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Ventilator Associated Pneumonia Rates in 88 Intensive Care Units of 18 Developing Countries. Findings of the International Nosocomial Infection Control Consortium (INICC)

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Objectives: To determine the rate, microorganism profile, bacterial resistance, extra length of stay (LOS) and extra mortality of Ventilator Associated Pneumonia (VAP) in 88 intensive care units (ICUs) of hospital members of the INICC in Argentina, Brazil, Chile, Colombia, Costa Rica, Cuba, India, Kosovo, Lebanon, Macedonia, Mexico, Morocco, Nigeria, Peru, Philippines, El Salvador, Turkey and Uruguay.

Methods: An open label, prospective cohort, active healthcare-associated infection surveillance study was conducted on adult and pediatric patients admitted to 88 tertiary-care ICUs of 46 cities in 18 countries. Rates of device-associated infections (DAI) were recorded through applying the definitions provided by CDC-NNIS system. The protocol, forms, and methodology of outcome surveillance implemented were developed by INICC. The data collection was performed in the participating ICUs. Data uploading and data analysis were conducted at INICC headquarters on proprietary software.

Results: From 01/02 to 12/07, we enrolled 42,580 patients, representing 271,189 bed days.
The overall VAP rate in all the ICUs combined was 19.8 per 1000 device days; stratified by type of ICU the VAP rate per 1000 device days was: in the Medical-Surgical ICUs rate was 20.2; in the Coronary Units 20.2; in the Medical ICUs 40.7; in the Surgical ICUs rate 18.0; in the Trauma ICUs 16.8; in the Neuro-Surgical ICUs 19.9; in the Cardio-Surgical ICUs 16.8; and in the Pediatric ICUs 7.9.
Overall 28% of all VAP were caused by *Pseudomonas* sp (51.1% of which were resistant to Ciprofloxacin, 36.9% to Imipenem, and 51.5% to Piperacilin); 22.0% by *Acinetobacter* sp; 19.3% by Staphylococcus aureus (80.2% of which were resistant to methicilin); 10.5% by *Klebsiella* sp (68.1% of which were resistant to third generation cephalosporins); 5.2% by E. Coli (64.9% were resistant to third generation cephalosporins and 63.3% were Quinolones-resistant); 4.4% by *Enterobacter* sp (55.4% of which were resistant to third generation cephalosporins and 5.8% to Carbapenem); 3.0% by *Candida* sp; 2.3% by *Coagulase-negative-staphylococci* (84.6% of which were resistant to methicilin) and 1.1% by *Streptococcus* sp.

The LOS of patients without DAI was 4.9 days; the LOS of patients with VAP was 15.3 days (RR, 3.13), representing 10.4 extra days.
A total of 5,904 out of 38,646 (15.3%) patients without any DAI died; 552 out of 1,271 patients (43.4%) with VAP died, the extra mortality of VAP being 28.2% (RR, 2.84 , 95% CI, 2.61 – 3.10, P, 0.0001).

Conclusions: This study has identified that the VAP rate is high, increasing 10 extra days the length of stay, and it has also identified that VAP is significantly associated with higher mortality.