UW TASP tele-antimicrobial stewardship program | echo

Antibiotic Overkill: Most commonly abused broad-spectrum antibiotics

Zahra Kassamali Escobar, PharmD, BCIDP
UW Medicine | Valley Medical Center
zescobar@uw.edu

May 14, 2019

Agenda

1.) Defining broad spectrum

2.) Why does antibiotic overkill exist?

3.) Strategies to address over-use

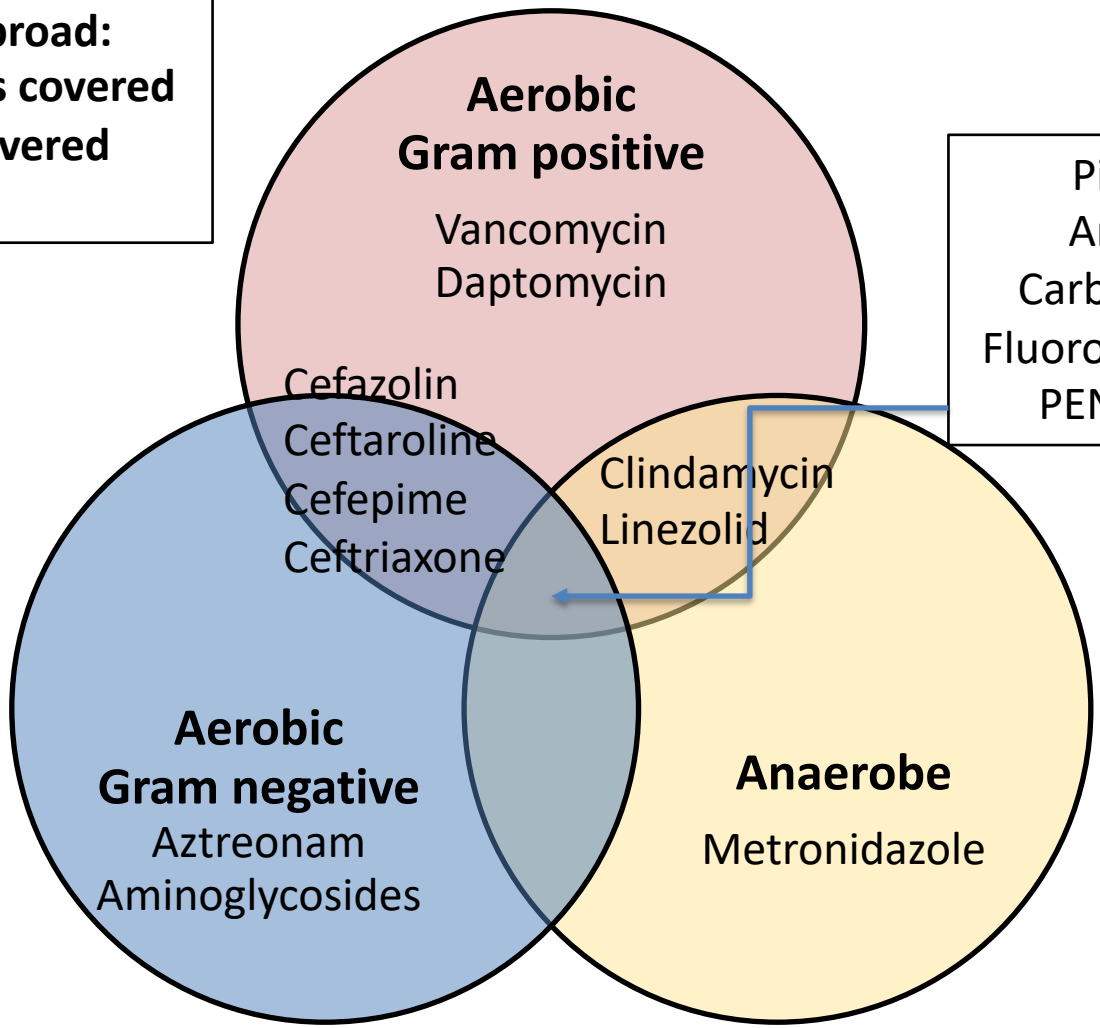
Defining Broad Spectrum

# of bacterial organisms covered

# of bacterial classes covered

Defining Broad Spectrum

Possible definitions of broad:
# of bacterial organisms covered
# of bacterial classes covered



Pip/tazo
Amp/Sul
Carbapenems
Fluoroquinolones
PENICILLIN!

WSHA Definitions

Broad Spectrum Penicillins	Cephalosporins	Carbapenems
• Amoxicillin/clavulante	• Cefepime	• Ertapenem
• Ampicillin/sulbactam	• Ceftaroline	• Imipenem
• Piperacillin/tazobactam	• Ceftazidime	• Meropenem
• Ticarcillin/clavulanate	• Ceftriaxone	• Doripenem
	• Cefotaxime	

Active against *Pseudomonas aeruginosa*

UWTASP tele-antimicrobial stewardship program

Why the Over-kill?

Clinical Infectious Diseases

IDSA GUIDELINE

IDSA Infectious Diseases Society of America · hivma hiv medicine association · OXFORD

Management of Adults With Hospital-acquired and Ventilator-associated Pneumonia: 2016 Clinical Practice Guidelines by the Infectious Diseases Society of America and the American Thoracic Society

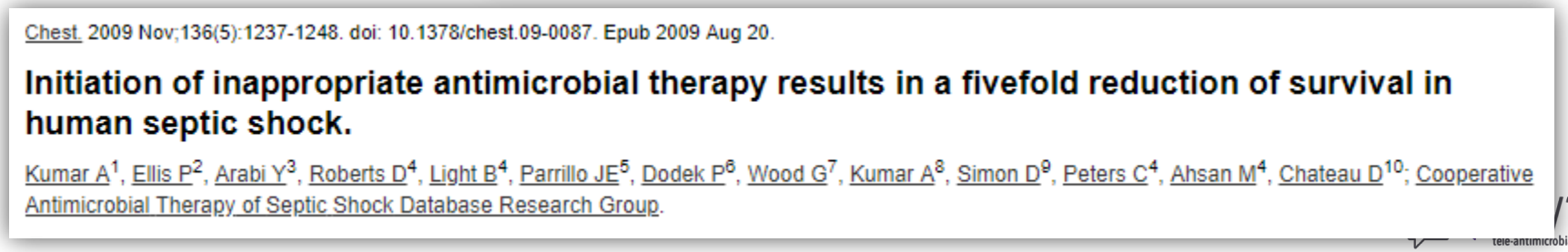
Andre C. Kalil,[1,a] Mark L. Metersky,[2,a] Michael Klompas,[3,4] John Muscedere,[5] Daniel A. Sweeney,[6] Lucy B. Palmer,[7] Lena M. Napolitano,[8] Naomi P. O'Grady,[9] John G. Bartlett,[10] Jordi Carratalà,[11] Ali A. El Solh,[12] Santiago Ewig,[13] Paul D. Fey,[14] Thomas M. File Jr,[15] Marcos I. Restrepo,[16] Jason A. Roberts,[17,18]

ANTIMICROBIAL AGENTS AND CHEMOTHERAPY, May 2010, p. 1742–1748 Vol. 54, No. 5
0066-4804/10/$12.00 doi:10.1128/AAC.01365-09
Copyright © 2010, American Society for Microbiology. All Rights Reserved.

Empiric Combination Antibiotic Therapy Is Associated with Improved Outcome against Sepsis Due to Gram-Negative Bacteria: a Retrospective Analysis[▽]

Scott T. Micek,[1] Emily C. Welch,[1] Junaid Khan,[2] Mubashir Pervez,[2] Joshua A. Doherty,[3] Richard M. Reichley,[3] and Marin H. Kollef[2]*

Pharmacy Department, Barnes-Jewish Hospital, St. Louis, Missouri[1]; Pulmonary and Critical Care Division, Washington University School of Medicine, St. Louis, Missouri[2]; and Hospital Informatics Group, BJC Healthcare, St. Louis, Missouri[3]



Chest. 2009 Nov;136(5):1237-1248. doi: 10.1378/chest.09-0087. Epub 2009 Aug 20.

Initiation of inappropriate antimicrobial therapy results in a fivefold reduction of survival in human septic shock.

Kumar A[1], Ellis P[2], Arabi Y[3], Roberts D[4], Light B[4], Parrillo JE[5], Dodek P[6], Wood G[7], Kumar A[8], Simon D[9], Peters C[4], Ahsan M[4], Chateau D[10]; Cooperative Antimicrobial Therapy of Septic Shock Database Research Group.

TASP
tele-antimicrobial stewardship program

SEP-1 Criteria

MONOTHERAPY	OR	Column A +	Column B
Doripenem		Amikacin	Cefazolin
Ertapenem		Gentamicin	Cefoxitin
Imipenem/Cilastatin		Tobramycin	Cefuroxime
Meropenem		Aztreonam	Clindamycin IV
Cefotaxime		Ciprofloxacin	Daptomycin
Ceftazidime			Telavancin
Ceftriaxone			Vancomycin
Ceftazidime			Linezolid
Cefepime			Azithromycin
Ceftaroline fosamil			Erythromycin
Moxifloxacin			Ampicillin
Levofloxacin			Nafcillin
Amoxicillin/clavulanate			Oxacillin
Ampicillin/sulbactam			Penicillin G
Piperacillin/tazobactam			

Strategies to Address Overuse

Pre-authorization for broad spectrum antibiotics:

Orders have to be approved by an antibiotic steward (via pager or phone call) prior to release

Prospective audit with feedback:

Orders are reviewed 48-72h after start for appropriateness

My Institution Utilizes Pre-Authorization for Broad Spectrum Antibiotics

Approval prior to release

Yes

No

Not sure

UWTASP
tele-antimicrobial stewardship program

My Institution Utilizes Prospective Audit & Feedback OR Antibiotic Time-out

Orders are reviewed 48-72h after

Yes

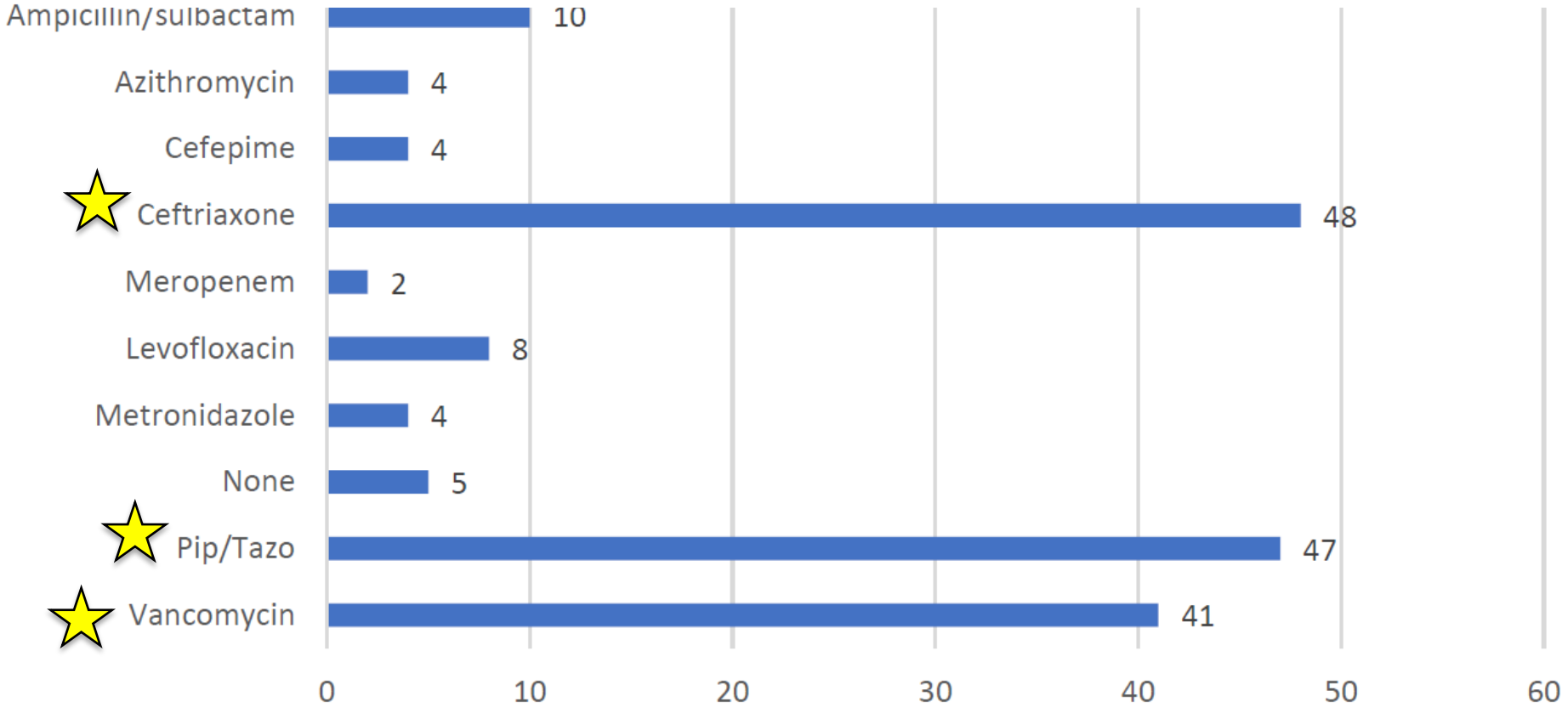
No

Not sure

Preferred Broad-Spectrum Therapy?

77% had antibiotics de-escalated within 72 hours

Antimicrobial Stewardship program involved in 20-30% of these cases



There is Time to Review ALL Antibiotic Use within 72h at my Institution

Yes, usually

No

Sometimes, depends on the day

There is Time to Review BROAD-SPECTRUM Antibiotic Use within 72h at my Institution

Yes, usually

No

Sometimes, depends on the day

Strategies to Address Overuse: Assess *Pseudomonas* risk

Gram Negative Isolates

Percent susceptible

Organism	No. of Isolates	Ampicillin	Ampicillin/Sulbactam	Aztreonam	Cefazolin	Ceftriaxone	Gentamicin	Levofloxacin	Nitrofurantoin	Piperacillin/tazo	Trimethoprim/Sulfa	Cefepime	Ertapenem	Meropenem	Minocycline
Acinetobacter species	68						97	91		82	91	93		94	
Citrobacter freundii	118			81		77	97	90	97	82	86		100		
Citrobacter koseri	79			100		100	100	99	97	100	100		100		
Enterobacter aerogenes	144			80		76	100	97	24	77	99		99		
Enterobacter cloacae complex	226			79		76	97	96	61	80	87		93		
Escherichia coli	7032	56													
Klebsiella oxytoca	137														
Klebsiella pneumoniae	1005														
Morganella morganii	126			90		84	85	79		98	71		100		
Proteus mirabilis	801	80	91	98	96*	97	82	74		100	70		100		
Providencia rettgeri	35			97		100	100	97		100	83		100		
Providencia stuartii	18			100		100	0	6		100	91		100		
Pseudomonas aeruginosa	706			84			94	74		86		94		92	

P. aeruginosa isolates (N = 702)
one tenth the frequency of *E. coli* isolates (N = 7032)

Strategies to Address Overuse: Publicity Campaigns

FluoroquinoDON'T

- **28% *E. coli* isolates are resistant to levofloxacin**
- **35% of *Pseudomonas* isolates are resistant to levofloxacin**

- **2016 FDA Warning Against Fluoroquinolones:**

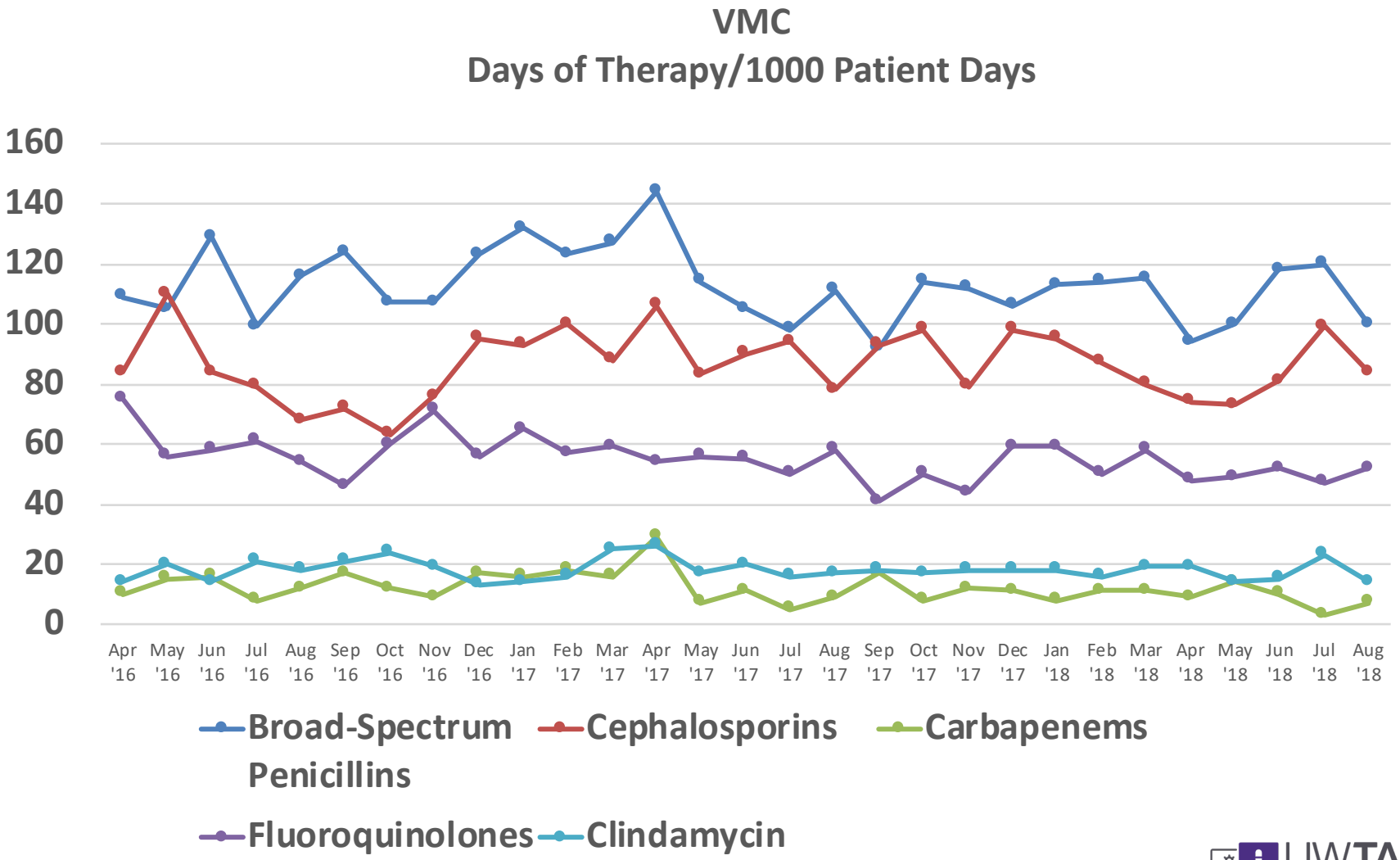
FQ should be reserved for use in patients with no other treatment options because the risk of side effects generally outweighs the benefits

Fluoroquinolones should be avoided for the treatment of uncomplicated UTIs, COPD exacerbations, and intra-abdominal infections if other treatment options are available

From Frankfort Regional Medical Center Pharmacy Department
J. Cowper ACCP Presentation October, 22, 2018

UWTASP tele-antimicrobial stewardship program

Strategies to Address Overuse: Where to Start? Focus on your Local Data



UWTASP
tele-antimicrobial stewardship program

On which broad spectrum antibiotic class do you think your institution should focus antimicrobial stewardship efforts?

Broad-spectrum penicillins

Cephalosporins

Carbapenems

Fluoroquinolones

All of them

Antibiotic Overkill: Summary & Conclusions

Defining Broad Spectrum

- Agents with anti-pseudomonal activity
- Agents that cover the greatest number of common bacterial species

Providers are trying to do right by their patients. Broad-spectrum antibiotic use IS evidenced-based medicine

- Evidence is generated by academic institutions whose antibiograms look very different than community-based practice
- Generate & utilize LOCAL prescribing and antibiogram data

Strategies to Address Overuse

- Prospective audit and feedback
- Generate and distribute antibiogram
- Publicity campaigns