A multicentre survey of vancomycin therapeutic drug monitoring practice in Austria and Germany

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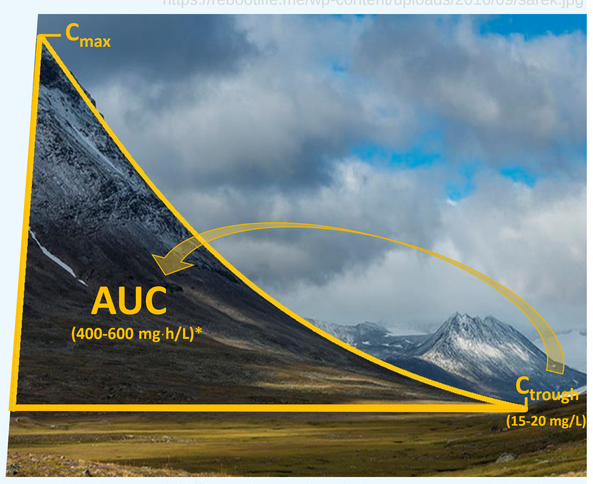
Introduction

- Accurate dosing of the anti-MRSA antibiotic vancomycin remains challenging due to its nephrotoxic potential and its high interpatient pharmacokinetic variability.
- In an effort to optimise clinical efficacy and patient safety, **new consensus guidelines** recommend a shift towards **AUC** (area under the concentration-time curve)**-guided dosing** and therapeutic drug monitoring (TDM) using Bayesian software programs [1].
- This survey aimed to reveal the status-quo clinical practices of vancomycin dosing and TDM in adult patients in Austria and Germany, together with the potential for model-based TDM.



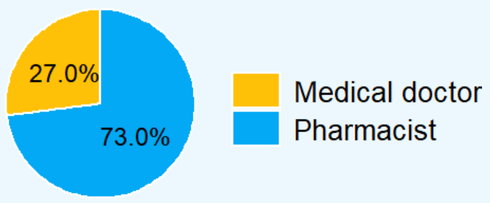
*Serious methicillin-resistant *Staphylococcus aureus* infections, minimum inhibitory concentration=1 mg/L

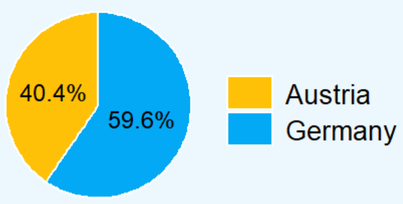
Methods

- An online structured and anonymised questionnaire was developed in partnership with the Paul-Ehrlich-Society for Chemotherapy and the Federal Association of German Hospital Pharmacists (ADKA). It was distributed among hospital pharmacists and members of the Austrian Society for Infectious Diseases and Tropical Medicine (ÖGIT) in 2020.

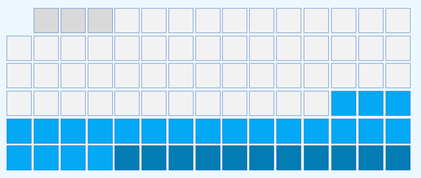
Results

- **89 healthcare professionals** from diverse hospital wards responded.





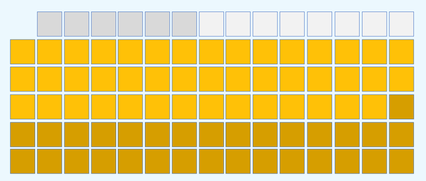
- **Continuous infusion (CI)** was confirmed by 37% of respondents



30%: CI > II;
<5%: only CI

n=89 participants
CI: 33/89 (AUT: 11/36, GER: 22/53)

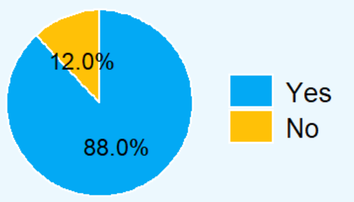
- **Intermittent infusions (II)** were confirmed by 84% of respondents



34%: II + CI

n=89 participants
II: 75/89 (AUT: 31/36, GER: 44/53)

- **TDM** for vancomycin was **highly common** (n=66, 88% of respondents). Targets for TDM are shown in Table 1.



(84% response rate)

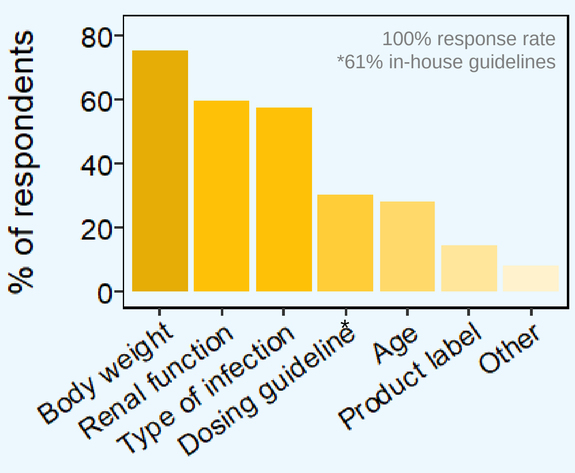
AUT: 86% yes, GER: 89% yes
TDM used for >75% of patients: 70%
TDM used for <50% of patients: 14%

Table 1. Targets for vancomycin dosing including the ability to meet them

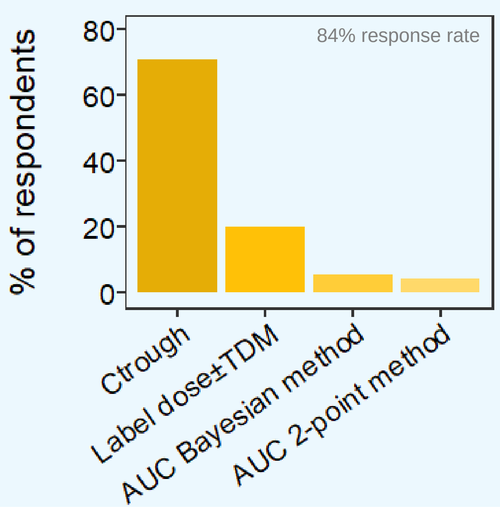
	C_{SS} [mg/L]	C_{trough} [mg/L]	C_{max} [mg/L]	AUC [mg·h/L]
Used for TDM	n.a.	91% (60/66)	13.6% (9/66)	7.6% (5/66)
Target	20-25 (10-30)*	15-20 (5-30)	30-40 (15-55)	400 (400-600)
Target met?	in >75% of pat.: 21%⁺ in <50% of pat.: 6.1%	in >75% of pat.: 28% in <50% of pat.: 13%	in >75% of pat.: 56% in <50% of pat.: 11%	in >75% of pat.: 40% in <50% of pat.: 20%

*Median of lower-upper limit (minimum-maximum); pat.=patients; AUC: area under the concentration-time curve
⁺ i.e. 21% of respondents reported target attainment in >75% patients

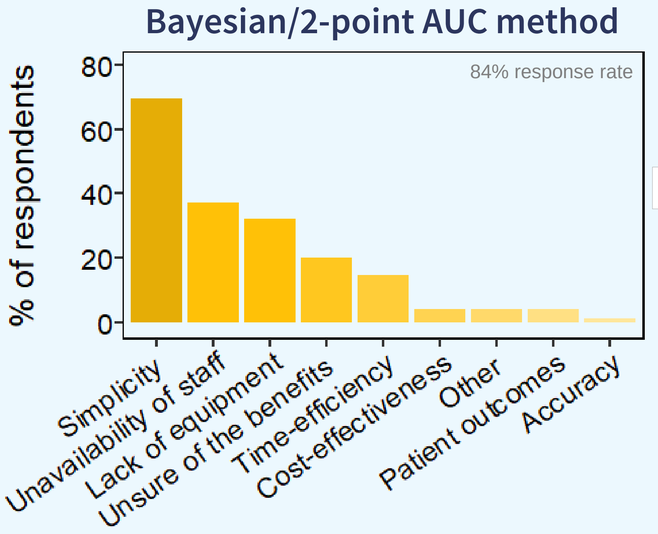
Basis for initial dose



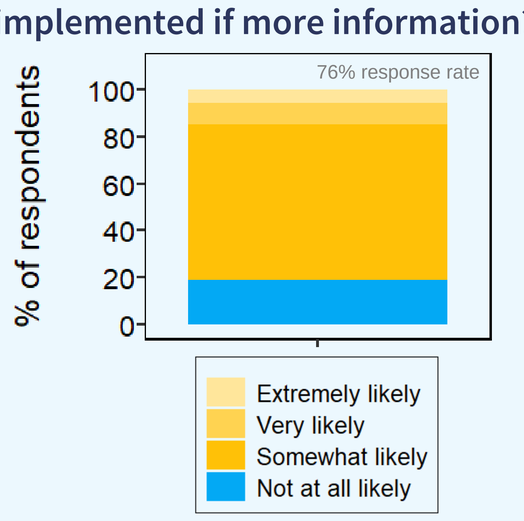
Basis for next dose



Reasons for not using Bayesian/2-point AUC method



How likely AUC-based methods implemented if more information?



- **Current practices for vancomycin dosing** in Austria and Germany are **highly diverse** and mainly **guided by trough concentrations.**
- The survey shows a need and **high acceptance of clinicians towards training in Bayesian dosing** to adopt the AUC-based dosing guidelines.

Perspectives

- The survey lays the basis for clinically relevant pharmacometric investigations, e.g. on
  - how well the different dosing strategies meet therapeutic targets,
  - what are ideal—and still clinically feasible—time points for TDM blood sampling

  with the goal to further improve the status-quo of vancomycin dosing, reduce vancomycin-related toxicity and ultimately improve patient outcomes.

References

[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. Clin Infect Dis. 2020; ciaa303. doi:10.1093/cid/ciaa303