TITLE: ANTIBIOTICS IN ADULT PATIENTS – EMPIRIC USE GUIDELINES, COLUMBIA UNIVERSITY MEDICAL CENTER

MEDICATION GUIDELINE

PURPOSE:

These are the 2011 guidelines for the empiric use of antibiotics at NewYork-Presbyterian Hospital - Columbia University Medical Center. These recommendations were developed by the NewYork-Presbyterian Hospital - Columbia University Medical Center's Division of Infectious Diseases, Department of Epidemiology, and Department of Pharmacy in response to the increasing use of broad-spectrum antibiotics, recent susceptibility trends specifically at the Columbia University Medical Center campus, and the need to preserve existing antibiotics due to the lack of new antibiotics targeting gram-negative resistant organisms in the pipeline.

The recommendations presented here are an attempt to aid in more rational selection of antibiotics based on the most likely pathogens for a given infection and the susceptibility profiles of these pathogens that are specific to this institution. This document is not hospital policy but is meant to serve as general guidelines for the empiric use of antibiotics in the hospital setting. These guidelines are intended as a tool to help guide the initial management of patients' infections and are not meant to replace clinical judgment in each particular case. The following are empiric antibiotic guidelines for the most common types of infections encountered in the hospital setting. These recommendations take into account the site of infection, most common organisms, hospital epidemiology and susceptibilities, expert opinion, and cost. The goals of these guidelines are to optimize antibiotic use and patient outcomes while limiting the emergence of resistant bacteria. These recommendations are not meant to replace clinical judgment. **Antibiotic therapy must still be individualized based on a patient's severity of illness, comorbidities, culture history, antibiotic history, and immune status.** Subsequently, therapy should be modified based on the patients' clinical status and the microbiology data obtained. In no way should these guidelines replace an Infectious Diseases consultation and, as such, Infectious Diseases should continue to be contacted with any questions or requests for formal consultations.

APPLICABILITY:

NYP/C

PROCEDURE:

- Cultures of presumed infected site(s) should always be obtained (preferably prior to any antibiotics).
- Initial empiric therapy should be chosen based on most likely pathogens, hospital susceptibility patterns, cost-effective therapy, and impact on development of resistance.
- Patients' flora may be altered by previous antibiotic courses and recent therapy should be taken into account when choosing initial empiric therapy.
- Greater severity of illness or severely immunocompromised state may warrant broader initial empiric coverage.
- A history of PCN-allergy should be carefully evaluated as it does not always warrant the use of non-beta-lactam antibiotics. In patients with less severe PCN allergies (e.g. mild

rash in the absence of both Stevens-Johnson Syndrome and anaphylaxis) the use of cephalosporins or carbapenems may be possible based on risk/benefit. If any doubt exists, discussion with Infectious Diseases (ID) is recommended.

- Reassess all antibiotic therapy once culture results are obtained or a worsening of clinical status suspected to be due to infection. Antibiotic therapy should be modified to target identified pathogen(s) and to narrow the spectrum of activity if possible.
- Discontinue vancomycin if no methicillin-resistant *Staphylococcus aureus* (MRSA) or resistant gram-positive organisms identified.
- A switch to oral therapy should be considered.
    - Medications with nearly 100% bioavailability (fluconazole, levofloxacin, linezolid, metronidazole, and voriconazole): a transition to oral therapy should be considered in patients able to tolerate an oral diet and other oral medications.
    - Other medications: a transition to oral therapy to complete a course of therapy should be considered following clinical improvement, where possible.
- Recommendations for duration of therapy are provided based on clinical syndromes and usual clinical course. Duration may be altered by clinical course.

COMMON TYPES OF INFECTIONS	DEFINITIONS / USUAL ORGANISMS	MODIFYING FACTORS	PRIMARY ANTIBIOTIC THERAPY RECOMMENDED	ALTERNATIVE ANTIBIOTIC THERAPY	TOTAL DURATION OF THERAPY (combined IV+PO)
CENTRAL NERVOUS SYSTEM					
MENINGITIS[1a]	*S. pneumoniae*, *N. meningitidis*	Community-acquired (18–50 yrs old, not immuno-compromised)	Ceftriaxone IV + Vancomycin IV	*If severe PCN-allergy*[1b]*:* Vancomycin IV + Aztreonam IV + TMP/SMX IV	7-10 days *(7 days: N. meningitidis, H. influenzae; 10 days: S. pneumoniae, others)*
	S. pneumoniae, *N. meningitidis*, *L. monocytogenes*, gram-negative bacilli	Community-acquired (> 50 yrs old, immuno-compromised, pregnant)	Ceftriaxone IV + Vancomycin IV + Ampicillin IV *Mild PCN allergy:* substitute Ampicillin IV with TMP/SMX IV	*If severe PCN-allergy*[1b]*:* Vancomycin IV + Aztreonam IV + TMP/SMX IV	10-14 days *(Documented gram-negative bacilli and L. monocytogenes may need to be extended to 21 days)*
	S. aureus, *S. epidermidis*, *P. acnes,* gram negative bacilli (e.g., *P. aeruginosa)*	Post-neurosurgery/ CSF shunt	Cefepime IV + Vancomycin IV	*If PCN-allergy*[1b]*:* Vancomycin IV + Aztreonam IV + TMP/SMX IV[1c]	7–14 days *(Duration for gram-negative bacilli and S. aureus is variable and may need to be extended based on the clinical scenario)*

[1a] An ID Consult should be considered for all patients with meningitis.

[1b] In patients with less severe PCN-allergies (e.g., mild rash in the absence of both Stevens-Johnson syndrome or anaphylaxis), treatment with a third- or fourth-generation cephalosporin or a carbapenem antibiotic may be possible and in some situations may be necessary. ID Consult recommended to evaluate risk/benefit.

[1c] Intravenous tobramycin or levofloxacin may be used in place of TMP/SMX based on previous culture data. Please note that aminoglycoside penetration into the CSF is generally suboptimal for treatment of gram-negative meningitis/ventriculitis. Intrathecal/intraventricular aminoglycoside administration may be necessary. In addition, quinolone penetration into the CSF is variable and should not be relied upon as monotherapy for gram-negative organisms. ID consult recommended.

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GASTROINTESTINAL					
UNCOMPLICATED INTRA-ABDOMINAL INFECTIONS (e.g. diverticulitis, peritonitis, and cholecystitis/cholangitis) [2a, 2b]	Enterobacteriaceae (*E. coli*, *K. pneumoniae), Streptococcus spp*, *Enterococcus spp*, anaerobes (e.g., *B. fragilis*)	Community-acquired (hospitalized ≤ 3 days) [2c]	Cefazolin IV + Metronidazole IV/PO OR Ampicillin/sulbactam IV[2d] ± Gentamicin IV	*If severe PCN-allergy[2e]:* Levofloxacin IV/PO + Metronidazole IV/PO ± Gentamicin IV	5–7 days
COMPLICATED INTRA-ABDOMINAL INFECTIONS (e.g., recent biliary instrumentation, secondary peritonitis)	As above plus *P. aeruginosa*	Hospital-acquired, Immune-compromised [2b]	Piperacillin/tazobactam IV ± Gentamicin IV[2f]	*If severe PCN-allergy[2e]:* Vancomycin IV + Aztreonam IV + Metronidazole IV/PO ± Gentamicin IV	5–7 days (may need to be extended for abscesses and those with inadequate source control)
NECROTIZING PANCREATITIS			Antibiotic prophylaxis not recommended without clinical or culture evidence of an established infection[2g]		
NECROTIZING PANCREATITIS WITH ESTABLISHED INFECTION [2b, 2g]	Enterobacteriaceae (*E. coli*, *K. pneumoniae), Streptococcus spp*, *Enterococcus spp*., anaerobes (e.g., *B. fragilis*)		Piperacillin/tazobactam IV ± Gentamicin IV[2f]	*If severe PCN-allergy[2e]:* Vancomycin IV + Aztreonam IV + Metronidazole IV/PO ± Gentamicin IV	10-14 days (may need to be extended with inadequate source control)

[2a] Antibiotics may not be necessary in uncomplicated appendicitis.

[2b] Empiric antimicrobial coverage directed against MRSA should be provided to patients with healthcare–associated intra-abdominal infections who are known to be colonized with the organism or who are at risk of having an infection due to this organism because of prior treatment failure and significant antibiotic exposure.

[2c] Isolation of staphylococci and yeast are uncommon in patients with community-acquired intra-abdominal infection. Use of agents effective against MRSA and yeast is not recommended in the absence of evidence that such organisms are involved in the infection. Therefore, the addition of antifungals for more severe community-acquired and complicated intra-abdominal infections is recommended if *Candida* is grown from intra-abdominal cultures.

[2d] History of recent hospitalization/intra-abdominal procedure or significant antibiotic exposure may warrant the use of empiric piperacillin/tazobactam IV rather than ampicillin/sulbactam IV ± gentamicin IV or cefazolin IV + metronidazole IV/PO.

[2e] Severe PCN allergy (e.g., anaphylaxis, shortness of breath, angioedema, Steven's Johnson Syndrome (SJS), Toxic Epidermal Necrolysis (TEN)). Other reactions (especially those that occurred >5 years ago) may warrant a trial with a cephalosporin as opposed to using levofloxacin or aztreonam.

[2f] History of significant piperacillin/tazobactam antibiotic exposure and resistant organisms may warrant the use of cefepime IV + metronidazole IV ± gentamicin IV.

[2g] Diagnosis and Management of Complicated Intra-abdominal Infection in Adults and Children: Guidelines by the Surgical Infection Society and the Infectious Diseases Society of America; *Clin Infect Dis* 2010; 50:133-64.

COMMON TYPES OF INFECTIONS	DEFINITIONS / USUAL ORGANISMS	MODIFYING FACTORS	PRIMARY ANTIBIOTIC THERAPY RECOMMENDED	ALTERNATIVE ANTIBIOTIC THERAPY	TOTAL DURATION OF THERAPY (combined IV+PO)
GENITOURINARY					
UTI, UNCOMPLICATED	Uncomplicated UTI[3a, 3b]: infection in a structurally and neurologically normal urinary tract (significant bacteriuria with pyuria or symptomatic) Most common organism: *E. coli*		Cephalexin PO	*If severe PCN-allergy[3c]:* TMP/SMX PO OR Levofloxacin PO OR Nitrofurantoin PO (only if CrCL>50 mL/min)	3 days
UTI, COMPLICATED, PYELONEPHRITIS	Complicated UTI[3a]: infection in a urinary tract with abnormalities (e.g., UTI in men, pregnancy) Pyelonephritis[3a]: clinical syndrome characterized by flank pain or tenderness, or both, and fever, often associated with dysuria, urgency and frequency (upper tract infection) Common organisms: Enterobacteriaceae (usually *E. coli*), *Enterococcus spp*		Ampicillin IV[3b] + Gentamicin IV	*If severe PCN-allergy[3c]:* Levofloxacin IV/PO + Gentamicin IV	10 days
UTI, CATHETER-ASSOCIATED	Catheter-associated UTI[3a,3d]: Significant bacteriuria with pyuria or symptoms Common organisms: *E. coli*, *K. pneumoniae*, *P. aeruginosa*, *P. mirabilis*, *Enterococcus spp.*		Gentamicin IV[3e]	Gentamicin IV[3e]	5 days

[3a] Diagnostic criteria for UTI: pyuria (>10 WBC/mm^3 of urine), significant bacteriuria: ≥ 10^5 bacteria/mL urine (≥ 10^4 for suspected pyelonephritis), symptoms of frequency, urgency, or dysuria. In certain settings, a CFU count < 10^5 may be indicative of a true infection.
Treatment of asymptomatic bacteriuria (defined as: ≥ 10^5 bacteria found in two consecutive voided urine specimens in women *or* a single clean-catch specimen in men; and ≥ 10^2 bacteria found in a single catheterized urine specimen in both men and women) is not recommended, EXCEPT in either pregnant women, or urinary tract structural abnormalities, or on immunosuppressive therapy, or about to undergo urinary tract instrumentation or manipulation.

[3b] Urosepsis: The use of piperacillin/tazobactam may be warranted in patients with frequent health care system contact, reside in a chronic care facility, or are immunocompromised,.

[3c] Severe PCN allergy (e.g., anaphylaxis, shortness of breath, angioedema, Steven's Johnson Syndrome (SJS), Toxic Epidermal Necrolysis (TEN)). Other reactions (especially those that occurred >5 years ago) may warrant a trial with a cephalosporin as opposed to using levofloxacin.

[3d] Removal or changing of the urinary catheter is recommended. With continued need for a catheter, catheter exchange during the treatment course is recommended (i.e., after a few days of treatment). Treatment of asymptomatic bacteriuria without pyuria does not appear to be useful in decreasing complications and is not recommended (possible exceptions: neutropenic, solid organ transplant, pregnancy, and patients undergoing urologic surgery).

[3e] In clinically unstable patients with more systemic signs/symptoms of infection, the addition of piperacillin/tazobactam IV (or aztreonam IV in PCN-allergic patients) to gentamicin IV may be warranted.

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RESPIRATORY TRACT					
BRONCHITIS / COPD-EXACERBATION	*S. pneumoniae*, *H. influenzae*, *M. catarrhalis*, *M. pneumoniae*, *C. pneumoniae*		Azithromycin PO/IV OR Doxycycline PO/IV		5 days
COMMUNITY-ACQUIRED PNEUMONIA	*S. pneumoniae*, *H. influenzae*, *M. pneumoniae*, *M. catarrhalis*, *Legionella* Suspected organisms altered by comorbidities (e.g., alcoholism, structural lung disease, post-viral, etc.)	Non-ICU Admission	Ceftriaxone IV + either: Azithromycin PO[4a,4b] OR Doxycycline PO[4b]	*If severe PCN-allergy*[4c]: Levofloxacin IV/PO[4a,4b]	7 days
		ICU Admission	Ceftriaxone IV + Azithromycin IV[4a,4b]	*If severe PCN-allergy*[4c]: Levofloxacin IV[4a,4b]	7 days
		Pseudomonas aeruginosa risk factors[4d]	Piperacillin/tazobactam IV + Azithromycin IV + Tobramycin IV[4a]	*If severe PCN-allergy*[4c]: Levofloxacin IV + Aztreonam IV ± Tobramycin IV[4a,4b,4e]	7 days
HOSPITAL-ACQUIRED / VENTILATOR-ASSOCIATED / HEALTHCARE-ASSOCIATED PNEUMONIA (HAP/VAP/HCAP) Hospitalized and/or ventilated patients often colonized. Organisms isolated from respiratory cultures should only be treated if accompanied by the clinical signs/symptoms of pneumonia.[4f]	Presence of pneumonia defined by a new or progressive infiltrate plus at least two of the following three clinical features: • fever greater than 38°C • leukocytosis or leukopenia • purulent secretions Common organisms: *S. pneumoniae, H. influenzae,* MSSA, antibiotic-sensitive enteric gram-negative bacilli	Early-onset (hospitalized <5 days) **AND** without risk factors for multidrug-resistance (see below)	Ceftriaxone IV[4g]	*If severe PCN-allergy*[4c]: Levofloxacin IV/PO	7 days[4h]
	Common organisms: As above, plus MDR pathogens including *P. aeruginosa, K. pneumoniae, Acinetobacter* spp., Methicillin-resistant *S. aureus* (MRSA)	Late-onset (hospitalized ≥5 days) **OR** risk factors for MDR -recent hospitalization -extended care facility -hemodialysis -home wound care -immunosuppressed	Piperacillin/tazobactam IV + Tobramycin IV + Vancomycin IV	*If severe PCN-allergy*[4c]: Levofloxacin IV/PO + Tobramycin IV + Vancomycin IV	7 days[4h]

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[4a] Consider the addition of vancomycin IV in patients with severe necrotizing and/or cavitating pneumonia (concern for community-associated MRSA).

[4b] Routine anaerobic coverage in not specifically needed in the majority of CAP cases. If a true aspiration pneumonia is suspected (pleuropulmonary syndrome in patients with a history of loss of consciousness as a result of alcohol/drug overdose or after seizures in patients with concomitant gingival disease or esophageal motility disorders), then consider the need for improved anaerobic coverage: ampicillin/sulbactam IV + (azithromycin IV/PO or doxycycline PO) OR for beta-lactam allergy, levofloxacin IV/PO + clindamycin IV/PO. Documentation in the medical record should indicate the need for this coverage due to aspiration.

[4c] Severe PCN allergy (e.g., anaphylaxis, shortness of breath, angioedema, Steven's Johnson Syndrome (SJS), Toxic Epidermal Necrolysis (TEN)). Other reactions (especially those that occurred >5 years ago) may warrant a trial with a cephalosporin as opposed to using levofloxacin or aztreonam (e.g., 3rd-generation: ceftriaxone IV or 4th-generation cefepime IV)

[4d] *Pseudomonas aeruginosa* risk factors: bronchiectasis, structural lung disease with repeated antibiotic or steroid use

[4e] Based on CMS recommendations, the omission of tobramycin may be considered in patients with renal insufficiency and must be documented.

[4f] For patients with suspected VAP, quantitative cultures are recommended as they may be more reliable in distinguishing VAP from colonization and limit the use of unnecessary antibiotics. The threshold below which discontinuation of antibiotic therapy for VAP may be considered is 10^4 cfu/mL for bronchoalveolar lavage (BAL or mini-BAL).

[4g] For early-onset HAP within the first 48 hours of hospital admission, consider the addition of azithromycin IV/PO for atypical pathogens.

[4h] Efforts should be made to shorten the duration of therapy from the traditional 14 days to periods as short as 7 days, provided that the etiologic pathogen is not *P. aeruginosa*, and that the patient has a good clinical response with resolution of clinical features of infection.

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SUSPECTED BACTEREMIA					
INTRAVASCULAR CATHETER-ASSOCIATED[5a]	*S. aureus*, *S. epidermidis*, enterococci, gram-negative organisms including *P. aeruginosa*		Vancomycin IV + Piperacillin/tazobactam IV ± Gentamicin IV	*If severe PCN-allergy*[5b]*:* Vancomycin IV + Aztreonam IV ± Gentamicin IV	7–14 days[5c]
UNKNOWN SOURCE[5d]		Not neutropenic	Piperacillin/tazobactam IV[5d] + Gentamicin IV[5d] + Vancomycin IV	*If severe PCN-allergy*[5b]*:* Aztreonam IV + Gentamicin IV + Vancomycin IV ± Metronidazole IV/PO[5e]	

[5a] Intravascular catheters should be removed whenever possible.

[5b] Severe PCN allergy (e.g., anaphylaxis, shortness of breath, angioedema, Steven's Johnson Syndrome (SJS), Toxic Epidermal Necrolysis (TEN)). Other reactions (especially those that occurred >5 years ago) may warrant a trial with a cephalosporin as opposed to using aztreonam (e.g., a 4th-generation: cefepime IV)

[5c] Selected pathogens may require a longer duration of therapy based on the following considerations: pathogen, potential secondary sites of seeding, the presence/absence of endocarditis, and the presence of indwelling intravascular catheters or prosthetic devices. *S. aureus* bacteremia warrants a thorough evaluation including echocardiogram and often requires 28 days of therapy.

[5d] Therapy must be individualized based on severity of illness, previous antibiotic use and culture histories, and probable source of infection. With a history of multiple antibiotics or resistant organisms, initial therapy with cefepime IV + gentamicin IV or meropenem IV + gentamicin IV may be warranted.

[5e] In patients with less severe PCN-allergies (e.g. mild rash in the absence of both Stevens-Johnson syndrome and anaphylaxis), treatment with a third- or fourth-generation cephalosporin or a carbapenem antibiotic may be possible and in some situations may be necessary. ID Consult recommended to evaluate risk/benefit.

COMMON TYPES OF INFECTIONS	DEFINITIONS / USUAL ORGANISMS	MODIFYING FACTORS	PRIMARY ANTIBIOTIC THERAPY RECOMMENDED	ALTERNATIVE ANTIBIOTIC THERAPY	TOTAL DURATION OF THERAPY (combined IV+PO)
SKIN/SOFT TISSUE					
CELLULITIS	Acute infection of the skin and subcutaneous tissue Common organisms: *S. aureus*, *Streptococcus spp*	Non-purulent	Cefazolin IV [6a] OR Cephalexin PO	*If severe PCN-allergy*[6b]*:* Clindamycin IV/PO [6a]	7 days
	Common organisms: As above plus MRSA	Purulent	Cefazolin IV + TMP/SMX IV/PO[6c] OR Vancomycin IV	*If severe PCN-allergy*[6b]*:* Clindamycin IV/PO + TMP/SMX IV/PO[6c] OR Vancomycin IV	7-10 days
	Common organisms: MRSA	Recurring skin infection	TMP/SMX IV/PO[6c] OR Vancomycin IV	*If severe PCN-allergy*[6b]*:* TMP/SMX IV/PO[6c] OR Vancomycin IV	7-10 days
DIABETIC FOOT AND OTHER SUPERFICIAL SKIN ULCERS	Non-limb threatening Common organisms[6d]: polymicrobial (*S. aureus*, streptococci, gram-negative bacilli, anaerobic gram-positive cocci, and *Bacteroides spp*)	Chronic ulcer without signs/symptoms of active infection (e.g., purulence, or erythema, pain, tenderness, warmth, or induration)	Antibiotics may not be necessary[6e]		
		Signs/symptoms of significant infection (e.g., purulence, or erythema, pain, tenderness, warmth, or induration)	Ampicillin/sulbactam IV [6a,6f]	*If severe PCN-allergy*[6b]*:* Aztreonam IV + Clindamycin IV/PO[6a]	7–10 days[6g]
	Limb-threatening Common organisms[6d]: polymicrobial as above	Clinically stable, not requiring ICU stay	Piperacillin/tazobactam IV[6a,6f]	*If severe PCN-allergy*[6b]*:* Levofloxacin IV/PO + Clindamycin IV/PO[6a]	7–10 days[6g]
		Clinically unstable or requiring ICU stay	Piperacillin/tazobactam IV + Vancomycin IV[6f]	*If severe PCN-allergy*[6b]*:* Levofloxacin IV + Vancomycin IV[6a,6f] ± Clindamycin IV	10–14 days[6g]
NECROTIZING FASCIITIS[6f]	Often polymicrobial (*S. aureus*, streptococci, gram negative bacilli, anaerobes)		Vancomycin IV + Piperacillin/tazobactam IV + Clindamycin IV	*If severe PCN-allergy*[6b]*:* Vancomycin IV + Levofloxacin IV + Clindamycin IV	10-14 days

COMMON TYPES OF INFECTIONS	DEFINITIONS / USUAL ORGANISMS	MODIFYING FACTORS	PRIMARY ANTIBIOTIC THERAPY RECOMMENDED	ALTERNATIVE ANTIBIOTIC THERAPY	TOTAL DURATION OF THERAPY (combined IV+PO)
WOUND INFECTION	Often polymicrobial (*S. aureus*, streptococci, gram negative bacilli)	Post-trauma / animal or human bites	Ampicillin/sulbactam IV OR Amoxicillin/clavulanate PO	*If severe PCN-allergy*[6b]*:* Clindamycin IV/PO + Doxycycline PO	7 days
SURGICAL SITE INFECTION (SSI)	*S. aureus*, Group A streptococci, gram negative bacilli; if surgery involves GI tract, then also anaerobes, enterococci, other Streptococcus spp.	Superficial Incisional[6h]	Cephalexin PO + TMP/SMX PO OR Vancomycin IV[6f]	*If severe PCN-allergy:* Clindamycin PO + TMP/SMX PO OR Vancomycin IV	3–5 days[6i]
		Deep Incisional	Vancomycin IV[6f] ± Piperacillin/tazobactam IV	*If severe PCN-allergy*[6b]*:* Vancomycin IV ± Levofloxacin IV/PO ± Metronidazole IV/PO	3–5 days[6i]
		Organ / space	Vancomycin IV[6f] + Piperacillin/tazobactam IV	*If severe PCN-allergy*[6b]*:* Vancomycin IV + Levofloxacin IV/PO ± Metronidazole IV/PO	7 days[6i]

[6a] Consider the addition of vancomycin IV in patients known colonized with MRSA or MRSA isolated from the wound. Clindamycin may not be appropriate alternative when MRSA is suspected as inducible clindamycin resistance is possible.

[6b] Severe PCN allergy (e.g., anaphylaxis, shortness of breath, angioedema, Steven's Johnson Syndrome (SJS), Toxic Epidermal Necrolysis (TEN)). Other reactions (especially those that occurred >5 years ago) may warrant a trial with a cephalosporin as opposed to using levofloxacin or aztreonam.

[6c] Trimethoprim/sulfamethoxazole (Bactrim®) not effective in the treatment of group A streptococci. If concern for group A streptococci, alternative or additional therapy warranted (e.g., cefazolin IV, clindamycin IV/PO).

[6d] Deep tissue cultures provide the most reliable bacteriologic information in diabetic foot infections. Superficial swabs not recommended.

[6e] Diagnosis and Treatment of Diabetic Foot Infections *Clin Infect Dis* 2004;39:885-910. Ensure appropriate wound care for clinically uninfected ulcers.

[6f] Antimicrobials are mostly in conjunction with surgical management: wound incisional drainage, debridement, and abscess drainage.

[6g] Duration of therapy recommended does not include treatment for osteomyelitis.

[6h] Most superficial SSI simply involves incisional drainage to evacuate the infected material, antibiotics may not be necessary.[6i] Longer treatment courses are indicated in the presence of a prosthetic device.

USUAL INITIAL DOSES FOR RECOMMENDED ANTIBIOTICS AND INDICTIONS FOR PATIENTS WITH NORMAL RENAL AND HEPATIC FUNCTION (WEIGHT ~ 70 KG)

Please refer to the "Adult Anti-infective Dosing Recommendations for Renal Dysfunction" for more detailed recommendations for dose adjustment in patients with renal dysfunction and for vancomycin and aminoglycoside dosing.

		SITE OF INFECTION								
	Drug	**Central Nervous System**	**Gastrointestinal**	**Genitourinary**	**Respiratory**	**Suspected Bacteremia**	**Skin and Soft Tissue**	**Renal Adjustment**	**Hepatic Adjustment**	**IV to PO conversion with clinical improvement See indications**
	Ampicillin/sulbactam (IV)		3 g IV q6h	1.5 g IV q6h			3 g IV q6h	Yes	No	Yes – See amoxicillin/ clavulanic acid
	Amoxicillin/clavulanic acid (PO)		875 mg PO q12h	500 mg PO q12h			875 mg PO q12h	Yes	No	Can NOT use for *Acinetobacter* spp. infections
Aminopenicillin	**Ampicillin (IV)**	2 g IV q4h		1 gram IV q6h				Yes	No	Yes – See amoxicillin
Aminopenicillin	**Amoxicillin (PO)**			250 mg PO q8h				Yes	No	--
	Azithromycin (IV/PO)				Non-ICU 500 mg PO x 1, then 250 mg PO q24h ICU: 500 mg IV q24h			No	No	Yes – Reorder azithromycin PO at the same dose
	Aztreonam (IV)	2 g IV q8h	1 g IV q8h	1 g IV q8h	2 g IV q8h	1 g IV q8h	1 g IV q8h	Yes	No	No
1st Generation	**Cefazolin (IV)**		1 – 2 g IV q8h	1 g IV q8-12h			1 g IV q8h	Yes	No	Yes – See cephalexin or cefuroxime for specific indications
1st Generation	**Cephalexin (PO)**		500 mg PO q6h	500 mg PO q12h			500 - 1000 mg PO q6h	Yes	No	--
2nd & 3rd Generation	**Ceftriaxone (IV)**	2 g IV q12h	1 g IV q24h	1 g IV q24	1 g IV q24h	1 – 2 g IV q24h		Yes (with combined hepatic/renal dysfunction)	Yes (with combined hepatic/renal dysfunction)	Yes – See cefpodoxime or cefuroxime
2nd & 3rd Generation	**Cefpodoxime (PO)**		200 mg PO q12h	100 mg PO q12h	200 mg PO q12			Yes	No	3rd generation cephalosporin
2nd & 3rd Generation	**Cefuroxime (PO)**		500 mg PO q12h	250 mg PO q12h	500 mg PO q12h		500 mg PO q12h	Yes	No	2nd generation cephalosporin
	Cefepime (IV)	2 g IV q8h	2 g IV q12h		2 g IV q12h	2 g IV q12h		Yes	No	No
	Clindamycin (IV/PO)				600 - 900 mg IV q8h or 450 mg PO q8h		600 - 900 mg IV q8h or 450 mg PO q8h	No	Yes	Yes
	Doxycycline (IV/PO)				100 mg IV/PO q12h		100 mg IV/PO q12h	No	No	Yes

SITE OF INFECTION									
Drug	**Central Nervous System**	**Gastrointestinal**	**Genitourinary**	**Respiratory**	**Suspected Bacteremia**	**Skin and Soft Tissue**	**Renal Adjustment**	**Hepatic Adjustment**	**IV to PO conversion with clinical improvement See indications**
Gentamicin (IV)	5-7 mg/kg IV q24h or 2 mg/kg IV q8h *(ideal or adjusted body weight)*	5 mg/kg IV q24h or 1.5 mg/kg IV q8h *(ideal or adjusted body weight)*	1 mg/kg IV q8h or if urosepsis, use dosing for "suspected bacteremia" *(ideal or adjusted body weight)*		5 mg/kg IV q24h or 1.5 mg/kg IV q8h *(ideal or adjusted body weight)*		Yes	No	No
Levofloxacin (IV/PO)	750 mg IV q24h	500 mg IV/PO q24h	250 mg PO q24h	500 mg IV/PO daily or 750 mg IV/PO q24h (higher dose covers *P. aeruginosa)*	500 – 750 mg IV/PO q24h		Yes	No	Yes
Metronidazole (IV/PO)		500 mg IV/PO q8h			500 mg IV/PO q8h	500 mg IV/PO q8h	Yes	Yes	Yes
Nitrofurantoin (MacroBID®) (PO)			100 mg PO q12h				Yes – Do NOT use if CrCL < 50 mL/min	No	No
Piperacillin/tazobactam (IV)		4.5 g IV q8h	4.5 g IV q8h	4.5 g IV q8-6h (higher dose covers *P. aeruginosa*)	4.5 g IV q8-6h (higher dose covers *P. aeruginosa*)	4.5 g IV q8h	Yes	No	No
ICU patients		4.5 g IV q8h infused over 4 hours							
Tobramycin (IV)				5-7 mg/kg IV q24h or 1.7-2 mg/kg q8h *(ideal or adjusted body weight)*			Yes	No	No
TMP/SMX (Trimethoprim/ Sulfamethoxazole) (IV/PO)	10-20 mg/kg/day trimethoprim IV divided q6-8h		160 mg trimethoprim (1 DS tab) PO q12h			8-10 mg/kg/day trimethoprim IV/PO divided q6-12h	Yes	No	Yes
Vancomycin (IV)	15 mg/kg IV q8-12h *(each dose rounded to nearest 250 mg)*			15 mg/kg IV q8-12h *(each dose rounded to nearest 250 mg)*			Yes	No	No

RESPONSIBILITY:
Joint Subcommittee on Anti-Infective Use

POLICY/GUIDELINE DATES:
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