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Vancomycin-resistant enterococci (VRE) in the ICU and clinical epidemiological associations between patient and environmental VRE: don't underestimate the environment outside of outbreaks

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Background: Ireland has the highest rate of invasive vancomycin-resistant enterococci (VRE) in Europe at 42% (EARS-Net). Policies that include active surveillance screening and patient isolation in Beaumont Hospital, Dublin, aim to limit transmission especially in the intensive care unit (ICU). However, the contribution of the near-patient environment to transmission is poorly understood.

Material/methods: During seven sampling periods, VRE recovery from the near-patient environment and from patients in the ICU was investigated (irrespective of their VRE status) to identify potential reservoirs and clinical epidemiological associations between VRE recovered in space and time.

Results: Of 289 sampling occasions (sampling of a specific bed space on a single day) investigated involving 157 patients and their bed-space environments, VRE was recovered from the patient bed-space, the patient clinical sample, or both on 114/289 (39.4%) of sampling occasions. The patient and their bed-space was positive for VRE on 34/114 (29.8 %) of VRE-associated sampling occasions. Of

1647 environment samples studied, 107 sites (6.5%) were VRE-positive, with significantly greater VRE recovery from isolation rooms compared to the ICU open plan area (9.1% *Vs* 4.1 %, $p<0.0001$). Sixty nine patients (44%) occupied isolation rooms at least once over the course of the study and 24/69 (34.8%) were colonised with VRE. The specific high touch ICU sites most frequently contaminated with VRE were the drip stand, bed control panel, and chart holders, together accounting for 61% of contaminated sites. The difference in the proportional recovery of VRE from any one surface was not statistically significant.

Conclusions: Even outside of outbreak**s,** near-patient ICU environmental contamination with VRE is common. Better infection control policies that limit environment transmission of VRE in the ICU are neccessary.