for UTI is not well established. Duration will vary based on the clinical response and successful modification of the predisposing factor. **In most cases, 7 days of therapy is sufficient.**

Urinary Tract Infections (UTI)

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Obtain UA with reflex to urine culture (Ucx) prior to antibiotic initiation whenever possible.
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Review patient's microbiology history within the last 12 months*	**NO Penicillin (PCN) ALLERGY**	**Mild to moderate PCN allergy** **Rash, itching** **Unknown reaction (>10yrs)** **Intolerance, PEN-FAST score ≤ 2**	**Severe PCN Allergy** **Anaphylaxis in the last 10yrs** **Stevens-Johnson syndrome (SJS)/DRESS**	**Expected Duration** Consider ID consult if no clinical improvement past the expected duration
Catheter-associated UTI (Foley, nephrostomy, supra-pubic catheter, stent etc.) Patient **without sepsis** and **no evidence of upper tract disease** **Remove or replace catheter** prior to UA/Ucx collection & initiation of antibiotic therapy whenever feasible	**Observation off antibiotic** and await culture results. **OR** Fosfomycin PO **OR** Ceftriaxone IV	**Observation off antibiotic** and await culture results. **OR** Fosfomycin PO **OR** Ceftriaxone IV	**Observation off antibiotic** and await culture results. **OR** Fosfomycin PO **OR** Ciprofloxacin IV/PO	**5-7 days**
Catheter-associated UTI (Foley, nephrostomy, supra-pubic catheter, stent etc.) Patient **with sepsis and/or with evidence of upper tract disease:** **Remove or replace catheter** prior to UA/Ucx collection & initiation of antibiotic therapy whenever feasible	Piperacillin-tazobactam IV **OR** Cefepime IV **Consider** meropenem IV if: • History of **ESBL** *E. coli* or *Klebsiella* spp. or other cephalosporin resistant gram-negative organism in the last 12 months • Septic shock	Cefepime IV **Consider** meropenem IV if: • History of **ESBL** *E. coli* or *Klebsiella* spp. or other cephalosporin resistant gram-negative organism in the last 12 months • Septic shock	Aztreonam IV **PLUS** Vancomycin IV **If history of ESBL *E. coli* or *Klebsiella* spp. in the last 12 months or septic shock:** • History of severe **IgE mediated** PCN reactions: Benefit of using carbapenem should be weighed in this setting. • History of **non-IgE mediated** PCN reactions (SJS/DRESS): discuss with ID	**7-14 days**

Urinary Tract Infections (UTI)

Pyuria on urinalysis (UA) alone is not an indication for antibiotic therapy. Always assess for symptoms (urinary symptoms, fever, hemodynamic instability) unless pregnant, planned urologic procedure, recent kidney transplant, neutropenia.

Obtain UA with reflex to urine culture (Ucx) prior to antibiotic initiation whenever possible.

(1st) indicates the medication that should be given first by nursing staff to be compliant with sepsis core measures.

Review patient's microbiology history within the last 12 months*	**NO Penicillin (PCN) ALLERGY**	**Mild to moderate PCN allergy** **Rash, itching** **Unknown reaction (>10yrs)** **Intolerance, PEN-FAST score ≤ 2**	**Severe PCN Allergy** **Anaphylaxis in the last 10yrs** **Stevens-Johnson syndrome (SJS)/DRESS**	**Expected Duration**
Febrile UTI, Pyelonephritis **Community-acquired**	Ceftriaxone IV **Consider** ertapenem IV If: • History of **ESBL** *E. coli* or *Klebsiella* spp. or other cephalosporin resistant gram-negative organism in the last 12 months • Septic shock	Ceftriaxone IV **Consider** ertapenem IV If: • History of **ESBL** *E. coli* or *Klebsiella* spp. or other cephalosporin resistant gram-negative organism in the last 12 months • Septic shock	Aztreonam IV **PLUS** Vancomycin IV **If history of ESBL *E. coli* or *Klebsiella* spp. in the last 12 months or septic shock:** • History of severe **IgE mediated** PCN reactions: Benefit of using carbapenem should be weighed in this setting. • History of **non-IgE mediated** PCN reactions (SJS/DRESS): discuss with ID	**7 days** ***Most can be treated with 7 days if good clinical response (e.g. improvement within 3-5 days. afebrile >48 hrs)** **Discuss with ID if longer durations are clinically indicated**
Febrile UTI, Pyelonephritis **Hospital-acquired (>48 hrs after admission)**	Piperacillin-tazobactam IV **OR** Cefepime IV **Consider** meropenem IV if: • History of **ESBL** *E. coli* or *Klebsiella* spp. or other cephalosporin resistant gram-negative organism in the last 12 months • Septic shock	Cefepime IV **Consider** meropenem IV if: • History of **ESBL** *E. coli* or *Klebsiella* spp. or other cephalosporin resistant gram-negative organism in the last 12 months • Septic shock		

***Discuss empiric regimen with ID if patient has a history of organisms that are resistant to the recommended empiric regimen (e.g. Carbapenem resistant Enterobacteriaceae or Pseudomonas that is only sensitive to aminoglycosides).**

Click on the antibiotic name for recommended doses.

Intra-abdominal Infection

(1st) indicates the medication that should be given first by nursing staff to be compliant with sepsis core measures

Review patient's microbiology history within the last 12 months*	NO Penicillin (PCN) ALLERGY	Mild to moderate PCN allergy Rash, itching Unknown reaction (>10yrs) Intolerance, PEN-FAST score ≤ 2	Severe PCN Allergy Anaphylaxis in the last 10yrs Stevens-Johnson syndrome (SJS)/DRESS	Expected Duration Consider ID consult if no clinical improvement past the expected duration
Community Acquired	Ceftriaxone IV **(1st) PLUS** Metronidazole IV/PO **OR** Piperacillin-tazobactam IV	Ceftriaxone IV **(1st) PLUS** Metronidazole IV/PO	Aztreonam IV **(1st) PLUS** Metronidazole IV/PO **PLUS** Vancomycin IV	**4 days after source control** ID consult recommended in patients who are hemodynamically unstable or have difficult to achieve source control
Healthcare associated: • Recent IV antibiotics within 90 days • Intra-abdominal surgery in the last year	Piperacillin-tazobactam IV **(1st) (Preferred option** as provides coverage for *Enterococcus faecalis***)** **OR** Cefepime IV **(1st) PLUS** Metronidazole IV/PO **PLUS** Vancomycin IV# **Consider** meropenem IV if: • History of **ESBL** *E. coli* or *Klebsiella* spp. or other cephalosporin resistant gram-negative organism in the last 12 months • Septic shock #**ADD or Replace** vancomycin to Daptomycin IV **if:** • Severe sepsis or Septic shock • History of VRE in the past 12 months **Consider** anti-fungal therapy (i.e. micafungin) in severe sepsis or septic shock	Cefepime IV **(1st) PLUS** Metronidazole IV/PO **PLUS** Vancomycin IV# **Consider** meropenem IV if: • History of **ESBL** *E. coli* or *Klebsiella* spp. or other cephalosporin resistant gram-negative organism in the last 12 months • Septic shock #**ADD or Replace** vancomycin to Daptomycin IV if: • Severe sepsis or Septic shock • History of VRE in the past 12 months **Consider** anti-fungal therapy (i.e. micafungin) in severe sepsis or septic shock	Aztreonam IV **(1st) PLUS** Metronidazole IV/PO **PLUS** Daptomycin IV **or** Vancomycin IV# #**Consider** Daptomycin **IV if history of VRE in past 12 months or severe sepsis or septic shock** **If history of ESBL *E. coli* or *Klebsiella* spp. in the last 12 months or septic shock:** • History of severe **IgE mediated** PCN reactions: Benefit of using carbapenem should be weighed. • History of **non-IgE mediated** PCN reactions (SJS/DRESS): discuss with ID **Consider** anti-fungal therapy (i.e. micafungin) in severe sepsis or septic shock	

***Discuss empiric regimen with ID if patient has a history of organisms that are resistant to the recommended empiric regimen.**

Click on the antibiotic name for recommended doses.

Skin and Soft Tissue Infection (SSTI)

(1st) indicates the medication that should be given first by nursing staff to be compliant with sepsis core measures

Review patient's microbiology history within the last 12 months*	NO Penicillin (PCN) ALLERGY	Mild to moderate PCN allergy Rash, itching Unknown reaction (>10yrs) Intolerance, PEN-FAST score ≤ 2	Severe PCN Allergy Anaphylaxis in the last 10yrs Stevens-Johnson syndrome (SJS)/DRESS	Expected Duration Consider ID consult if no clinical improvement past the expected duration
Non-purulent (non-severe†) cellulitis †Patients **without** systemic signs/symptoms of infection **No associated drainage or abscess**	Cephalexin PO **OR** Cefazolin IV	TMP/SMX PO **OR** Cefazolin IV	TMP/SMX PO **OR** Vancomycin IV	**5-7 days**
Purulent (non-severe†) cellulitis †Patients **without** systemic signs/symptoms of infection	TMP/SMX PO **OR** Doxycycline IV/PO **OR** Vancomycin IV	TMP/SMX PO **OR** Doxycycline IV/PO **OR** Vancomycin IV	TMP/SMX PO **OR** Doxycycline IV/PO **OR** Vancomycin IV	**5-7 days** If I&D of abscess is performed, count 5-7d from source control
Injection-related cellulitis and/or xylazine related wounds (non-severe) †Patients **without** systemic signs/symptoms of infection **If patient with systemic signs/symptoms, please see "Severe sepsis with SSTI" section** **In stable patients, hold OFF on antibiotics until wound care and thorough wound examination is performed.**	**If clinical concerns for infection after wound care assessment:** **Amoxicillin** 1gm q12h PO **PLUS** Doxycycline IV/PO **OR** TMP/SMX PO **OR** Vancomycin IV **OR** Daptomycin IV	**If clinical concerns for infection after wound care assessment:** TMP/SMX PO **OR** Vancomycin IV **OR** Daptomycin IV	**If clinical concerns for infection after wound care assessment:** TMP/SMX PO **OR** Vancomycin IV **OR** Daptomycin IV	**5-7 days** If I&D of abscess is performed, count 5-7d from source control

Skin and Soft Tissue Infection (SSTI)

(1st) indicates the medication that should be given first by nursing staff to be compliant with sepsis core measures

Review patient's microbiology history within the last 12 months*	NO Penicillin (PCN) ALLERGY	Mild to moderate PCN allergy Rash, itching Unknown reaction (>10yrs) Intolerance, PEN-FAST score ≤ 2	Severe PCN Allergy Anaphylaxis in the last 10yrs Stevens-Johnson syndrome (SJS)/DRESS	Expected Duration Consider ID consult if no clinical improvement past the expected duration
Severe sepsis patient with SSTI (non-necrotizing) **For patients without signs/symptoms of infection, please see above SSTI section** **For NSTI, see section below**	Ceftriaxone IV **(1st)** **PLUS** Vancomycin IV **Consider** Cefepime IV if: • immunocompromised host For vancomycin allergy: Linezolid IV/PO **OR** Daptomycin IV	Ceftriaxone IV **(1st)** **PLUS** Vancomycin IV **Consider** Cefepime IV if: • immunocompromised host For vancomycin allergy: Linezolid IV/PO **OR** Daptomycin IV	Vancomycin IV **(1st)** **PLUS** Aztreonam IV For vancomycin allergy: Linezolid IV/PO **OR** Daptomycin IV	Duration depends on the causative pathogen and clinical scenario. Please consult infectious diseases if assistance needed.
Necrotizing SSTI (NSTI) **NSTI generally requires ICU level of care;** • **Recommend early general surgery consultation** • **Recommend ID consult** **Clindamycin-resistant Group A Streptococcus (GAS) has been increasing** **Linezolid has anti-toxin effects similar to clindamycin**	Piperacillin-tazobactam IV **(1st)** **PLUS** Linezolid IV/PO **OR** Cefepime IV **(1st) PLUS** Metronidazole IV/PO **PLUS** Linezolid IV/PO **OR** Piperacillin-tazobactam IV **(1st)** **PLUS** Clindamycin IV **PLUS** Vancomycin IV **OR** Cefepime IV **(1st) PLUS** Metronidazole IV/PO **PLUS** Vancomycin IV **PLUS** Clindamycin IV	Cefepime IV **(1st) PLUS** Metronidazole IV/PO **PLUS** Linezolid IV/PO **OR** Cefepime IV **(1st) PLUS** Metronidazole IV/PO **PLUS** Vancomycin IV **PLUS** Clindamycin IV	Aztreonam IV **(1st) PLUS** Linezolid IV/PO **PLUS** Metronidazole IV/PO Consider meropenem in place of aztreonam/metronidazole if critically ill (i.e. ICU admission) **If patient with hx of SJS/DRESS:** Linezolid IV **OR** Vancomycin IV **(1st) PLUS** Clindamycin IV **AND CONSULT INFECTIOUS DISEASES for guidance on gram negative coverage**	Duration depends on the causative pathogen and clinical scenario. Please consult infectious diseases if assistance needed.

Diabetic Wound Patients with diabetes who have cellulitis but NO open wound should be managed as outlined above for Skin/Soft Tissue Infection Patients with NO systemic signs/symptoms of infection & pending biopsy, consider monitor off antibiotic until biopsy.	**Mild, no recent antibiotic use:** Vancomycin IV **All other situations without severe sepsis or septic shock** Ceftriaxone IV **(1st) PLUS** Vancomycin IV **If Severe sepsis or septic shock:** Piperacillin-tazobactam IV **(1st) PLUS** Vancomycin IV **For vancomycin allergy daptomycin IV can be substituted	**Mild, no recent antibiotic use:** Vancomycin IV **All other situations without severe sepsis or septic shock:** Ceftriaxone IV **(1st) PLUS** Vancomycin IV **If Severe sepsis or septic shock:** Cefepime IV **(1st) PLUS** Vancomycin IV **PLUS** Metronidazole IV/PO **For vancomycin allergy daptomycin IV can be substituted	**Mild, no recent antibiotic use:** Vancomycin IV **All other situations:** Vancomycin IV **(1st) PLUS** Aztreonam IV **PLUS** Metronidazole IV/PO **If patient with hx of SJS/DRESS:** Vancomycin IV **(1st)** **AND CONSULT INFECTIOUS DISEASES for guidance on gram negative coverage** **For vancomycin allergy daptomycin IV can be substituted	Duration depends on the causative pathogen and clinical scenario. Please consult infectious diseases if assistance needed.
Bite Wound **(Human, dog, cat) – consult ID for all other bite wounds** **Thorough wound irrigation and examination** **Evaluation for tetanus and/or rabies post-exposure prophylaxis** **Consider antibiotic prophylaxis when:** • Deep wounds (cat bites, Bone or Joint penetration) • Wounds of face, hands or genitals • Immunocompromised, asplenia • Wound is adjacent to prosthetic material	Amoxicillin-clavulanate PO **If unable to take oral agent:** Ampicillin-sulbactam IV	Metronidazole PO **PLUS of the following:** Doxycycline PO **OR** TMP/SMX PO **OR** Levofloxacin PO **If unable to take oral agent:** Ceftriaxone IV **PLUS** Metronidazole IV	Metronidazole PO **PLUS of the following:** Doxycycline PO **OR** TMP/SMX PO **OR** Levofloxacin PO **If unable to take oral agent:** Doxycycline IV **PLUS** Metronidazole IV **OR** Levofloxacin IV **PLUS** Metronidazole IV	**Prophylaxis** 3-5 days **Mild infection** 5-7 days **Severe/complicated infection** 7-14 days - Duration depends on the causative pathogen and clinical scenario. Please consult infectious diseases if assistance needed.
***Discuss empiric regimen with ID if patient has a history of organisms that are resistant to the recommended empiric regimen (e.g. Carbapenem resistant Enterobacteriaceae or Pseudomonas that is only sensitive to aminoglycosides).**				

Click on the antibiotic name for recommended doses.

Septic arthritis

Collection of synovial fluid gram stain and cultures should occur prior to the administration of antibiotics. Therapy should be tailored based on gram stain, culture, and sensitivities.

(1st) indicates the medication that should be given first by nursing staff to be compliant with sepsis core measures

Review patient's microbiology history within the last 12 months*	**NO Penicillin (PCN) ALLERGY**	**Mild to moderate PCN allergy** **Rash, itching** **Unknown reaction (>10yrs)** **Intolerance, PEN-FAST score ≤ 2**	**Severe PCN Allergy** **Anaphylaxis in the last 10yrs** **Stevens-Johnson syndrome (SJS)/DRESS**	**Expected Duration**
Atraumatic bacterial arthritis See below if persons who injects drugs (PWID), severe sepsis or septic shock	Vancomycin IV **(1st)** For vancomycin allergy: Linezolid IV/PO **OR** Daptomycin IV	Vancomycin IV **(1st)** For vancomycin allergy: Linezolid IV/PO **OR** Daptomycin IV	Vancomycin IV **(1st)** For vancomycin allergy: Linezolid IV/PO **OR** Daptomycin IV	Duration depends on the causative pathogen and clinical scenario. Please consult infectious diseases if assistance needed.
Traumatic bacterial arthritis **PWID** **Severe sepsis or septic shock**	Ceftriaxone IV **(1st) PLUS** Vancomycin IV	Ceftriaxone IV **(1st) PLUS** Vancomycin IV	Aztreonam IV **(1st) PLUS** Vancomycin IV	
Immunocompromised patients **Prosthetic joint infection**	Cefepime IV **(1st) PLUS** Vancomycin IV	Cefepime IV **(1st) PLUS** Vancomycin IV	Aztreonam IV **(1st) PLUS** Vancomycin IV	

***Discuss empiric regimen with ID if patient has a history of organisms that are resistant to the recommended empiric regimen (e.g. Carbapenem resistant Enterobacteriaceae or Pseudomonas that is only sensitive to aminoglycosides).**

Click on the antibiotic name for recommended doses.

Meningitis

Strongly encourage urgent lumbar puncture (LP), however antibiotics should NOT be withheld

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Review patient's microbiology history within the last 12 months*	**NO Penicillin (PCN) ALLERGY**	**Mild to moderate PCN allergy** **Rash, itching** **Unknown reaction (>10yrs)** **Intolerance, PEN-FAST score ≤ 2**	**Severe PCN Allergy** **Anaphylaxis in the last 10yrs** **Stevens-Johnson syndrome (SJS)/DRESS**	**Expected Duration** Consider ID consult if no clinical improvement past the expected duration
Community acquired Consider adding **dexamethasone 0.15mg/kg IV** with the first dose administered 10-20 minutes before, or at least concomitant with, the first dose of antimicrobial therapy in adults with suspected or proven pneumococcal meningitis **ID consult highly recommended for the management of meningitis**	Ceftriaxone IV **(1st) PLUS** Vancomycin IV **ADD** ampicillin IV for listeria if • If >50 years old • History of transplant, HIV and other immunocompromised patient For vancomycin allergy: Initiate ceftriaxone as above AND **CONSULT INFECTIOUS DISEASES** **Consider** acyclovir IV based on clinical presentation and CSF results.	Ceftriaxone IV **(1st) PLUS** Vancomycin IV **ADD** TMP/SMX IV for listeria if • If >50 years old • History of transplant, HIV and other immunocompromised patient **If listeria coverage needed, and TMP/SMX contraindicated:** Meropenem IV **PLUS** Vancomycin IV For vancomycin allergy: Initiate ceftriaxone as above AND **CONSULT INFECTIOUS DISEASES** **Consider** acyclovir IV based on clinical presentation and CSF results.	**Patients without hx of SJS/DRESS:** Meropenem IV **(1st) PLUS** Vancomycin IV **AND CONSULT INFECTIOUS DISEASES** **Patients with hx of SJS/DRESS:** Vancomycin IV **(1st) PLUS** Ciprofloxacin IV **ADD** TMP/SMX IV for listeria if • If >50 years old • History of transplant, HIV and other immunocompromised patient • Ciprofloxacin is used **AND CONSULT INFECTIOUS DISEASES** For vancomycin allergy: Initiate meropenem or ciprofloxacin as above AND **CONSULT INFECTIOUS DISEASES** **Consider** acyclovir IV based on clinical presentation and CSF results.	Duration depends on the causative pathogen and clinical scenario. Please consult infectious diseases if assistance needed.

Healthcare associated/Ventriculitis	Cefepime IV (**1st**) **PLUS** Vancomycin IV For vancomycin allergy: Initiate cefepime as above AND **CONSULT INFECTIOUS DISEASES**	Cefepime IV (**1st**) **PLUS** Vancomycin IV For vancomycin allergy: Initiate cefepime as above AND **CONSULT INFECTIOUS DISEASES**	Aztreonam IV (**1st**) **PLUS** Vancomycin IV **AND CONSULT INFECTIOUS DISEASES** For vancomycin allergy: Initiate aztreonam as above AND **CONSULT INFECTIOUS DISEASES**	
***Discuss empiric regimen with ID if patient has a history of organisms that are resistant to the recommended empiric regimen (e.g. Carbapenem resistant Enterobacteriaceae or Pseudomonas that is only sensitive to aminoglycosides).**				

Click on the antibiotic name for recommended doses.

Neutropenic fever

(1st) indicates the medication that should be given first by nursing staff to be compliant with sepsis core measures

Review patient's microbiology history within the last 12 months*	NO Penicillin (PCN) ALLERGY	Mild to moderate PCN allergy Rash, itching Unknown reaction (>10yrs) Intolerance, PEN-FAST score ≤ 2	Severe PCN Allergy Anaphylaxis in the last 10yrs Stevens-Johnson syndrome (SJS)/DRESS	Expected Duration Consider ID consult if no clinical improvement past the expected duration
Absolute Neutrophil Count (ANC) of less than 500, or ANC 1000 with an expectation that the ANC will drop below 500 within 48 hours Please also see TUH INC MM Guidelines 37 – Febrile Neutropenia Empiric Treatment Guideline	Cefepime IV (1st) **OR** Piperacillin-tazobactam IV **Consider** Vancomycin IV if: • Suspicion of PNA, SSTI, line infection • Hemodynamic instability • History of MRSA or PCN/Ceph resistant pneumococci **Consider** Tobramycin IV if: • Septic shock 5mg/kg (IBW) x 1 dose, or 2mg/kg (IBW) if HD or CrCl <20 **Consider:** metronidazole IV/PO if suspected gingivitis, neutropenic enterocolitis, or perirectal abscess	Cefepime IV (1st) **Consider** Vancomycin IV if: • Suspicion of PNA, SSTI, line infection • Hemodynamic instability • History of MRSA or PCN/Ceph resistant pneumococci **Consider** Tobramycin IV if: • Septic shock 5mg/kg (IBW) x 1 dose, or 2mg/kg (IBW) if HD or CrCl <20 **Consider:** metronidazole IV/PO if suspected gingivitis, neutropenic enterocolitis, or perirectal abscess	Aztreonam IV (1st) **PLUS** Vancomycin IV **Consider** Tobramycin IV if: • Septic shock 5mg/kg (IBW) x 1 dose, or 2mg/kg (IBW) if HD or CrCl <20 **Consider:** metronidazole IV/PO if suspected gingivitis, neutropenic enterocolitis, or perirectal abscess **If history of ESBL *E. coli* or *Klebsiella* spp. in the last 12 months or septic shock:** • History of severe **IgE mediated** PCN reactions: Benefit of using carbapenem should be weighed in this setting. • History of **non-IgE mediated** PCN reactions (SJS/DRESS): discuss with ID	Duration depends on the infectious source and ANC recovery. Please consult infectious diseases if assistance needed.

***Discuss empiric regimen with ID if patient has a history of organisms that are resistant to the recommended empiric regimen (e.g. Carbapenem resistant Enterobacteriaceae or Pseudomonas that is only sensitive to aminoglycosides).**

Click on the antibiotic name for recommended doses.

Central Line Infection

Consider removal of lines whenever feasible
(1st) indicates the medication that should be given first by nursing staff to be compliant with sepsis core measures

Review patient's microbiology history within the last 12 months*	NO Penicillin (PCN) ALLERGY	Mild to moderate PCN allergy Rash, itching Unknown reaction (>10yrs) Intolerance, PEN-FAST score ≤ 2	Severe PCN Allergy Anaphylaxis in the last 10yrs Stevens-Johnson syndrome (SJS)/DRESS	Expected Duration Consider ID consult if no clinical improvement past the expected duration
PICC lines, Ports, HD catheters Keep in mind other sources of infection and review those guidelines in order to provide the best empirical therapy	Cefepime IV **(1st)** **OR** Piperacillin-tazobactam IV **(1st)** **PLUS** Vancomycin IV **Consider** Micafungin IV If the patient receives **TPN** via central line for >7days.	Cefepime IV **(1st) PLUS** Vancomycin IV **Consider** Micafungin IV If the patient receives **TPN** via central line for >7days.	Aztreonam IV **(1st) PLUS** Vancomycin IV **Consider** Micafungin IV If the patient receives **TPN** via central line for >7days.	Duration depends on the causative pathogen and clinical scenario. Please consult infectious diseases if assistance needed.

Unknown Source of Infection

(1st) indicates the medication that should be given first by nursing staff to be compliant with sepsis core measures

Review patient's microbiology history within the last 12 months*	NO Penicillin (PCN) ALLERGY	Mild to moderate PCN allergy Rash, itching Unknown reaction (>10yrs) Intolerance, PEN-FAST score ≤ 2	Severe PCN Allergy Anaphylaxis in the last 10yrs Stevens-Johnson syndrome (SJS)/DRESS	Expected Duration Consider ID consult if no clinical improvement past the expected duration
Unknown source	Cefepime IV **(1st)** **PLUS** Metronidazole IV/PO **OR** Piperacillin-tazobactam IV **(1st)** **PLUS** Vancomycin IV **Consider** Tobramycin IV** if: • Septic shock **5mg/kg (IBW) x 1 dose, or 2mg/kg (IBW) if HD or CrCl <20	Cefepime IV **(1st)** **PLUS** Metronidazole IV/PO **PLUS** Vancomycin IV **Consider** Tobramycin IV** if: • Septic shock	Aztreonam IV **(1st)** **PLUS** Vancomycin IV **PLUS** Metronidazole IV/PO **Consider** Tobramycin IV** if: • Septic shock	Duration depends on the causative pathogen and clinical scenario. Please consult infectious diseases if assistance needed.

***Discuss empiric regimen with ID if patient has a history of organisms that are resistant to the recommended empiric regimen (e.g. Carbapenem resistant Enterobacteriaceae or Pseudomonas that is only sensitive to aminoglycosides).**

Dosing of Antimicrobial Agents for Adult Patients with Renal Impairment

The following table only includes antimicrobials noted in this empiric guide. For full renal dosing guideline for all formulary antimicrobials, please click here.

CrCl = [(140-age) x weight* ÷ 72 (SCr)] (x0.85 if female)

*weight: Use IBW unless a) TBW<IBW → use TBW or b) TBW is >120%IBW → use AdjBW
The eGFR is typically NOT recommended to use for drug dosing unless noted otherwise.

** Literature on dosing for CVVHDF is limited. Consider the severity/site of infection and the toxicity profile of the drug to determine dosing, and consider TDM (therapeutic drug monitoring) if available. **Drug/ CrCl (ml/min)**	**ED once dose (prior to CrCl)**	**>50**	**50-30**	**29-10**	**<10 (no HD)**	**HD**	**CVVHDF****
Acyclovir IV If BMI ≥35 kg/m^2, use **AdjBW**	**HSV encephalitis/ meningitis or Varicella or Herpes Zoster infection**						
	10 mg/kg	10mg/kg q8h	10mg/kg q12h	10mg/kg q24h	5mg/kg q24h	5mg/kg q24h AD	10mg/kg q12h
		Turner RB et.al: AAC 2016; 60: 1830-1833.					
Amoxicillin/ Clavulanate PO	**Standard dose**						
	875 mg	875mg q12h or 500mg q8h		250-500mg q12h	250-500mg q24h	500mg q24h AD	500 mg q12h (no data)
Ampicillin IV	**Standard dose**						
	2 gram	1-2g q6h	1-2g q8h	1-2g q12h	1-2g q24h	1-2g q24h AD	1-2g q8h
	Meningitis						
	2 gram	2g q4h	2g q6h	2g q8h	2g q12h	2g q12h AD	2g q6h
Ampicillin/ Sulbactam IV	**Standard dose**						
	1.5 -3 gram	1.5-3g q6h	1.5g q6h or 3g 8h	1.5-3g q12h	1.5-3g q24h	1.5g q12h AD or 3g q24h AD	1.5-3g q8h
	High dose regimen for Carbapenem resistant *Acinetobacter* spp. infections. ID consult strongly recommended.						
	9 gram over 4 hours	**CrCl >60** 9g q8h over 4 hours	CrCl 30-60 6g q8h over 4 hours	CrCl <30 4.5g q12h over 4 hours			6g q8h over 4 hours (no data)
		CrCl 50-60 is a gray zone. Can be dosed as >60 or 30-60. Use clinical judgement.					

** Literature on dosing for CVVHDF is limited. Consider the severity/site of infection and the toxicity profile of the drug to determine dosing, and consider TDM (therapeutic drug monitoring) if available. **Drug/ CrCl (ml/min)**	**ED once dose (prior to CrCl)**	**>50**	**50-30**	**29-10**	**<10 (no HD)**	**HD**	**CVVHDF****
		High dose unasyn (9gm q8h over 4 hours) may be indicated in patients with multi-drug resistant *Acinetobacter* spp. infections. Renal dosing for this regimen is not well established. AP. Betrosian, F. Frantzeskaki, A. Xanthaki et.al: J of Infect 2008; 56(6): 432-436. Tamma PD et.al: Clin Infect Dis. 2021 Dec5:ciab1013.doi: 10.1093/cid/ciab1013.					
Azithromycin IV/PO	**500 mg**	**3-day regimen**: 500mg q24h **5-day regimen**: 500mg q24h x 1day, then 250mg q24h x 4 days NO RENAL ADJUSTMENT NECESSARY (NOT dialyzed)					
Aztreonam IV	**2 gram**	**Mild to moderate systemic infections/ Urinary Tract Infection**					
		1g q8-12h	1g q8-12h	1g q12h	1g q24h or 500mg q12h	1g q24h [AD] or 500mg q12h [AD]	1g q12h
		Serious systemic gram-negative infections including *Pseudomonas aeruginosa*					
		2g q8h	2g q8h	2g q12h	2g q24h or 1g q12h	2g q24h [AD] or 1g q12h [AD]	2g q12h or 1gm q8h
		Meningitis					
		2g q6h	2g q6-8h	2g q8h	2g q12h	2g q12h [AD]	2g q8h
Cefazolin IV	**1-2 gram**	1-2g q8h	1g q8h	1g q12h	1g q24h	1g q24h [AD] or 2g after each HD (Can give 3g AD if next HD to occur in 3 days)	1g q8h or 2g q12h
Cefepime IV *(Please refer to TUH PD optimized cefepime dosing protocol – TUH-ADMIN-MM-950.8715)*	**2 gram over 30 minutes**	**Standard dose (All doses to be infused over 30 minutes)**					
		2g loading dose, followed by:					
		1g q6h	1g q8h	1g q12h	1g q24h	1g q24h [AD] or 2g after each HD	1g q8h
		Neutropenic fever, CNS infections (All doses to be infused over 30 minutes)					

** Literature on dosing for CVVHDF is limited. Consider the severity/site of infection and the toxicity profile of the drug to determine dosing, and consider TDM (therapeutic drug monitoring) if available. **Drug/ CrCl (ml/min)**	**ED once dose (prior to CrCl)**	**>50**	**50-30**	**29-10**	**<10 (no HD)**	**HD**	**CVVHDF****
		2g q8h	2g q12h	2g q24h	1g q24h	1g q24h [AD] or 2g after each HD	2g q12h
		Intensive pharmacodynamically optimized dosing (Recommendation by ID or ASP suggested):					
		2g loading dose (infused over 30 minutes), followed by:					
		<u>CrCl >60</u> 2g q8h over 4 hrs	**<u>CrCl 30-60</u>** 2g q12h over 4 hrs	**<u>CrCl 11-29</u>** 2g q24h over 4 hrs	**<u>CrCl <11</u>** 1g q24h over 4 hrs	1g q24h [AD] or 2g after each HD over 4 hrs	2g q12h over 4 hrs
Cefpodoxime PO	**200 mg**	200mg q12h	200mg q12h	200mg q24h	200mg q24h	100mg daily or 200mg 3x/wk [AD]	No data
Ceftriaxone IV	**Standard dose** Higher dose (2g based regimen) may be recommended for ICU patients						
	1-2 gram	1-2g q24h	1-2g q24h	1-2g q24h	1-2g q24h	1-2g q24h [AD]	2g q24h
	Meningitis, Enterococcal infective endocarditis (in conjunction with ampicillin)						
	2 gram	2g q12h	NO RENAL ADJUSTMENT NECESSARY			2g q12h [AD]	2g q12h
Cephalexin PO	**Uncomplicated Urinary Tract Infections**						
	500mg	500mg q12h	500mg q12h	500mg q12h	500mg q24h	500mg q24h [AD]	Consider alternative agent
	Standard dose						
	500-1000mg	500 mg q6h **OR** 1000mg q8h	500 mg q6h **OR** 1000mg q8h	500 mg q8h **OR** 1000mg q12h	500 mg q12h **OR** 1000mg q24h	500 mg q12-24h [AD] **OR** 1000mg q24h [AD]	Consider alternative agent
Ciprofloxacin IV	**Uncomplicated Urinary Tract Infections**						
	200 mg	200mg q12h	200mg q12h	200mg q24h	200mg q24h	200mg q24h [AD]	200mg q12h
	Standard dose						
	400 mg	400mg q12h	400mg q12h	400mg q24h	400mg q24h	400mg q24h [AD]	400mg q12h

** Literature on dosing for CVVHDF is limited. Consider the severity/site of infection and the toxicity profile of the drug to determine dosing, and consider TDM (therapeutic drug monitoring) if available. **Drug/ CrCl (ml/min)**	**ED once dose (prior to CrCl)**	**>50**	**50-30**	**29-10**	**<10 (no HD)**	**HD**	**CVVHDF****
	Severe systemic infection including *Pseudomonas aeruginosa*						
	400 mg	400mg q8h	400mg q8h	400mg q12h	400mg q24h	400mg q24h [AD]	400mg q12h
Ciprofloxacin PO	**Uncomplicated Urinary Tract Infections**						
	250mg	250mg q12h	250mg q12h	250mg q24h	250mg q24h	250mg q24h [AD]	250mg q12h
	Standard dose						
	500mg	500mg q12h	500mg q12h	500mg q24h	500mg q24h	500mg q24h [AD]	500mg q12h
	Severe systemic infection including *Pseudomonas aeruginosa*						
	750mg	750mg q12h	750mg q12h	750mg q24h	750mg q24h	750mg q24h [AD]	750mg q12h
Clindamycin IV	**Standard dose**						
	600mg	600mg q8h NO RENAL DOSAGE ADJUSTMENT NECESSARY (Not dialyzed)					
	Maximum dose (PID, septic shock due to NSTI, obese patients may benefit from max dosing)						
	900mg	900mg q8h NO RENAL DOSAGE ADJUSTMENT NECESSARY (Not dialyzed)					
		PID: Pelvic Inflammatory Disease, NSTI: Necrotizing skin and soft tissue infection					
Clindamycin PO	**300-450mg**	300-450mg q6-8h NO RENAL DOSAGE ADJUSTMENT NECESSARY (Not dialyzed) <60kg: 300mg q8-12h 60.1-90kg: 300mg q8h 90.1-120kg: 450mg q8h >120 kg: 450mg q6h					
	In certain occasions (treatment of PCP pneumonia, bone/ joint infections etc.), 600mg q8h may be used (off-label & may have more GI adverse effects) ≥10mg/kg/day is correlated with clinical success of SSTI in small studies (Cox KK et.al: *J of Infect* 2017; 75: 486-492).						
Daptomycin IV If BMI ≥35 kg/m^2, use **AdjBW**	**Skin and soft tissue infection, simple cystitis (off-label)**						
	4mg/kg	4mg/kg q24h	4mg/kg q24h	4mg/kg q48h	4mg/kg q48h	4mg/kg q48h [AD] or 4mg/kg after each HD[1)] (off-label)	4mg/kg q48h (Consider dose for bacteremia)
	Bacteremia (Consider ID consult for doses >6mg/kg as off-label) **Consider doses >8-10 mg/kg (Max 12 mg/kg) for *Entercoccus faecium* bacteremia**						

** Literature on dosing for CVVHDF is limited. Consider the severity/site of infection and the toxicity profile of the drug to determine dosing, and consider TDM (therapeutic drug monitoring) if available. **Drug/ CrCl (ml/min)**	**ED once dose (prior to CrCl)**	**>50**	**50-30**	**29-10**	**<10 (no HD)**	**HD**	**CVVHDF****
	6mg/kg	6mg/kg q24h	6mg/kg q24h	6mg/kg q48h	6mg/kg q48h	6mg/kg q48h [AD] or 6mg/kg after each HD[1)] (off-label) (Can give 9mg/kg AD if next HD to occur in 3 days)[3)]	6mg/kg q24h[2), 4)] For doses **>6mg/kg** consider q48h interval and or TDM
	1) *Nephrol Dial Transplant* 2010; 25: 1279-84 2) *Crit Care Med* 2011; 39: 19-25 3) *Antimicrob Agents Chemother* 2011; 55(4): 1677-1683 4) *J Antimicrob Chemother* 2020; 75: 1559-1566.						
Doxycycline IV/PO	**100 mg**	100mg q12h NO RENAL DOSAGE ADJUSTMENT NECESSARY (Not dialyzed)					
Ertapenem IV	**1 gram**	1gm q24h	1gm q24h	500mg q24h	500mg q24h	500mg q24h [AD] or 1gm 3x/wk (off label[1)])	1gm q24h (Limited data)
		1) Nephrol Dial Transplant 2019; 34: 1766-1772.					
Fosfomycin PO >3 doses requires ID approval	**3 gram PO**	**Uncomplicated cystitis**					
		3g x 1 dose					
		Complicated cystitis (off-label)					
		3g every other day x 3 doses					
		Fosfomycin should not be used for pyelonephritis.					
Levofloxacin IV/PO	**750mg based regimen (e.g. HAP, CAP-5day course, cSSTI, cUTI-5day course)**						
	750mg IV/PO	**CrCL≥50** 750mg q24h	**CrCl 20-49** 750mg q48h		**CrCl <20, on HD** 750mg x1, then 500mg q48h [AD] or 250mg q24h		**CVVHDF** 750mg q24h
	500mg based regimen (e.g. CAP, ABECB-COPD, SSTI)						
	500mg IV/PO	**CrCL≥50** 500mg q24h	**CrCl 20-49** 500mg x1, then 250mg q24h		**CrCl <20, on HD** 500mg x1, then 250mg q48h [AD]		**CVVHDF** 500mg q24h
	250mg based regimen (e.g. UTI)						
	250mg IV/PO	**CrCL≥50** 250mg q24h	**CrCl 20-49** 250mg q24h		**CrCl <20, on HD** 250mg q48h [AD]		**CVVHDF** 250mg q24h

** Literature on dosing for CVVHDF is limited. Consider the severity/site of infection and the toxicity profile of the drug to determine dosing, and consider TDM (therapeutic drug monitoring) if available. **Drug/ CrCl (ml/min)**	**ED once dose (prior to CrCl)**	**>50**	**50-30**	**29-10**	**<10 (no HD)**	**HD**	**CVVHDF****
	Tablets can be crushed.						
Linezolid IV/PO	**600mg IV/PO**	600mg q12h	NO RENAL ADJUSTMENT NECESSARY			600mg q12h [AD]	600mg q12h
	Observational studies suggest an increased incidence of thrombocytopenia in patients with kidney impairment. Consider therapeutic drug monitoring (TDM). Crass et.al: AAC 2019: 63(8); e00605-19. doi: 10.1128/AAC.00605-19.						
Meropenem IV	**Standard dose**						
	1 gram	1g q8h	1g q12h	500mg q12h	500mg q24h	500mg q24h [AD]	1g q8-12h
	Meningitis, Treatment of *Gram-negative organisms* with meropenem mic=2						
	2 gram	2g q8h	2g q12h	1g q12h	1g q24h	1g q24h [AD]	2g q8-12h
Metronidazole IV/PO	**TUH-Inc. Standard dose per TUH INC ADMIN MM-950.8704 for general anaerobic coverage:**						
	500mg IV/PO	500mg q12h	500mg q12h	500mg q12h	500mg q12h	500mg q12h [AD]	500mg q12h
	Treatment of *C. difficile* infection, H. pylori infection, Central nervous system infections & Amebiasis						
	500mg IV/PO	500mg q8h	500mg q8h	500mg q8h	500mg q8h	500mg q8h [AD]	500mg q8h
Micafungin IV	**Treatment of candidemia, acute disseminated candidiasis, *candida* peritonitis & abscesses**						
	100 mg	100mg q24h					100-150mg q24h
		CRRT data is limited and conflicting. Weigh risks and benefits, consider higher end of dose especially if patient is obese, or on ECMO concomitantly with CRRT. 1) *Antimicrob Agents Chemother* 2017; 61: e02425-16. 2) *Ther Drug Monit* 2019; 41: 376-382. 3) *Crit Care* 2018; 22: 289.					
Nitrofurantoin SR (MacroBID®)	**100mg**	100mg q12h	***CONTRAINDICATED in CrCl ≤60ml/min***				
		Limited data suggests that use in patients with CrCl 40-60 ml/min may be considered with close monitoring (M Oplinger et.al: *Ann Pharmacother* 2013; 47: 106-11).					
Piperacillin/ tazobactam IV *(Please refer to TUH extended infusion dosing protocol – TUH-ADMIN-MM-950.8705)*	**4.5 gram over 30 minutes**	**Extended infusion (Standard dosing at TUH)**				**Intermittent infusion**	
		Loading dose: 4.5gm over 30min x1, followed by: **CrCl ≥20**: 3.375g q8h, **infuse over 4 hours** **CrCl <20**: Refer to HD dosing NO loading dose needed if • 4.5gm (over 30min) was given in the last 6hrs • 3.375gm (over 4hrs) was given in the last 8hrs.				4.5g q12h infuse over 30min	4.5g q8h infuse over 30min

<table>
<tr><th>** Literature on dosing for CVVHDF is limited. Consider the severity/site of infection and the toxicity profile of the drug to determine dosing, and consider TDM (therapeutic drug monitoring) if available. Drug/ CrCl (ml/min)</th><th>ED once dose (prior to CrCl)</th><th>>50</th><th>50-30</th><th>29-10</th><th><10 (no HD)</th><th>HD</th><th>CVVHDF**</th></tr>
<tr><td rowspan="6">Trimethoprim/ sulfamethoxazole (TMP/SMX) IV

TMP/SMX IV = 80mg SMX/ 16mg TMP per 1ml</td><td rowspan="4">Calculate daily dose & divide by 2-4 (max 500mg TMP)

If renal function unknown, give 5mg/kg (max 500mg TMP)</td><td colspan="6">PCP treatment (Dose based on TMP component)
There are studies to suggest that 10-15mg/kg/day TMP may provide optimal outcomes while significantly decreasing the risk of adverse events. Consider lowering the dose if adverse event emerges.
Butler-Laprte G et.al: OFID 2020; 7(5): ofaa112.dos:10.1093/ofid/ofaa112.</td></tr>
<tr><td>15-20 mg/kg/DAY divided q6-12h</td><td>15-20 mg/kg/DAY divided q6-12h</td><td><u>CrCl 15-30</u>: 15-20mg/kg/DAY divided q6-8h x 48h, then 7-10mg/kg/day divided q12-24h

<u>CrCl<15</u>: 7-10mg/kg/DAY divided q12-24h</td><td>7-10mg/kg after each HD
or
5mg/kg q24h [AD]</td><td>10-15mg/kg/DAY divided q6-12h

(Limited data)</td></tr>
<tr><td colspan="6">Other (i.e. Stenotrophomonas maltophilia) indications (Dose based on TMP component)</td></tr>
<tr><td>8-12 mg/kg/ DAY divided q6-12h</td><td>8-12 mg/kg/ DAY divided q6-12h</td><td><u>CrCl 30-15</u>: 8-12mg/kg/DAY divided q12h x 48h, then 4-6mg/kg/day divided q12-24h

<u>CrCl<15</u>: 4-6mg/kg/DAY divided q12-24h</td><td>4-6mg/kg after each HD
or
2.5mg/kg q24h[AD]</td><td>8-10mg/kg/DAY divided q6-12h

(Limited data)</td></tr>
<tr><td colspan="6">Divide dose to max 500mg TMP/dose

Kesner J et.al. Blood Purif 2014; 38: 195-202
Curkovic I et.al: Ann Pharmacother 2010; 44: 1669-72
Brown G et.al: Ann Intensive Care 2014; 4:13</td></tr>
<tr><td rowspan="3">Trimethoprim/ sulfamethoxazole (TMP/SMX) PO</td><td colspan="7">Urinary Tract Infection, AECOPD, SSTI</td></tr>
<tr><td>1 DS PO</td><td><u>TBW ≤90 kg</u>
1 DS q12h

<u>TBW >90 kg</u>
2DS q12h</td><td><u>TBW ≤90 kg</u>
1 DS q12h

<u>TBW >90 kg</u>
2DS q12h</td><td><u>CrCl 30-15</u>: 1 SS q12h

<u>CrCl <15</u>: Generally not recommended
1 SS-DS q24h (Limited data)</td><td>1 SS-DS q24h [AD]</td><td>1 DS q12h (Limited data)</td></tr>
<tr><td colspan="6">• For infections outside of the above indications, may require weight-based dosing (see TMP/SMX IV)</td></tr>
</table>

For full vancomycin dosing and monitoring information, please refer to TUH-ADMIN-MM-GUIDELINES-20
Providers have an option to order "pharmacy to dose vancomycin" to authorize the pharmacists to assume the responsibility of IV vancomycin dosing as per TUH INC-ADMIN-MM-980.8718

1-1. Vancomycin loading Dose (The first dose, to achieve rapid attainment of therapeutic levels)

If patient has not received vancomycin doses within the last 24 hours, administer a one-time loading dose (~20-25 mg/kg, max 2500 mg) to achieve therapeutic serum concentrations rapidly. Loading doses should not be withheld due to impaired renal function.
Refer to Table 1 to determine the appropriate loading dose.

1. Higher end of the loading dose (25 mg/kg) is recommended in patients who meet one of the following criteria:
    a. Admitted to the intensive care unit with sepsis or septic shock
    b. Currently receiving extracorporeal membrane oxygenation (ECMO)
    c. Augmented renal clearance (CrCl > 120 mL/min + SCr < 0.6 mg/dL + age < 40)

    Lower end of the loading dose (20 mg/kg) is recommended for all other patients, however 25 mg/kg loading dose can also be considered based on clinical judgement.

Table 1. Vancomycin Loading Dose Recommendations

Actual weight (kg)	Loading Dose (20-25 mg/kg)	Infusion Time (minutes)
30-31 kg	500-750 mg	60 minutes
32-34 kg	750 mg	60 minutes
35-43 kg	750-1000 mg	60 minutes
44 kg	1000 mg	60 minutes
45-54 kg	1000-1250 mg	60-90 minutes
55-56 kg	1000-1500 mg	60-90 minutes
57-64 kg	1250-1500 mg	90 minutes
65-68 kg	1250-1750 mg	90-120 minutes
69-74 kg	1500-1750 mg	90-120 minutes
75-81 kg	1500-2000 mg	90-120 minutes
82-89 kg	1750-2000 mg	120 minutes
90-93 kg	1750-2500 mg	120-150 minutes
94-112 kg	2000-2500 mg	120-150 minutes
>112 kg	2500 mg	150 minutes

References:

- Metlay JP, Waterer GW, Long AC, Anzueto A, Brozek J, Crothers K, Cooley LA, Dean NC, Fine MJ, Flanders SA, Griffin MR, Metersky ML, Musher DM, Restrepo MI, Whitney CG. Diagnosis and Treatment of Adults with Community-acquired Pneumonia. An Official Clinical Practice Guideline of the American Thoracic Society and Infectious Diseases Society of America. Am J Respir Crit Care Med. 2019 Oct 1;200(7):e45-e67. doi: 10.1164/rccm.201908-1581ST.
- Klompas M, Li L, Menchaca JT, Gruber S; Centers for Disease Control and Prevention Epicenters Program. Ultra-Short-Course Antibiotics for Patients With Suspected Ventilator-Associated Pneumonia but Minimal and Stable Ventilator Settings. Clin Infect Dis. 2017 Apr 1;64(7):870-876. doi: 10.1093/cid/ciw870.
- Heintz BH et.al: *Pharmacotherapy* 2009; 29: 562-577.
- Plstolesl V et.al: *Antimicrob Agents Chemother* 2019; 63: e00583-19.
- Li L et.al: *Frontiers in Pharmacology* 2020;11: 786.
- Lexicomp Online, Lexi-Drugs Online, Hudson, Ohio: Wolters Kluwer Clinical Drug Info

Revision history

12/14/21	Meningitis: Add guidance to consult ID for vancomycin allergy
3/4/22	Add dosing information column for one time doses in ED
3/4/22	Revise zosyn dosing recommendation to include 4.5gm loading dose
5/11/22	Add cefepime/vancomycin/metronidazole/clindamycin regimen to NSTI, no PCN allergy
6/10/22	Update renal dosing recommendations to align with recent update to the institutional renal dosing guideline
4/23/2024	• Add PEN-FAST score as a criteria for mild to moderate PCN allergy • CAP – Comment on azithromycin duration • HAP/VAP - Comment on azithromycin duration, ultra short course, modification of risk factors • UTI – comment about shorter duration • HA-IAI – emphasis on VRE coverage in severe sepsis or septic shock • SSTI – remove clindamycin for non-purulent cellulitis given increased GAS resistance, addition of injection related cellulitis, emphasis on linezolid-based regimen for NSTI, criteria for gram-positive coverage only for diabetic foot infection, add bite wounds row • NF – add zosyn based regimen • Dosing table updated to reflect current version of TUH dosing guideline
8/23/2024	• HAP/VAP/CAP w risk factors for Pseudomonas – severe PCN allergy: change levofloxacin or aztreonam to levofloxacin PLUS aztreonam
12/11/2024	• Revision of neutropenic fever – reference link and align definitions