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Comparison of susceptibility patterns among Enterobacteriaceae from European and North American ICU and non-ICU wards: TEST 2014-2016

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Background: Higher resistance rates have been reported in *Enterobacteriaceae* from intensive care units (ICUs) than observed in non-ICU settings limiting treatment options in ICU patient management. Using data from the Tigecycline European Surveillance Trial (TEST), the susceptibility of *Enterobacteriaceae* to tigecycline and comparators was analyzed according to ICU and non-ICU wards in Europe and North America.

Material/methods: 18569 *Enterobacteriaceae* (*E. coli*, *Klebsiella* spp., *Citrobacter* spp., *Enterobacter* spp., and *Serratia* spp.) isolates from multiple specimen sources were collected in 28 countries in Europe and North America (Canada and the United States) from ICU and non-ICU wards in 2014-2016. MICs were determined at each site using supplied broth micro dilution panels following CLSI methodology and interpreted according to EUCAST guidelines. Isolates were categorized as multi-drug resistant (MDR) if resistant to ≥3 of the tested drug classes (glycylcyclines, β-lactam/inhibitor, cephems, penems, penicillins [ampicillin], quinolones, and aminoglycosides). Differences in susceptibility and MDR rates between patient locations and geographic regions were assessed for statistical significance with the chi-square test.

Results: Susceptibility to a selected subset of the tested agents and % MDR are shown below.

	Europe		North America	
	ICU	**non-ICU**	**ICU**	**non-ICU**

% S Tigecycline	90.9	92.6*	93.1	92.7
% S Pip-Tazo	77.2	81.2*	85.5	89.6*
% S Amox-Clav	37.9	43.5*	45.5	55.6*
% S Ceftriaxone	68.0	71.1*	80.8	83.9*
% S Cefepime	75.7	78.5*	88.7	88.8
% S Meropenem	96.2	97.8*	98.8	99.0
% S Levofloxacin	81.8	79.0**	88.8	83.4**
% S Amikacin	95.8	97.2*	98.6	99.1
% MDR	31.1	28.8*	19.3	18.1
n	4158	10384	1096	2931

* Significantly lower susceptibility or higher MDR rate in ICU than non-ICU ($p<0.05$)

** Significantly higher susceptibility in ICU ($p<0.05$)

Comparing regions, isolates from ICUs were less susceptible in Europe than in North America ($p<0.05$) to all agents except tigecycline; isolates from non-ICU wards were generally less susceptible in Europe than in North America to all agents except tigecycline, meropenem, and amikacin.

Conclusions: In Europe, *Enterobacteriaceae* isolates from ICUs were significantly less susceptible than those from non-ICU wards to the majority of agents, but not in North America. Of the tested agents, only tigecycline, meropenem, and amikacin maintained susceptibility >90% against *Enterobacteriaceae* in both settings and both regions. Knowledge of resistance patterns across geographic regions and hospital settings is crucial both for infection control efforts and patient treatment decisions.