**Vancomycin AUC-Based Monitoring Educational Document for Nursing Staff**

1. Background
	1. Vancomycin is a commonly prescribed antibiotic for infections caused by Gram-positive organisms
	2. Vancomycin has a narrow therapeutic index, meaning that therapeutic and toxic level are relatively close; therefore, therapeutic drug monitoring (TDM) is performed to maximize efficacy and minimize toxicity (i.e. nephrotoxicity)
	3. Vancomycin TDM has traditionally been guided by trough-only monitoring where a single vancomycin serum level is drawn approximately 30 minutes before the next scheduled dose
	4. This approach is being revised to an area-under-the-concentration-time-curve (AUC)-based monitoring method that uses one or two vancomycin serum levels
	5. Goal AUC ratio ~400-600 mg\*h/L
	6. Why are we switching to AUC-based monitoring?
		1. AUC-based monitoring is more accurate than trough-based monitoring for vancomycin efficacy and toxicity
		2. Troughs serve as a poor predictor of AUC
		3. Evidence demonstrates that target AUC of 400-600 mg\*h/L can be achieved with troughs of 10-15 mg/L for many patients → lower vancomycin doses per day typically required
		4. Decreased risk of nephrotoxicity with AUC-based monitoring compared to trough-based monitoring
2. Indications for vancomycin AUC-based monitoring (may vary depending on each institution)
	1. Generally, whenever vancomycin is used for documented or suspected methicillin-resistant *Staphylococcus aureus* infections EXCEPT: 
		1. Patients expected to receive vancomycin for <24 hours (i.e. surgical prophylaxis)
		2. Unstable or fluctuating renal function (i.e. acute kidney injury)
		3. Renal replacement therapy (i.e. hemodialysis)
3. How is AUC-based monitoring performed?
	1. AUC-based monitoring is performed by collection of two vancomycin serum levels
	2. Vancomycin serum levels are typically collected following the same dose (same dosing interval); however, they may be on different dosing intervals and extrapolated in certain clinical scenarios for ease of timing/logistics
		1. C1= “peak”
			1. Generally, should be collected at least 1-2 hours following the end of the vancomycin infusion
				1. Avoids collection of the serum level during vancomycin post-infusion distribution phase and is more lenient for changes in vancomycin administration time
			2. Typical range: ~30-40 mg/L (varies based on institution)
		2. C2= “trough”
			1. Generally, should be collected 30 minutes before the next dose
			2. Typical range: ~10-20 mg/L (varies based on institution)
		3. There should be a minimum of 4 hours between these levels (typically at least one vancomycin half-life)
4. Nurses’ role for vancomycin AUC-based monitoring
	1. Inaccurate vancomycin levels can affect patient safety, hospital length of stay, and drug/laboratory costs
	2. For this strategy to work, timing is of the essence, and nursing collaboration is essential for getting this right!
		1. Assist in the appropriate collection and timing of vancomycin serum levels
			1. Do not hold vancomycin dose to wait for vancomycin serum level to return unless directed to do so by the pharmacist or prescriber
		2. Provide timely administration of vancomycin as scheduled (including barcode scanning for documentation purposes)
			1. Improves accuracy and interpretation of vancomycin serum levels
		3. Contact pharmacists with any concerns or questions related to collection of vancomycin serum levels
		4. If the second level is due after your shift, please be sure to include this in your hand-off to the oncoming nurse
	3. Pharmacist or providers will order vancomycin serum levels in EMR
	4. Pharmacists are encouraged to include text comments on the order for appropriate timing
		1. Ex: “please collect vancomycin serum level 30 minutes prior to vancomycin dose scheduled at 2100”
	5. Pharmacists are encouraged to contact nurses via EMR chat functions or through MAR chart reminders to alert nurses of when the vancomycin serum levels are ordered/scheduled
5. Example AUC-based monitoring scenario for nurses
	1. Vancomycin dosing regimen: 1000 mg IV every 12 hours administered over 1 hour (scheduled for 0900 and 2100)
	2. Vancomycin serum levels ordered with 0900 dosing interval
		1. Infusion is scheduled to end at 1000 (one-hour infusion)
	3. Vancomycin C1 serum level (first level) ordered at 1200 (2 hours after the end of the infusion)
	4. Vancomycin C2 serum level ordered for 2030 (30 minutes prior to next scheduled dose at 2100)
	5. Pharmacist and/or provider will perform vancomycin pharmacokinetic calculations to calculate AUC to MIC ratio to guide subsequent vancomycin dosing regimens
6. Thank you for all of your help with vancomycin monitoring to improve our patients’ care!
	1. Please reach out to your pharmacist if you have any questions or concerns!