

How Well is the Target Concentration of Vancomycin Achieved in Intensive Care Unit Patients?

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Background

The recommended serum trough concentration of vancomycin is 15-20 mg/L. Concentrations outside this interval increase the risk of adverse effects, therapeutic failure and resistance development. In critically ill patients it is recommended to start with a loading dose of 25-30 mg/kg.

Methods

A retrospective observational study was performed at Uppsala University Hospital, Sweden. Data was extracted from two electronic medical record systems. One hundred sixty-four patients treated with intravenous vancomycin at any of the four ICUs; Central Intensive Care Unit (CICU), Thorax Intensive Care Unit (TICU), Burn Injury Intensive Care Unit (BIICU), Neurologic Intensive Care Unit (NICU) were included.

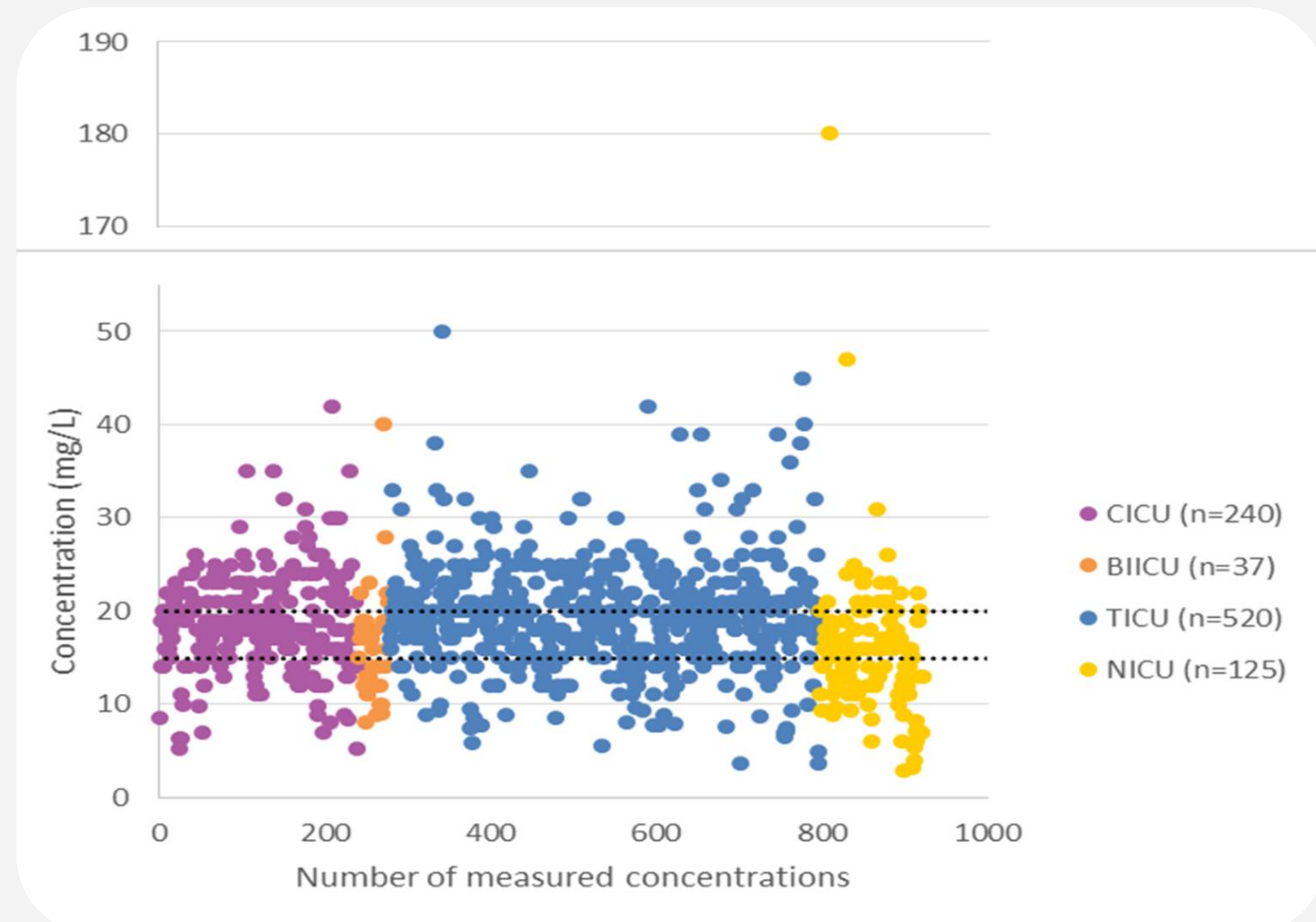


Figure 1. Distribution of the measured concentrations, with a marked interval of the recommended trough serum concentration of 15-20 mg/L. Broken y-axis was used to be able to see the extreme outlier.

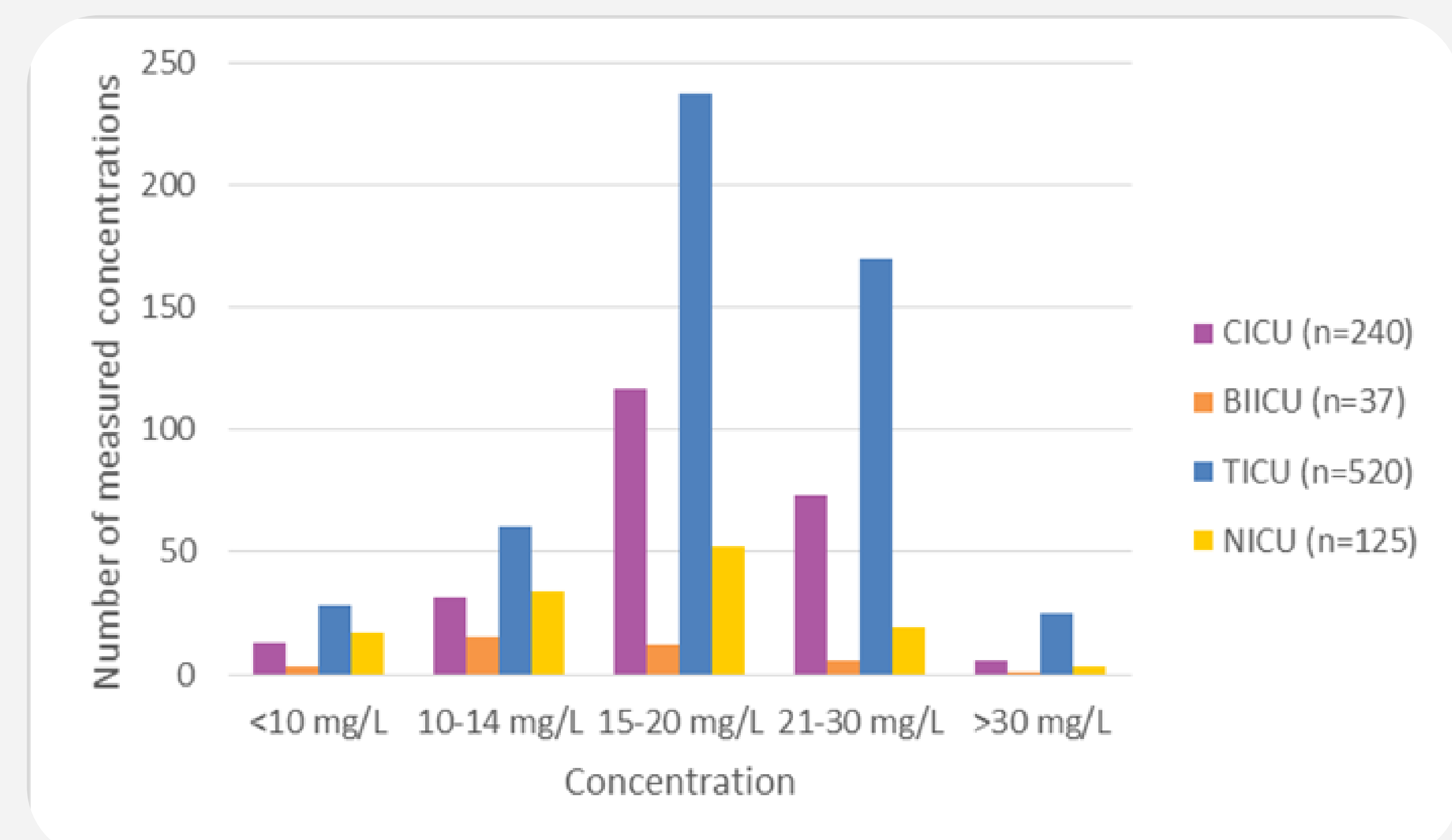


Figure 2. Descriptive figure of the number of concentrations per interval, for the different ICUs.

Objective

To determine to what extent trough concentrations of vancomycin are within the recommended range, in patients in intensive care units (ICUs).

Results

In total, 922 vancomycin concentrations were registered in 185 treatment episodes in 164 patients. More than half (54.7%) of all the trough concentrations were outside the target range, 21.8% were subtherapeutic and 32.9% supratherapeutic (figure 1 and 2).

Out of the 185 treatment episodes, 147 were initiated at an ICU and 61.2% of these started with a loading dose, see figure 3.

A majority of cases (74%) had >1 trough concentration outside of target range and 55% of these non-therapeutic concentrations led to a change in dose regimen.

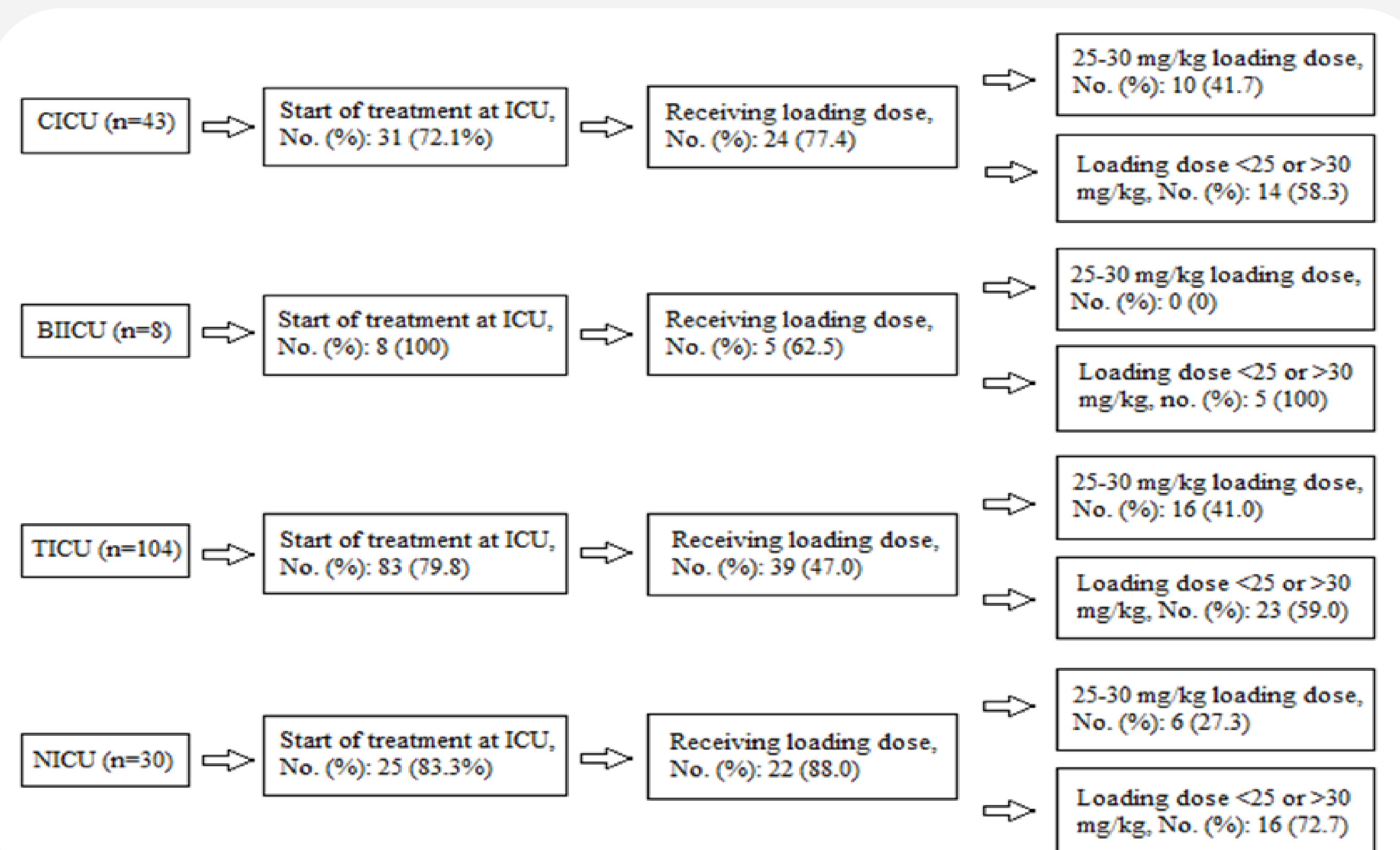


Figure 3. Schematic figure of cases with initiated treatment at any of the four ICUs and if they received a loading dose. The percentage of patients that received a loading dose corresponding to the recommendations of 25-30 mg/kg is seen.

Conclusions

More than half of the measured vancomycin concentrations were outside of recommended target range. Dosing and monitoring of vancomycin in patients treated in an ICU should be improved.

