

## Documents

Rosenthal, V.D.<sup>a, b</sup>, Yin, R.<sup>a</sup>, Rodrigues, C.<sup>c</sup>, Myatra, S.N.<sup>d</sup>, Divatia, J.V.<sup>d</sup>, Biswas, S.K.<sup>d</sup>, Shrivastava, A.M.<sup>d</sup>, Kharbanda, M.<sup>e</sup>, Nag, B.<sup>e</sup>, Mehta, Y.<sup>f</sup>, Sarma, S.<sup>f</sup>, Todi, S.K.<sup>g</sup>, Bhattacharyya, M.<sup>g</sup>, Bhakta, A.<sup>h</sup>, Gan, C.S.<sup>h</sup>, Low, M.S.Y.<sup>h</sup>, Kushairi, M.B.M.<sup>h</sup>, Chuah, S.L.<sup>h</sup>, Wang, Q.Y.<sup>h</sup>, Chawla, R.<sup>i</sup>, Jain, A.C.<sup>i</sup>, Kansal, S.<sup>i</sup>, Bali, R.K.<sup>i</sup>, Arjun, R.<sup>j</sup>, Davaadagva, N.<sup>i</sup>, Bat-Erdene, B.<sup>j</sup>, Begzjav, T.<sup>j</sup>, Basri, M.N.M.<sup>k</sup>, Tai, C.-W.<sup>k</sup>, Lee, P.-C.<sup>k</sup>, Tang, S.-F.<sup>l</sup>, Sandhu, K.<sup>m</sup>, Badyal, B.<sup>m</sup>, Arora, A.<sup>m</sup>, Sengupta, D.<sup>m</sup>, Tao, L.<sup>n</sup>, Jin, Z.<sup>a</sup>

**Multinational prospective cohort study over 18 years of the risk factors for ventilator-associated pneumonia in 9 Asian countries: INICC findings**

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<sup>a</sup> Department of Public Health Sciences, University of Miami Miller School of Medicine, Miami, United States

<sup>b</sup> International Nosocomial Infection Control Consortium (INICC) Foundation, Miami, United States

<sup>c</sup> Pd Hinduja National Hospital and Medical Research Centre, Mumbai, India

<sup>d</sup> Tata Memorial Hospital, Homi Bhabha National Institute, Department of Anesthesiology, Critical Care and Pain, Mumbai, India

<sup>e</sup> Desun Hospital, Department of Critical Care, Kolkata, India

<sup>f</sup> Medanta The Medicity, Department of Critical Care and Anesthesiology, Haryana, India

<sup>g</sup> Advanced Medicare Research Institute AMRI Hospitals, Department of Critical Care, Kolkata, India

<sup>h</sup> University Malaya Medical Centre, Department of Pediatric Intensive Care, Kuala Lumpur, Malaysia

<sup>i</sup> Indraprastha Apollo Hospitals, Department of Critical Care, New Delhi, India

<sup>j</sup> Kerala Institute of Med Sciences Health, Department of Critical Care, Trivandrum, India

<sup>k</sup> International Islamic University Malaysia, Department of Anesthesia and Critical Care, Kuantan Pahang, Malaysia

<sup>l</sup> Universiti Kebangsaan Malaysia Specialist Children's Hospital, Department of Critical Care, Kuala Lumpur, Malaysia

<sup>m</sup> Max Super Speciality Hospital Saket Delhi, Department of Critical Care, New Delhi, India

<sup>n</sup> Zhongshan Hospital, Fudan University, Department of Pneumology, Shanghai, China

**Abstract**

Background: Ventilator associated pneumonia (VAP) rates in Asia are several times above those of US. The objective of this study is to identify VAP risk factors. Methods: We conducted a prospective cohort study, between March 27, 2004 and November 2, 2022, in 279 ICUs of 95 hospitals in 44 cities in 9 Asian countries (China, India, Malaysia, Mongolia, Nepal, Pakistan, Philippines, Sri Lanka, Thailand, Vietnam). Results: 153,717 patients, followed during 892,996 patient-days, acquired 3,369 VAPs. We analyzed 10 independent variables. Using multiple logistic regression we identified following independent VAP RFs= Age, rising VAP risk 1% per year (aOR=1.01; 95%CI=1.00-1.01, P<.0001); male gender (OR=1.17; 95%CI=1.08-1.26, P<.0001); length of stay, rising VAP risk 7% daily (aOR=1.07; 95%CI=1.06-1.07, P<.0001); mechanical ventilation (MV) device utilization (DU) ratio (OR=1.43; 95%CI=1.36-1.51; p<.0001); tracheostomy connected to a MV (OR=11.17; 95%CI=9.55-14.27; p<.0001); public (OR=1.84; 95%CI=1.49-2.26, P<.0001), and private (OR=1.57; 95%CI=1.29-1.91, P<.0001) compared with teaching hospitals; upper-middle income country (OR=1.86; 95%CI=1.63-2.14, P<.0001). Regarding ICUs, Medical-Surgical (OR=4.61; 95%CI=3.43-6.17; P<.0001), Neurologic (OR=3.76; 95%CI=2.43-5.82; P<.0001), Medical (OR=2.78; 95%CI=2.04-3.79; P<.0001), and Neuro-Surgical (OR=2.33; 95%CI=1.61-3.92; P<.0001) showed the highest risk. Conclusions: Some identified VAP RFs are unlikely to change= age, gender, ICU type, facility ownership, country income level. Based on our results, we recommend limit use of tracheostomy, reducing LOS, reducing the MV/DU ratio, and implementing an evidence-based set of VAP prevention recommendations. © 2022 Association for Professionals in Infection Control and Epidemiology, Inc.

**Author Keywords**

Intensive care unit; International nosocomial infection control consortium; Limited resources countries; Low and middle income countries; Nosocomial pneumonia

**Index Keywords**

adult, age, Article, China, cohort analysis, female, hospital infection, human, India, infection control, infection risk, intensive care unit, international cooperation, low income country, major clinical study, Malaysia, male, middle income country, Mongolia, Nepal, organization and management, Pakistan, Philippines, prospective study, resource limited setting, sex factor, Sri Lanka, Thailand, ventilator associated pneumonia, Viet Nam, cross infection, risk factor, teaching hospital, ventilator associated pneumonia; Cross Infection, Hospitals, Teaching, Humans, Intensive Care Units, Male, Pakistan, Pneumonia, Ventilator-Associated, Prospective Studies, Risk Factors

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**Correspondence Address**

Rosenthal V.D.; Department of Public Health Sciences, 1120 NW 14th St. 9th Floor, Office 912, United States; email: vdr21@med.miami.edu

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