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Letter to perpetual observational study of the clinical and microbiological epidemiology of ventilator-associated pneumonia in Europe

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Dear Editor,

We read with great interest the recent ECRAID-POS-VAP study by Jackson et al. which provides valuable prospective data on the epidemiology of ventilator-associated pneumonia (VAP) across European intensive care units (ICUs) [1]. The authors should be commended for assembling a large, multicountry cohort addressing an area where harmonised data remain scarce. However, we would like to highlight an important and somewhat unexpected finding regarding microbiological patterns, particularly the predominance of *Staphylococcus aureus*.

In the microbiologically evaluable population, *S. aureus* accounted for 26.2% of VAP episodes, the most frequently identified pathogen, followed by *Haemophilus influenzae* (16.2%) and *Pseudomonas aeruginosa* (15.0%). This distribution contrasts with the body of evidence from large multicentre cohorts and raises important questions regarding the underlying patient population and case-mix included in this study.

In previous multinational observational studies, including the ENIRRI cohort, Gram-negative organisms, particularly *Pseudomonas aeruginosa*, *Klebsiella spp.*, and *Acinetobacter spp.*, consistently predominate in ICU-acquired lower respiratory tract infections, with *S. aureus* representing a smaller proportion of cases [2, 3]. Similarly, in the TAVeM study, which included a broad spectrum of ventilated ICU patients across multiple countries, microbiologically confirmed lower respiratory tract infections were not dominated by *S. aureus*, and the distribution reflected a more classical ICU ecology with a significant Gram-negative burden [4].

The prominence of *S. aureus* in the ECRAID cohort is therefore somewhat unexpected and suggests that the study population may differ substantially from typical VAP cohorts. Indeed, the reported patient characteristics indicate a higher proportion of individuals admitted with stroke and trauma, as well as a notable contribution of early-onset VAP. These subgroups are well known to exhibit a different microbiological profile, with increased rates of *S. aureus*, particularly in early VAP and in neurocritical or trauma populations.

This raises the possibility that the ECRAID dataset is enriched for early-onset VAP or specific ICU subpopulations, rather than reflecting the broader epidemiology of late VAP typically encountered in general ICU cohorts. Such a case mix would partially explain the relatively high proportion of *S. aureus* and the comparatively low representation of multidrug-resistant Gram-negative pathogens.

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Another point worth considering is the relatively low rate of microbiological documentation (60.8%), which may introduce selection bias toward pathogens that are more easily identified using routine diagnostic approaches. In contrast, studies using systematic sampling strategies and achieving higher microbiological yields tend to report a greater burden of Gram-negative organisms and polymicrobial infections [5].

Taken together, these findings suggest that caution is warranted when extrapolating the microbiological distribution reported in this study to the general ICU population. The observed predominance of *S. aureus* appears to reflect, at least in part, the specific patient population included, likely enriched in early VAP, trauma, and neurocritical care patients, rather than a shift in the epidemiology of VAP per se.

From a clinical perspective, this distinction is critical. Empirical antibiotic strategies, antimicrobial stewardship efforts, and the design of interventional trials rely heavily on an accurate understanding of pathogen distribution. Overestimation of *S. aureus* prevalence could potentially lead to inappropriate empirical coverage decisions, particularly in settings where late-onset VAP and multidrug-resistant Gram-negative pathogens remain predominant.

We believe that further stratified analyses, particularly according to timing of VAP onset, admission diagnosis, and ICU type, would help clarify these findings and improve the interpretability of this important dataset.

In conclusion, while the ECRAID-POS-VAP study represents a significant contribution to European ICU epidemiology, the unusually high prevalence of *S. aureus* warrants careful interpretation and likely reflects a specific patient case-mix rather than a generalizable shift in VAP microbiology.

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Declarations

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Competing interests
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