UW TASP tele-antimicrobial stewardship program | echo

Anti[illegible]Vancomycin[illegible]tibiotics

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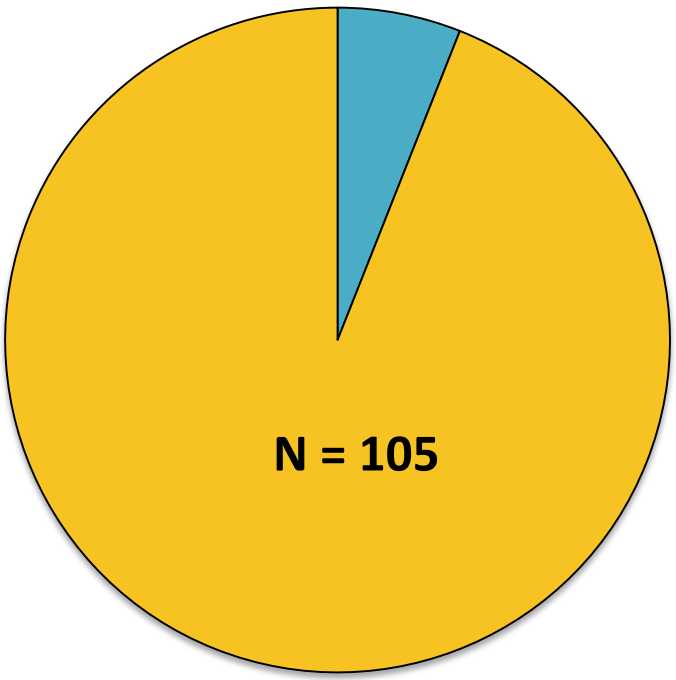
What Percent of Patients Treated with Vancomycin in your Hospital have Confirmed MRSA infection?

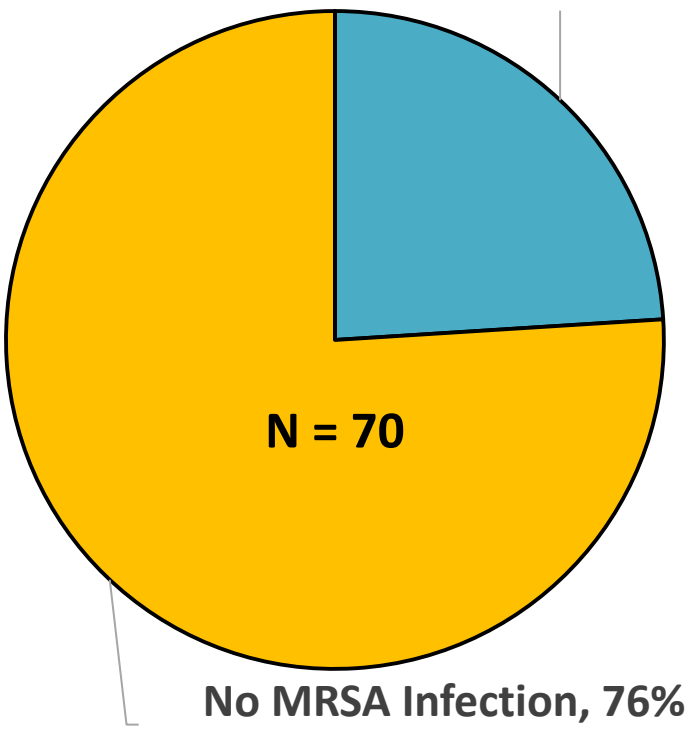
- 5 - 10%
- 11 - 25%
- 26 - 50%
- 51 - 75%
- 76 - 100%

Confirmed MRSA infection among inpatients on Vancomycin

UCLA Medical Center



UW Valley Medical Center



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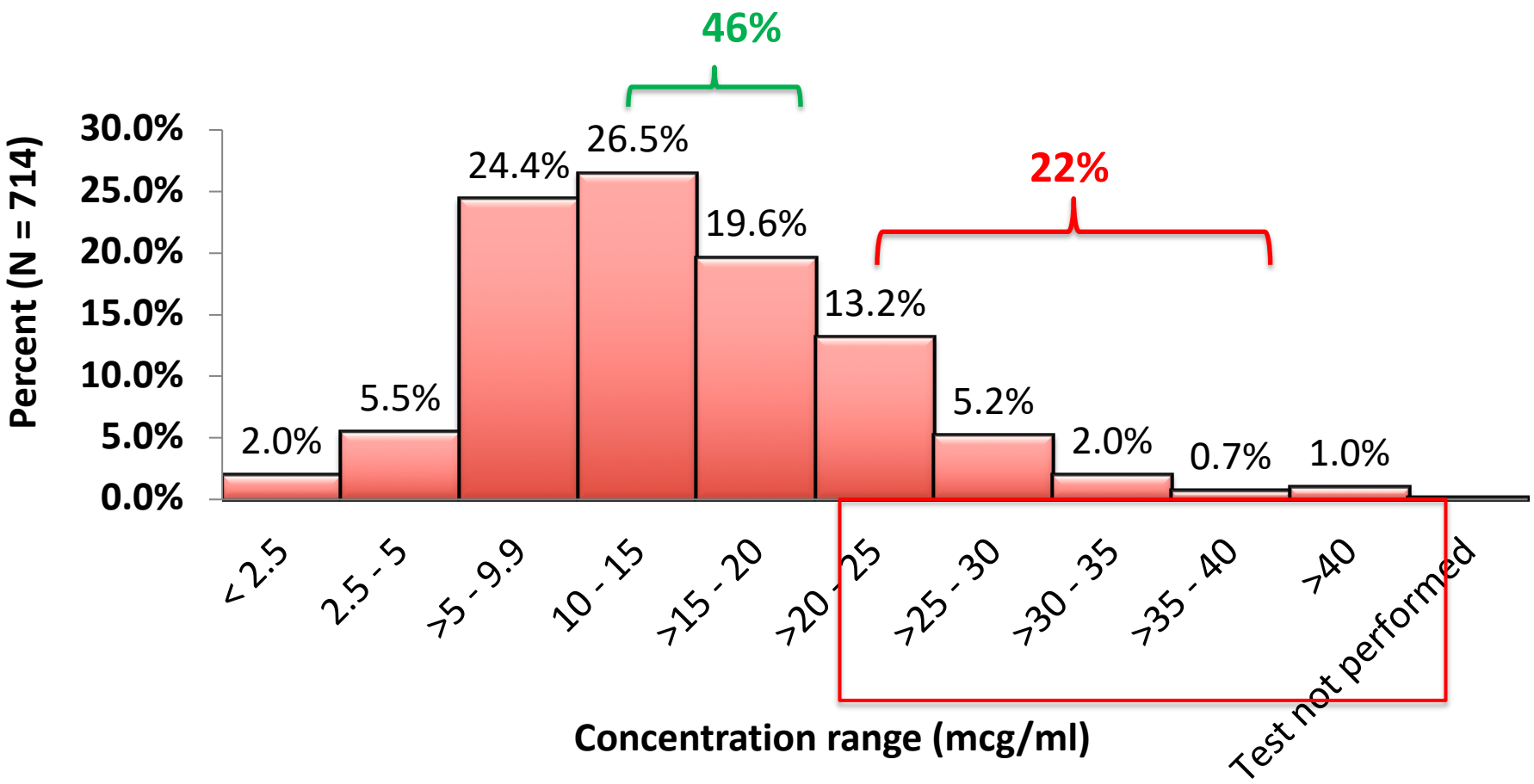
Conclusions of this Presentation

1. Vancomycin troughs may not be accurate
2. Time spent monitoring serum vancomycin concentrations is often unwarranted
3. Alternate anti-MRSA therapies may be cost-effective in some scenarios

Vancomycin monitoring requires high resource utilization & we get it wrong half the time

9/1/2014 - 9/30/2014 = 390 unique patients and 714 vancomycin lab results



IDWeek 2015. Presentation #134.

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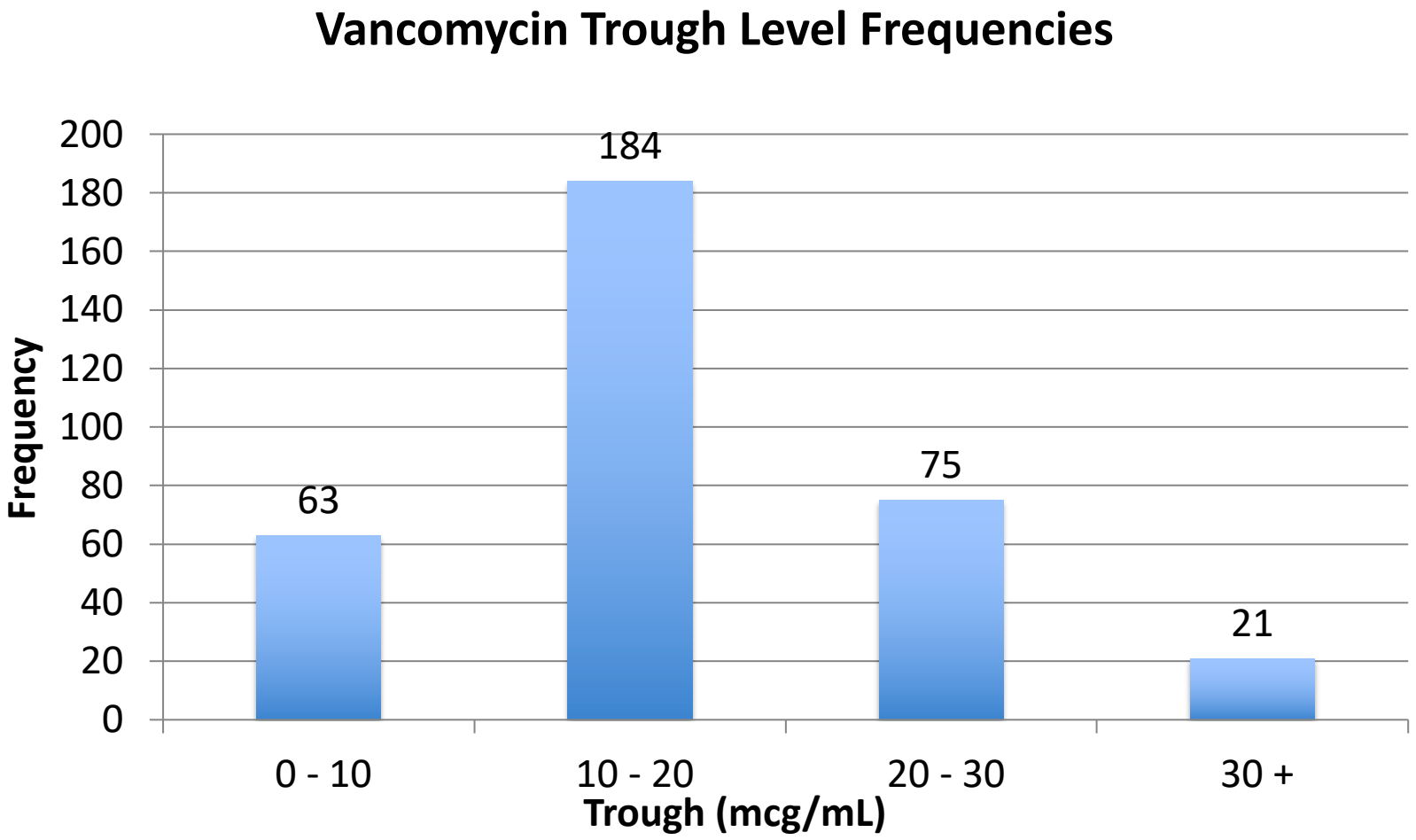
My institution has a pharmacy-driven vancomycin dosing protocol

- Yes
- No
- Not sure

Trough Frequencies in a Vancomycin Per Pharmacy Protocol



Distribution of vancomycin levels over a 3-month period (7/1/15 - 9/28/15)

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Expert Panel Recommendations for Vancomycin Therapeutic Drug Monitoring

2009

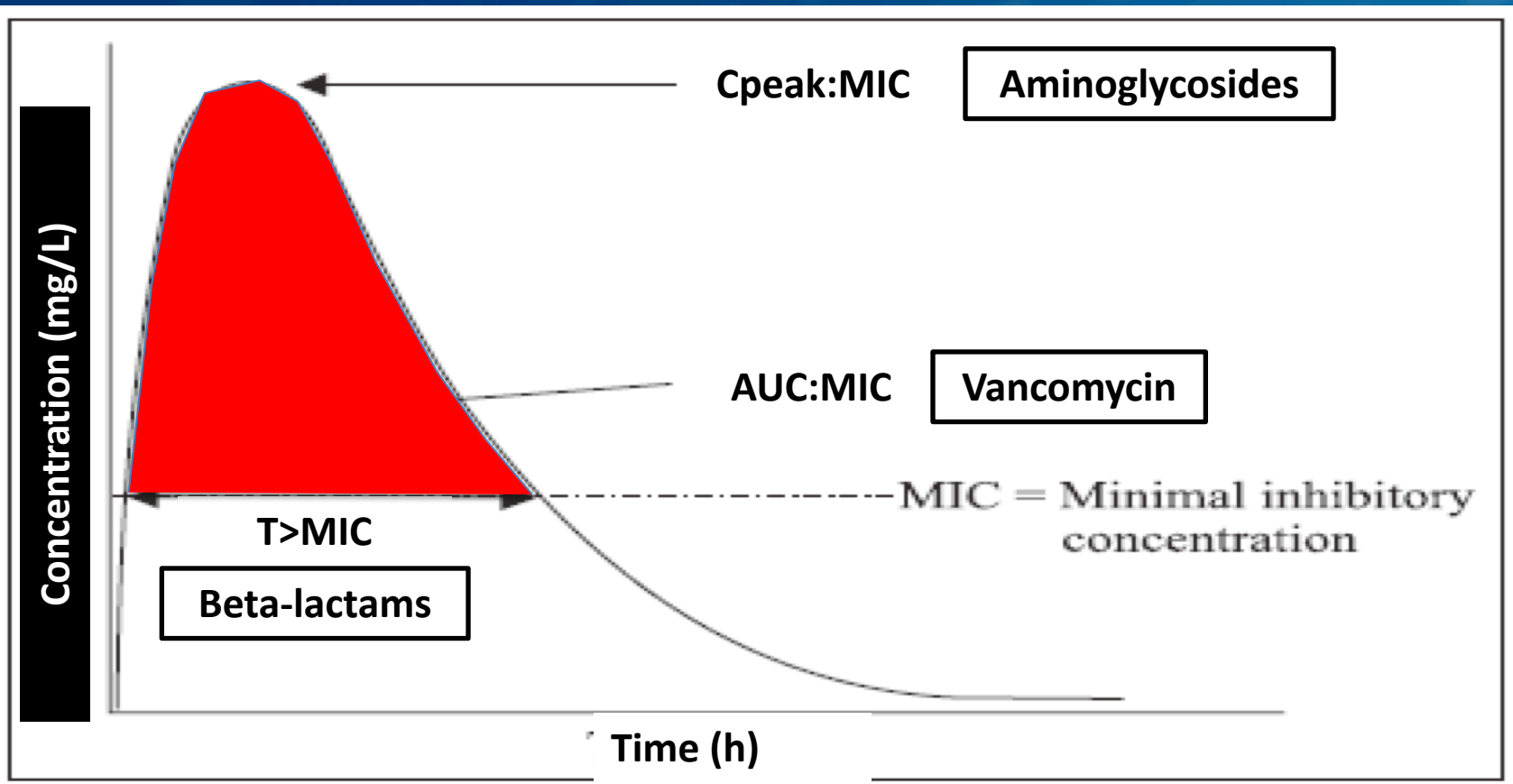
Variable	Recommendation	Level of Evidence	
Recommended TDM Parameters			
Optimal monitoring parameter	Trough serum vancomycin concentrations are the most accurate and practical method for monitoring efficacy.	IIB	Therapeutic vancomycin drug monitoring, Peak versus trough concentrations
Timing of monitoring	Troughs should be obtained just prior to the next dose at	IIB	Therapeutic vancomycin drug monitoring, Peak versus trough concentrations
Optimal trough concentration—complicated infections (bacteremia, endocarditis, osteomyelitis, meningitis and hospital-acquired pneumonia caused by *Staphylococcus aureus*)			erapeutic vancomycin drug monitoring, Optimal trough concentrations
Dosing Regimen			
Dosing to achieve optimal trough concentrations	Doses of 15–20 mg/kg (as actual body weight) given every 8–12 hr are recommended for most patients with normal renal function to achieve the suggested serum concentrations when the MIC is ≤1 mg/L. In patients with normal renal function, the targeted AUC:MIC of >400 is not achievable with conventional dosing methods if the MIC is ≥2 mg/L in a patient with normal renal function.	IIIB	Therapeutic vancomycin drug monitoring, Optimal trough concentrations
Loading doses—complicated infections	In seriously ill patients, a loading dose of 25–30 mg/kg (based on actual body weight) can be used to facilitate rapid attainment of target trough serum vancomycin concentration.	IIIB	Therapeutic vancomycin drug monitoring, Optimal trough concentrations
Continuous vs. intermittent dosing	Continuous infusion regimens are unlikely to substantially improve patient outcome when compared to intermittent dosing.	IIA	Impact of dosing strategies on pharmacokinetic and pharmacodynamic parameters
TDM for Vancomycin-Induced Nephrotoxicity			
Definition	A minimum of two or three consecutive documented increases in serum creatinine concentrations (defined as an increase of 0.5 mg/dL or a ≥50% increase from baseline, whichever is greater) after several days of vancomycin therapy.	IIB	Vancomycin toxicity; Incidence, mechanism, and definition of nephrotoxicity

Optimal trough concentrations

For a pathogen with an MIC of 1 mg/L, the minimum trough concentration would have to be at least 15 mg/L to generate the target AUC/MIC of 400.

ASHP REPORT Vancomycin

Vancomycin AUC Monitoring



AUC = Area under the curve, MIC = Minimal inhibitory concentration

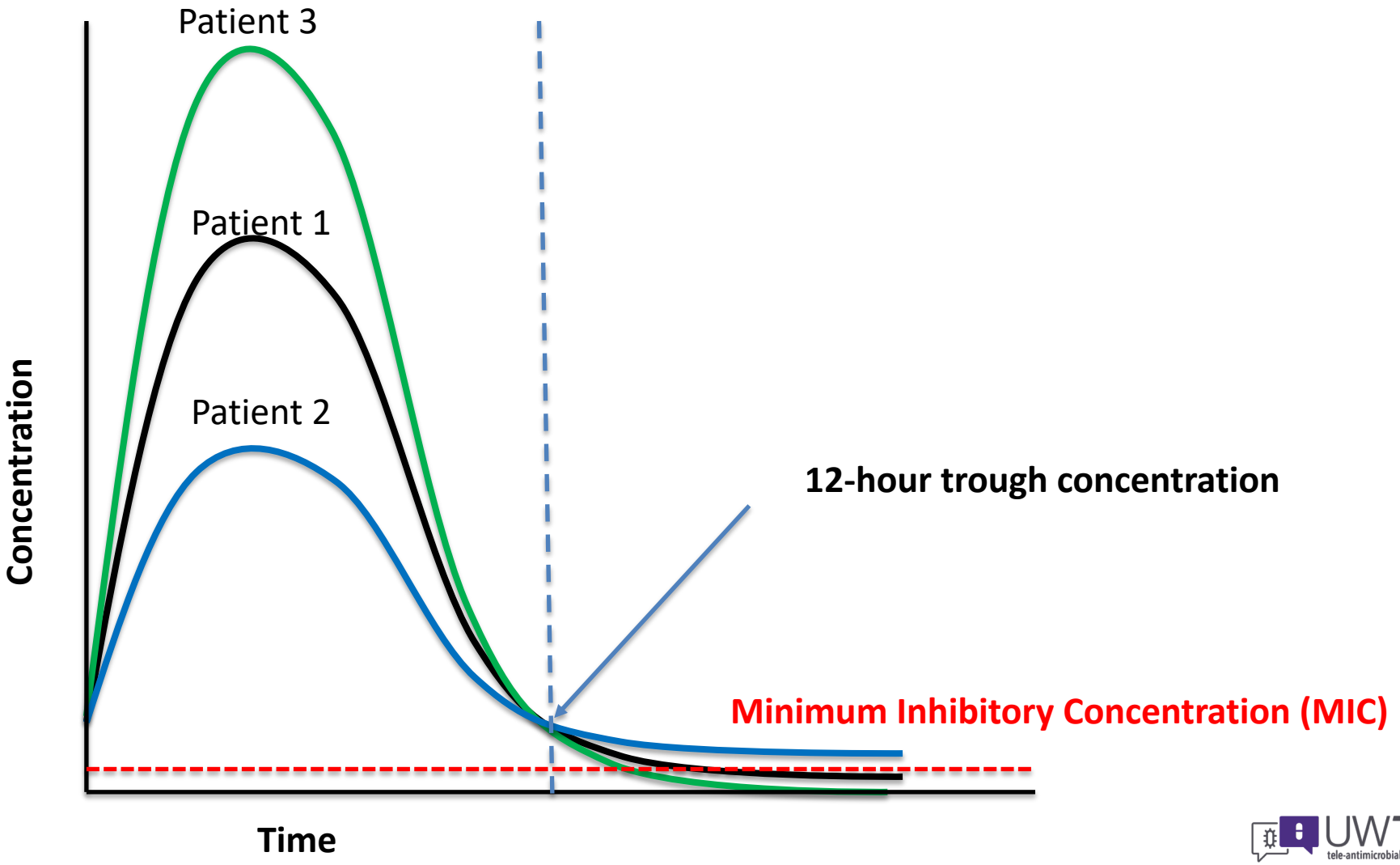
Santos Filho L et al. Braz J Microbiol. 2007 Apr/June;38(2):183-193.
Meagher AK et al. Antimicrob Agents Chemother. 2007 Jun;51(6):1939-45.
Craig WA. Infect Dis Clin North Am. 2003 Sep;17(3):479-501.

Do Troughs Predict the AUC:MIC Target?

"50 to 60% of adults who have an AUC of ≥ 400 mg*h/L, are not expected to have a trough concentration of > 15 mg/liter"

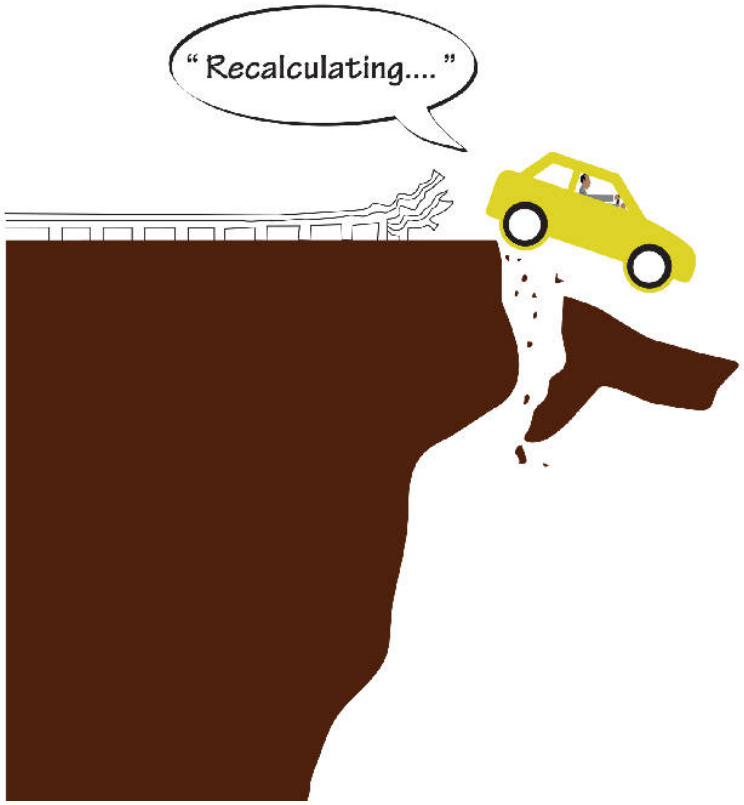
Neely et al. Antimicrob Agents Chemother 2014 58(1): 309

Troughs are not useful for efficacy



What to do in the Guideline Gap

1. Stop vancomycin when not indicated
2. Treat the patient, not the trough



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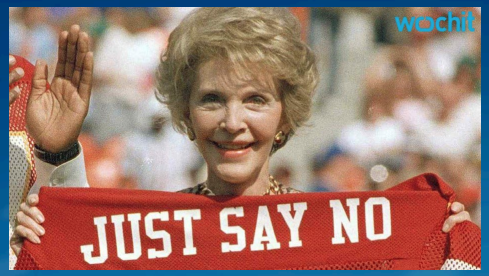
Stop vancomycin when not indicated

MRSA nasal swabs:
If it doesn't grow, just say no



- Retrospective study x2 years, 6 ICUs in a single center

12,215 adult ICU pts w/ MRSA surveillance swabs

MRSA-positive nasal swab
N = 441 (3.7%)
403 on admit

MRSA-neg nasal swab
N = 11,441 (96.3%)

MRSA-neg culture
N = 342 (77.6%)

MRSA-pos culture
N = 99 (22.4%)

MRSA-neg culture
N=11,392 (99.6%)

MRSA-pos culture
N=49 (0.4%)

Received empiric vancomycin
N=102 (29.8%)

Treated for MRSA infection
N=65 (14.7%)

Received empiric vancomycin
N=4,067 (35.7%)

Treated for MRSA infection
N=25 (0.22%)

RISK

STEWARDSHIP OPPORTUNITY

Infect Control Hosp Epidemiol 2018;1-7

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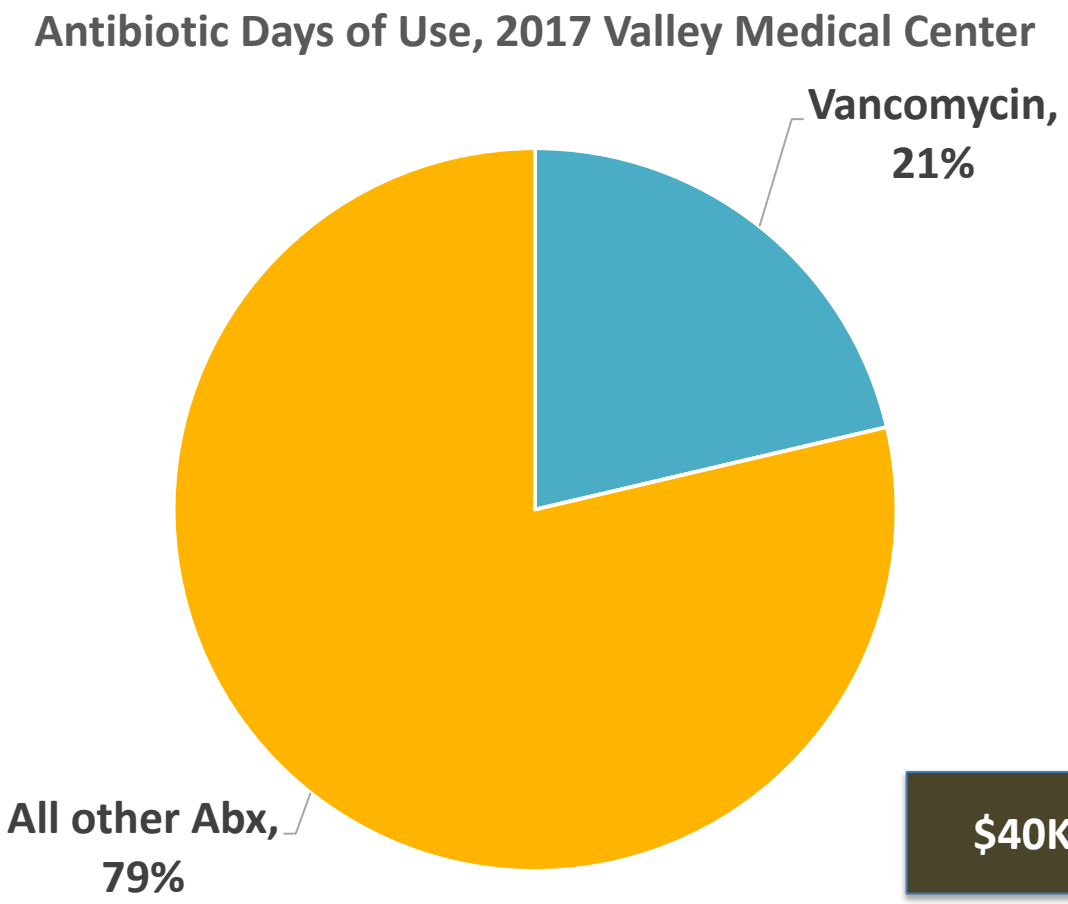
Vancomycin is #3 most highly utilized antibiotic at Valley Medical Center



$40K in drug acquisition cost

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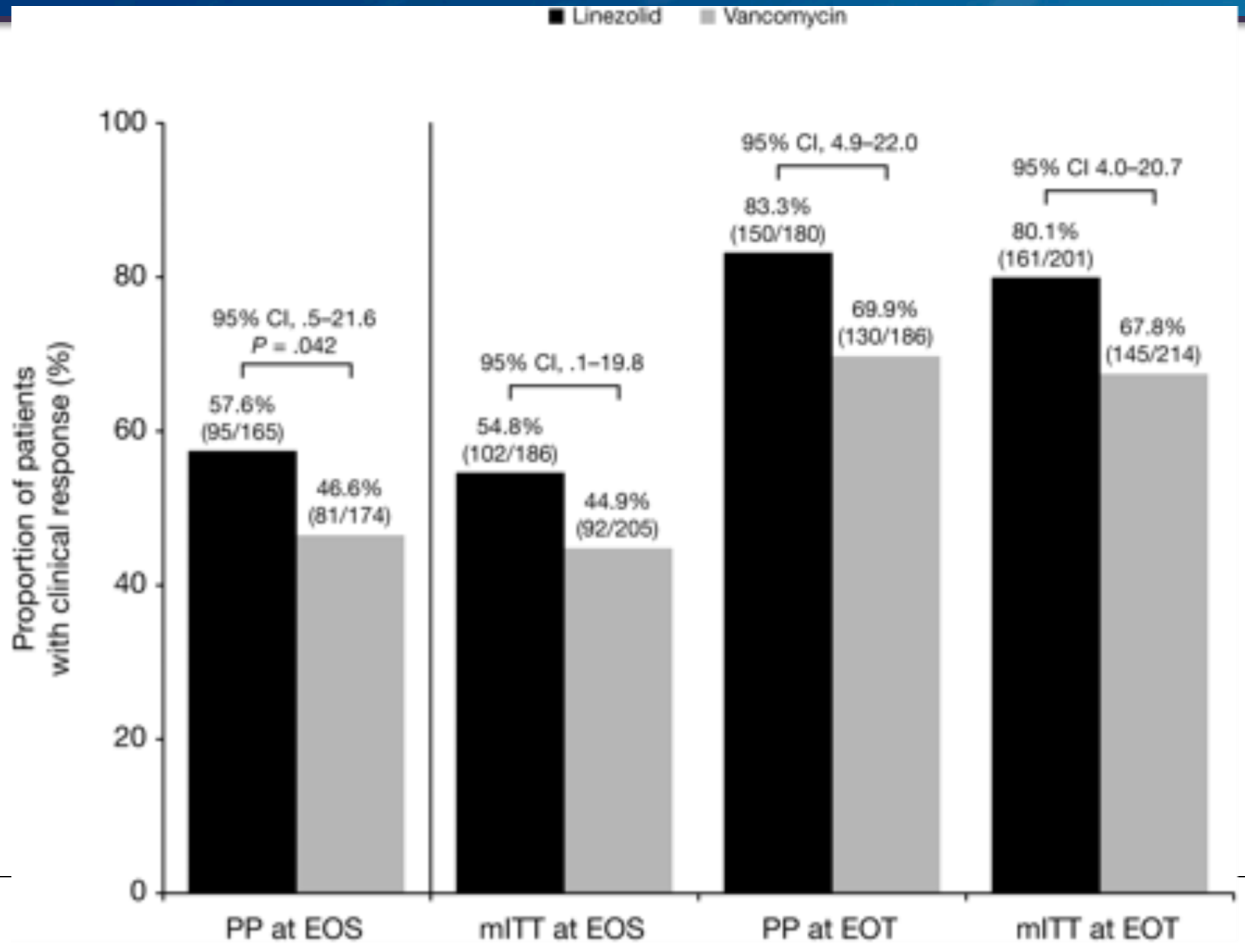
Treat the patient, not the trough

Questions to ask when trough < 10 mg/L

1. Are you treating *S. aureus* infection?
2. Is the patient improving clinically?
3. Is the total daily dose > 40 mg/kg/day (4000 mg)

Alternate options:
PO Linezolid for MRSA pneumonia



From: Linezolid in Methicillin-Resistant Staphylococcus aureus Nosocomial Pneumonia: A Randomized, Controlled Study

Clin Infect Dis. 2012;54(5):621-629. doi:10.1093/cid/cir895

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