**Montefiore Antimicrobial Stewardship Program (ASP)**

**Syndrome Specific Guidelines – Antibiotic Initiation, Adult Inpatients**

**Notes:**

* ***This document is not intended to replace clinical judgment***
* ***ID assistance recommended for severely ill patients, compromised hosts, pregnancy, organ transplant, etc.***
  + - ***Dose and frequency may depend on renal function and weight*** (e.g. IV vancomycin, gentamicin, acyclovir, SMX/TMP, etc.)
* Always send 8-10cc/ blood cx bottle as part of initial fever work up
* Look at prior micro results to help guide you
* MDRO = multidrug resistant organism
* PCN = penicillin
* Abx = antibiotics
* Recommendations may be amended during drug shortages
* Syndromes are listed in alphabetical order

**Take a “time out” at 48-72hrs after starting antibiotics**

* Is this antibiotic still needed?
* Can it be narrowed in spectrum or switched to PO?
* How long do I plan to treat?
* Have I obtained appropriate diagnostics and followed up on results?
* Did I document antibiotic plan in the EMR?
* At discharge, did I communicate the correct REMAINING duration of antibiotics to avoid excess use?

**Clarifying an Antibiotic Allergy**

* **Non-IgE mediated penicillin reaction:** non-urticarial rash, injection site reaction, unknown/remote reaction (e.g., type IV, delayed hypersensitivity reaction)
* **IgE mediated/immediate hypersensitivity reaction:** (requires prior drug exposure) urticarial rash, dyspnea, hoarseness, bronchospasm, facial/tongue swelling, anaphylaxis
* 1 in 10 patients report an PCN allergy but 8 in 10 are no longer allergic within a 10-year period
* PCN-cephalosporin cross reactivity rate: ≤ 2.5%; benefit of cephalosporin may outweigh risk
* ***Take opportunity to challenge while in monitored setting; look back at administered meds from prior admits to see if β-lactam ever given 🡪 if no reaction, you are good to go!***

**Colonization vs. True Infection**

**Colonization may predispose to infection, but does NOT always indicate active infection:**

* Asymptomatic pyuria and bacteriuria are common in elderly females and nursing home residents (altered mental status and falls are NOT symptoms of UTI)
* Is the patient symptomatic with signs of active infection? (ex. dysuria, purulent sputum, fever, leukocytosis)
* Are symptoms persistent > 24 hours?
* Is this a condition that may not require abx or only a short course of abx? (ex. tracheitis, aspiration pneumonitis)
* Do radiographs support the presence of infection?
* Was catheter changed on schedule?
* Is there a single dominant organism in culture with many WBC and low epithelial cells?
* Are antibiotics alone likely to cure the infection? Has source control been achieved?
* Can always call ID/ASP for assistance

**Aspiration**

Obtain CXR, CBC, sputum culture if antibiotics required(aspiration is often caused by chemical irritation, not infectious process; treatment may not be required)

**Refer to Montefiore Respiratory Infection Guidelines**

**Catheter-associated Bloodstream Infection**

Send at least 2 sets of blood cultures (culprit line and peripheral blood), remove line and send tip for culture

**Treatment**

* IV Vancomycin 15-20mg/kg + Cefepime 1-2g +/- Gentamicin 5-7mg/kg IBW x 1 (if sepsis or h/o MDRO);
* **If HD OR severe PCN allergy:** IV Vancomycin 15-20mg/kg +/- Gentamicin 5mg/kg IV IBW x 1
* *\*If endocarditis suspected remove line and consult ID, which may recommend cardiology consult for TEE*
  + - *ID consult recommended for Staphylococcus aureus, Candida spp., Pseudomonas spp., and MDROs*

***Clostridium difficile* Infection (CDI)**

Obtain CBC, BMP, abdominal Xray or CT if ileus, stool *C.difficle,* **STOP** unnecessary PPI, antibiotics, laxatives; *Surgery/GI/ID consult recommended for severe or fulminant disease*

Access separate Montefiore CDI guidelines at:

[**https://einsteinmed.edu/uploadedFiles/departments/medicine/Divisions/Infectious\_Diseases/Updated%20CDI%20guidelines%202018.pdf**](https://einsteinmed.edu/uploadedFiles/departments/medicine/Divisions/Infectious_Diseases/Updated%20CDI%20guidelines%202018.pdf)

**COPD Exacerbation**

**Refer to MMC Respiratory Infection Guidelines**

**Community Acquired Pneumonia**

**Refer to MMC Respiratory Infection Guidelines**

**Hospital Acquired Pneumonia**

**Refer to MMC Respiratory Infection Guidelines**

**Influenza**

Obtain Influenza/RSV PCR, SARS-CoV-2 PCR to distinguish between viral syndromes, CXR

**Treatment** (for patients at risk for severe illness and symptom onset within 72h): Oseltamivir (CrCl ≥ 60 ml/min: 75mg PO Q12h, CrCl 30-59 ml/min: 30mg PO Q12h, CrCl ≤ 29ml/min: 30 mg PO Q24h)

Severe influenza with respiratory failure in an ICU patient: consider ID consult for IV peramivir

**COVID-19**

Obtain SARS-CoV-2 PCR, CXR, admission labs, and CT thorax as indicated

(<https://www.covid19treatmentguidelines.nih.gov/therapeutic-management/>)

Treatment of bacterial/fungal co-infection in COVID-19 patients: Refer to separate guidelines on MMC ASP website.

**Intra-abdominal Infection (non-CDI):**

**Community acquired**: Ceftriaxone IV 1g + Metronidazole 500mg IV/PO, OR Cefoxitin 1-2g IV/PO +/- Metronidazole 500mg IV/PO, OR Ciprofloxacin 400mg IV/500mg PO + Metronidazole 500mg IV/PO (severe PCN allergy)

* Note: q12h dosing is adequate for most indications (except amoebic infection and C. *difficile* infection)

**Risk for MDROs**: Piperacillin/tazobactam 4.5g IV (Aztreonam IV + Metronidazole IV/PO if severe PCN allergy +/- Vancomycin 15-20mg/kg IV for Streptococcal/Enterococcal coverage)

**Meningitis/Encephalitis**

Obtain LP, blood cultures, CT/MRI; ID consult recommended

**Meningitis:**

* Age <50 **AND** normal host immunity: Vancomycin 15-20mg/kg IV + Ceftriaxone 2g IV
* Age >50 **OR** Immunosuppressed: Vancomycin 15-20mg/kg IV + Ceftriaxone 2g IV + Ampicillin 2g IV

**Suspect HSV Encephalitis:**

Acyclovir 10 mg/kg IV based on IBW (adjusted body weight for BMI >30); add to meningitis regimen above in at-risk patient if coverage of both meningitis and encephalitis desired

**Anaphylaxis to Penicillin:**

Vancomycin 15-20mg/kg x IV + [Levofloxacin 750mg IV or Ciprofloxacin 400mg IV]

* If *Listeria* coverage is needed, add SMX-TMP 5mg/kg q12h

**Neutropenic Fever**

Look for focal sx/signs on exam and history, blood cultures, UA/UCx, CXR

* Look back at clinical cultures from prior admits to select a targeted antibiotic regimen

**Treatment:** Cefepime 2g IV

**MMC Criteria for adding IV Vancomycin**

* Blood cultures positive for GP organisms
* Clinically suspect catheter or skin source (cellulitis, chills with infusion through catheter)
* h/o MRSA or other MDRO infection
* Infiltrate on CXR
* Severe sepsis or hemodynamic instability

**Severe illness:** Can add Gentamicin 5-7 mg/kg x 1 IV IBW

**Severe Penicillin allergy**

Aztreonam 1-2g IV +/- Gentamicin 5-7mg/kg IV IBW (enhanced coverage of MDROs) + Vancomycin 15-20mg/kg IV (GP coverage) *\*for intra-abdominal source, can add metronidazole 500mg IV*

**Staphylococcus aureus bacteremia:**

**Remove catheter if present, obtain daily blood cultures, TTE and potentially TEE**

* **ID consult strongly recommended** for assistance with work up, investigation for distant sites of infection, and management (sometimes dual antibiotic therapy required); OPAT follow-up recommended on discharge

**Skin & Skin Structure/Bone Joint Infections**

Select lower dose for elderly patients or those with low body weight

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| **Syndrome** | **Regimen** |
| **Uncomplicated Cellulitis OR Diabetic Foot Infection** *Purulent = S. aureus*  *Non-purulent, streaky/diffuse = Strep*  \*Note high local MRSA prevalence in the Bronx | **MRSA:****PO**: Bactrim 1-2 DS tabs, ***OR***Doxycycline 100mg, ***OR***Clindamycin 600mg**IV**:Vancomycin 15-20mg/kg**MSSA:****PO:** Dicloxacillin 500mg, **OR** Cephalexin 500mg, **OR** Amox/clav 500-875/125mg**IV:** Cefazolin 1-2g**Strep:****PO:** Cephalexin 500mg, OR Amoxicillin 500mg**IV:** Cefazolin 1-2g ORAmpicillin/sulbactam 3g (if anaerobic coverage needed); select lower dose for elderly patients |
| **Severe Soft Tissue** **OR Complicated Diabetic Foot** | (Limb threatening, h/o MDRO or prior abx, toxic appearance)Vancomycin 15-20mg/kg IV + Piperacillin/tazobactam 4.5g IV |
| **Suspect Necrotizing Infection** | Call Surgery/ID consult, add **Clindamycin 900mg IV** to severe regimen (refine later based on cultures) |
| **Osteomyelitis** | Obtain CRP, ESR with routine labs, X-ray (or MRI if inconclusive), OR cultures if possible (superficial wound cultures may not be accurate)  ***\*\*Consider holding antibiotics to increase bone/tissue culture yield if patient clinically stable and infection is chronic (e.g. chronic diabetic OM)\*\****  **Mild to Moderate**:  Ceftriaxone 2g (+/- metronidazole 500mg if necrotic, foul smelling) **OR** Ampicillin/sulbactam 3g  +/- Vancomycin 15-20mg/kg (if prior MRSA or excess abx exposure)  **Sepsis OR Suspect *P. aeruginosa*** (i.e., foot puncture wound, water exposure, excess abx, past Pseudomonas):   * Piperacillin/tazobactam 4.5g IV **OR** Cefepime 1-2g IV (+/- metronidazole 500mg if necrotic, foul smelling) * +/- Vancomycin 15-20mg/kg IV (if high MRSA risk)   **Severe Penicillin allergy:**   * Aztreonam 1-2g IV **OR** ciprofloxacin 400mg IV **OR** levofloxacin 750mg IV * +/- Vancomycin 15-20mg/kg IV (GP coverage) * +/- metronidazole 500mg IV if necrotic, foul smelling |

**Urinary Tract Infection**

Change foley, obtain UA/UCx, U/S of kidneys if suspect pyelo or obstruction, BCx if febrile

**Cystitis**: Cephalexin 500mg PO, **OR** TMP/SMX 1 DS tab PO, **OR** Nitrofurantoin 100mg PO (for CrCl >30ml/min), **OR** Cefdinir 300mg PO, **OR** Ciprofloxacin 500mg PO (severe PCN and sulfa allergy).

* For urine isolates, cefazolin results predict results for the oral agents cefaclor, cefdinir, cefpodoxime, cefprozil, cefuroxime, and cephalexin when used for therapy of uncomplicated UTI due to *E. coli, K. pneumoniae, P. mirabilis*

**Complicated UTI/pyelonephritis** (without h/o MDRO): Ceftriaxone 1g IV

* **Anaphylaxis to Penicillin:** Gentamicin 3mg/kg IV IBW, OR Aztreonam 1-2g IV, OR Ciprofloxacin 400mg IV or 500mg PO (if from home ONLY)

**Severe Illness OR h/o MDRO:** Cefepime 1-2g IV +/- Gentamicin 3mg/kg IV IBW x1

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| **Suggested Antibiotic Durations** | |
| **Syndrome** | **Median Duration** |
| COPD exacerbation, meets criteria for antibiotics | 3-5 days |
| CAP | 5 days |
| Complicated CAP (empyema, bacteremic, S. aureus PNA, abscess, Legionella) | Duration variable up to several weeks  (ID consult recommended);  7-21 days for Legionella based on severity |
| HAP/VAP (empiric treatment OR isolation of specific pathogen such as MRSA, Pseudomonas, MDRO, etc.) | 7 days |
| Bacterial meningitis | 7-21 days depending on organism isolated (ID consult recommended) |
| HSV encephalitis | 14-21 days (ID consult recommended) |
| Catheter-related bloodstream infection (catheter removal recommended for source control)  For *Staph aureus,* Pseudomonas*,* Yeast, and/or recurrent bacteremias – ID consult recommended | **CoNS**: 5-7 days if transient; longer if persistent  ***S. aureus***: up to 4-6 weeks  **GNB** (not Pseudomonas): 7-14 days if neg BCx and source controlled  ***Candida* *spp.*:** at least 14 days from first neg BCx; 6 weeks or more for endocarditis |
| Influenza | Oseltamivir 5 days; up to 7-10 days only if critically ill |
| Uncomplicated UTI  Pyelonephritis/complex UTI | 3-5 days  7-10 days; ≥14 days if renal abscess (ID consult rec.) |
| Intra-abdominal source | 4-7 days **if source controlled** |
| Skin and soft tissue  (if discrete lesion drained, often no further abx needed) | Pathogen/case specific; 5 to ≥ 14 days  if systemic illness, deep infection, non-healing, unusual pathogen, compromised host – ID and Surgery input suggested |
| *C. difficile* colitis | 10 days for first or second episode  See Montefiore *C. diff* guideline for details |
| Osteomyelitis | 4-6 weeks depending on source control/hardware; ID consult and OPAT referral recommended |
| Neutropenic fever  (ID consult suggested) | Hold Abx once afebrile ≥ 48h with negative cultures, resolving neutropenia; if documented source, treat accordingly for site and organism |

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