

UHS

VANCOMYCIN THERAPEUTIC DRUG MONITORING: AUC₂₄/MIC RATIO & TROUGH BASED

And Vancomycin AUC Calculator

11-9-2020

Table of Contents

- I. Vancomycin Therapeutic Drug Monitoring Update
 - II. Indications for AUC₂₄/MIC monitoring
 - III. Exclusions for AUC₂₄/MIC dosing:
 - IV. Dosing
 - V. Post Dose Levels
 - VI. Monitoring Frequency
 - VII. Vancomycin Time Out at 24 – 48 Hours Checklist
 - VIII. Oral De-escalation Options According to Underlying Infection*
 - IX. References
-

About The AUC₂₄/MIC Calculator

I. Pharmacist Vancomycin AUC₂₄/MIC Workshop:

A. **Case 1:** Walkthrough – *Empiric Dosing*

- 1. Patient Info
- 2. Kidney Function
- 3. Loading Dose (LD)
- 4. Volume of Distribution (Vd)
- 5. Vancomycin Clearance (CL_{Vanco})
- 6. Maintenance Dose Table
- 7. Levels / Labs
- 8. Progress Note

Calculator Generated Monitoring Form

B. **Case 1:** Walkthrough – *Post Levels*

- 1. Load patient or fill in information
- 2. Post dose level entry – Ke, t_{1/2}
- 3. Volume of Distribution (Vd)
- 4. Maintenance Dose Table
- 5. Progress Note

C. **Case 2:** Jimmy Dean - Pneumonia

D. **Case 3:** MRN: 56789 - Sepsis

I. Vancomycin Therapeutic Drug Monitoring Update

[\[back to table of contents ↗ \]](#)

- a. The old vancomycin trough of 15-20 mg/dL surrogate goal is outdated and linked to 30% increase in development of acute kidney injury (AKI)
- b. Under most circumstances, we can consider MRSA infections to have a minimum inhibitory concentration (MIC) = 1 mg/L (unless the MIC is known and above 1 by broth microdilution or other method verified for accuracy) review of literature has identified no evidence of MIC creep phenomenon.
- c. Transitioning to 24 hour area under the curve (AUC₂₄)/MIC with a goal of 400-600 via direct PK/PD monitoring is a more accurate predictor of clinical efficacy

II. Indications for AUC₂₄/MIC monitoring:

[\[back to table of contents ↗ \]](#)

Invasive **MRSA infections**, including:

- a. Bacteremia
- b. Pneumonia
- c. Meningitis
- d. Endocarditis
- e. Osteomyelitis
- f. Sepsis
- g. Intra-abdominal infections

III. EXCLUSIONS for AUC₂₄/MIC dosing:

[\[back to table of contents ↗ \]](#)

- a. Skin and soft tissue infections (ABSSSI): 10 – 15 mg/dL trough target efficacious
- b. Enterococcal infections: 10 – 15 mg/dL trough target efficacious
- c. *Staphylococcus epidermidis* infections: 10 – 15 mg/dL
- d. Urinary tract infections
- e. Acute kidney injury/Rapidly changing renal function
- f. ERSD on Hemodialysis or Peritoneal Dialysis (*Chronic kidney disease, but stable residual renal function, should get AUC based dosing*)
- g. Surgical prophylaxis

IV. Dosing:

[\[back to table of contents ↗ \]](#)

- a. Loading doses (20-35 mg/kg Actual Body Weight (ABW) up to 3000 mg based on patient population) for:
 - i. All ED patients will get loading dose due to uncertainty of critical illness
 - ii. Critically ill or ICU patients
 - iii. Documented serious MRSA infections
 - iv. Hemodialysis, Peritoneal Dialysis or CRRT Patients
 - v. Obese pediatric patients
- b. Maintenance doses will be based on empiric dosing calculator population estimates (maximum 4500 mg/day). In the calculator, any doses > 4500 mg/day will appear in red.
- c. Hemodialysis: 20 - 25 mg/kg ABW loading dose followed by 7.5 – 10 mg/kg maintenance dose after hemodialysis
- d. Continuous Renal Replacement (effluent rates 20 – 25 mg/kg/h): 20 - 25 mg/kg ABW loading dose followed by 7.5 – 10 mg/kg maintenance dose every 12 hours CVVHD, every 24 hours for CVVH; consideration should be given to the lowering Vd as fluid overload resolves (Nebraska Renal Dosing Guidelines)

- e. Peritoneal Dialysis: 20 – 25 mg/kg IV or IP loading dose, followed by 7.5 – 10 mg/kg IV or IP Q48-72hrs based on serum levels

V. Post Dose Levels:

[\[back to table of contents ↗ \]](#)

- Two post dose levels are utilized to calculate AUC₂₄/MIC ratio → should be ordered as Peak and Trough levels
- Priority for measuring levels:
 - i. Measuring levels after the first dose is recommended for:
 - a. Severe infection (Bacteremia, meningitis)
 - b. High risk for AKI (ICU residence, CKD, concurrent nephrotoxin exposure)
 - c. Obese - BMI ≥ 30 kg/m²
 - d. Large empiric maintenance doses
 - i. Adults ≥ 4000 mg/day
 - ii. Pediatrics ≥ 2500 mg/day
 - e. Continuous renal replacement (CRRT)
 - ii. All other levels should be measured at or close to steady state, typically after the 4th dose
- Level order timing; order two (2) random vancomycin levels at least one (1) estimated half-life (t_{1/2}) apart.
 - First level - schedule at least one (1) hour after the end of the first dose infusion to allow for proper distribution.
 - Second level - should be at end of the dosing interval, before the next dose.
 - The dosing frequency of vancomycin may make it difficult to schedule two post levels at least 1 t_{1/2}, apart (i.e. extended infusion time, short t_{1/2}, short dosing interval), the levels may need to be drawn at shorter than one t_{1/2} interval.
 - Ensure line where vancomycin was infusing is properly flushed prior to level collection to prevent falsely elevated levels.
- Hemodialysis: maintaining pre-dialysis concentrations between 15 and 20 mg/L is likely to achieve the AUC₂₄/MIC of 400 to 600 mg·h/L in the previous 24 hours; pre-dialysis level preferred, may be drawn 4 hours after the end of hemodialysis prior to next dose if pre-dialysis window is missed.
- Continuous Renal Replacement Therapy (CRRT) – Monitor random level in first 24 hours with goal of 15 – 20 mg/L to ensure AUC₂₄/MIC targets are met
- Peritoneal Dialysis – monitor one random level every 2 - 3 days as needed, re-dose when serum levels fall below 15 mcg/mL (ISPD Guidelines)

VI. Monitoring Frequency:

[\[back to table of contents ↗ \]](#)

- a. Hemodynamically stable, await culture results. If vancomycin is to be continued, initial steady state monitoring and then weekly monitoring is sufficient.
- b. Hemodynamically unstable or at higher risk of nephrotoxicity (critically ill, concurrent nephrotoxins), more frequent monitoring recommended
- c. Hemodialysis: predialysis serum concentration monitoring should be performed weekly
- d. Peritoneal dialysis: serum concentration monitoring should be performed weekly once clearance rate identified\

- e. CRRT: daily evaluation of modality and ultrafiltration rate to guide level monitoring

VII. Vancomycin Time Out at 24 – 48 Hours Checklist

[\[back to table of contents ↩\]](#)

The following questions should be considered prior to continuing antibiotic therapy.

- i. Is a bacterial infection present? ☐ Yes ☐ No If No, vancomycin should be discontinued.
- ii. Has the site of infection been determined? ☐ No ☐ Yes If Yes, select one:

- ☐ Deep-seated endovascular infection (e.g., *S. aureus* bacteremia, endocarditis, meningitis, osteomyelitis, necrotizing fasciitis, mediastinitis, epidural or visceral abscess)
- ☐ Diabetic foot infection
- ☐ Intra-abdominal infection
- ☐ IV catheter related bloodstream infection
- ☐ Pneumonia
- ☐ Sepsis
- ☐ Skin/soft tissue infection (non-surgical site related)
- ☐ Surgical site or device/prosthesis-related infection
- ☐ Urinary tract infection
- ☐ Other _____

- iii. Has an infectious disease physician recommended continuation of vancomycin?
 - ☐ Yes - continue vancomycin
 - ☐ No
- iv. Has the culprit bacterial pathogen(s) been identified?

- ☐ Yes, definitively known – therapy is for an infection known to be caused by a culture proven gram positive organism - continue vancomycin until at least susceptibilities are known.
- ☐ Yes, definitively known – therapy is for an infection known to be caused by a culture proven gram positive organism susceptible only to vancomycin or patient has a serious beta-lactam allergy – continue vancomycin, determine length of therapy.
- ☐ Yes, definitively known – therapy is for an infection known to be caused by a culture proven gram positive organism susceptible to beta-lactam antibiotics. Recommend vancomycin discontinuation - vancomycin may be less rapidly bactericidal than beta-lactam agents for methicillin-susceptible staphylococci (MSSA).
- ☐ Possibly, a gram positive pathogen is suspected (microbiological results are pending) – follow-up in 48 hours.

- v. **Has the patient had a positive MRSA nasal surveillance culture or PCR within 24 hours of starting vancomycin?** ☐ Yes ☐ No - **Negative MRSA surveillance cultures have a 99% negative predictive value of MRSA HCAP.**

- vi. Is the patient clinically stable? ☐ No ☐ Yes - if Yes can the patient be switched to an oral antibiotic?

VIII. Oral De-escalation Options According to Underlying Infection*: [\[back to table of contents ↩ \]](#)

Infection	MRSA COVERAGE WARRANTED	MRSA COVERAGE NOT WARRANTED
Skin and soft tissue infection (suspect MRSA if induration, fluctuance, or purulence is present; diffuse cellulitis suggests a streptococcal etiology)	<ul style="list-style-type: none"> • TMP-SMZ 2 DS Tab q12h • Clindamycin 450 mg q8h • Doxy/minocycline 100 mg q12h • Linezolid 600 mg q12h 	<ul style="list-style-type: none"> • Dicloxacillin 500 mg q6h • Cephalexin 500 mg q6h
Diabetic foot infection (suspect MRSA if prior history of infection or colonization with MRSA)	<p>Mild to moderate infection:</p> <ul style="list-style-type: none"> • Cephalexin 1000 mg TID OR • Amoxicillin-clavulanate 875/125 mg q12h OR <p>PLUS</p> <ul style="list-style-type: none"> • Doxy/minocycline 100 mg q12h OR • SMT-TMZ 2 DS Tab q12h <p>With or without metronidazole 500 mg TID</p> <ul style="list-style-type: none"> • Severe PCN Allergy: Clindamycin 300 mg 450 q8h <p>*Verify osteomyelitis has been ruled out via MRI</p>	<ul style="list-style-type: none"> • Cephalexin 1000 mg TID • Amoxicillin-clavulanate 875/125 mg q12h • Severe PCN Allergy: Clindamycin 450 mg PO q8h
Community Acquired Pneumonia (consider continuation of anti-MRSA therapy past 3d only in cases where lower respiratory cultures have grown MRSA or MRSA is otherwise strongly suspected)	<ul style="list-style-type: none"> • Linezolid 600 mg q12h • Clindamycin 600 mg q8h* 	<ul style="list-style-type: none"> • Doxycycline 100 mg BID • Azithromycin 500 mg Daily Levofloxacin 750 mg QD (in severe penicillin allergy)
MRSA Bacteremia <u>Uncomplicated</u> (source: UTI, SSTI) - check with ID	<ul style="list-style-type: none"> • Linezolid 600 mg q12h 	<p>For MSSA bacteremia, recommend to rule out endocarditis and consider nafcillin for high inoculum (i.e. repeated positive bacteremia) and transition to cefazolin. Consideration can be given to</p> <ul style="list-style-type: none"> • SMT-TMZ 2 DS Tab q12h • Cephalexin 1 g TID

*Please corroborate with antimicrobial susceptibility testing before starting.

Other considerations for recommending the discontinuation of vancomycin:

- Patient is identified as low risk for MRSA infection:
 - Skin and soft tissue infection not present
 - No recent surgery or hemodialysis
 - No recent homelessness, hospitalization, incarceration, or nursing home residence
 - Patient has no surveillance or clinical culture proven MRSA within the past 12 months AND
 - Patient has not received parenteral antibiotics in preceding 90 days
 - **Clinical cultures obtained during the admission are negative for MRSA 48-72 hours after collection OR a cause of infection other than MRSA has been identified.**

About The AUC₂₄/MIC Calculator

[\[back to table of contents ↩ \]](#)

This vancomycin calculator uses a variety of published pharmacokinetic equations and principles to estimate an initial vancomycin dosing regimen for a patient based on population estimates. Subsequently, a regimen may be calculated based two vancomycin levels for severe MRSA infections. The AUC₂₄/MIC is calculated using the trapezoidal method.

Rule of Thumb

If vancomycin is likely not to be continued after 48-72 hours, go easy on the vancomycin LEVEL monitoring!

Pharmacist Vancomycin AUC₂₄/MIC Workshop:

[\[back to table of contents ↩ \]](#)

1. Patient example
2. 2 Patient problems
 - a. Empiric Dosing
 - b. 2 Levels with first dose
 - c. 2 Levels at steady state

Patient Example 1: New Consults - Empiric AUC/MIC

[\[back to table of contents ↩ \]](#)

Cerner (Default)

Default Settings: Add/Edit Profile

*Clinical calculators similar to this one are to assist healthcare professionals in making complex decisions. This calculator is a tool to be used in combination with clinical judgement, not as a stand alone one-size-fits all depot for dosing

Vancomycin AUC Calculator

New Consult

Post-Levels

Patient View

Patient List

AUC

MIC

Exclusions

- Hemodialysis, CRRT, AKI/Unstable Renal Function (Renal)
- UTI, Skin and soft tissue infections (ABSSSI), Surgical Prophylaxis (non-AUC)
- Enterococcal infections, Staphylococcus Epidermidis (non-MRSA Infections)

1. Patient Info:

[\[back to table of contents ↩ \]](#)

- 41 yo Female with MRSA Osteomyelitis
- Wt: 88.9 kg
- Ht: 157 cm

Add Patient

MRN: 12345
Name: Smith, Jane
Location: 2W 214
Age: 41 F
Ht: 157 cm
Ht: 5'2"

Wt: 196 lbs
TBW: 88.9 kg
IBW: 49.7 kg
AdjBW: 65.4 kg
TBW/IBW: 1.79
BMI: 36.1

Provider: Dr John Jones
Indication: Osteomyelitis

Enter Patient Information

Load Patient

Load Patient Information

Load

2. Diagnosis

Consulting Physician:

Dr John Jones

Suspected Indication:

Osteomyelitis

1. Patient Identifiers

* MRN

12345

Last Name

Smith

First Name

Jane

Service

2W

Room

214

3. Patient Characteristics

Age

41

years

Height

157

cm

Weight

88.9

kg

Gender

Female

Cancel
Next

1. Choose the New Consult button
2. Enter the patient information into the calculator and choose Next. Choosing Next will save the information automatically.
3. Entering the medical record number will allow patient to be identified during future admissions in the database
4. Previously added patients can be identified and loaded in the "Load Patient Information" section

Kidney Function

[\[back to table of contents ↗\]](#)

- Patient example: This patient has stable renal function with a SCr 0.5 and no concurrent nephrotoxic medications, no amputations
- 1.) Enter patient's current serum creatinine into the calculator
- There is also an option to enter concurrent nephrotoxic agents and amputee status into the calculator. It will then provide a Caution pop-up for more careful monitoring.
- 2.) If patient is muscle wasted or cachectic, the SCr can be rounded by selecting "Yes"
- 3.) If patient is obese (>120% IBW) the AdjBW can be used to calculate CrCl by selecting "Yes"
- Select "Accept ### ml/min as CrCl"

New Consult

MRN: 12345 Wt: 196 lbs SCr: 0.5 mg/dL Provider: Dr John Jones
 Name: Smith, Jane TBW: 88.9 kg CrCl: 152.8 mL/min Indication: Osteomyelitis
 Location: 2W 214 IBW: 49.7 kg Using AdjBW: True
 Age: 41 F AdjBW: 65.4 kg
 Ht: 157 cm TBW/IBW: 1.79
 Ht: 5'2" BMI: 36.1

1. Pt Info 2. Kidney Function 3. LD 4. Vd 5. CLVanco 6. MD 7. Levels / Labs 8. Progress Note

☐ Manually-Enter CrCl

4. Kidney Function

1 * SCr 0.5 mg/mL SCr Date (optional) [*click here*](#)

Other Nephrotoxic Drugs:

☐ Amputee Next

* Required if not manually-entering CrCl

Calculated CrCl

(140 - age {41}) * wt {65.4}
 ----- * 0.85 = 152.8 mL/min
 72 * SCr {0.5}

Pt is female, using correction factor

Manually-Enter CrCl

mL/min

Cachectic / Muscle Wasting Check

Age: 41 F Adult
 SCr: 0.5 mg/dL SCr < 1.0
 BMI: 36.1 Obese

2 Would you like to round SCr up to 1.0?

Obesity Check

BMI: 36.1 TBW: 88.9
 TBW/IBW: 1.79 IBW: 49.7
 AdjBW: 65.4

3 Would you like to use AdjBW in CrCl calculation?

*TBW > 1.2 IBW, AdjBW recommended

Accept 152.8 mL/min as CrCl

Cancel << Back Next >> Save

3. LD – Loading Dose

[\[back to table of contents ↩ \]](#)

- New IDSA Vancomycin Guidelines from March 2020 recommend giving a loading dose for critically ill patients, ICU patients, those that require dialysis or renal replacement therapy. Consider whether patient requires a loading dose and if so, what category they fall into, and select “Calculate Load” or “No Load”.
- Loading dose max will be hospital specific, but according new guidelines may go up to 3000 mg.
- Calculator will estimate what time the loading dose will be given, adjust time based on expectations (consider time to dispense and potential delay from administering other antibiotics before vancomycin)
- Accept loading dose if giving, or hit next.

New Consult

MRN: 12345 Wt: 196 lbs SCr: 0.5 mg/dL Provider: Dr John Jones
 Name: Smith, Jane TBW: 88.9 kg CrCl: 152.8 mL/min Indication: Osteomyelitis
 Location: 2W 214 IBW: 49.7 kg Using AdjBW: True
 Age: 41 F AdjBW: 65.4 kg
 Ht: 157 cm TBW/IBW: 1.79
 Ht: 5'2" BMI: 36.1

1. Pt Info | 2. Kidney Function | 3. LD | 4. Vd | 5. CLVanco | 6. MD | 7. Levels / Labs | 8. Progress Note

Data Input

Patient's weight: 88.9 kg

Dosing: 20 mg/kg

Max Dose: 2,000 mg

No Load **1** Calculate Load

Revise / Manually Enter Load Dose

Load Dose: 1750 mg

Infuse Over: 1.8 hrs

2 Schedule at: Mon, 11/09 at 02:00 pm

11/09 14:00 **3**

Table 1. ASHP / IDSA Recommendations

Serious MRSA Infections: 20-35 mg/kg ABW*
 Critically ill: 25-35 mg/kg#
 Obese (BMI > 30): 20-25 mg/kg+
 HD: 20-25 mg/kg+
 CRRT: 20-25 mg/kg+
 Pediatrics (Obese): 20 mg/kg
 Pediatrics: no loading dose

* consider in treatment of serious MRSA infections.
 # for intermittent or cont TBW not to exceed 3000mg
 + using TBW not to exceed 3000mg in serious infections

Calculations

Calculated Dose: $88.9 \times 20 = 1778$ mg

Rounded Dose: 1750 mg

Doses

11/09 14:00 - 1750 mg

Accept "1750 mg" as load dose

LOAD DOSE: 1750 mg over 1.8 hrs
 on Mon, 11/09 at 14:00

edit

Cancel << Back Next >> Save

"Smith, Jane" last saved Mon, 11/9 05:32 am

4. Vd: Volume of distribution

[\[back to table of contents ↩\]](#)

- Select desired Volume of distribution based on Table and patient characteristics and hit Next.
- For volume of distribution ranges, the value will default to the average; however, scrollbar allows for adjustment.

New Consult

MRN: 12345

Wt: 196 lbs

SCR: 0.5 mg/dL

Population: Estimates

Provider: Dr John Jones

Name: Smith, Jane

TBW: 88.9 kg

CrCl: 152.8 mL/min

Vd: 44.4 L

Indication: Osteomyelitis

Location: 2W 214

IBW: 49.7 kg

Using AdjBW: True

DOT: Day 1 (-503 min)

Age: 41 F

AdjBW: 65.4 kg

Ht: 157 cm

TBW/IBW: 1.79

Ht: 5'2"

BMI: 36.1

1. Pt Info

2. Kidney Function

3. LD

4. Vd

5. CLVanco

6. MD

7. Levels / Labs

8. Progress Note

Estimate Vd

* Vd:

0.4 - 0.6

▶

Vd Calculation

Calculated Vd: $0.5 * 88.9 \text{ kg} = 44.4 \text{ L}$

Vd Adjustment

0.5

◀

▶

Min: 0.4

Max: 0.6

Table 2. Population-based Vd estimates

Normal:	0.65
Dehydrated:	0.5 - 0.6
Obese:	0.4 - 0.6
Overhydrated:	0.7 - 0.85
Cystic fibrosis:	0.7 - 0.85
Septic Shock:	0.7 - 0.75
ICU:	0.7 - 0.75
Trauma:	0.7 - 0.75
ESRD:	0.7 - 0.75
Post-partum < 48 hrs:	0.7
Pregnant in 3rd trimester:	0.7

Doses

11/09 14:00 - 1750 mg

LOAD DOSE: 1750 mg over 1.8 hrs on Mon, 11/09 at 14:00

edit

2

Cancel

<< Back

Next >>

Save

"Smith, Jane" last saved Mon, 11/9 05:37 am

Dose Type: Load

Strength: 1750 mg

Infusion Time: 1.8 hrs

Scheduled: 11/09 14:00

5. Cl Vanco

[\[back to table of contents ↗\]](#)

- Select the vancomycin clearance equation to estimate vancomycin clearance based on the patients renal function +/- weight.
- Crass is more appropriate for obese patients. Matze may be used for all others.

New Consult

MRN: 12345	Wt: 196 lbs	SCr: 0.5 mg/dL	Population: Estimates	Provider: Dr John Jones
Name: Smith, Jane	TBW: 88.9 kg	CrCl: 152.8 mL/min	Eqn Used: Crass	Indication: Osteomyelitis
Location: 2W 214	IBW: 49.7 kg	Using AdjBW: True	Vd: 44.4 L	DOT: Day 1 (-495 min)
Age: 41 F	AdjBW: 65.4 kg		Ke: 0.1487	
Ht: 157 cm	TBW/IBW: 1.79		t1/2: 4.7 hrs	
Ht: 5'2"	BMI: 36.1		CLVanco: 6.6 L/hr	

1. Pt Info
2. Kidney Function
3. LD
4. Vd
5. CLVanco
6. MD
7. Levels / Labs
8. Progress Note

1
Choose CLVanco Equation
* CLVanco: Crass

Estimated PK Parameters
CLVanco: 6.6 L/hr
CrCl: 152.8 mL/min
Vd: 44.4 L
Ke: 0.1487
t1/2: 4.7 hrs

Table 3. CLVanco estimation equations
Matzke: $[(CrCl * 0.689) + 3.66] * 0.06$
^ for normal weight patients
Crass: $9.656 - 0.078 * age - 2.009 * SCr + 1.09 * sex + 0.04 * TBW^{0.75}$
^ for obese patients, where female = 0, male = 1

Doses
11/09 14:00 - 1750 mg

LOAD DOSE: 1750 mg over 1.8 hrs on Mon, 11/09 at 14:00

2
Cancel << Back Next/Save
"Smith, Jane" last saved Mon, 11/9 05:45 am

6. Maintenance Dose Table

[\[back to table of contents ↩\]](#)

- Potential doses will populate in the table based on a Target AUC₂₄/MIC 400-600
- Boxes will populate with estimated AUC on top and troughs on bottom
- Choose an appropriate dosage regimen based on target AUC₂₄/MIC 400-600 by selecting the box. Keep in mind the troughs may be low, but we are dosing on target AUC.
- The selected dosing regimen will appear, hit next

Maintenance Dose Table

MRN: 12345 Age: 41 F SCr: 0.5 mg/dL Provider: Dr John Jones
Name: Smith, Jane Ht: 157 cm CrCl: 152.8 mL/min Indication: Osteomyelitis
Wt: 88.9 kg Using AdjBW: True DOT: Day 1 (-485 min)
TBW/IBW: 1.79
BMI: 36.1

Maintenance Dose Table

Infusion Rate: 1000 mg/hr * Target: AUC/MIC range 400-600 MIC: 0.1 - 1.0

	500mg	750mg	1000mg	1250mg	1500mg	1750mg	2000mg	
	0.5 hrs	0.8 hrs	1 hr	1.2 hrs	1.5 hrs	1.8 hrs	2 hrs	<input checked="" type="checkbox"/> infusion times
Q6H		480 14						mg h / L mg/dL
Q8H			490 12					mg h / L mg/dL
Q12H				410 7	500 9	600 11		mg h / L mg/dL
Q18H							460 5 22.5*	mg h / L mg/dL
Q24H								mg h / L mg/dL
Q36H								mg h / L mg/dL
Q48H								mg h / L mg/dL

* AUC calculations are estimated and rounded to nearest 10's.

PK Parameters
Population-based
Vd: 44.4 L
Ke: 0.1487
t_{1/2}: 4.7 hrs
CLVanco: 0 L/hr
^ Using for table

PK Parameters
Patient-Specific
Vd:
Ke:
t_{1/2}:
CLVanco:

Legend

AUC/MIC
trough
TDD
dosing

Options
☒ Estimated trough
☐ Total Daily Dose (TDD)
☐ dosing in mg/kg
☐ Show all values

*View AUC Calculation Steps

Exit

7. Levels/Labs

[\[back to table of contents ↗\]](#)

- Under Schedule Labs, the desired time for post dose levels will populate based on when the loading dose was given. They should be collected after the 1st dose or at steady state, depending on the infection severity and patient risk for AKI.
- Hit Next

New Consult

MRN: 12345

Wt: 196 lbs

SCR: 0.5 mg/dL

Population: Estimates

Provider: Dr John Jones

Name: Smith, Jane

TBW: 88.9 kg

CrCl: 152.8 mL/min

Vd: 44.4 L

Indication: Osteomyelitis

Location: 2W 214

IBW: 49.7 kg

Using AdjBW: True

Ke: 0.1487

DOT: Day 1 (-411 min)

Age: 41 F

AdjBW: 65.4 kg

t1/2: 4.7 hrs

Ht: 157 cm

TBW/IBW: 1.79

Ht: 5'2"

BMI: 36.1

1. Pt Info

2. Kidney Function

3. LD

4. Vd

5. CLVanco

6. MD

7. Levels / Labs

8. Progress Note

Load Dose

Load Dose mg

Infuse Over hrs

1st Interval (adjustable)

Interval hrs

Reload

1 Schedule Labs

☒ "Peak" Options

☐ "Trough" Options

Doses

11/09 14:00 - 1750 mg

11/10 02:00 - 1500 mg

11/10 14:00 - 1500 mg

11/11 02:00 - 1500 mg

11/11 14:00 - 1500 mg

Estimated Concentration Curve

Time Frame

edit

LOAD DOSE: 1750 mg over 1.8 hrs on Mon, 11/09 at 14:00

edit

MAINTENANCE: 1500 mg over 1.5 hrs every 12 hrs

AUC: 500 +/- on Tue, 11/10 at 02:00

[*View AUC Calculation Steps](#)

Cancel

<< Back

Next >>

Save

"Smith, Jane" last saved Mon, 11/9 07:09 am

Dose Type: Load

Regimen: 1500 mg q12h

Strength: 1750 mg

AUC (Pop): 500

Infusion Time: 1.8 hrs

Scheduled: 11/10 02:00

Scheduled: 11/09 14:00

7. Progress Note

[\[back to table of contents ↗\]](#)

- This page will populate with the information that was used to determine the LD (if giving) and MD. It can be copied and pasted into a Cerner Progress Note.
- Hit “Create Monitoring Form”

New Consult

MRN: 12345

Wt: 196 lbs

SCr: 0.5 mg/dL

Population: Estimates

Provider: Dr John Jones

Name: Smith, Jane

TBW: 88.9 kg

CrCl: 152.8 mL/min

Vd: 44.4 L

Indication: Osteomyelitis

Location: 2W 214

IBW: 49.7 kg

Using AdjBW: True

Ke: 0.1487

DOT: Day 1 (-407 min)

Age: 41 F

AdjBW: 65.4 kg

t1/2: 4.7 hrs

Ht: 157 cm

TBW/IBW: 1.79

Ht: 5'2"

BMI: 36.1

1. Pt Info

2. Kidney Function

3. LD

4. Vd

5. CLVanco

6. MD

7. Levels / Labs

8. Progress Note

Progress Note

Update Progress Note

1 Create Monitoring Form

Health Status

Patient is a 41 year old female who started vancomycin on 11/09/2020. The pharmacokinetic service is being consulted for vancomycin dosing and monitoring.

Results Review

Height (cm): 157 cm

Weight (kg): 88.9 kg

SCr (mg/dL): 0.5 mg/dL

Estimated Renal Function: CrCl 152.8 mL/min

Obesity Check:

-- Patient's TBW/IBW: 1.79

-- Patient's BMI: 36.1

-- Used AdjBW of 65.4 kg instead of 49.7 kg for CrCl Calculation

-- Calculated CrCl increased from 116.1 mL/min to 152.8 mL/min with adjustment

Assessment

Day of Therapy: 1

Duration of therapy per treating prescribers

Ordering Physician: Dr John Jones

Suspected Indication: Osteomyelitis

Plan

Doses

11/09 14:00 - 1750 mg

11/10 02:00 - 1500 mg

11/10 14:00 - 1500 mg

11/11 02:00 - 1500 mg

11/11 14:00 - 1500 mg

LOAD DOSE: 1750 mg over 1.8 hrs on Mon, 11/09 at 14:00

edit

MAINTENANCE: 1500 mg over 1.5 hrs every 12 hrs

edit

AUC: 500+/- on Tue, 11/10 at 02:00

View AUC Calculation Steps

Dose Type: Load

Strength: 1750 mg

Infusion Time: 1.8 hrs

Scheduled: 11/09 14:00

Regimen: 1500 mg q12h

AUC (Pop): 500


Scheduled: 11/10 02:00

AUC Level 1: 11/09 17:30

AUC Level 2: 11/10 01:30

Calculator Generated Monitoring Form:

[\[back to table of contents ↩ \]](#)

Vancomycin Monitoring Form																																																																																																											
One Liner:		An adult, obese, 41 yr old female with normal or high renal function (153 mL/min) has been diagnosed by Dr John Jones with Osteomyelitis. Pharmacy is being consulted to dose vancomycin.																																																																																																									
Initial CrCl (mL/min)		<div>  </div>										<table border="1"> <thead> <tr> <th colspan="2">Identifiers</th> <th colspan="4">Creatinine Clearance Calculation</th> <th colspan="2">Diagnosis</th> </tr> </thead> <tbody> <tr> <td>MRN:</td> <td>12345</td> <td>Age:</td> <td>41</td> <td>Wt:</td> <td>89 kg</td> <td>BMI:</td> <td>36.1</td> <td>Age Used:</td> <td>41</td> <td>Provider:</td> <td>Dr John Jones</td> </tr> <tr> <td>Last Name:</td> <td>Smith</td> <td>Gender:</td> <td>F</td> <td>Wt:</td> <td>196 lbs</td> <td>TBW/IBW:</td> <td>1.79</td> <td>Wt Used:</td> <td>65 kg</td> <td>Indication:</td> <td>Osteomyelitis</td> </tr> <tr> <td>First Name:</td> <td>Jane</td> <td>Ht:</td> <td>157 cm</td> <td>ABW:</td> <td>89 kg</td> <td>IBW:</td> <td>50 kg</td> <td>Using:</td> <td>AdjBW</td> <td>Target:</td> <td></td> </tr> <tr> <td>FIN:</td> <td></td> <td>Ht:</td> <td>5'2"</td> <td>IBW:</td> <td>50 kg</td> <td>AdjBW:</td> <td>65 kg</td> <td>SCR:</td> <td>0.5</td> <td>MIC:</td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>CrCl:</td> <td>152.8</td> <td></td> <td></td> </tr> </tbody> </table>				Identifiers		Creatinine Clearance Calculation				Diagnosis		MRN:	12345	Age:	41	Wt:	89 kg	BMI:	36.1	Age Used:	41	Provider:	Dr John Jones	Last Name:	Smith	Gender:	F	Wt:	196 lbs	TBW/IBW:	1.79	Wt Used:	65 kg	Indication:	Osteomyelitis	First Name:	Jane	Ht:	157 cm	ABW:	89 kg	IBW:	50 kg	Using:	AdjBW	Target:		FIN:		Ht:	5'2"	IBW:	50 kg	AdjBW:	65 kg	SCR:	0.5	MIC:										CrCl:	152.8			<table border="1"> <thead> <tr> <th colspan="4">Population-based PK Parameters</th> </tr> </thead> <tbody> <tr> <td>Equation:</td> <td>Crass</td> <td>Ke:</td> <td>0.1487</td> </tr> <tr> <td>Vd:</td> <td>0.5</td> <td>t1/2:</td> <td>4.7 hrs</td> </tr> <tr> <td></td> <td></td> <td>Vd:</td> <td>44.5 L</td> </tr> <tr> <td>Infusion Rate:</td> <td>1000</td> <td>ClVanco:</td> <td>6.6 L/hr</td> </tr> </tbody> </table>				Population-based PK Parameters				Equation:	Crass	Ke:	0.1487	Vd:	0.5	t1/2:	4.7 hrs			Vd:	44.5 L	Infusion Rate:	1000	ClVanco:	6.6 L/hr
Identifiers		Creatinine Clearance Calculation				Diagnosis																																																																																																					
MRN:	12345	Age:	41	Wt:	89 kg	BMI:	36.1	Age Used:	41	Provider:	Dr John Jones																																																																																																
Last Name:	Smith	Gender:	F	Wt:	196 lbs	TBW/IBW:	1.79	Wt Used:	65 kg	Indication:	Osteomyelitis																																																																																																
First Name:	Jane	Ht:	157 cm	ABW:	89 kg	IBW:	50 kg	Using:	AdjBW	Target:																																																																																																	
FIN:		Ht:	5'2"	IBW:	50 kg	AdjBW:	65 kg	SCR:	0.5	MIC:																																																																																																	
								CrCl:	152.8																																																																																																		
Population-based PK Parameters																																																																																																											
Equation:	Crass	Ke:	0.1487																																																																																																								
Vd:	0.5	t1/2:	4.7 hrs																																																																																																								
		Vd:	44.5 L																																																																																																								
Infusion Rate:	1000	ClVanco:	6.6 L/hr																																																																																																								
Day of Therapy /Date	Load Dose	Day 1 11/09	Day 2 11/10	Day 3 11/11	Day 4 11/12	Day 5 11/13	Day 6 11/14	Day 7 11/15	Day 8 11/16	Day 9 11/17	Day 10 11/18	Day 11 11/19	Day 12 11/20	Day 13 11/21	Day 14 11/22	Day 15 11/23	Day 16 11/24	Day 17 11/25	Day 18 11/26																																																																																								
Dose	1750	1500																																																																																																									
Frequency		12																																																																																																									
Total Daily Dose (TDD)		3,000 g																																																																																																									
Time 1	14:00	02:00																																																																																																									
Time 2																																																																																																											
Time 3																																																																																																											
AUC																																																																																																											
Population-based Estimate		500																																																																																																									
Cmax estimate		41																																																																																																									
Cmin estimate		9																																																																																																									
Patient-Specific																																																																																																											
Levels																																																																																																											
Peak Level Ordered for: (date/time)		1W09 17:30																																																																																																									
Peak Level/Time Drawn																																																																																																											
Trough Level Ordered for: (date/time)		1W10 01:30																																																																																																									
Trough Level/Time Drawn																																																																																																											
Labs																																																																																																											
SCr (daily for adults)		0.5																																																																																																									
Manual SCr																																																																																																											
CrCl estimate (mL/min)		152.8																																																																																																									
Manual CrCl																																																																																																											
CLVanco		6.6 L/hr																																																																																																									
Ke		0.1487																																																																																																									
BUN (daily for adults)																																																																																																											
WBC																																																																																																											
Temp																																																																																																											
Procalcitonin																																																																																																											
Other nephrotoxic drugs: NSAIDs, ACE Inhibitor, diuretics, pif/tazo, vasopressors, etc.																																																																																																											
Culture & Sensitivity results / MRSA PCR results for respiratory and sepsis indications:		Nasal MRSA PCR () Positive () Negative Date: _____ Blood culture organism(s): _____ () final Date: _____ Resp culture; organism(s): _____ () final Date: _____ Other: _____ organism(s): _____ () final Date: _____																																																																																																									
Evaluate for de-escalation		<input type="checkbox"/> MRSA PCR follow up #	<input type="checkbox"/> Action on culture informatio n if applicable																																																																																																								
Comments:																																																																																																											

Two post dose levels:

[\[back to table of contents ↗\]](#)


- Use “Post-Level” portion of calculator once two post dose levels are available – ideally close to steady state (after 4th dose) and at least 1 half-life apart.

Cerner (Default) ▼


⚙️

Default Settings: Add/Edit Profile


Vancomycin AUC Calculator




New Consult



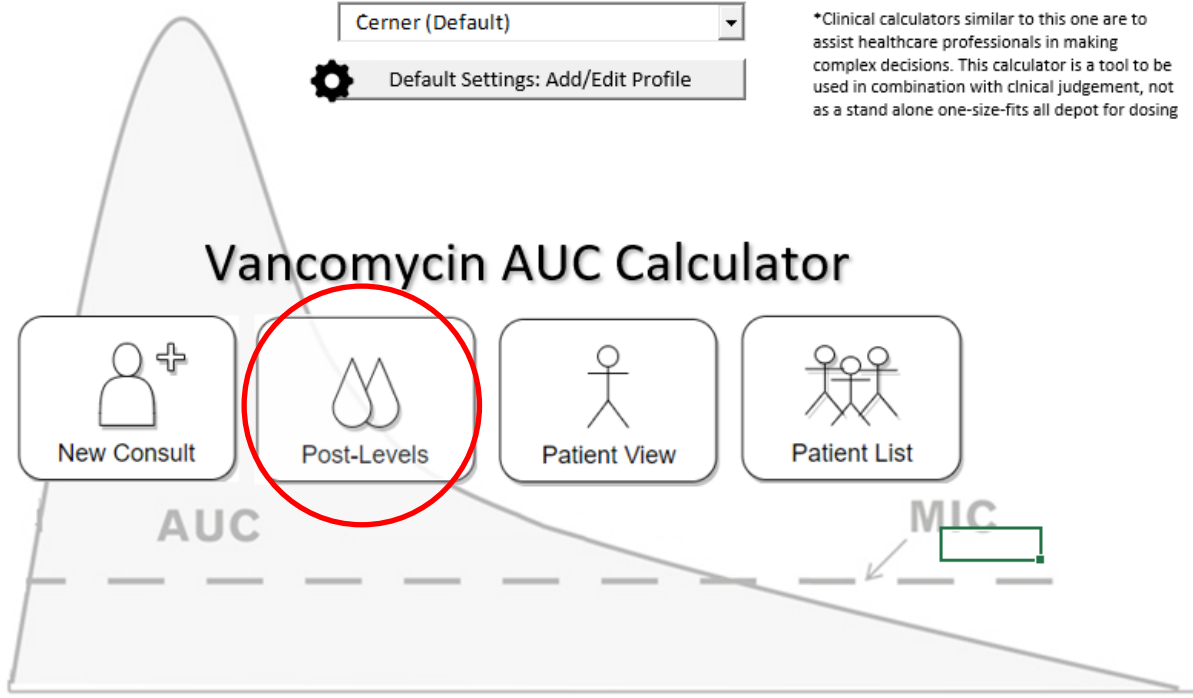
Post-Levels



Patient View



Patient List



AUC

MIC

•Clinical calculators similar to this one are to assist healthcare professionals in making complex decisions. This calculator is a tool to be used in combination with clinical judgement, not as a stand alone one-size-fits all depot for dosing

Exclusions

<ul style="list-style-type: none"> - Hemodialysis, CRRT, AKI/Unstable Renal Function - UTI, Skin and soft tissue infections (ABSSSI), Surgical Prophylaxis - Enterococcal infections, Staphylococcus Epidermidis 	<p>(Renal)</p> <p>(non-AUC)</p> <p>(non-MRSA Infections)</p>
---	--

1. Search patient and load patient information input from initial empiric dosing or fill in demographic information:

[\[back to table of contents ↩ \]](#)

Add Patient

MRN: 12345	Wt: 196 lbs	SCr: 0.5 mg/dL	Population: Estimates
Name: Smith, Jane	TBW: 88.9 kg	CrCl: 152.8 mL/min	Eqn Used: Crass
Location: 2W 214	IBW: 49.7 kg	Using AdjBW: True	Vd: 44.4 L
Age: 41 F	AdjBW: 65.4 kg		Ke: 0.1487
Ht: 157 cm	TBW/IBW: 1.79		t1/2: 4.7 hrs
Ht: 5'2"	BMI: 36.1		CLVanco: 6.6 L/hr

Enter Patient Information

Load Patient

Load Patient Information

12345

Load

2. Diagnosis

Consulting Physician:

Dr John Jones

Suspected Indication:

Osteomyelitis

1. Patient Identifiers

* MRN

12345

Last Name

Smith

First Name

Jane

Service

2W

Room

214

3. Patient Characteristics

Age

41

years

Height

157

cm

Weight

88.9

kg

Gender

Female

Cancel

Next

Provider: Dr John Jones	Dose Type: Load	Regimen: 1500 mg q12h	AUC Level 1: 11/09 17:30
Indication: Osteomyelitis	Strength: 1750 mg	AUC (Pop): 500	AUC Level 2: 11/10 01:30
DOT: Day 1 (-389 min)	Infusion Time: 1.8 hrs	Scheduled: 11/10 02:00	
	Scheduled: 11/09 14:00		

2. Post dose level entry – patient specific K_e , $t_{1/2}$ results [\[back to table of contents ↩ \]](#)

- Enter post dose levels, ensure times and dates are correct based on when last dose was given
- Hit the “Calculate the K_e , $t_{1/2}$ ” and Next
- The green check mark indicates there is at least one $t_{1/2}$ between the levels

Post Levels

MRN: 12345

Wt: 196 lbs

SCr: 0.5 mg/dL

Ke: 0.1281

Population: Estimates

Name: Smith, Jane

TBW: 88.9 kg

CrCl: 152.8 mL/min

t1/2: 5.4 hrs

Eqn Used: Crass

Location: 2W 214

IBW: 49.7 kg

Using AdjBW: True

Vd: 44.4 L

Ke: 0.1487

Age: 41 F

AdjBW: 65.4 kg

t1/2: 4.7 hrs

CLVanco: 6.6 L/hr

Ht: 157 cm

TBW/IBW: 1.79

Ht: 5'2"

BMI: 36.1

1. Pt Info

2. Ke, t1/2

3. Vd

4. Dose Table

5. Progress Note

Equations Used

Level(s)

1

1st post-dose level

32 mg/L

Level 1 Date/Time

06/05 16:00

2

2nd post-dose level

10.1 mg/L

Level 2 Date/Time

06/06 01:00

3

Calculate K_e , $t_{1/2}$

Ke, t1/2: Patient-Specific

Ke: 0.1281

t1/2: 5.4 hrs

Half-life check

t2 - t1

half-life

9

5.4

Levels were drawn greater (>) than one (1) half-life apart.

Equation Used:

$$K_e = \frac{\ln(C_1/C_2)}{\Delta t}$$

where:

K_e = elimination-rate constant

C_1 = measured peak concentration ~1 hour after infusion

C_2 = measured trough concentration ~30 min before next dose

Δt = difference in time between lab samples in hrs

Cancel

<< Back

Next >>

Save

Provider: Dr John Jones

Dose Type: Load

Regimen: 1500 mg q12h

AUC Level 1: 11/09 17:30

Indication: Osteomyelitis

Strength: 1750 mg

AUC (Pop): 500

AUC Level 2: 11/10 01:30

DOT: Day 1 (~383 min)

Infusion Time: 1.8 hrs

Scheduled: 11/10 02:00

Scheduled: 11/09 14:00

20 | Page

3. Volume of Distribution

[\[back to table of contents ↩ \]](#)

- Select Level Strategy: after 1st dose vs steady state
- Enter the dose the patient received, verify the infusion time, and date/time administered. If level is at steady state, enter and verify the dosing interval.
- Hit "Calculate Vd"
- Hit "Next"

Post Levels

MRN: 12345	Wt: 196 lbs	SCr: 0.5 mg/dL	Ke: 0.1281	Population: Estimates
Name: Smith, Jane	TBW: 88.9 kg	CrCl: 152.8 mL/min	t1/2: 5.4 hrs	Eqn Used: Crass
Location: 2W 214	IBW: 49.7 kg	Using AdjBW: True		Vd: 44.4 L
Age: 41 F	AdjBW: 65.4 kg			Ke: 0.1487
Ht: 157 cm	TBW/IBW: 1.79			t1/2: 4.7 hrs
Ht: 5'2"	BMI: 36.1			CLVanco: 6.6 L/hr

1. Pt Info
2. Ke, t1/2
3. Vd
4. Dose Table
5. Progress Note
Equations Used

Levels Strategy: 1st Dose: Peak and Trough

1st Dose

Dose: 1750 mg
Infusion time: 1.8 hrs
Dose Date/Time: 06/05 14:00

☒ Load Dose
☐ Maintenance Dose

Calculate Vd

Vd: Patient-Specific
Vd: 47.6 L

Equation Used:

$$V_d = \frac{(1 - e^{-K_e \cdot T_{inf}})}{K_e \cdot C_{peak\ 1}} \cdot \frac{Dose}{T_{inf}} \cdot e^{-K_e \cdot t'}$$

where:

$C_{peak\ 1}$ = measured peak concentration ~1 hour after infusion
Dose = 1st dose
 T_{inf} = infusion time in hrs
 t' = time between end of infusion and collection of blood sample
 K_e = elimination constant
 V_d = Volume of distribution

Transfer Data to DMC Calculator

Cancel
<< Back
Next >>
Save

"Smith, Jane" last saved Mon, 11/9 07:39 am

Provider: Dr John Jones	Dose Type: Load	Regimen: 1500 mg q12h	AUC Level 1: 11/09 17:30
Indication: Osteomyelitis	Strength: 1750 mg	AUC (Pop): 500	AUC Level 2: 11/10 01:30
DOT: Day 1 (-383 min)	Infusion Time: 1.8 hrs	Scheduled: 11/10 02:00	
	Scheduled: 11/09 14:00		

4. New Maintenance Dose Table:

[\[back to table of contents ↩\]](#)

- If necessary, select a new maintenance dose based on the AUC target. Usually the lowest clinically effective AUC dose should be used, along with consideration for more convenient dosing (i.e. avoid q18H, q36H intervals if possible)
- Patient specific PK parameters are presented on the right

Maintenance Dose Table

MRN: 12345

Name: Smith, Jane

Age: 41 F

Ht: 157 cm

Wt: 88.9 kg

TBW/IBW: 1.79

BMI: 36.1

SCr: 0.5 mg/dL

CrCl: 152.8 mL/min

Using AdjBW: True

Provider: Dr John Jones

Indication: Osteomyelitis

DOT: Day 1 (-377 min)

Maintenance Dose Table

Infusion Rate

1000 mg/hr

* Target

AUC/MIC range 400-600

MIC

0.1 - 1.0

	500mg	750mg	1000mg	1250mg	1500mg	1750mg	2000mg	
	0.5 hrs	0.8 hrs	1 hr	1.2 hrs	1.5 hrs	1.8 hrs	2 hrs	infusion times
Q6H		520 16						mg h / L mg/dL
Q8H			520 14					mg h / L mg/dL
Q12H				440 9	540 11			mg h / L mg/dL
Q18H						430 5	490 6	mg h / L mg/dL
Q24H								mg h / L mg/dL
Q36H								mg h / L mg/dL
Q48H								mg h / L mg/dL

* AUC calculations are estimated and rounded to nearest 10's.

PK Parameters

Population-based

Vd: 44.4 L

Ke: 0.1487

t1/2: 4.7 hrs

CLVanco: 6.6 L/hr

PK Parameters

Patient-Specific

Vd: 47.6 L ▲ 7.1%

Ke: 0.1281 ▼ -13.9%

t1/2: 5.4 hrs ▲ 16.1%

CLVanco: 6.1 L/hr ▼ -7.7%

^ Using for table

Legend

AUC/MIC

trough

TDD

dosing

Options

☒ Estimated trough

☐ Total Daily Dose (TDD)

☐ dosing in mg/kg

☐ Show all values

*View AUC Calculation Steps

Exit

* Click inside the blue box to view steps!

22 | Page

5. Progress Note Update

[\[back to table of contents ↩ \]](#)

- The progress note is now updated with the patient specific PK parameters and dosage adjustment information.

Post Levels

MRN: 12345

Wt: 196 lbs

SCr: 0.5 mg/dL

Patient: Specific

Population: Estimates

Name: Smith, Jane

TBW: 88.9 kg

CrCl: 152.8 mL/min

Vd: 47.6 L

Eqn Used: Crass

Location: 2W 214

IBW: 49.7 kg

Using AdjBW: True

Ke: 0.1281

Vd: 44.4 L

Age: 41 F

AdjBW: 65.4 kg

t1/2: 5.4 hrs

Ke: 0.1487

Ht: 157 cm

TBW/IBW: 1.79

CLVanco: 6.1 L/hr

t1/2: 4.7 hrs

Ht: 5'2"

BMI: 36.1

CLVanco: 6.6 L/hr

1. Pt Info

2. Ke, t1/2

3. Vd

4. Dose Table

5. Progress Note

Equations Used

* Target

AUC/MIC range 400-600

MIC

0.1 - 1.0

Start Date/Time

11/09 14:00

Progress Note

Update Progress Note

Assessment

Suspected Indication: Osteomyelitis

Consulting Physician: Dr John Jones

Day of Therapy: Day 1

Target: AUC/MIC range 400-600

MIC: 0.1 - 1.0

Calculated Patient-Specific PK Parameters:

- Ke: 0.1281

- T1/2: 5.4 hrs

- Vd: 47.6 L

- CLVanco: 6.1 L/hr

AUC Calculation

Current Regimen: 1500 mg over 1.5 hrs

-- TDD: 3 g

-- AUC: 540

New Regimen: 1250 mg over 1.2 hrs

-- TDD: 2.5 g

-- AUC: 440

*TDD = total daily dose

*AUC = calculated using patient-specific PK parameters, assuming MIC of 1

Plan

Based on Patient-Specific PK parameters, adjusted regimen to:

Cancel

<< Back

Next >>

Save

"Smith, Jane" last saved Mon, 11/9 07:47 am

edit

MAINTENANCE: 1500 mg over 1.5 hrs every 12 hrs

AUC: 540 +/- on Tue,

*View AUC Calculation Steps

NEW MAINTENANCE DOSE

1250 mg over 1.25 hrs every 12 hrs

Provider: Dr John Jones

Indication: Osteomyelitis

DOT: Day 1 (-373 min)

Dose Type: Load

Strength: 1750 mg

Infusion Time: 1.8 hrs

Scheduled: 11/09 14:00

Old Regimen: 1500 mg q12h

AUC (Pop): 500

AUC (Pt): 540

Scheduled: 11/10 02:00

Administered: 6/05 14:00

New Regimen: 1250 mg q12h

AUC (Pop): 410

AUC (Pt): 440

Scheduled: 11/10 02:00

AUC Level 1: 11/09 17:00

AUC Level 2: 11/10 01:00

23 | Page

Patient 2:[\[back to table of contents ↩ \]](#)

MRN: 123456, Location: 314 (ICU)

Name: Jimmy Dean

Age: 72

Gender: Male

Height/weight: 180.34 cm 102.3 kg measured

SrCr 1.3 – stable

Other medications: Metformin, metoprolol, aspirin, Lisinopril & Pip/tazo

WBC 18,000, temperature 39.5 C

Indication: Pneumonia

Questions:

1. Creatinine Clearance: _____ ml/min
2. Loading dose:
 - a. Patient should receive a loading dose? ☐ Yes ☐ No
 - b. Why or why not: _____
 - c. If yes, loading dose selected: _____
3. Vd selected & why: _____
4. CL Vanco Equation Selected: _____
5. Maintenance Dose: _____
6. Schedule post-dose levels after:
 - ☐ 1st dose why? _____
 - ☐ 4th dose; why? _____
 - ☐ Wait and re-evaluate in 24 hours; why? _____

Patient 2 continued:

Loading dose (2000 mg) administered on 6/5 @ 12:00 (over 2 hours)

1st Post dose level = 31.2 on 6/5 @ 15:002nd Post dose level: 30 minutes prior to subsequent dose = 7.8 on 6/6 @ 00:30**Questions:**

1. Patient specific Vd: _____ L
2. New maintenance dose: _____ mg Q _____ h
3. Estimated AUC: _____

Why did you choose this regimen?

What is the total gram/day? _____

Does this place the patient at additional risk for nephrotoxicity.

Patient Case 3:[\[back to table of contents ↩ \]](#)

MRN 56789, Location: 612 (Med/Surg)

Age: 59 years

Gender: Male

Height/weight: 180.34 cm 63.3 kg measured

SrCr 0.8 (4/27/20 0352) stable

WBC 9.31, Afebrile

Indication: Sepsis

Questions:

1. Creatinine Clearance: _____ ml/min
2. Loading dose:
 - a. Patient should receive a loading dose? ☐ Yes ☐ No
 - b. Why or why not: _____
 - c. If yes, loading dose selected: _____
3. Vd selected & why: _____
4. CL Vanco Equation Selected: _____
5. Maintenance Dose: _____
6. Schedule post-dose levels after:
 - ☐ 1st dose why? _____
 - ☐ 4th dose; why? _____
 - ☐ Wait and re-evaluate in 24 hours; why? _____

Patient 3 continued:

Maintenance Regimen Selected (no LD given): Vancomycin 1 gm q12h, 1 dose at 1734 on 2/10 over 1 hr

"Peak": 2/12 @ 2001 - 24.3

"Trough": 2/12 @ 0510 - 15.9

Questions:

7. Patient specific Vd: _____ L
8. New maintenance dose: _____ mg Q _____ h
9. Estimated AUC: _____

Why did you choose this regimen?

What is the total gram/day? _____

Does this place the patient at additional risk for nephrotoxicity.

How would you treat this patient differently if the vancomycin was indicated for cellulitis?

IX. References:[\[back to table of contents ↗\]](#)

1. Rybak MR, Le J, Lodise TP et al. Therapeutic monitoring of vancomycin for serious methicillin-resistant *Staphylococcus aureus* infections: A revised consensus guideline and review by the American Society of Health-System Pharmacists, the Infectious Diseases Society of America, the Pediatric Infectious Diseases Society, and the Society of Infectious Diseases Pharmacists. *Am J Health-Syst Pharm*. 19 Mar 2020; <https://doi.org/10.1093/ajhp/zxaa036>.
2. Khuu T, Bagdasarian G, Leung J, et al. Estimating aminoglycoside clearance and creatinine clearance in underweight patients. *Am J Health Syst Pharm*. 2010;67(4):274-279. doi:10.2146/ajhp090251
3. Winter MA, Guhr KN, Berg GM. Impact of various body weights and serum creatinine concentrations on the bias and accuracy of the Cockcroft-Gault equation. *Pharmacotherapy*. 2012; 32(7):604-612.
4. Infectious Diseases Society of America. Clinical practice guideline for the diagnosis and treatment of diabetic foot infections. *Clin Infect Dis* 2012;54:132-73.
5. Liu C, Bayer A, Cosgrove SE, et al. Practice guidelines by the Infectious Diseases Society of America for the treatment of methicillin-resistant *Staphylococcus aureus* infections in adults and children. *Clin Infect Dis* 2011;52:1-38.
6. Metlay JP, Waterer GW, Long AC, Anzueto A, Brozek J, Crothers K, et al. Diagnosis and Treatment of Adults with Community-acquired Pneumonia. An Official Clinical Practice Guideline of the American Thoracic Society and Infectious Diseases Society of America. *Am J Respir Crit Care Med*. 2019 Oct 1. 200 (7):e45-e67. https://www.atsjournals.org/doi/10.1164/rccm.201908-1581ST#_i6
7. Stevens DL, Bisno AL, Chambers HF, et al. Practice guidelines for the diagnosis and management of skin and soft tissue infections: 2014 update by the Infectious Diseases Society of America. *Clin Infect Dis* 2014;59:e10-59.
8. Early Oral Switch to Linezolid for Low-risk Patients With *Staphylococcus aureus* Bloodstream Infections: A Propensity-matched Cohort Study. AU Willekens R, Puig-Asensio M, Ruiz-Camps I, Larrosa MN, González-López JJ, Rodríguez-Pardo D, Fernández-Hidalgo N, Pigrau C, Almirante B SO *Clin Infect Dis*. 2019;69(3):381.
9. Schweizer ML, Furuno JP, Harris AD et al. Comparative effectiveness of nafcillin or cefazolin versus vancomycin in methicillin-susceptible *Staphylococcus aureus* bacteremia. *BMC Infect Dis*. 2011; 11: 279.
10. Detroit Medical Center. "Vancomycin Dosing in Adults- Clinical Guidelines" Jan 2015 and <https://pharmacy.ufl.edu/files/2013/01/5127-28-equations.pdf>. Accessed 29 April 20.
11. Stanford Health Care. SHC Vancomycin Dosing Guide. Revised 9/2018. Accessed 29 April 20. Available from http://med.stanford.edu/bugsanddrugs/guidebook/_jcr_content/main/panel_builder_584648957/panel_0/download_2105810811/file.res/SHC%20Vancomycin%20Dosing%20Guide.pdf.
12. University of Nebraska Medical Center. "Renal Dosing Adjustment Guidelines for Antimicrobials". Available from <https://www.nebraskamed.com/sites/default/files/documents/for-providers/asp/antimicrobial-renal-dosing-guidelines.pdf>.
13. Li PK, Szeto CC, Piraino B, et al. ISPD Peritonitis Recommendations: 2016 Update on Prevention and Treatment. *Peritoneal Dialysis International* 2016;35:481-508.