

Appropriate Vancomycin Level Collection in CVICU

Brian Gulbis, PharmD, BCPS

January 25, 2017

Problem Overview

In CVICU, approximately 40% of vancomycin levels are being collected inappropriately,¹ and this rate has been increasing from April to December 2016.

Inappropriately drawn levels lead to inaccurate dosing and treatment decisions, which may result in undertreating infections, increased antimicrobial resistance, and increased risk of adverse effects.

Aim Statement

Increase appropriately collected vancomycin levels in CVICU from 66% to 80% by April 2017

Project Scope

- Patients on vancomycin in CVICU
- Excludes any patients without vancomycin levels (i.e., those on post-operative prophylaxis)
- Will not assess appropriateness of order or vancomycin dosing

Financial Implications

A vancomycin level drawn after the scheduled time could actually be supratherapeutic, potentially resulting in nephrotoxicity if the dose is not properly adjusted. Vancomycin-induced nephrotoxicity has been associated with a 46% increase in length of stay and a 17% increase in hospital cost.^{2 3} A vancomycin level drawn before the scheduled time may actually be subtherapeutic, potentially resulting in undertreating the infection. This may ultimately lead to increased antimicrobial resistance, which has been associated with an increased cost of \$18,588 to \$29,069 per patient, and increase in length of stay of 6.4 to 12.7 days, and an increase in mortality of 6.5%.⁴

Pre-Intervention Data Analysis

Vancomycin level requests are excluded from the analysis of appropriate collection. Vancomycin levels ordered as Early AM are

¹ Defined as being collected more than 60 minutes from the scheduled collection time, or more than 120 minutes for Early AM levels

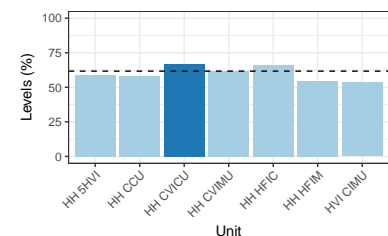


Figure 1: Appropriately Collected Vancomycin Levels

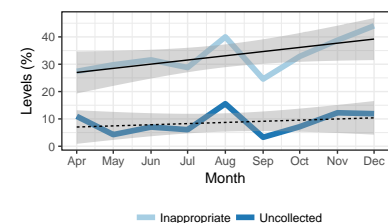


Figure 2: Inappropriately Collected and Uncollected Levels in CVICU

² Stevens V, et al. Cost and Length of Stay Associated with Vancomycin-Induced Nephrotoxicity (Abstract). Proceedings from: ISPOR 16th Annual European Congress and 4th Latin America Conference 2013

³ Bamgbola O. Ther Adv Endocrinol Metab 2016;7:136-47

⁴ Roberts R, et al. Clin Infect Dis 2009;49:1175-84

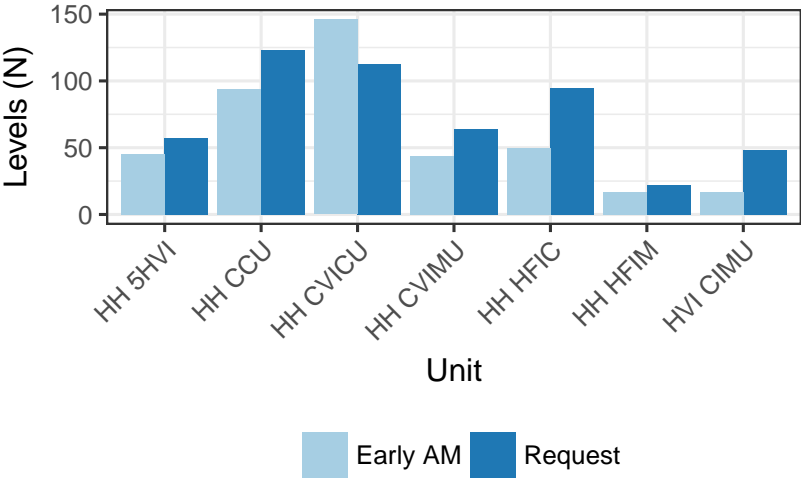


Figure 3: Orders for Early AM or by Vancomycin Request

considered appropriate if they are drawn at 0300 plus/minus 120 minutes.

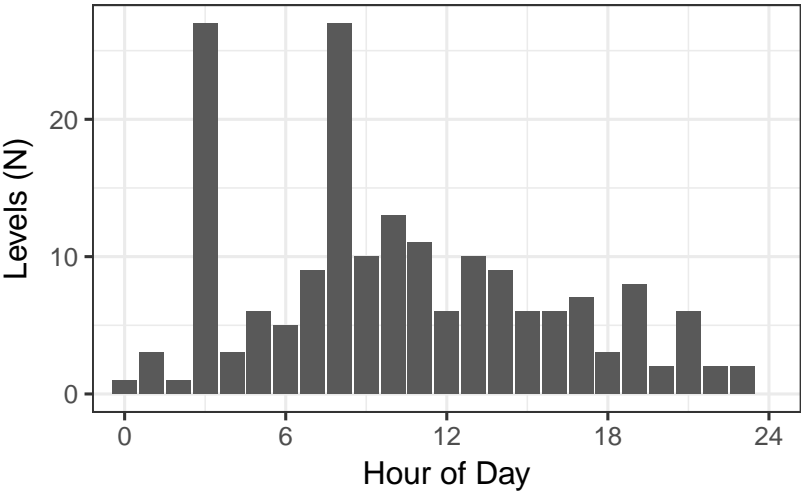


Figure 4: Inappropriate Levels by Hour of Day

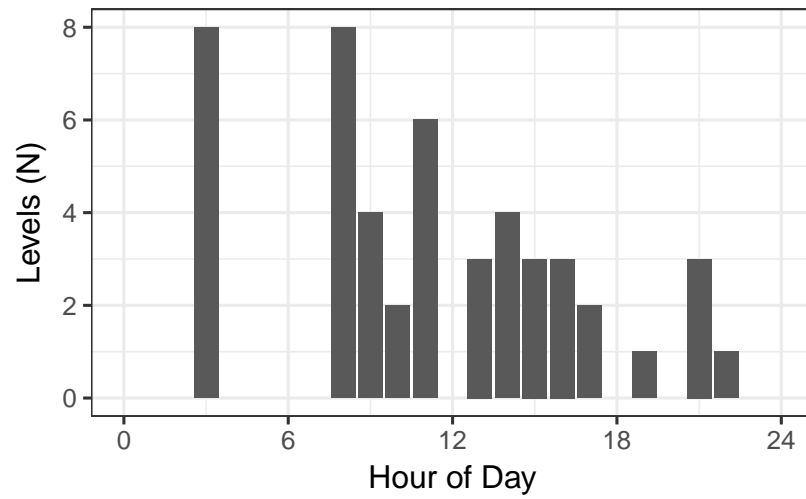


Figure 5: Uncollected Levels by Hour of Day