

Antibiotics

By Sara Klinger, DO & Neil Backer, MD

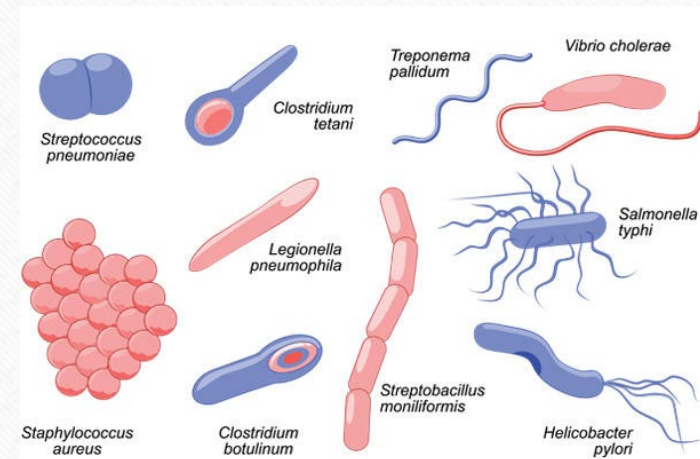
Different Approaches

❑ Organ system vs Organisms

- IE: what bacteria live where in the body?
- Skin vs GU Tract vs Oral Cavity – all prone to different bugs.

❑ Resources

- **IDSA Guidelines**
 - <https://www.idsociety.org/PracticeGuidelines/>
- **UK Antibigram**
- **ID Pharmacist**



CareWeb - Clinician Desk... X +

www.hosp.uky.edu/careweb/carehome.asp?PageName=General&Section=

UK HealthCare UK Resources - CareWeb

- STAR Program
- Report a Breach
- Report an Incident
- Sustainability
- OVHD - Quality
- Quality and Patient Safety
- Continuous Readiness
- Workplace Safety
- Patient Experience
- Infection Prevention
- Leadership
- Physicians
- Nurses
- Rehab
- Pharmacy
- Perioperative Services
- Respiratory
- Information Technology
- PPD
- Clinical Engineering
- Lab
- UK HealthCare

limited to break/fix, emergency, and standard changes (like adding new users). This freeze to changes should be lifted following application stabilization 9/1/17. Watch for additional information about changes and new functionalities associated with this upgrade. Contact Clint Lush at 323-4462 if you have any questions.

7/13/2017 - 27th Annual Nursing Research Papers Day

UK HealthCare Nursing Service in collaboration with UK College of Nursing present the 27th Annual Nursing Research Papers Day - **"Bringing the Science to Life: Innovations in Nursing Research"**

Keynote Speaker:
Gail Stern, MSN, PMHCNS-BC
Administrator, Department of Psychiatry
Lehigh Valley Hospital & Health Network
Bethlehem, PA

Topic:
The Evolution of Behavioral Health Integration: New Roles in Nursing

Date:
Friday, November 10, 2017

Location:
Hilton Downtown
369 West Vine Street, Lexington, KY 40507

Conference Registration: <http://www.ukconce.org/default.aspx>
2017 Abstract application: Click [here](#)

[Read more](#)

7/9/2017 - SCM 16.3 Upgrade: New Functionality!

The **SCM 16.3 Upgrade on July 9th**, will bring new functionality including a new **Discharge Tab and Discharge orders** that will optimize the discharge process. **Timeline and Visit**

- ED Downtime Tool - Chandler
- ED Downtime Tool - GS
- Equipment Resources
- Health Manager
- Kronos Pilot Group Link
- Nursing Staff Development
- Order Sets/Protocols
- PageCenterX
- PatientWorks
- SCM Resources
- Staff Manager info
- Staff Manager Web Login
- Transport Tracking XT
- Patient Links**
- ED Advanced Nursing Protocols
- Patient Diet Menus
- Patient Education
- Clinician Links**
- Antibiograms
- Apheresis Request Protocol
- Behavioral Standards
- Chart Components
- Order List
- Chemo & Hazardous Med Database
- Clinical Laboratory
- Clinical Practice Guidelines
- Clostridium difficile

www.hosp.uky.edu/Careweb/antibiograms.html

Chandler Emergency Department

Chandler Medical Center

Good Samaritan

Kentucky Children's Hospital

Markey Cancer Center

CVICU

MICU

NSICU

PICU-NICU

SICU

Chandler Medical Center (Including Emergency Department)
 Cumulative Antimicrobial Susceptibility Report* (Percent Susceptible)
 Developed Date: February 15, 2018

Gram-Negative Organism	Number of Isolates	Beta-lactams											Aminoglycosides			FQ	Other			Urinary	
		Ampicillin	Amipicillin-sulbactam	Aztreonam	Ceftazidime	Ceftioxone	Cefepime	Cefoxitin	Cefazolin	Ertapenem	Meropenem	Piperacillin-tazobactam	Amikacin	Gentamicin	Tobramycin	Levofloxacin	Tetracycline	Minocycline	Trimethoprim-sulfamethoxazole	Nitrofurantoin§	Oral Cephalosporins for UTIs
Enterobacteriaceae																					
<i>Citrobacter freundii</i>	54	R	R	76	75	74	91	R	R	96	98	87	100	94	91	96	85	-	78	100 (21)+	R
<i>Enterobacter (Klebsiella) aerogenes</i>	68	R	R	82	81	82	97	R	R	97	96	79	100	100	100	99	93	-	100	9 (23)+	R
<i>Enterobacter cloacae</i>	199	R	R	80	79	80	92	R	R	87	99	83	100	94	93	95	89	-	88	32 (41)	R
<i>Escherichia coli</i>	1318	42	46	91	94	88	90	92	63	99	100	95	100	89	88	70	72	-	68	97 (861)	85 (861)
<i>Klebsiella pneumoniae</i>	403	R	81	97	96	94	96	88	84	97	99	93	100	98	97	98	84	-	94	38 (174)	92 (177)
<i>Klebsiella oxytoca</i>	91	R	56	95	98	95	100	98	36	100	100	93	100	97	97	99	97	-	96	90 (31)	81 (31)
<i>Morganella morganii</i>	51	R	14	96	78	80	100	R	R	98	100	100	100	76	82	75	R	R	69	R	R
<i>Proteus mirabilis</i>	137	85	91	99	99	96	98	96	R	99	100	100	100	85	84	72	R	R	76	R	R
<i>Serratia marcescens</i>	131	R	R	99	100	93	99	R	R	98	99	95	100	98	77	99	0	-	100	R	R
Non-fermenting Gram-negatives																					
<i>Acinetobacter baumannii</i> †	24	R	57	R	39	30	43	R	R	R	54	-	52	43	52	46	42 (19)+	-	58	-	R
<i>Acinetobacter lwoffii</i>	1	R	-	R	-	-	-	R	R	R	-	-	-	-	-	-	-	-	-	-	R
<i>Burkholderia cepacia complex</i>	9	R	R	-	-	R	-	R	R	R	-	R	R	R	R	-	-	-	-	-	R
<i>Pseudomonas aeruginosa</i>	426	R	R	68	82	R	75	R	R	R	77	77	90	87	89	68	R	R	R	-	R
<i>Pseudomonas aeruginosa</i> (Non-CF isolates)	362	R	R	69	84	R	81	R	R	R	81	77	99	88	91	74	R	R	R	-	R
<i>Pseudomonas aeruginosa</i> (CF isolates)	64	R	R	64	71	R	44	R	R	R	55	75 (16)+	38	67 (15)+	83	31	R	R	R	-	R
<i>Stenotrophomonas maltophilia</i>	74	R	R	-	**	R	-	R	R	R	-	R	R	R	R	78	R	99	99	-	R
Other Gram-negatives																					
<i>Haemophilus influenzae</i>	131	90 (84)	-	-	-	100	-	-	-	-	-	-	-	-	-	100	99	-	64	-	-

*The percent susceptible for each organism/antimicrobial combination was generated by including the first isolate of that organism encountered on a given patient. Organisms with < 15 isolates do not have sensitivities reported due to lack of scientific validity.

†Calculated from fewer than the standard recommendation of 30 isolates; number in parentheses is number of isolates tested

§Data from urinary isolates only

Abbreviations: CF - cystic fibrosis; R - intrinsic resistance; [-] Drug not tested or not indicated

**Selective isolates (ex. multi-drug resistant organisms) were tested but did not achieve threshold for reporting

It's All About Odds – what is the most likely organism? And what is the chance of resistance?

Who is this Greek god?

Hint: look at the staff

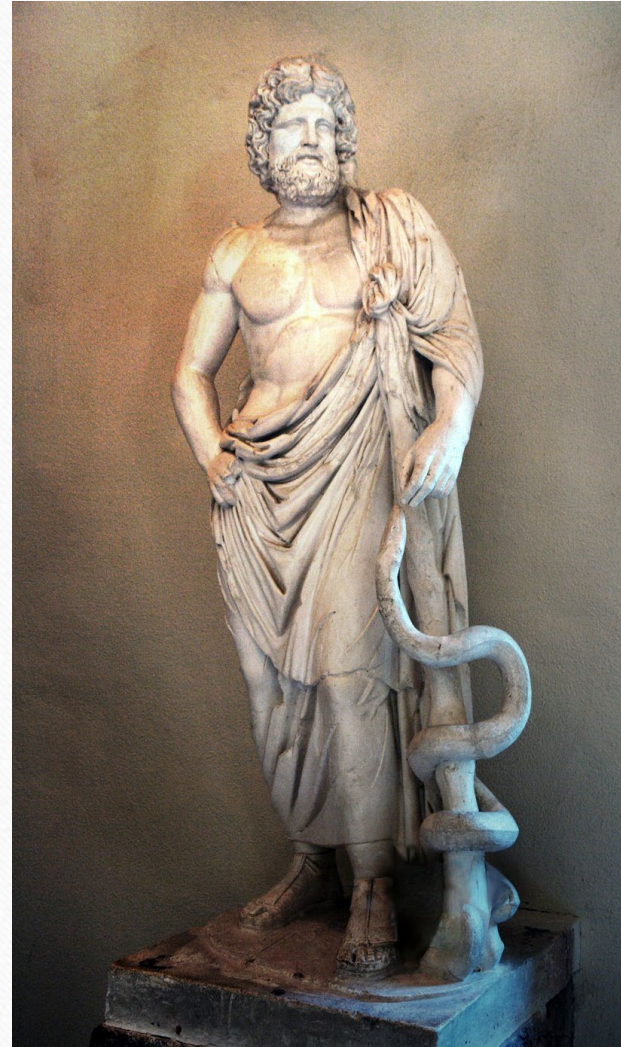
Asclepius
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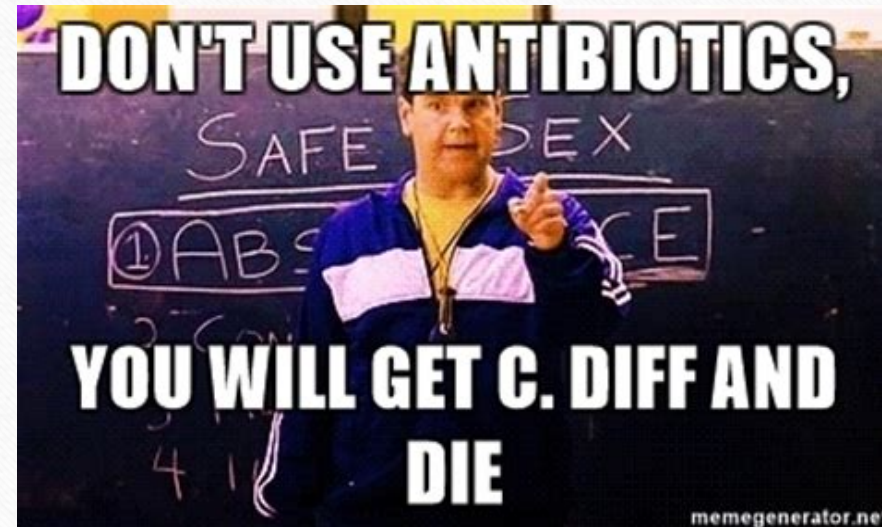
28yo student w/o PMH, presents with fever, productive cough, and feeling unwell. CXR shows RLL infiltrate.

What treatment is most appropriate?

- A. Admit for IV Levofloxacin
- B. Admit for Vancomycin & Pip/tazo
- C. Outpatient Levofloxacin
- D. Outpatient Azithromycin
- E. Admit for IV Ceftriaxone/Azithro

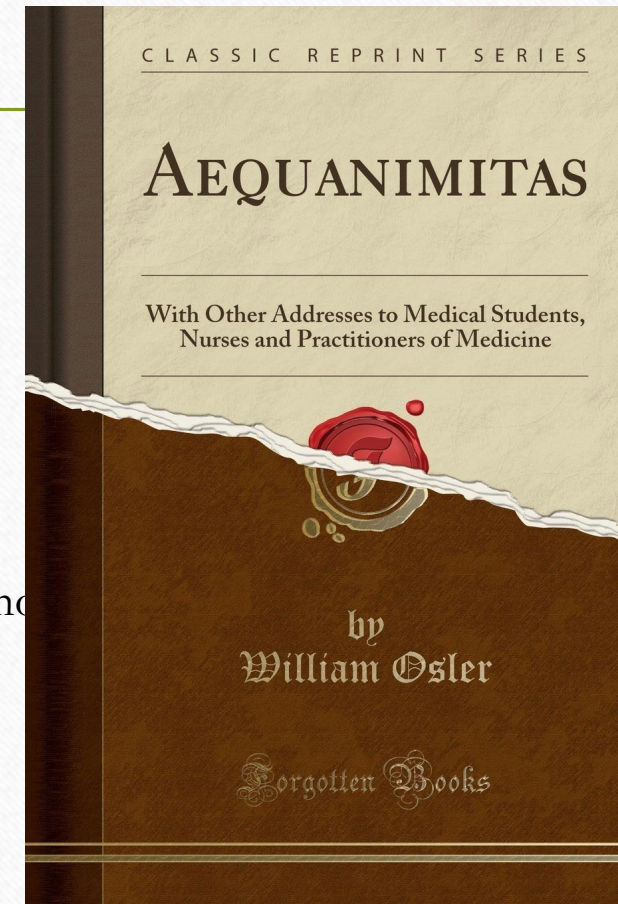
CAP: What Are We Covering?

- Most Common Causes of CAP in this previously healthy patient?:
 - Typical
 - Strep Pneumoniae
 - Atypical
 - Mycoplasma
 - Chlamydophila



To Admit or Not Admit?

- Admit:
 - CURB-65 ≥ 2 or CRB-65 ≥ 1
 - New hypoxia
 - Inability to take PO
 - Failure of outpatient therapy



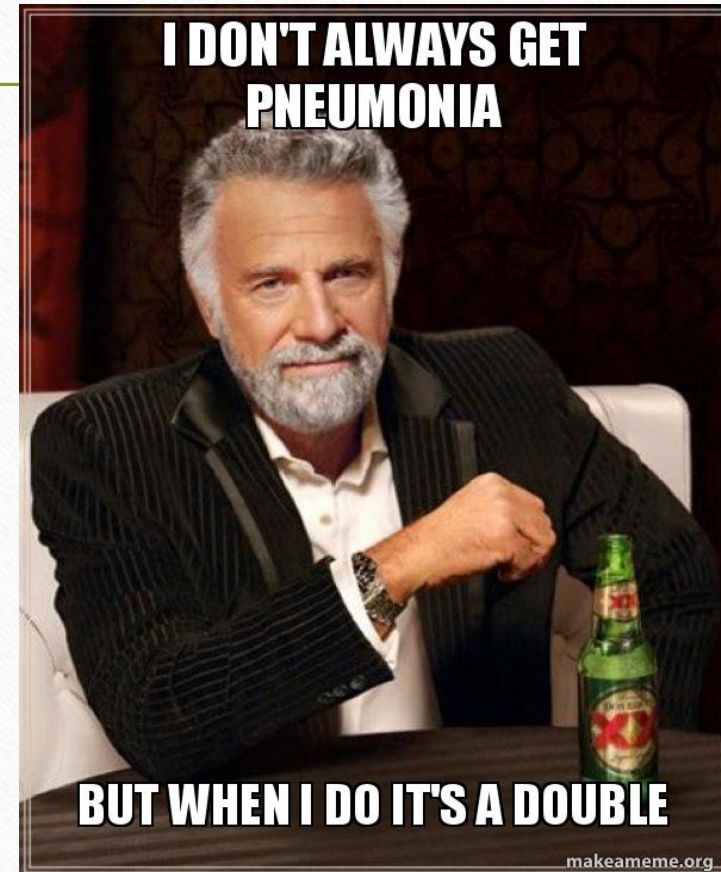
Who?

52yo man with DM & COPD , presents with fever, productive cough, and feeling unwell. CXR shows RLL infiltrate. What Treatment is most appropriate?

- A. Admit for IV Levofloxacin
- B. Admit for Vancomycin & Pip/tazo
- C. Outpatient Levofloxacin
- D. Outpatient Azithromycin
- E. Admit for IV Ceftriaxone/Azithro

Pneumonia: What are we covering?

- ❑ Common Things:
 - Strep Pneumo & Atypical
- ❑ Underlying lung disease – increases risk for Gram (-)'s
 - H. Influenzae
 - Moraxella
 - Legionella
 - Pseudomonas
- ❑ Diabetes:
 - Increases risk for drug resistant strep pneumo



Quick Review:

- Healthy patient w/ CAP:
 - Atypical, *strep pneumoniae*
- Underlying lung disease
 - Gram negatives, legionella
- Comorbid conditions or recent Abx:
 - Drug resistant strep pneumo
- Post-Flu, nursing homes, recent hospitalization, cavitory PNA:
 - MRSA

Table 8. Epidemiologic conditions and/or risk factors related to specific pathogens in community-acquired pneumonia.

Condition	Commonly encountered pathogen(s)
Alcoholism	<i>Streptococcus pneumoniae</i> , oral anaerobes, <i>Klebsiella pneumoniae</i> , <i>Acinetobacter</i> species, <i>Mycobacterium tuberculosis</i>
COPD and/or smoking	<i>Haemophilus influenzae</i> , <i>Pseudomonas aeruginosa</i> , <i>Legionella</i> species, <i>S. pneumoniae</i> , <i>Moraxella cararrhalsis</i> , <i>Chlamydophila pneumoniae</i>
Aspiration	Gram-negative enteric pathogens, oral anaerobes
Lung abscess	CA-MRSA, oral anaerobes, endemic fungal pneumonia, <i>M. tuberculosis</i> , atypical mycobacteria
Exposure to bat or bird droppings	<i>Histoplasma capsulatum</i>
Exposure to birds	<i>Chlamydophila psittaci</i> (if poultry: avian influenza)
Exposure to rabbits	<i>Francisella tularensis</i>
Exposure to farm animals or parturient cats	<i>Coxiella burnetti</i> (Q fever)
HIV infection (early)	<i>S. pneumoniae</i> , <i>H. influenzae</i> , <i>M. tuberculosis</i>
HIV infection (late)	The pathogens listed for early infection plus <i>Pneumocystis jirovecii</i> , <i>Cryptococcus</i> , <i>Histoplasma</i> , <i>Aspergillus</i> , atypical mycobacteria (especially <i>Mycobacterium kansasii</i>), <i>P. aeruginosa</i> , <i>H. influenzae</i>
Hotel or cruise ship stay in previous 2 weeks	<i>Legionella</i> species
Travel to or residence in southwestern United States	<i>Coccidioides</i> species, <i>Hantavirus</i>
Travel to or residence in Southeast and East Asia	<i>Burkholderia pseudomallei</i> , avian influenza, SARS
Influenza active in community	Influenza, <i>S. pneumoniae</i> , <i>Staphylococcus aureus</i> , <i>H. influenzae</i>
Cough >2 weeks with whoop or posttussive vomiting	<i>Bordetella pertussis</i>
Structural lung disease (e.g., bronchiectasis)	<i>Pseudomonas aeruginosa</i> , <i>Burkholderia cepacia</i> , <i>S. aureus</i>
Injection drug use	<i>S. aureus</i> , anaerobes, <i>M. tuberculosis</i> , <i>S. pneumoniae</i>
Endobronchial obstruction	Anaerobes, <i>S. pneumoniae</i> , <i>H. influenzae</i> , <i>S. aureus</i>
In context of bioterrorism	<i>Bacillus anthracis</i> (anthrax), <i>Yersinia pestis</i> (plague), <i>Francisella tularensis</i> (tularemia)

22yo student, presents with fever, headache, nausea, neck stiffness.

What are your antibiotics of choice?

- A. IV Ceftriaxone
- B. IV Vancomycin
- C. IV Vanc + Ceftriaxone
- D. IV Vanc + Ceftriaxone + Ampicillin

Bacterial Meningitis: What are we Covering?

□ Community Acquired Meningitis:

- N. Meningitis
- Strep Pneumo
- Together account for > 80%

□ But why vancomycin?

- Drug resistant strep pneumo



55yo lady, presents with fever, headache, nausea, neck stiffness.

What are your antibiotics of choice?

- A. IV Ceftriaxone
- B. IV Vancomycin
- C. IV Vanc + Ceftriaxone
- D. IV Vanc + Ceftriaxone + Ampicillin

Bacterial Meningitis: What are we covering?

Common:

- Strep. Pneumo
- N. meningitides

Why ampicillin?

- Listeria
- Who?
 - > 50
 - Altered cell mediated immunity: HIV, immunosuppressants

Bacterial Meningitis: Special Considerations

□ Hospital Acquired or Neurosurgical Procedures:

- MRSA
- Pseudomonas
- Gram negatives

□ Regimen:

- MRSA: vancomycin
- Gram (-)/Pseudomonas: cefepime/ceftazidime or meropenem

Table 4. Recommendations for empirical antimicrobial therapy for purulent meningitis based on patient age and specific predisposing condition (A-III).

Predisposing factor	Common bacterial pathogens	Antimicrobial therapy
Age		
2–50 years	<i>N. meningitidis</i> , <i>S. pneumoniae</i>	Vancomycin plus a third-generation cephalosporin ^{a,b}
>50 years	<i>S. pneumoniae</i> , <i>N. meningitidis</i> , <i>L. monocytogenes</i> , aerobic gram-negative bacilli	Vancomycin plus ampicillin plus a third-generation cephalosporin ^{a,b}
Head trauma		
Basilar skull fracture	<i>S. pneumoniae</i> , <i>H. influenzae</i> , group A β -hemolytic streptococci	Vancomycin plus a third-generation cephalosporin ^a
Penetrating trauma	<i>Staphylococcus aureus</i> , coagulase-negative staphylococci (especially <i>Staphylococcus epidermidis</i>), aerobic gram-negative bacilli (including <i>Pseudomonas aeruginosa</i>)	Vancomycin plus cefepime, vancomycin plus ceftazidime, or vancomycin plus meropenem
Postneurosurgery	Aerobic gram-negative bacilli (including <i>P. aeruginosa</i>), <i>S. aureus</i> , coagulase-negative staphylococci (especially <i>S. epidermidis</i>)	Vancomycin plus cefepime, vancomycin plus ceftazidime, or vancomycin plus meropenem
CSF shunt	Coagulase-negative staphylococci (especially <i>S. epidermidis</i>), <i>S. aureus</i> , aerobic gram-negative bacilli (including <i>P. aeruginosa</i>), <i>Propionibacterium acnes</i>	Vancomycin plus cefepime, ^c vancomycin plus ceftazidime, ^c or vancomycin plus meropenem ^c

Suspicion for bacterial meningitis

↓ Yes

Immunocompromise, history of CNS disease, new onset seizure, papilledema, altered consciousness, or focal neurologic deficit;^a or delay in performance of diagnostic lumbar puncture

No ↙

↘ Yes

Blood cultures and lumbar puncture STAT

Blood cultures STAT

↓
Dexamethasone^b + empirical antimicrobial therapy^{c,e}

↓
Dexamethasone^b + empirical antimicrobial therapy^c

↓ Yes

CSF findings c/w bacterial meningitis

↓
Negative CT scan of the head

↓ Yes

Positive CSF Gram stain

↓
Perform lumbar puncture

No ↙

↘ Yes

Dexamethasone^b + empirical antimicrobial therapy^c

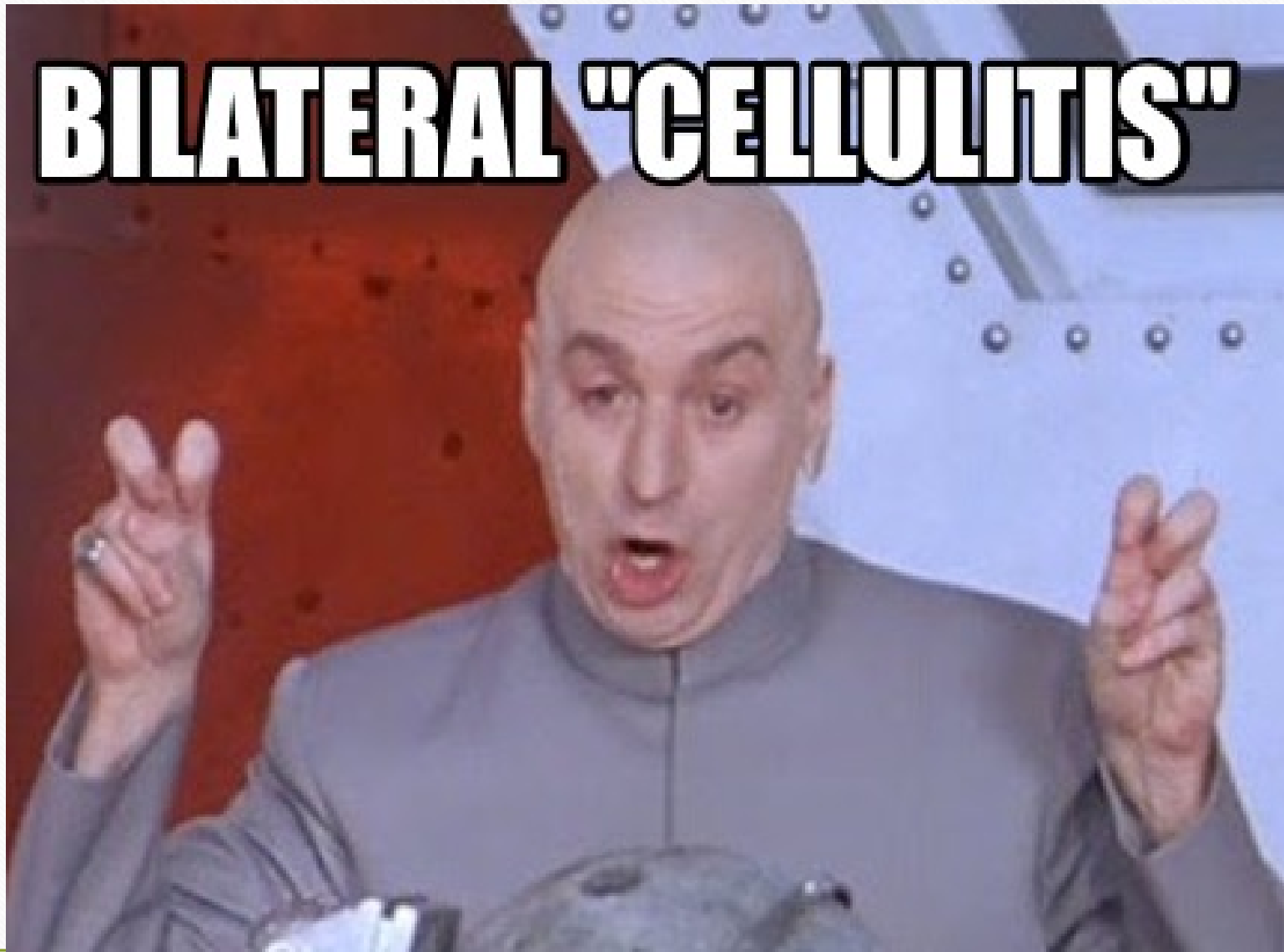
Dexamethasone^b + targeted antimicrobial therapy^d

A 34 y/O M presents with pain, swelling and erythema over his left thigh. On exam there is a 3cm area of fluctuance with 6cm or overlying erythema.

In addition to I&D, which is the most treatment?

- A. Cephalexin
- B. Bactrim
- C. Levaquin
- D. Dicloxacillin

BILATERAL "CELLULITIS"



Cellulitis: What are we Covering?

☐ Most Common Pathogens?

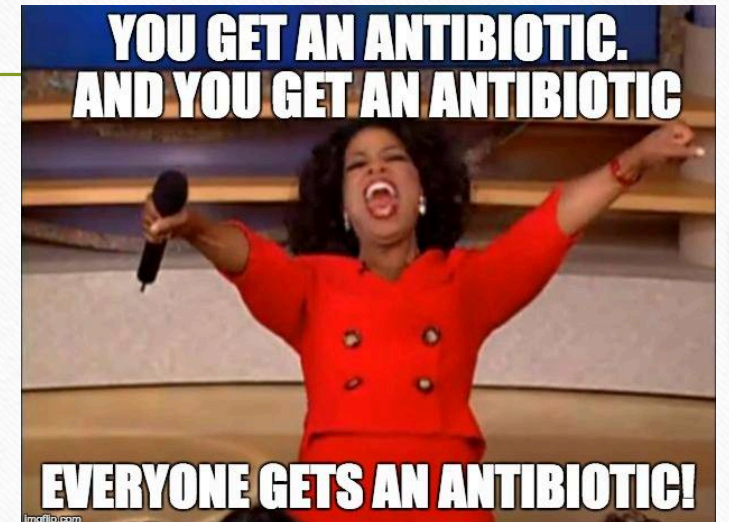
- Staph
- Strep

☐ Purulent:

- MSSA/MRSA

☐ Special MRSA considerations for non-purulent infections:

- Penetrating trauma, IVDU, h/o or current MRSA infection, sepsis



Cellulitis Therapies: (2014 IDSA SSTI Guidelines)

☐ Strep/MSSA – First Line:

- PO ? : dicloxacillin, cephalexin, amoxicillin-clavulanate, macrolide
- IV ? : penicillin, cefazolin, ceftriaxone

☐ MRSA Coverage – Consider if purulence/abscess or risk factors:

- PO?: doxycycline, Bactrim, clindamycin, linezolid
- IV?: daptomycin, vancomycin, ceftaroline

Skin & Soft Tissue Special Circumstances:

❑ Bite wound:

- Think Anaerobes: Tx with augmentin or clindamycin

❑ Diabetic Foot Infection:

- Often polymicrobial including gram negatives (incl pseudomonas) and anaerobes
- Tx: augmentin, Levaquin, clindamycin, doxycycline, zosyn, vancomycin, linezolid
 - Consider adding MRSA coverage for purulence/risk factors

27 YO WOMAN WITH DYSURIA, HEMATURIA, AND INCREASED URINARY FREQUENCY PRESENTS TO CLINIC. SHE IS HEMODYNAMICALLY STABLE AND TOLERATING PO.

WHAT ANTIBIOTIC IS MOST APPROPRIATE?

- A. Nitrofurantion
- B. Ciprofloxacin
- C. Ceftriaxone
- D. Zosyn

Urinary Tract Infections:

□ What are we covering?

○ Most common –

- E. Coli
- Klebsiella

○ Other: Enterococcus; Proteus, Pseudomonas, staph saprophyticus

UTI's Treatment (IDSA)

□ Uncomplicated Cystitis:

- PO: Bactrim, Nitrofurantoin (fosfomicin, beta lactams)
- IV: Rocephin, unasyn

□ Pyelonephritis:

- PO: Levaquin, Bactrim if susceptible
- IV: Rocephin

UTI: special points

- ❑ Enterococcal UTI:
 - No cephalosporins
 - Ampicillin, Fosfomycin, Vanc or Dapto
- ❑ Chandler E. Coli Strains have high fluoroquinolone resistance
- ❑ Cannot use nitrofurantoin for pyelonephritis
- ❑ Only Tx asymptomatic bacteriuria in:
 - Pregnancy & Upcoming GU surgery

QUESTIONS?

