

Vancomycin Infusion Frequency and Intensity: Analysis of Real-World Data Generated from Automated Infusion Devices

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Background

- Automated infusion devices capture actual infused medication administration data in real-time.
- Vancomycin use is now recommended to be driven by AUC (area under the curve) dosing.¹
- Objective:
 - Evaluate automated infusion device data
 - Depict vancomycin administration practices in acute care hospitals.

Methods

- Analyzed archived vancomycin infusion data
 - **Patients:** n=2,417
 - **Hospitals:** n=3
 - **Data:** captured by automated infusion systems
 - Starting time
 - Stopping time
 - Alarms & alerts
 - Vancomycin dose
 - Other timestamped data
- **Analytics approach**
 - Evaluated infusion session duration and dosing
 - Using data-driven clustering algorithms

Results

- A total of 13,339 vancomycin infusion sessions from 2,417 unique adult patients were analyzed.
- Approximately 26.1% of patients had just one infusion of vancomycin.
- For the rest of the patients, the median number of infusion sessions per patient was 4; the interquartile range was 3 to 8.
- The most common dose was 1.0 gram (53.7%) or 1.5 gram (24.6%) (*Fig. 1*).
- The distribution of infusion session duration (hours) was 4.2% (≤ 1.0 hh); 40.1% (1.01-1.5 hh); 29.1% (1.51-2.0 hh); and 26.6% (> 2.0 hh).
- The dosing frequency was 39.5% (q8 hh), 42.9% (q12 hh), 11.1% (q24 hh), and 6.5% ($> q24$ hh), approximately. The time between infusion sessions is illustrated in *Fig. 2*.
- These data demonstrated clinical interpretability.

Discussions and Conclusions

- A considerable number of patients received just *one vancomycin infusion* during their hospital stay, suggesting a *potential overuse* of empiric vancomycin.
- The majority of infusion doses were between 1 to 1.5 grams and most infusion sessions were administered every 8 or 12 hours.
- The actual infusion duration for each dose often exceeds the prescribed 1- or 2-hour infusion orders, which may be due to known instances of infusion interruptions due to patient movement, procedures or IV access compromise.
- The data generated by infusion devices can augment insights on actual antimicrobial administration practices and duration.
- As vancomycin AUC dosing becomes more prevalent, real world infusion data may aid timely *data-driven antimicrobial stewardship* and patient safety interventions for vancomycin and other AUC dosed drugs.

Fig 1. Vancomycin Dose (gram) per Infusion Session

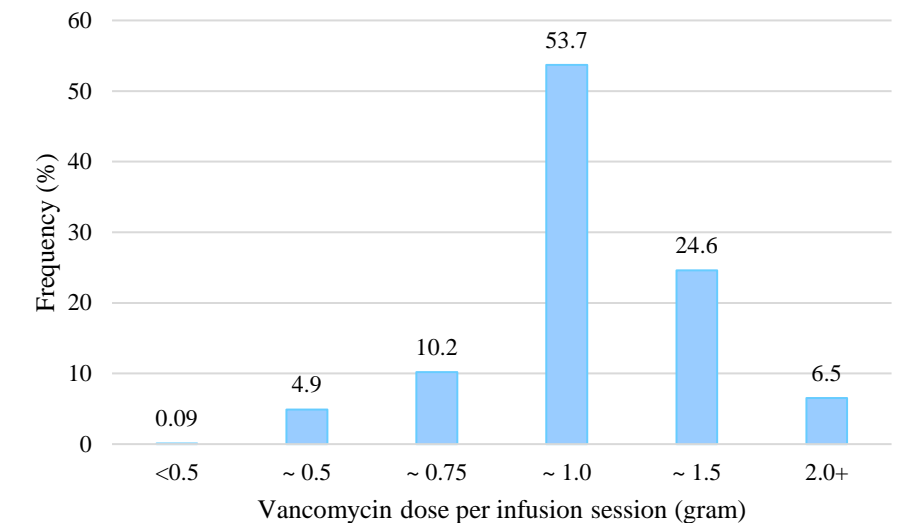
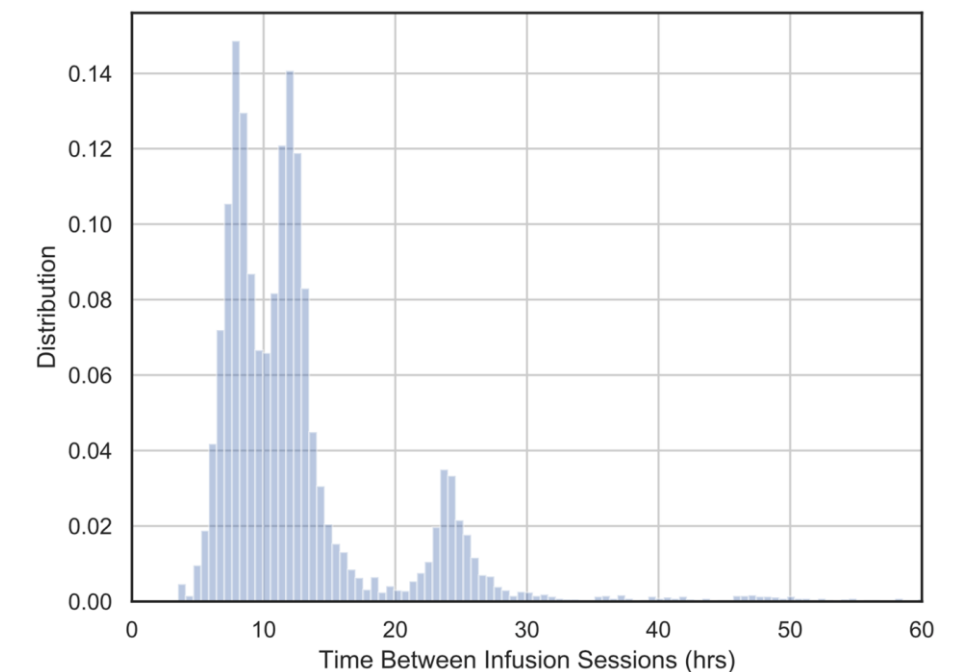


Fig 2. Dosing Frequency (time between infusion sessions, hours)



Reference:

1. Rybak MJ, 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.* 2020;77(11):835-864.