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Prior environmental contamination increases the risk of acquisition of vancomycin-resistant enterococci

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Background: Patients colonized with vancomycin-resistant enterococci (VRE) frequently contaminate their environment, but the environmental role of VRE transmission remains controversial.

Methods: During a 14-month study in 2 intensive care units, weekly environmental and twice-weekly patient surveillance cultures were obtained. VRE acquisition was defined as a positive culture result >48 h after admission. To determine risk factors for VRE acquisition, Cox proportional hazards models using time-dependent covariates for colonization pressure and antibiotic exposure were examined.

Results: Of 1330 intensive care unit admissions, 638 patients were at risk for acquisition, and 50 patients (8%) acquired VRE. Factors associated with VRE acquisition included average colonization pressure (hazard ratio [HR], 1.4 per 10% increase; 95% confidence interval [CI], 1.2-1.8), mean number of antibiotics (HR, 1.7 per additional antibiotic; 95% CI, 1.2-2.5), leukemia (HR, 3.1; 95% CI, 1.2-7.8), a VRE-colonized prior room occupant (HR, 3.1; 95% CI, 1.6-5.8), any VRE-colonized room occupants within the previous 2 weeks (HR, 2.5; 95% CI, 1.3-4.8), and previous positive room culture results (HR, 3.4; 95% CI, 1.2-9.6). In separate multivariable analyses, a VRE-colonized prior room occupant (HR, 3.8; 95% CI, 2.0-7.4), any VRE-colonized room occupants within the previous 2 weeks (HR, 2.7; 95% CI, 1.4-5.3), and previous positive room culture results (HR, 4.4; 95% CI, 1.5-12.8) remained independent predictors of VRE acquisition, adjusted for colonization pressure and antibiotic exposure.

Conclusions: We found that prior room contamination, whether measured via environmental cultures or prior room occupancy by VRE-colonized patients, was highly predictive of VRE acquisition. Increased attention to environmental disinfection is warranted.