

# Multicenter prospective study on device-associated infection rates and bacterial resistance in intensive care units of Venezuela: International Nosocomial Infection Control Consortium (INICC) findings

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**Background:** Device-associated healthcare-acquired infections (DA-HAI) pose a threat to patient safety in the intensive care unit (ICU).

**Methods:** A DA-HAI surveillance study was conducted by the International Nosocomial Infection Control Consortium (INICC) in two adult medical/surgical ICUs at two hospitals in Caracas, Venezuela, in different periods from March 2008 to April 2015, using the US Centers for Disease Control and Prevention’s National Healthcare Safety Network (CDC/NHSN) definitions and criteria, and INICC methods.

**Results:** We followed 1041 ICU patients for 4632 bed days. Central line-associated bloodstream infection (CLABSI) rate was 5.1 per 1000 central line days, ventilator-associated pneumonia (VAP) rate was 7.2 per 1000 mechanical ventilator days, and catheter-associated urinary tract infection (CAUTI) rate was 3.9 per 1000 urinary catheter days, all similar to or lower than INICC rates (4.9 [CLABSI]; 16.5 [VAP]; 5.3 [CAUTI]), and higher than CDC/NHSN rates (0.8 [CLABSI]; 1.1 [VAP]; and 1.3 [CAUTI]). Device utilization ratios were higher than INICC and CDC/NHSN rates, except for urinary catheter, which was similar to INICC. Extra length of stay was 8 days for patients with CLABSI, 9.6 for VAP and 5.7 days for CAUTI. Additional crude mortality was 3.0% for CLABSI, 4.4% for VAP, and 16.9% for CAUTI.

**Conclusions:** DA-HAI rates in our ICUs are higher than CDC/NHSN’s and similar to or lower than INICC international rates.

**Keywords:** Antibiotic resistance, Catheter-associated urinary tract infection, Central line-associated bloodstream infections, Healthcare-associated infection, Hospital infection, Ventilator-associated pneumonia

## Introduction

Device-associated healthcare-acquired infections (DA-HAIs) are among the main causes of patient morbidity and mortality, and are responsible for prolonging the length of stay in the intensive care unit (ICU) and excess hospital costs, particularly in developing countries, where rates have been shown to be much higher than in high-income countries.<sup>1,2</sup>

Implementing an integrated infection control program focused on DA-HAI surveillance was shown to be effective in different studies conducted in the US, suggesting that the incidence of DA-HAI can be reduced by as much as 30%.<sup>3</sup>

Similarly, it is essential to address the burden of antimicrobial-resistant infections and report susceptibility to antimicrobials of DA-HAI-associated pathogens, so that informed decisions can be made to effectively prevent transmission of resistant strains and their determinants.<sup>4</sup>

For more than 40 years, the US Centers for Disease Control and Prevention’s National Healthcare Safety Network (CDC/NHSN)<sup>5</sup> has provided invaluable benchmarking data on DA-HAIs, which served as an inspiration to the International Nosocomial Infection Control Consortium (INICC).<sup>6</sup>

The INICC is an international non-profit, open, multi-centre, collaborative healthcare-associated infection control network









