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Practical Antibiotics

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Goals

- Understand General Principles of Antibiotic Coverage
- Specific Antibiotic Indications
- Not Covered
  - Pharmacokinetics
  - Dosing
  - Interactions

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Clinical Vignette #1

- A 67 yo WM with PMH of HTN presents to the ED with 3 day history of SOB, cough with yellow phlegm, and fever up to 101^{3} at home. Pulse ox shows mild hypoxia of 90% on RA. A CBC shows WBC of 11.4 and a CXR shows a left lower lobe infiltrate. What pathogens should you consider, and what antibiotic(s) should be used?

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Clinical Vignette #2

- A 20 yo AAF college student presents to the ED with 1 day of headache and neck stiffness. She has had fever up to 103^5 at home and has become lethargic. Physical exam is positive for meningismus. A Head CT is negative. You draw an LP and send it for the usual labs. What pathogens are you concerned about, and what antibiotic(s) would be appropriate at this point?

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Clinical Vignette #3

- A 45 yo WF presents to your office with 3 days of dysuria. She denies fevers/chills or vaginal discharge. A urine dipstick is positive for nitrate, leukocyte esterase, and has 20-50 WBCs. What pathogens are suspected and what antibiotic(s) can be used in this situation? How long should she be treated?

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Clinical Vignette #4

- A 68 yo AAM with diabetes, COPD, HTN is brought unresponsive to the ED. His vitals are T 100^5, P 120, BP 70/40, R 6 and pulse ox of 85% on RA. PE shows crackles in both bases. You intubate him and evaluate further labs. WBC is 13.5. EKG is normal. CXR shows Bilateral basal infiltrates, and UA is positive for UTI. What antibiotic(s) should you start?

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Penicillins

	Gram +	Gram -	Anaerobe	Atypical	Comments
Penicillin	+/-	-	+/-	-	No Staph No Bacteroides
Nafcillin	+	-	-	-	No MRSA No VRE
Ampicillin	+	+	-	-	+ Enterococcus
Ampicillin/ Sulbactam	+	+/-	+	-	No Pseudomonas
Timentin Zosyn	+	+	+	-	+ Pseudomonas No MRSA No VRE +/-

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Cephalosporins

	Gram +	Gram -	Anaerobe	Atypical	Comments
1st Generation	+	-	-	-	No MRSA
2nd Generation	+	+/-	-	-	+ Bacteroides
Rocephin	+	+	-	-	No Enterococcus No Pseudomonas
Fortaz	-	+	-	-	+ Pseudomonas

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Fluoroquinolones

	Gram +	Gram -	Anaerobe	Atypical	Comments
Cipro	-	+	-	+	+ Pseudomonas
Levaquin Avelox Tequin	+	+	-	+	+/- Pseudomonas
Trovan	+	+	+	+	No MRSA NoVRE

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Miscellaneous 1

	Gram +	Gram -	Anaerobe	Atypical	Comments
Macrolides	+	+ H Influenza + Moraxella	-	+	
Clindamycin	+	-	+	-	
Tetracycline	+/-	+ H Influenza + M. Cattarrhalis	-	+	
Aminoglycosides	-	+	-	-	+ Pseudomonas
Vancomycin	+	-	+/-	-	+ MRSA No VRE

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Miscellaneous 2

	Gram +	Gram -	Anaerobe	Atypical	Comments
Bactrim	+/-	+	-	-	No H. Influenza + Legionella
Flagyl	-	-	+	-	
Imipenim	+	+	+	+	+ Pseudomonas No MRSA No VRE No Maltophilia Seizure Risk
Aztreonam	-	+	-	-	+ Pseudomonas
Rifampin	+	+ Neisseria + H Influenza + M. Cattarrhalis	-	+ Chlamydia	

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Miscellaneous 3

	Gram +	Gram -	Anaerobe	Atypical	Comments
Synercid	+	-	+/-	-	+ VRE **No E Faecalis**
Zyvox	+	-	+/-	-	+ VRE **+ E Faecalis**

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Targeting Antibiotics To Selected Pathogens

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Methicillin Susceptible Staph Aureus (MSSA)

- Nafcillin
- Ancef/Keflex
- Vancomycin
- Rifampin

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Methicillin Resistant Staph Aureus (MRSA)

- Vancomycin
- Lineolid
- Synercid
- Rifampin

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Vancomycin Resistant Enterococcus (VRE)

- Linezolid
- Synercid
- Chloramphenicol
- Ampicillin
- Macrodantin
- Bactrim
- Tetracycline

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Pseudomonas
(Should always be double covered)

- Cipro
- Zosyn
- Timentin
- Fortaz
- Gentamicin
- Amikacin
- Imipenim
- Aztreonam
- Trovan

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Listeria

- Ampicillin
- Bactrim

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Enterococcus

- Ampicillin
- Macrobid
- Fluoroquinolones
- Unasyn
- Tetracycline

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Legionella

- Macrolides
- Tetracycline
- Flouroquinolones
- Bactrim

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Staph Epidermis

- Vancomycin
- Rifampin

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This is great and all, but how can I use this?

- Trivia
- Clinical Situations
- Board Topics

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Trivia

- What is the only po antipseudomonal?
  - Cipro
- A healthy patient is started on Bactrim and their creatinine rises from 1.1 to 1.8. What's going on?
  - Trimethoprim inhibits tubular creatinine secretion

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PCN Allergy Trivia

- A patient developed hives with PCN; can they receive a cephalosporin?
  - Yes, 10% cross-reactivity; cephalosporins are only absolutely contraindicated with an anaphylactic PCN allergy
- If a person has a PCN allergy (anaphylactic), can they receive aztreonam?
  - Yes, it is a monobactam with theoretically no cross-reactivity

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Community Acquired Pneumonia

- Typical Pathogens
  - Strep pneumoniae
  - Haemophilus influenza
  - Klebsiella pneumoniae
  - Staphylococcus aureus (rare)
- Atypical Pathogens
  - Mycoplasma pneumoniae
  - Chlamydia pneumoniae
  - Moraxella Catarrhalis (smokers)
  - Legionella (Actually gram -, unusual, epidemic)

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Outpatient Treatment of Community Acquired Pneumonia

- Macrolide
  - Azithromycin, Erythromycin, Clarithromycin
- Doxycycline
- Fluoroquinolone – used for resistant Strep pneumoniae and older patients with comorbities
  - Levaquin
  - Tequin
  - Avelox

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Inpatient Treatment of Community Acquired Pneumonia

- Ceftriaxone (Covers G+ mainly)
- Macrolide (Covers Atypicals)
  - Erythromycin
  - Azithromycin
  - Clarithromycin

OR

- Fluoroquinolone
  - Levaquin
  - Tequin
  - Avelox
- For Aspiration pneumonia, use clindamycin or metronidazole

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Clinical Vignette #2

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Treatment of Bacterial Meningitis

- Pathogens
  - Streptococcus pneumoniae
  - Neisseria meningitidis
  - Listeria monocytogenes (pregnant women, elderly, immunocompromised)
  - Haemophilus influenza (children, rare)
- Treatment
  - Ceftriaxone 2g IV q12h (Neisseria)
    - May substitute Cefotaxime 2g IV q4-6h
    - If PCN allergy, may use chloramphenicol or meropenam
  - Vancomycin 2-3g/day (Resistant S. pneumoniae)
  - Ampicillin 2g IV q4h (Listeria when indicated)

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Treatment of Uncomplicated UTI

- Pathogens
  - E. coli
  - Staph saprophyticus
  - Enterococcus
- Treatment
  - Cipro or other flouroquinolone x **3d**
  - Alternatives
    - Bactrim
    - Nitrofurantoin
    - Doxycycline
    - Amoxicillin – safe for pregnancy
  - For Enterococcus, use ampicillin or flouroquinolone

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Clinical Vignette #4

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Treatment of Sepsis Syndrome

- Unknown source
  - Timentin, Zosyn
  - Imipenem, Meropenem
  - Cefotaxime, Ceftriaxone, Cefepime

Use in conjunction with

  - Gentamicin, Tobramycin, or Amakacin

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Sepsis Syndrome suspected pathogen

- MRSA
  - Vancomycin
    - May add gentamicin or rifampin
- Bacterial endocarditis
  - Vancomycin and gentamicin
- Intra-abdominal or pelvic infections
  - Timentin, Zosyn, Unasyn
  - Imipenem, Meropenem
  - Cefoxitin, Cefotetan
  - Each may be used with or without aminoglycoside

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Sepsis Syndrome suspected pathogen

- Biliary Tract
  - Zosyn, Timentin, Unasyn
    - May use with or without aminoglycoside
- Neutropenic patients
  - Ceftazidime
  - Imipenem, Meropenem
  - Use with or without aminoglycoside

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Board Topics

- Tuburculosis Therapy (Dosing Schedules Vary)
  - INH
  - Rifampin (or Rifabutin)
  - Pyrazinamide
  - AND
    - Streptomycin
    - OR
    - Ethambutol

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HIV Prohylaxis

- CD4 < 200
  - PCP, Toxoplasmosis
  - Bactrim Prophylaxis
- CD4 < 50
  - M. Avium Complex
  - Clarithromycin or Azithromycin
- Fungal and CMV prophylaxis still investigational

200-500 +	Tuberculosis Bacterial pneumonia Herpes zoster Oropharyngeal and vaginal candidiasis
50-200	Pneumocystis carinii pneumonia Toxoplasmosis Esophageal candidiasis Cryptococcal meningitis Histoplasmosis
< 50	Cytomegalovirus end-organ disease Mycobacterium avium complex infection

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Gonorrhea and Chlamydia

- Rocephin 125mg IM x 1
- Azithromycin 1g po x1

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