#### Ann & Robert H. Lurie Children's Hospital of Chicago®

M Northwestern Medicine<sup>®</sup> Feinberg School of Medicine

# APP Antibiotic Stewardship Series: Skin and Soft Tissue Infections

#### Ann & Robert H. Lurie Children's Hospital of Chicago Pediatric Infectious Diseases April 21<sup>st</sup>, 2022

MAGNFT

MERICAN NURSES









#### **Project Origins**

Morthwestern Medicine

Feinberg School of Medicine

- Antimicrobial resistance is a significant problem facing the medical community and world
- Most services in the hospital encounter common infectious disease problems
- Most services at LCH engage APP's in a large proportion of all patient care
- ID education is directed mostly at MD/DO trainees and providers

Engage APP's with antibiotic stewardship through APPdirected education

# Learning Objectives

- Identify the two most common bacteria that cause skin and soft tissue infections
- Identify the most appropriate first line antibiotic for simple skin and soft tissue infections
- Recognize the utility of institutional and global antibiograms in choosing empiric antibiotics
- Demonstrate how to use microbiology reports to alter therapy based on antibiotic susceptibility



#### **Case Presentation**

A 13yo boy comes to clinic because of a rash on his R arm. He thought it was a bug bite, but it continued to grow. He endorses pain, mild swelling and it feels warm to the touch. He denies fever, chills, purulent drainage.

Physical exam is significant for a 4cm area of erythema, without clear borders, that is warm to the touch with mild tenderness to palpation. There is a small area of induration with fluctuance.

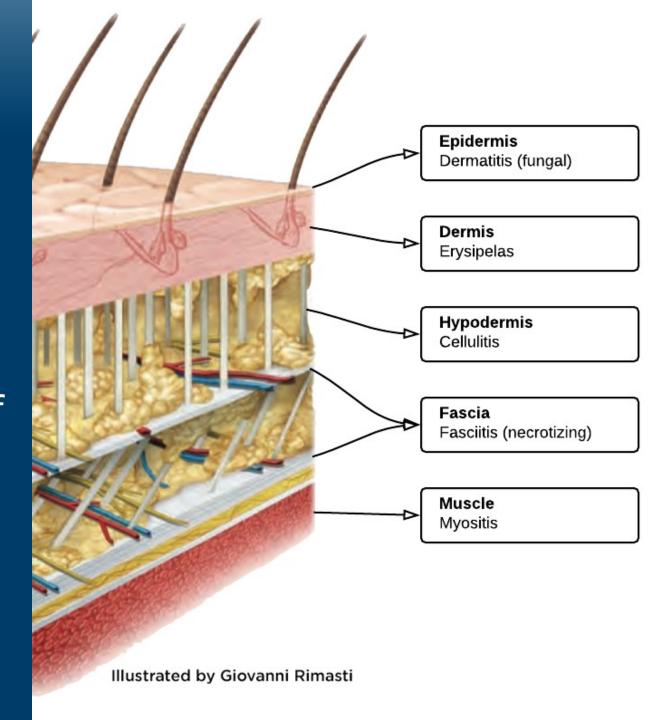
You make a diagnosis of cellulitis with abscess.



# **Skin Infections**

- Cellulitis = bacterial infection of the hypodermis

   Fades off into distance
   Staph aureus > Group A Strep
- Erysipelas = bacterial infection of the dermis
  - Discrete borders
  - Group A Strep > Staph aureus



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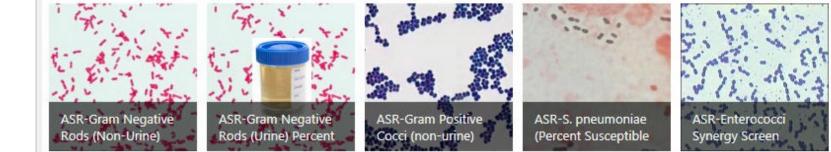
Pain Management Pocket Guide (UNDER REVISION)

currents						
Category Category Name	Antimicrobial Utilization ✓ Category					
01-Optimizing Specimen Collection (2) 02-Clinical Care Guidelines (16)	▷ + : A01-ASP Documents (2) ▷ + : A02-Benchmarking (1)					
03-Institutional Antibiotic Susceptibilities (1)	<sup>▷</sup> + : <b>A03-Lurie Trends</b> (37)					
04-Dosing Resources (1) 05-Interpreting Rapid Diagnostics (3)	▷ + : A04-Restricted Antimicrobials (2)					
06-True pathogen vs. Contamination/Colonization (1) 07-Pharmacokinetics & Pharmacodynamics (1)	Education					
08-Therapeutic Drug Monitoring (1) 09-Antimicrobial Adverse Events (2)	<sup>▶</sup> + : E01-Public Health (1)					
10-Choosing Duration of Therapy (1)	<ul> <li>+ : E02-Resistance Mechanisms (1)</li> <li>+ : E03-Spectrum of Activity of Antimicrobials (4)</li> </ul>					
11-Perioperative Prophylaxis (5) 12-Communicating with Families (5)	<sup>▷</sup> + : E04-Susceptibilty Test (2)					

#### Links

URL	Notes							
4 - : Scholarship and Advocacy (2)								
Areas of Study and Publications								
Collaborations	•••							
- : Lurie Children's Hospital Days of Therapy by Department (1)								
Lurie Children's Hospital Days of Therapy (DOT) by Department								

-: Additional Resources (11)		
Antimicrobial Susceptibility Report		Antibiogram
ASP Article of the Month		
ASP Handbook-2021		
CDC Core Elements		
Health Care Without Harm		Public Health
IDSA		
Illinois Department of Public Health		Public Health
Infection Control Manual		
Joint Commission Guidelines		
U.S.PIRG		Public Health
World Health Organization	•••	Public Health



# Antibiogram

Collection of yearly culture and susceptibility results available on Epic
Used to determine the narrowest, most reasonable empiric therapy

Gram Positive Cocci (non- urine)	No. of Isolates	Penicillin	Ampicillin	Ampicillin/Sulbactam	Amox / Clav	Cefazolin	Cefepime	Ceftriaxone	Cefotaxime	Clindamycin	Azithromycin	Erythromycin	Gentamicin	Levofloxacin	Oxacillin	Rifampin	Linezoli
Streptococcus pneumoniae	37	100/79*						100/97*	100/94*	94	61			97			
Streptococcus mitis/oralis	18	67					78	89	89	94				88			
Other Streptococcus spp. viridans group	28	79					96	96	95	82				95			
Streptococcus pyogenes (Grp A)	53	100					100	100		94		92					
Streptococcus agalactiae (Grp B)	8	100	100							57		38					
Enterococcus faecalis*	81		99											95		57	98
Enterococcus faecium*	13		83											45		33	100
Staphylococcus aureus - MSSA	573	25		100	100	100				71		60	98	93	100	99	100
Staphylococcus aureus - MRSA	131	0		0	0	0				65		18	94	52	0	96	100
Staphylococcus epidermidis	96	7		27	27	27				42		15	63	67	28	97	100
Other Staphylococcus species	39	21		46	46	46				54		34	91	91	44	97	100

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### Antibiogram

Cephalexin = Covers 100% of MSSA (573), 0% MRSA (0) → 81% of all
Clindamycin = Covers 71% of MSSA (407), 65% MRSA (85) → 70% of all

Gram Positive Cocci (non- urine)	No. of Isolates	Penicillin	Ampicillin	Ampicillin/Sulbactam	Amox / Clav	/ Cefazolin	Cefepime	Ceftriaxone	Cefotaxime	Clindamycin	Azithromycin	Erythromycin	Gentamicin	Levofloxacin	Oxacillin	Rifampin	Linezoli
Streptococcus pneumoniae	37	100/ <b>79</b> *						100/97*	100/94*	94	61			97			
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Other Staphylococcus species	39	21		46	46	46				54		34	91	91	44	97	100

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#### Cefazolin/Ancef (IV), Cephalexin/Keflex (PO)





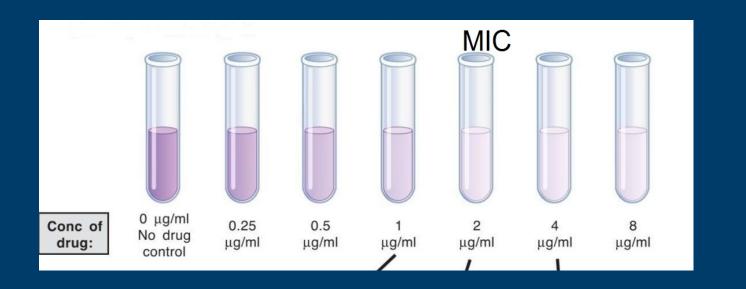
70% coverage of *S. aureus* 

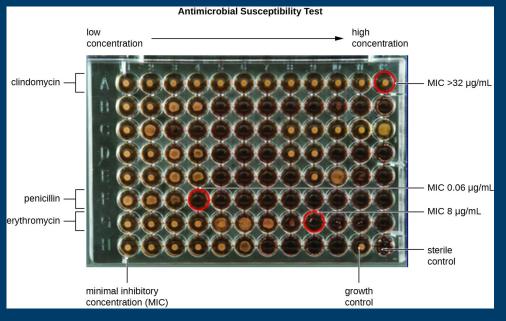
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Skin/Soft Tissue Infection										
Impetigo	S. aureus, GAS	Mupirocin topical BID If multiple lesions or in outbreaks to reduce transmission	Duration 5-7 days							
		Cephalexin 50 mg/kg/day PO divided TID								
Ervsipleas	GAS and other beta- hemolytic Streptococci	Cephalexin 16.7 mg/kg/dose PO TID <u>Severe B-lactam allergy</u> Clindamycin 10 mg/kg/dose every 8 hours (max dose 600 mg) OR	Duration 5-7 days							
Cellulitis w/o purulence	GAS and other beta- hemolytic Streptococci,	<u>Outpatient:</u> Cephalexin 16.7 mg/kg/dose PO TID Inpatient: Cefazolin 25 mg/kg/day IV q8h	Duration 5-7 days							

- -Skin/Soft Lissue Infection
- -Simple Cystitis, Pyelonephritis
- Poor oral bioavailability

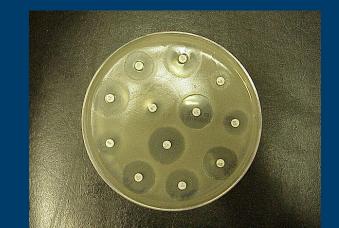
- High oral bioavailability
- Significant increased risk of *Clostridium difficile*

## Minimum Inhibitory concentration





Antimicrobial	Staphylococcus spp.	Disk	Zone		ter Breakpo t whole mm		MIC Breakpoints, µg/mL					
Agent	Indications	Content	S	SDD	I.	S	SDD	I.	R			
PTIDES												
ests should be pe	erformed to determine	e the susc	eptibility	of all is	olates of sta	aphyloco	cci to van	comycin.	The disk	test does		
	ncomycin-intermediat				t differentiat	e among	vancomyc	in-suscep	otible, -int	ermediate,		
han S. aureus, all of which give similar size zones of inhibition.												
Vancomycin	S. aureus	-	-	_	_	-	≤2	. –	4–8	: ≥16		
								-	-			



TMP-SMX/Bactrim (IV/PO)

- Spectrum: Gram positive cocci, gram negative rods
  - -MRSA/MSSA, Group A *Strep*
- Common indications

   Skin/Soft Tissue Infection
   Simple Cystitis, Pyelonephritis
   PJP Prophylaxis/Disease

Antibiotic	MIC	Interpretation
Amoxicillin/Clavulan ate	16/4	Resistant
Ampicillin/Sulbacta m	32/16	Resistant
Cefazolin	8	Resistant
Clindamycin	8	Resistant
Gentamicin	$\leq 1$	Susceptible
Levofloxacin	$\leq 0.5$	Susceptible
Vancomycin	1	Susceptible
Meropenem	8	Resistant
Oxacillin	8	Resistant
Penicillin	8	Resistant
TMP-SMX	$\leq 0.5/9.5$	Susceptible
Daptomycin	$\leq 0.5$	Susceptible
Linezolid	2	Susceptible
Tetracycline	$\leq 1$	Susceptible