Tracking antimicrobial resistance patterns in clinical and healthcare-associated *Enterococcus* spp.

Joana Monteiro Marques[¥ 1,2], Mariana Coelho[¥ 1,2], Maria Teresa Barreto-Crespo [3,4], Teresa Semedo-Lemsaddek [1,2]

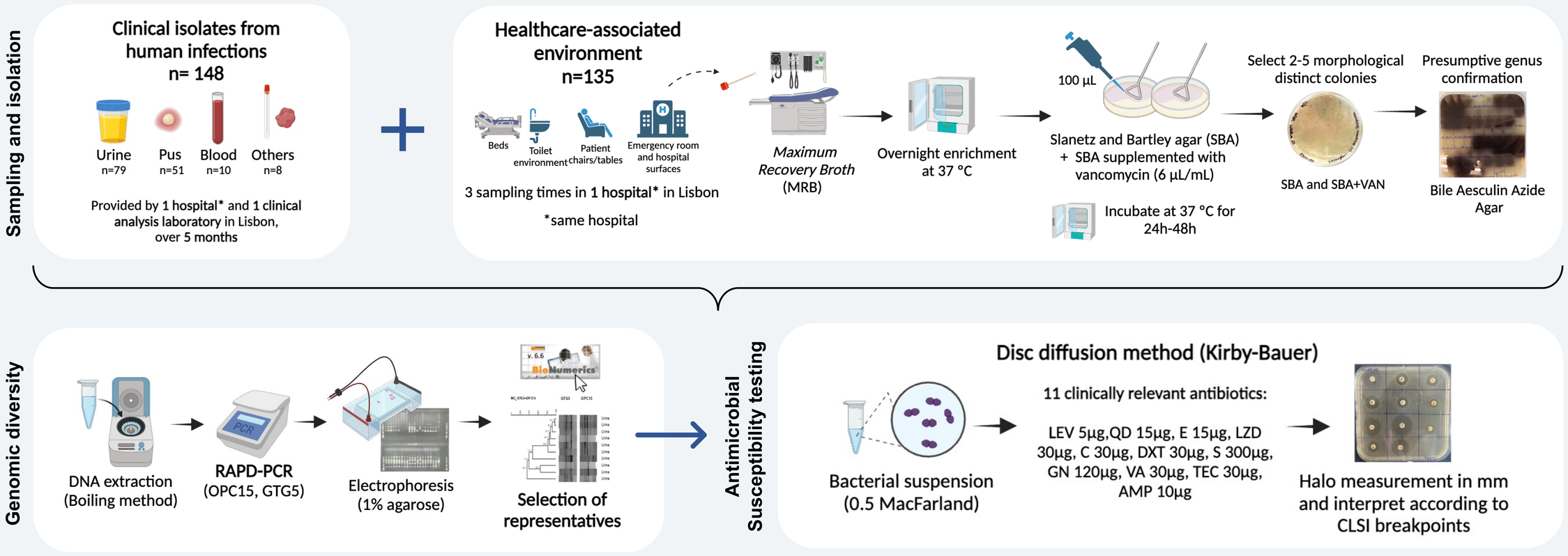
[1] Centre for Interdisciplinary Research in Animal Health (CIISA), Faculty of Veterinary Medicine, University of Lisbon, Lisbon, Portugal;
[2] Associate Laboratory for Animal and Veterinary Sciences (AL4AnimalS), Lisbon, Portugal.
[3] iBET - Institute of Experimental Biology and Technology, Oeiras, Portugal.
[4] ITQB NOVA – Instituto de Tecnologia Química e Biológica António Xavier, Universidade Nova de Lisboa, Oeiras, Portugal.

[¥] Equal contributors to the work.

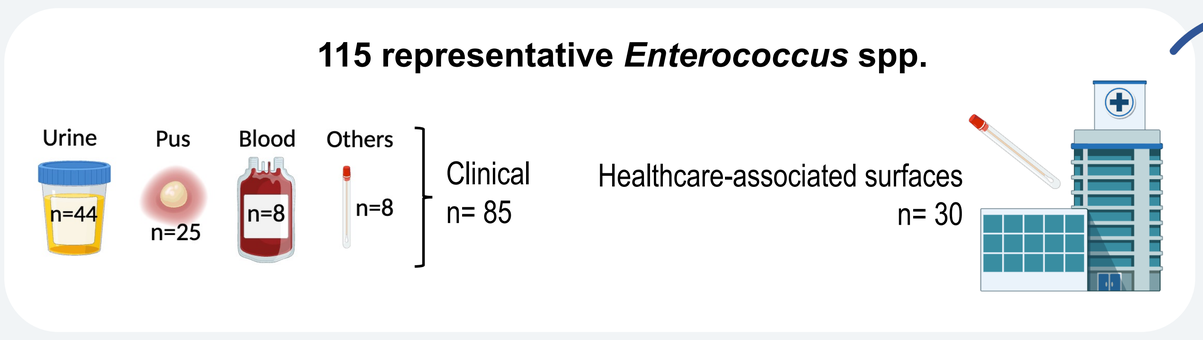
1 Introduction

- *Enterococcus* spp. are ubiquitous bacteria that are part of the normal intestinal microbiota of humans and animals, also spreading in soil, plants, food, water, and sewage through fecal contamination. In the last decades, they have emerged as opportunistic pathogens and are a major cause of healthcare-associated serious infections, due to their rapid adaptation to the host and propensity to acquire virulence and antibiotic resistance genes. These bacteria can cause urinary tract, intra-abdominal, and tissue infections; as well as bacteraemia, and endocarditis in humans. From the *Enterococcus* genus, *E. faecalis* and *E. faecium* are considered the main pathogens (Monteiro Marques et al., 2023).
- The objective of this work was to sample and isolate *Enterococcus* spp. from healthcare-associated surface settings and obtain clinical isolates from human infections, to characterize them regarding the antimicrobial resistance phenotype and compare clinical isolates with those from the healthcare environment.

2 Materials and methods



3 Results



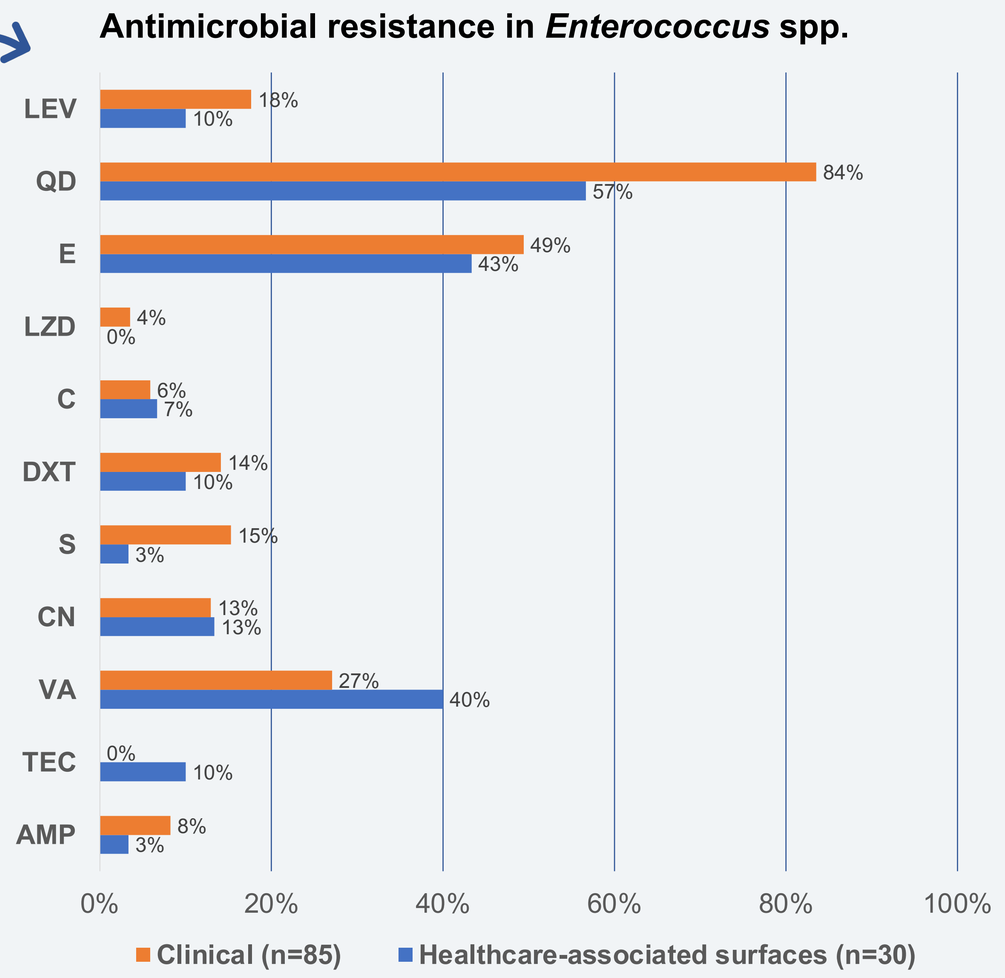


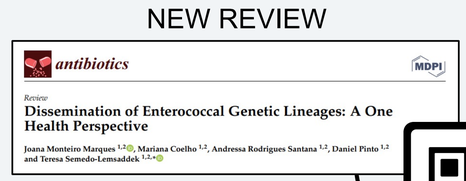
Figure 1. Frequency (%) of antimicrobial resistance in representative *Enterococcus* spp. from clinical infections and healthcare-associated surfaces, following CLSI guidelines. LEV – Levofloxacin, QD – Quinupristin-dalfopristin, E – Erythromycin, LZD – Linezolid, C – Chrolamphenicol, DXT – Doxicycline, S – Streptomycin, CN – Gentamicin, VA – Vancomycin, TEC – Teicoplanin, AMP – Ampicilin.

- Considering the antimicrobial resistance results, high levels of resistance to quinupristin-dalfopristin (QD), erythromycin (E) and vancomycin (VA) were observed in both clinical and healthcare-associated isolates. Nonetheless, *E. faecalis* are known to have intrinsic resistance to QD.
- A considerable percentage of vancomycin (VA) resistance was observed in isolates from healthcare-associated surfaces (40%), being higher than that of clinical isolates (27%), highlighting the dissemination of resistance within healthcare settings.
- Resistance to the last resort antibiotic linezolid (LZD) was detected in 4% of clinical isolates.
- Teicoplanin (TEC) resistance was only observed in isolates from healthcare-associated surfaces (10%).
- Nine isolates (~8%) were considered multidrug-resistant, i.e. were resistant to at least one agent in three or more antimicrobial classes (Magiorakos et al., 2011).

4 Conclusions

- Overall, both clinical and healthcare-associated isolates showed low to moderate levels of resistance to antibiotics commonly used in the clinical practice. The high levels of resistance obtained to last resort antibiotics such as vancomycin (and linezolid) are emphasized as public health concerns.
- This study highlights the importance of antimicrobial resistance surveillance, mainly focusing on the presence of antimicrobial resistance between isolates from patients with a clinical infection diagnosis and isolates from healthcare settings.

NEW REVIEW



SCAN ME

Illustrations were created with BioRender.com.

References: Monteiro Marques, J., et al. (2023). Dissemination of Enterococcal Genetic Lineages: A One Health Perspective. Antibiotics, 12(7), 1140; Magiorakos, A.-P., et al. (2011). Multidrug-resistant, extensively drug-resistant and pandrug-resistant bacteria: an international expert proposal for interim standard definitions for acquired resistance. *European Society of Clinical Microbiology and Infectious Diseases*, *25*, 10–14.

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