# PRMCE ANTI-INFECTIVES SELECTION GUIDELINE FOR ADULTS

(Revision October 22, 2015)

## SKIN AND SOFT TISSUE INFECTIONS:

A. **Cellulitis:**

MRSA uncommonly causes cellulitis in the absence of a wound or abscess.
Add empiric anti-MRSA therapy if severe disease is present or if risk factors for MRSA are present:

**Risk factors:**

1. H/o MRSA or hospitalization or residence in a long term care facility within 1 year
2. Recent antibiotic therapy within 4 months
3. HIV infection or men who have sex with men or injection drug use
4. Hemodialysis
5. Incarceration
6. Military service
7. Sharing needles, razors or sharing sports equipment

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| Mild | **Cephalexin 500mg PO QID for 7-10 days**<br>***Or:***<br>**Clindamycin 300mg PO QID for 7-10 days** (if anaphylaxis to penicillin)[1] |
| Moderate (requires admission) | **Cefazolin (per protocol) 1g IV q8h equivalent for 10-14 days**<br>**(if > 80 kg give cefazolin 2 g IV q8h)**<br>***Or:***<br>**Clindamycin (per protocol) 900mg IV q8h equivalent for 10-14 days** (if anaphylaxis to penicillin) |
| Severe (sepsis) | **Vancomycin IV (per protocol, goal trough 15-20)**<br>***Plus:***<br>**Cefazolin (per protocol) 1g IV q8h equivalent for 10-14 days**<br>**(if > 80 kg give cefazolin 2 g IV q8h)** |
| Necrotizing soft tissue infections including necrotizing fasciitis | **Vancomycin (IV (per protocol, goal trough of 15-20)**<br>***Plus:***<br>**Meropenem (per protocol) 500mg IV q6h equivalent**<br>***Plus:***<br>**Clindamycin 900 mg IV q8h**<br><br>***Duration of therapy*** is guided by clinical course/surgical intervention<br><br>***Note:*** Consider consultation with ID or general surgery for (1) pain disproportionate to the physical findings, (2) violaceous bullae, (3) cutaneous hemorrhage, (4) skin sloughing, (5) skin anesthesia, (6) rapid progression, and (7) gas in the tissue |

[1] Clindamycin substantially increases the risk for C. difficile associated diarrhea (OR=32) Dial S, Kezouh A, Dascal A, Barkun A, Suissa S. *CMAJ* 2008;179:767-772

***Order Set: ED Cellulitis/Wound Infection***

**B. Community Acquired MRSA (CA-MRSA).**
If soft tissue abscess is present, assume MRSA is present; obtain cultures with I+D if no prior cultures are available on records.

***Duration of therapy:*** Treat for 14 days.

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| Mild | **Trimethoprim/sulfamethoxazole DS 1 tablet PO BID** (1st line)[2]<br>***Or:***<br>**Clindamycin 300mg mg PO QID** (2nd line)<br>***Or:***<br>**Doxycycline 100mg PO BID** (3rd line)<br>***Or:***<br>**Linezolid 600mg PO BID** (formulary restriction; ID approval) |
| Moderate or Severe | **Vancomycin IV (per protocol, goal trough 10-15)**<br>***Or:***<br>**Linezolid 600mg PO BID** (formulary restriction; ID approval) |
| Recurrent MRSA abscesses >2 episodes | Outpatient ID consultation if patient has frequent MRSA soft tissue infections. Call 425-261-4905 to schedule. |

[2] Dose for patients >40kg is 2 tablets BID, however, minor infections may respond to lower dose with lower incidence of nausea

***Order Set: ED Cellulitis/Wound Infection***

C. **Diabetic foot infection.**
Uninfected wounds do not require antibiotics, refer to outpatient podiatry for wound management. Obtain cultures for infected wounds.
***Duration of therapy:*** Based on clinical response and surgical intervention; generally 14 days.

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| Cellulitis without open wound | Treat as above for cellulitis |
| Infected diabetic foot ulcer (mild) | **Amoxicillin/clavulanate (Augmentin) 875mg PO BID x 7 days**<br>***Or:***<br>**Cephalexin 500mg PO QID** for 7-10 days (if rash with penicillin)<br>***Plus:***<br>**Metronidazole 500mg PO TID**<br>***Or*** (anaphylaxis with penicillin):<br>**Clindamycin 300mg mg PO QID**<br>***Plus:***<br>**Ciprofloxacin 500mg PO BID** |
| Infected diabetic foot ulcer (Moderate-requiring admission) | **Ampicillin/sulbactam (Unasyn) 3g IV q6h equivalent**<br>***Or:***<br>**Ceftriaxone 1g IV q24h** (if rash with penicillin)<br>***Plus:***<br>**Metronidazole 500mg IV q8h**<br><br>***Note:*** Cellulitis extending >2cm, lymphangitic streaking, spread beneath the superficial fascia, deep-tissue abscess, gangrene, and involvement of muscle, tendon, joint or bone |

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| Infected diabetic foot ulcer (Severe) | **Vancomycin IV (per protocol, goal trough 15-20)**<br>***Plus***:<br>**Cefepime 2g IV q8h (equivalent)**<br>***Plus:***<br>**Metronidazole 500mg IV q8h**<br>Severe includes fever, chills, tachycardia, hypotension, confusion, vomiting, leukocytosis, acidosis, severe hyperglycemia, or azotemia |

***Order Set: None***

**RESPIRATORY INFECTIONS:**

**Community Acquired Pneumonia (CAP):**
**Use CAP Protocol**, MRSA is still uncommon in CAP, treat if risk factors are present, or if clinical course is suggestive of MRSA pneumonia: ie rapid progression of lung infection in an otherwise healthy patient, with lung necrosis or sepsis. Prophylaxis for patients at risk for aspiration is not recommended.

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| Ambulatory patients | **Azithromycin 500mg PO x 1, then 250mg PO x 4 days** ($1^{st}$ line)<br>***Or:***<br>**Levofloxacin 750 PO q24h x 5 days** ($2^{nd}$ line)<br>***Or:***<br>**Doxycycline 100 mg PO BID ($3^{rd}$ line**) |
| CAP needing hospitalization | **Ceftriaxone 1g IV q24 h *plus* Azithromycin 500mg PO q24h** ($1^{st}$ line)<br>***Or:***<br>**Levofloxacin 750 PO/IV q24 hours ($2^{nd}$ line)** |
| MRSA risk | **Vancomycin IV (per protocol, goal trough 15-20)**<br>***Plus*:**<br>**Ceftriaxone 1g IV q24h**<br>***Plus*:**<br>**Azithromycin 500mg PO q24h**<br>***Duration of therapy:*** Treat for 14 days for MRSA, if confirmed |

**Hospital Acquired Pneumonia (Healthcare associated pneumonia; HAP):**

- **Obtain sputum cultures.**

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| Hospitalized patients | **Vancomycin IV (per protocol, goal trough 15-20)**<br>***Plus:***<br>**Cefepime 2g IV q8h (equivalent)**<br>***Plus*:**<br>**Metronidzole 500mg IV q8h**<br>***Duration of therapy:*** Treat for 7 days<br>14 days if: MRSA, Pseudomonas, or ESBL G-negative rods |

**Aspirarion Pneumonia:**

- **Evaluate for risk factors for HAP/MRSA, obtain sputum cultures, and if no risk factors are present:**

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| Hospitalized patients | **Ampicillin/sulbactam (Unasyn) 3g IV q6h equivalent** (1st line)<br>***Or:***<br>**Ceftriaxone 1g IV q12h**<br>***Plus:***<br>**Metronidazole 500mg IV q8h** (2nd line)<br>***Duration of therapy:*** Treat for 7 days. |

***Order Set: IP Community-Acquired Pneumonia Admission***

**URINARY TRACT INFECTION (UTI):**

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| Asymptomatic bacteriuria in pregnancy | **Macrodantin (Macrobid) 100mg PO BID x 7 days** (1st line)<br>***Or:***<br>**Cephalexin 500 mg PO q12h x 7 days**<br>***Or:***<br>**Amoxicillin 250mg PO q8h x 5 days** (3rd line)<br><br>***Note:*** Test of cure should be obtained 7 days post treatment, and then monthly until completion of therapy |
| Acute cystitis in women of childbearing age | **Macrodantin (Macrobid) 100 mg PO BID x 5 days**<br>***Or:***<br>**Trimethoprim/sulfamethoxazole DS 1 tab PO BID x 3 days** (2nd line)<br>***Or:***<br>**Ciprofloxacin 250mg PO BID x 3 days** (3rd line) |
| Mild pyelonephritis (low grade fever < 101.5, only slightly elevated WBC, no nausea/vomiting) | **Ciprofloxacin 500mg PO BID x 7 days**<br><br>***Note:*** If beta-lactams are used, duration of therapy is 14-21 days. |
| UTI with sepsis/ complicated pyelonephritis | **Vancomycin IV (per protocol, goal trough 10-15)**<br>***Plus***:<br>**Cefepime 2g IV q12h (equivalent)**<br>***Plus:***<br>**Metronidazole 500mg IV q8h**<br>(14-day course of antimicrobial therapy is recommended; consider changing to ciprofloxacin orally if appropriate based on culture results). |
| Acute uncomplicated pyelonephritis in pregnancy | **Ceftriaxone 1g IV q12h *or* 2g IV q24h**<br><br>***Note:*** All pregnant patients should be hospitalized for pyelonephritis and treated with parenteral antimicrobials until afebrile for 24 hours. |
| Prostatitis: | **Ciprofloxacin 500mg PO q12h**<br>***Or:***<br>**Trimethoprim/sulfamethoxazole DS 1 tab PO BID**<br><br>***Note:*** Complete 21-28 days of therapy. Initial empiric antibiotics with follow- |

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| | up in 1 week for culture results and assessment of clinical improvement as aggressive treatment of acute prostatitis can lessen the chance of developing chronic prostatitis. |

***Order Set: see UTI within "Sepsis" order set for patients who have SIRS and a UTI***

**INTRA-ABDOMINAL INFECTIONS:** ***Changes based on IDSA guideline***

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| Mild – to – Moderate Severity | **Ceftriaxone 1g IV q12h**<br>***Plus:***<br>**Metronidazole 500mg IV q8h**<br><br>***Or*** *(if beta-lactam allergy):*<br>**Levofloxacin 750mg IV q24h**<br>***Plus:***<br>**Metronidazole 500mg IV/PO q8h**<br>***Duration of therapy:*** Treat for 10-14 days |
| High Risk or Severity (severe physiologic disturbance, advanced age, or immunocompromised state) | **Single Agent:**<br>**Piperacillin-tazobactam 3.375g IV (Zosyn per protocol) q6h equivalent**<br>***Or:***<br>**Combination:**<br>**Cefepime 2g IV q12h** (rash with penicillin)<br>***Or:***<br>**Levofloxacin 750mg IV q24h** (anaphylaxis with penicillin)<br>***Plus:***<br>**Metronidazole 500mg IV q8h**<br>***Duration of therapy:*** Treat for 10-14 days |

***Order Set: see intra-abdominal infection within "Sepsis" order set for patients who have SIRS and an abdominal infection***

**SEPSIS:**

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| Initial treatment | **Vancomycin IV (per protocol, goal trough 15-20)** (1st line)<br>***Plus:***<br>**Cefepime 2g IV q8h equivalent** ***Plus*****:**<br>**Metronidazole 500mg IV q8h (optional)**<br>***Or:***<br>**Piperacillin/tazobactam 4.5 g IV q6h (Zosyn per protocol) equivalent**<br>***Or:***<br>**Meropenem 500mg IV q6h equivalent**<br>***Duration of therapy:*** Based on site of infection. If no source, treat for 10-14 days/consult infectious disease |
| Bacterial endocarditis | **Vancomycin IV (per protocol, goal trough 15-20)**<br>***Plus:***<br>**Ceftriaxone 2g IV q24h**<br>***Note:*** Consult ID |

***Order Set: Sepsis and Sepsis - Severe***

**FEBRILE NEUTROPENIA:**

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| Initial treatment | **Meropenem 1 gm IV q8h equivalent**<br>***Or:***<br>**Cefepime 2 gm q8h**<br><br>**Add Vancomycin IV (per protocol, goal trough 15-20)** for:<br>1. Sepsis, 2. Mucositis, 3. Skin or catheter site infection,<br>4. History of MRSA colonization, 5. Recent quinolone prophylaxis<br><br>*Beta-lactam allergy (anaphylaxis to penicillins or cephalosporins):*<br><br>**Aztreonam 2g IV q8h**<br>***Plus:***<br>**Vancomycin (per protocol, goal trough 15-20)**<br><br>***Duration of therapy:*** Based on clinical course and neutrophil recovery. |

***Order Set: ED Fever and Neutrop***

**BACTERIAL MENINGITIS:**

***Duration of therapy:*** Generally, for all age groups 2-3 weeks; depending on causative organism; consult infectious disease

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| In Adults <50 yrs. | **Vancomycin IV (per protocol, goal trough 15-20)**<br>***Plus:***<br>**Ceftriaxone 2g IV q12h**<br>**Administer dexamethasone 0.15 mg/kg (up to 10mg) q6h IV**<br><br>**(for 2 to 4 days); first dose to be given 10-20 minutes prior to antibiotics *or* at the time of first antibiotic administration.** |
| If additional risk factors or Listeria is concern: | ***add*** **Ampicillin 2g IV q4h equivalent to above regimen** |
| | **Note:** CT scan recommended before lumbar puncture in the following cases:<br>1. >60yrs of age<br>2. Immunocompromised<br>3. History of CNS disease<br>4. Seizure within a week of presentation<br>5. Abnormal level of consciousness or mentation<br>6. Focal neurological deficits<br>*(NEJM 2001; 345:1727)* |

***Order Set: GEN IP Bacterial Meningitis Admission***

**STD TREATMENT: Updated with 2010 CDC guidelines**

| | | **Pregnancy*** |
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| Chlamydia cervicitis | **Azithromycin 1gm PO x 1 dose** ***Or:*** **Doxycycline 100mg PO BID** x 7 days | **Azithromycin 1 gm PO x dose** ***or*** **Amoxicillin 500mg PO TID** x 7 days |
| Gonorrhea cervicitis/oropharygeal | **Ceftriaxone 250 mg IM x 1 dose** (***Note:*** Cefixime PO should not be used, failures are reported with oro-esophageal gonorrhea) | **Ceftriaxone 250 mg IM x 1 dose** |
| Epididymitis | **Coverage for GC and CL as above if less than 35 yrs** For acute epididymitis most likely caused by enteric organisms: **Levofloxacin 500 mg PO once daily** x 10 days | **N/A** |
| PID – Outpatient | **Coverage for GC and CL as above except give Doxycycline 100 mg PO BID** for 14 days ***Plus:*** **Metronidazole 500mg PO q12h** x 14 days | N/A |
| PID – Inpatient | **Cefoxitin 2 g IV q6h** ***Plus:*** **Doxycycline 100 mg PO q12h** *(**Note:** Cefotetan is off formulary due to decreased activity against B. fragilis group).* ***Duration of therapy:*** At least 24 hours after the patient improves; then continue outpatient treatment for 14 days** | **Gentamicin 5mg/kg IV q24h** ***plus*** **Clindamycin 900mg IV q8h** |

* Recommend follow up testing 3 weeks after treatment in pregnancy
** CDC guideline for PID treatment

**Note:** CDC guidelines recommend all partners within previous 60 days be treated and that intercourse be refrained from for 7 days after treatment is initiated.

***Order Set: GYN IP PID Admit***

**GENERAL NOTES:**

1. Obtain cultures where indicated (esp. sputum cultures if pneumonia suspected).
2. Be vigilant regarding previously documented resistant organisms that have been cultured.
3. Document specific allergy to Penicillin, if hives are allergy, generally it is OK to use cephalosporins.
4. Order parenteral antibiotics to be dosed per pharmacy protocol (create a pharmacy consult in EPIC); pharmacy services will adjust all dosages for renal or hepatic functions (per target dose equivalent listed in the guideline above), which can vary widely during an admission.

5. Add indication for antimicrobial when ordering per pharmacy dosing:
   *For example: "Ceftriaxone IV per protocol for meningitis" will result in 2g IV q12 hours dosing.*
6. Avoid clindamycin and fluoroquinolones where possible.
7. Use established hospital protocols for CAP and Sepsis.

**Restricted agents (indicate in orders reasoning for use) 1st dose will be administered; subsequent doses will require approval by Infectious Diseases:**

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| Linezolid<br>Daptomycin<br>Ertapenem *(Exception: ICU)*<br>Aztreonam<br>Voriconazole *(Exception: ICU)*<br>Telavancin<br>Tigecycline | Quinupristin/Dalfopristin<br>Meropenem<br>*(Exception: Neutropenic fever, ICU, NICU/pediatrics)*<br>Imipenem/cilastatin *(meropenem is now preferred Carbapenem on formulary)*<br>Micafungin *(Exception: ICU)*<br>Caspofungin *(micafungin is now preferred Echinocandin on formulary)* |

**Agents which prompt review by Antimicrobial Therapy Monitoring Service (ATMS):**

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| Vancomycin | Tigecycline |
| Piperacillin/Tazobactam | Linezolid |
| Imipenem/Cilastatin | Quinupristin/Dalfopristin |
| Meropenem | Daptomycin |
| Ertapenem | Voriconazole |
| Aztreonam | Caspofungin |
| Telavancin | Micafungin |
| Clindamycin | |

**PRMCE ANTI-INFECTIVEs SELECTION GUIDELINE FOR ADULTS:**

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