



ELSEVIER

Contents lists available at ScienceDirect

American Journal of Infection Control

journal homepage: www.ajicjournal.org

Special communication

International Nosocomial Infection Control Consortium (INICC) report, data summary of 36 countries, for 2004-2009

Victor D. Rosenthal MD, MSc, CIC^{a,*}, Hu Bijie^b, Dennis G. Maki^c, Yatin Mehta^d, Anucha Apisarnthanarak^e, Eduardo A. Medeiros^f, Hakan Leblebicioglu^g, Dale Fisher^h, Carlos Álvarez-Morenoⁱ, Ilham Abu Khader^j, Marisela Del Rocío González Martínez^k, Luis E. Cuellar^l, Josephine Anne Navoa-Ng^m, Rédouane Abouqalⁿ, Humberto Guanche Garcell^o, Zhan Mitrev^p, María Catalina Pirez García^q, Asma Hamdi^r, Lourdes Dueñas^s, Elsie Cancel^t, Vaidotas Gurskis^u, Ossama Rasslan^v, Altaf Ahmed^w, Souha S. Kanj^x, Olber Chavarría Ugalde^y, Trudell Mapp^z, Lul Raka^{aa}, Cheong Yuet Meng^{bb}, Le Thi Anh Thu^{cc}, Sameeh Ghazal^{dd}, Achilleas Gikas^{ee}, Leonardo Pazmiño Narváez^{ff}, Nepomuceno Mejía^{gg}, Nassya Hadjieva^{hh}, May Osman Gamar Elanbyaⁱⁱ, María Eugenia Guzmán Siritt^{jj}, Kushlani Jayatilleke^{kk}

^a From the International Nosocomial Infection Control Consortium, Buenos Aires, Argentina^b Zhongshan Hospital, Shanghai, China^c University of Wisconsin Medical School, Madison, WI^d Medanta the Medcity, New Delhi, India^e Thammasat University Hospital, Pratumthani, Thailand^f Hospital São Paulo, São Paulo, Brazil^g Ondokuz Mayıs University Medical School, Samsun, Turkey^h National University Hospital, Singapore, Republic of Singaporeⁱ Hospital Universitario San Ignacio, Universidad Pontificia Javeriana, Bogotá, Colombia^j Jordan University Hospital, Amman, Jordan^k Instituto Mexicano del Seguro Social, Torreón, Mexico^l Instituto Nacional de Enfermedades Neoplásicas, Lima, Peru^m St Luke's Medical Center, Quezon City, Philippinesⁿ Ibn Sina Medical ICU, Rabat, Morocco^o Hospital Docente Clínico Quirúrgico "Joaquín Albarrán Domínguez," La Habana, Cuba^p Filip II Special Hospital for Surgery, Skopje, Macedonia^q Centro Hospitalario Pereira Rosell Bouar, Montevideo, Uruguay^r Hôpital d'Enfants, Tunis, Tunisia^s Hospital Nacional de Niños Benjamin Bloom, San Salvador, El Salvador^t San Jorge Children's Hospital, Asociación Epidemiólogos de Puerto Rico, Guaynabo, Puerto Rico^u Hospital of Kaunas University of Medicine, Kaunas, Lithuania^v Ain Shams Faculty of Medicine, Cairo, Egypt^w Liaquat National Hospital, Karachi, Pakistan^x American University of Beirut Medical Center, Beirut, Lebanon^y Hospital Hotel La Católica, San José, Costa Rica^z Clínica Hospital San Fernando, Panama City, Panama^{aa} National Institute for Public Health of Kosova and Medical School, Prishtina University^{bb} Sunway Medical Centre Berhad and Monash University Sunway Campus, Petaling Jaya, Malaysia^{cc} Cho Ray Hospital, Ho Chi Minh City, Vietnam^{dd} King Fahad Medical City, Riyadh, Saudi Arabia^{ee} University Hospital of Heraklion, Heraklion, Greece^{ff} Hospital Eugenio Espejo, Quito, Ecuador^{gg} Hospital General de la Plaza de la Salud, Santo Domingo, Dominican Republic^{hh} Queen Joana, Sofia, Bulgaria

* Address correspondence to Victor D. Rosenthal, MD, MSc, CIC, International Nosocomial Infection Control Consortium (INICC), Corrientes Ave 4580, Floor 12, Apt D, Buenos Aires 1195, Argentina.

Victor D. Rosenthal and the Foundation to Fight Against Nosocomial Infections funds all of the activities at INICC headquarters.
Conflict of interest:

ⁱⁱ Bahry Accident and Emergency Hospital, Khartoum, Sudan

^{jj} Hospital Militar Dr Carlos Arvelo, Caracas, Venezuela

^{kk} Sri Jayewardenepura General Hospital, Nugegoda, Sri Lanka

Key Words:

International Nosocomial Infection Control Consortium
Network
Hospital infection
Nosocomial infection
Health care-associated infection
Device-associated infection
Ventilator-associated pneumonia
Catheter-associated urinary tract infection
Central line-associated bloodstream infection
Bloodstream infection
Urinary tract infection
Antibiotic resistance
Developing countries
Limited-resources countries
Low-income countries

The results of a surveillance study conducted by the International Nosocomial Infection Control Consortium (INICC) from January 2004 through December 2009 in 422 intensive care units (ICUs) of 36 countries in Latin America, Asia, Africa, and Europe are reported. During the 6-year study period, using Centers for Disease Control and Prevention (CDC) National Healthcare Safety Network (NHSN; formerly the National Nosocomial Infection Surveillance system [NNIS]) definitions for device-associated health care-associated infections, we gathered prospective data from 313,008 patients hospitalized in the consortium's ICUs for an aggregate of 2,194,897 ICU bed-days. Despite the fact that the use of devices in the developing countries' ICUs was remarkably similar to that reported in US ICUs in the CDC's NHSN, rates of device-associated nosocomial infection were significantly higher in the ICUs of the INICC hospitals; the pooled rate of central line-associated bloodstream infection in the INICC ICUs of 6.8 per 1000 central line-days was more than 3-fold higher than the 2.0 per 1000 central line-days reported in comparable US ICUs. The overall rate of ventilator-associated pneumonia also was far higher (15.8 vs 3.3 per 1000 ventilator-days), as was the rate of catheter-associated urinary tract infection (6.3 vs. 3.3 per 1000 catheter-days). Notably, the frequencies of resistance of *Pseudomonas aeruginosa* isolates to imipenem (47.2% vs 23.0%), *Klebsiella pneumoniae* isolates to ceftazidime (76.3% vs 27.1%), *Escherichia coli* isolates to ceftazidime (66.7% vs 8.1%), *Staphylococcus aureus* isolates to methicillin (84.4% vs 56.8%), were also higher in the consortium's ICUs, and the crude unadjusted excess mortalities of device-related infections ranged from 7.3% (for catheter-associated urinary tract infection) to 15.2% (for ventilator-associated pneumonia).

Copyright © 2011 by the Association for Professionals in Infection Control and Epidemiology, Inc.
Published by Elsevier Inc. All rights reserved.

This is an updated report of data on device-associated health care-associated infections (DA-HAIs) within intensive care units (ICUs) collected by hospitals participating in the International Nosocomial Infection Control Consortium (INICC)¹⁻¹⁷ between January 2004 and December 2009. The INICC is an international nonprofit, open, multicenter, collaborative health care-associated infection control program with a surveillance system based on that of the US National Healthcare Safety Network (NHSN^{18,19}; formerly the National Nosocomial Infection Surveillance system [NNIS]²⁰). Founded in Argentina in 1998, the INICC is the first multinational research network established to control and reduce DA-HAIs through the analysis of data collected on a voluntary basis by a pool of hospitals worldwide.¹⁻¹⁷ INICC has the following goals: (1) to create a dynamic global network of hospitals in the developing world that conduct surveillance of DA-HAIs by means of standardized definitions and established methodologies, promote implementation of evidence-based infection control practices, and perform applied infection control research; (2) to provide training and surveillance tools to individual hospitals to allow them to conduct outcome and process surveillance of DA-HAIs, measure their consequences, and assess the impact of infection control practices; and (3) to improve the safety and quality of health care worldwide through implementation of systematized programs to reduce rates of DA-HAI-associated mortality, excess length of hospital stays,²¹⁻²⁴ excess costs, and bacterial resistance.

METHODS

The INICC has focused on surveillance and prevention of DA-HAI in adult and pediatric ICUs and high-risk nurseries.^{3,10,13,25} Data are collected using standardized CDC NHSN protocols and definitions.^{19,20} The INICC's methodology includes both outcome surveillance and process surveillance components. The modules of the components may be used singly or simultaneously, but once selected, they must be used for a minimum of 1 calendar month.^{3,10,13,25}

All DA-HAIs of the outcome surveillance component are categorized using standard CDC NHSN definitions that include laboratory and clinical criteria.¹⁹ Both laboratory-confirmed bloodstream infection (BSIs) and clinical sepsis without microbiologic confirmation of BSI are recorded and reported.²⁶

Data are classified into specific module protocols addressing the following: DA-HAI rates, excess length of stay, evaluation of DA-HAI costs, crude excess mortality, microbiological profile, bacterial resistance, and antimicrobial use data within the outcome surveillance component. In addition, the INICC methodology includes a process for adjudication and validation of reported HAIs.^{3,10,13,25}

Infection control professionals (ICPs) collect data on central line-associated primary BSIs (CLABSIs), catheter-associated urinary tract infections (CAUTIs), and ventilator-associated pneumonia (VAP) occurring in patients hospitalized in a specific patient care location in nearly all hospitals. ICUs are stratified according to the patient population as adult ICUs, pediatric ICUs, and neonatal ICUs (NICUs).

All NICUs are level III or level II/III units, in which ICPs collect data on CLABSIs and umbilical catheter-associated primary BSIs or VAP for each of 5 birth weight categories (<750 g, 750-1000 g, 1001-1500 g, 1501-2500 g, >2500 g). ICPs also collect data on corresponding denominator data, patient-days, and specific device-days.

The INICC also receives aggregated data from hospitals with previous experience in conducting surveillance of DA-HAIs. Original and aggregated data were used to calculate DA-HAI rates. Only original data were used to calculate mortality and length of stay. The process surveillance component includes the following modules: hand hygiene compliance monitoring in ICUs, central and peripheral vascular catheter care compliance monitoring, urinary catheter care compliance monitoring, monitoring of compliance with measures to prevent VAP, and performance feedback. Data from the process surveillance module on hand hygiene compliance are included in this report.^{3,10,13,25}

The identity of all INICC hospitals, cities and countries is kept confidential, in accordance with the INICC charter.

RESULTS

Table 1 presents characteristics of 422 ICUs from 36 countries in Latin America, Asia, Africa, and Europe currently participating in the INICC that contributed data for this report. The hospitals' mean duration of participation in the INICC is 23.9 ± 21.7 months (range, 1-72 months).

For the outcome surveillance component, DA-HAI rates, device utilization (DU) ratios, crude excess mortality by specific type of DA-HAI, antimicrobial utilization, and bacterial resistance for January 2004 through December 2009 are summarized in Tables 2-17. Tables 2-7 present DA-HAI rates and DU ratios by infection type (CLABSI, CAUTI, and VAP) in adult and pediatric ICUs. The data for adult combined medical/surgical ICUs were not stratified by type or size of hospital. Device-days consisted of the total number of central line-days, urinary catheter-days, or ventilator-days. The DU ratio is an extrinsic risk factor for DA-HAI^{19,20}; it also provides a marker for severity of illness, vis a vis patients' susceptibility to DA-HAI.

Tables 8-11 present DA-HAI rates and DU ratios from the high-risk nursery component of the INICC system for CLABSIs and VAPs. For NICUs, device-days consist of the total number of central line-days, umbilical catheter-days, and ventilator-days. The data for neonatal ICUs were stratified by weight. Tables 12 and 13 provide data on crude ICU mortality in patients hospitalized in each type of unit during the surveillance period with and without DA-HAI, along with crude excess mortality of adult and pediatric patients with CLABSI, CAUTI, and VAP, and infants in NICUs with CLABSI or VAP.

Tables 14 and 15 provide data on crude length of stay of patients hospitalized in each type of unit during the surveillance period with and without DA-HAI, along with crude excess length of stay of adult and pediatric patients with CLABSI, CAUTI, and VAP and infants in NICUs with CLABSI or VAP. Table 16 provides data on bacterial resistance of pathogens isolated from patients with DA-HAI in adult and pediatric ICUs and NICUs. Table 17 provides data on hand hygiene compliance in each type of unit. Tables 18 and 19 compare overall rates of CLABSI, CAUTI, and VAP (Table 18)¹⁸ and rates of antimicrobial resistance (Table 19)²⁷ in the INICC ICUs and the CDC NHSN ICUs. Table 20 compares rates of CLABSI, CAUTI, and VAP in the INICC reports published in 2006,³ 2008,¹⁰ and 2010.¹³

DISCUSSION

The implementation effectiveness of an integrated infection control program focused on DA-HAI surveillance was demonstrated approximately 30 years ago, as shown in many studies conducted in the United States, with results indicating that the incidence of DA-HAI can be reduced by as much as 30%, and that a related reduction in health care costs was feasible as well.²⁸ For more than 30 years, the CDC's NNIS/NHSN network has provided benchmarking US ICU data on DA-HAIs and antibiotic resistance, which have proven to be invaluable for researchers and served as an inspiration for the INICC program.^{3,10,13,25} Initially, the INICC surveillance concentrated on DA-HAI surveillance in ICUs, the health care setting that has the highest DA-HAI rates and that poses the greatest risk to patient safety, given the patients' critical condition and exposure to invasive devices.^{3,10,13}

The rate of device use in the INICC ICUs is similar to or even lower than that reported in US ICUs by the NNIS/NHSN system¹⁸; however, DA-HAI rates identified in INICC ICUs are significantly higher than the published US rates (Table 18).^{18,29} Likewise, the antimicrobial resistance rates found in INICC ICUs for methicillin-resistant *Staphylococcus aureus* (MRSA) isolates, enterobacteria resistant to ceftazidime

Table 1
Features of the participating INICC hospitals, 2004-2009

	America	Asia	Africa	Europe	Pooled
ICUs, n	123	241	6	52	422
ICUs, type					
Medical ICU	3	34	0	5	42
Medical cardiac	6	17	0	4	27
Medical-surgical ICU	69	50	2	17	138
Neurosurgical ICU	1	22	0	2	25
Neurologic ICU	0	3	0	1	4
Neonatal ICU	19	10	2	5	36
Pediatric ICU	20	16	0	9	45
Respiratory ICU	0	16	1	1	18
Surgical ICU	3	40	1	6	50
Surgical-cardiothoracic ICU	0	26	0	2	28
Trauma ICU	2	7	0	0	9
Hospitals, n					
Academic teaching	19	45	5	25	94
Public	32	40	1	2	75
Private community	28	16	0	2	46

(extended-spectrum β -lactamase producers), and *Pseudomonas aeruginosa* as resistant to fluoroquinolones were significantly higher than those reported in NHSN ICUs (Table 19).²⁷ Nonetheless, the rate of vancomycin-resistant enterococci is much lower in the INICC ICUs than in the NHSN ICUs.²⁷

These higher DA-HAI rates may reflect the typical ICU situation in limited-resources countries as a whole, and several reasons have been exposed to explain this fact.³⁰ Among the primary plausible causes, it can be mentioned that in almost all limited-resources countries, there are still no legally enforceable rules or regulations concerning the implementation of infection control programs, such as national infection control guidelines, and in the few countries that have such a legal framework, adherence to and compliance with the guidelines is most irregular, and hospital accreditation is not mandatory. In most INICC hospitals, a lack of official regulations is strongly correlated with considerable variability in compliance with hand hygiene recommendations. This situation is further complicated by the fact that administrative and financial support in most INICC hospitals is insufficient to fund infection control programs,³⁰ which invariably results in very low nurse-to-patient staffing ratios—which have proven highly connected to high DA-HAI rates in ICUs³—hospital overcrowding, lack of medical supplies, and insufficient numbers of experienced nurses and trained health care workers.

The World Bank categorizes countries into 4 economic strata based on 2007 gross national income per capita: (1) low income, \$935 or less; (2) lower middle income, \$936-\$3705; (3) upper middle income, \$3706-\$11,455; and (4) high income, \$11,456 or more.³¹ Within this categorization, 144 out of 209 countries (68%) are low-income and lower middle-income economies (also referred to as lower-income countries, low-resources countries, developing economies, or developing or emerging countries), representing more than 75% of the world's population. The relationships between DA-HAI rates and socioeconomic level (low income, middle income, or high income) and between DA-HAI rates and type of hospital (public, academic, or private) was recently published by the INICC.³²

DA-HAI surveillance is essential to reduce hospitalized patients' risk of infection, because it effectively describes and addresses the importance and characteristics of the threatening situation created by HAIs. This must be followed by the implementation of practices aimed at DA-HAI prevention and control. In addition, participation in the INICC has played a fundamental role not only in increasing the awareness of DA-HAI risks in the INICC ICUs, but also in providing an exemplar for the institution of infection control

Table 2
Pooled means and 95% CIs of the distribution of CLABSI rates (per 1000 central line-days) and central line DU ratios by type of adult or pediatric ICU

Type of ICU	ICUs, n	Patients, n	CLABSI (LCBI), n*	CLABSI (CSEP), n [†]	CLABSI (LCBI + CSEP), n	Central line-days	Pooled mean CLABSI rate	95% CI
Medical	42	30,823	425	691	1116	75,846	14.7	13.8-15.6
Medical cardiac	27	26,704	147	186	333	53,287	6.2	5.6-6.9
Medical/surgical	138	109,237	3016	436	3452	506,934	6.8	6.6-7.0
Neurologic	4	3869	106	1	107	8306	12.9	10.6-15.5
Neurosurgical	25	8109	93	0	93	20,249	4.6	3.7-5.6
Pediatric	45	20,905	523	152	675	63,330	10.7	9.9-11.5
Respiratory	18	2710	119	3	122	24,774	4.9	4.1-5.9
Surgical	50	63,270	946	47	993	197,207	5.0	4.7-5.4
Surgical cardiothoracic	28	25,130	87	15	102	66,835	1.5	1.2-1.9
Trauma	9	4507	36	0	36	14,650	2.5	1.7-3.4
Overall	386	295,264	5498	1531	7029	1,031,418	6.8	6.7-7.0

CI, confidence interval.

*LCBI, laboratory-confirmed BSI.

[†]CSEP, clinical sepsis without laboratory confirmation.

Table 3
Pooled means and 95% CIs of central line DU ratios by type of adult or pediatric ICU

Type of ICU	ICUs, n	Central line-days	Patient-days	Pooled mean DU ratio	95% CI
Medical	42	75,846	151,243	0.50	0.50-0.50
Medical cardiac	27	53,287	94,180	0.57	0.56-0.57
Medical/surgical	138	506,934	949,971	0.53	0.53-0.53
Neurologic	4	8306	22,860	0.36	0.36-0.37
Neurosurgical	25	20,249	47,019	0.43	0.43-0.44
Pediatric	45	63,330	165,046	0.38	0.38-0.39
Respiratory	18	24,774	39,942	0.62	0.62-0.63
Surgical	50	197,207	382,523	0.52	0.51-0.52
Surgical cardiothoracic	28	66,835	97,426	0.69	0.68-0.69
Trauma	9	14,650	26,201	0.56	0.55-0.57
Overall	386	1,031,418	1,976,411	0.52	0.52-0.52

CI, confidence interval.

Table 4
Pooled means and 95% CIs of the distribution of CAUTI rates per 1000 urinary catheter-days, by type of adult or pediatric ICU

Type of ICU	UCIs, n	Patients, n	CAUTIs, n	Urinary catheter-days	Pooled mean CAUTI rate	95% CI
Medical	42	30,823	626	99,036	6.3	5.8-6.8
Medical cardiac	27	26,704	193	51,723	3.7	3.2-4.3
Medical/surgical	138	109,237	3798	535,414	7.1	6.9-7.3
Neurologic	4	3869	276	19,336	14.3	12.7-16.1
Neurosurgical	25	8109	219	35,468	6.2	5.4-7.1
Pediatric	45	20,905	183	38,789	4.7	4.1-5.5
Respiratory	18	2710	206	21,109	9.8	8.5-11.2
Surgical	50	63,270	869	173,759	5.0	4.7-5.4
Surgical cardiothoracic	28	25,130	90	56,185	1.6	1.3-1.9
Trauma	9	4507	135	18,722	7.2	6.1-8.5
Overall	386	295,264	6595	1,049,541	6.3	6.2-6.5

CI, confidence interval.

practices. In many INICC ICUs, for example, the high incidence of DA-HAI has been reduced by carrying out targeted performance feedback programs for hand hygiene and central line, mechanical ventilator, and urinary catheter care.³³⁻³⁹ Finally, it is of utmost importance to restrict the administration of anti-infective agents to effectively control antibiotic resistance.

To compare a hospital's DA-HAI rates and DU ratios with the rates identified in this report, the hospital should begin data collection by applying the methods and methodology described for

Table 5
Pooled means and 95% CIs of urinary catheter DU ratios by type of adult or pediatric ICU

Type of ICU	UCIs, n	Urinary catheter-days	Patient-days	Pooled mean DU ratio	95% CI
Medical	42	99,036	151,243	0.65	0.65-0.66
Medical cardiac	27	51,723	94,180	0.55	0.55-0.55
Medical/surgical	138	535,414	949,971	0.56	0.56-0.56
Neurologic	4	19,336	22,860	0.85	0.84-0.85
Neurosurgical	25	35,468	47,019	0.75	0.75-0.76
Pediatric	45	38,789	165,046	0.24	0.23-0.24
Respiratory	18	21,109	39,942	0.53	0.52-0.53
Surgical	50	173,759	382,523	0.45	0.45-0.46
Surgical cardiothoracic	28	56,185	97,426	0.58	0.58-0.58
Trauma	9	18,722	26,201	0.71	0.71-0.72
Overall	386	1,049,541	1,976,411	0.53	0.53-0.53

CI, confidence interval.

Table 6
Pooled means and 95% CIs of the distribution of VAP rates, per 1000 ventilator-days by type of adult or pediatric ICU

Type of ICU	Units, n	Patients, n	Ventilator-days	VAPs, n	Pooled mean VAP rate	95% CI
Medical	42	30,823	86,095	661	7.7	7.1-8.3
Medical cardiac	27	26,704	21,877	236	10.8	9.5-12.3
Medical/surgical	138	109,237	357,214	6570	18.4	17.9-18.8
Neurologic	4	3869	4015	113	28.1	23.2-33.8
Neurosurgical	25	8109	14,475	303	20.9	18.7-23.4
Pediatric	45	20,905	86,675	560	6.5	5.9-7.1
Respiratory	18	2710	18,571	514	27.7	25.4-30.1
Surgical	50	63,270	135,431	2213	16.3	15.7-17.0
Surgical cardiothoracic	28	25,130	32,575	484	14.9	13.6-16.2
Trauma	9	4507	12,266	491	40.0	36.6-43.7
Overall	386	295,264	769,194	12,145	15.8	15.5-16.1

CI, confidence interval.

the NHSN and INICC, and then calculate infection rates and DU ratios for the device-associated module. The major aim of these data is to serve as a guide for the implementation of prevention strategies and other quality improvement efforts locally, to help reduce DA-HAI rates to the minimum possible level.

In conclusion, the data presented in this report underscore the fact that HAIs—particularly DA-HAIs in ICU patients in

Table 7

Pooled means and 95% CIs of ventilator DU ratios by type of adult or pediatric ICU

Type of ICU	Units, n	Patient-days	Ventilator-days	Pooled mean DU ratio	95% CI
Medical	42	151,243	86,095	0.57	0.57-0.57
Medical cardiac	27	94,180	21,877	0.23	0.23-0.24
Medical/surgical	138	944,836	357,214	0.38	0.38-0.38
Neurologic	4	22,860	4,015	0.18	0.17-0.18
Neurosurgical	25	47,019	14,475	0.31	0.30-0.31
Pediatric	45	165,046	86,675	0.53	0.52-0.53
Respiratory	18	39,942	18,571	0.46	0.46-0.47
Surgical	50	382,523	135,431	0.35	0.35-0.36
Surgical cardiothoracic	28	97,426	32,575	0.33	0.33-0.34
Trauma	9	26,201	12,266	0.47	0.46-0.47
Overall	386	1,971,276	769,194	0.39	0.39-0.39

CI, confidence interval.

Table 8

Pooled means and 95% CIs of the distribution of CLABSI rates per 1000 central line-days for level III NICUs

Birth weight category, kg	Units, n	Patients, n	Central line-days	CLABSI (LCBI), n*	CLABSI (CSEP), n†	CLABSI (LCBI + CSEP)	Pooled mean CLABSI rate	95% CI
<0.75	9	73	1104	4	8	12	10.9	5.6-18.9
0.75-1.00	27	1163	9008	68	54	122	13.5	11.3-16.2
1.001-1.50	30	1916	11,700	100	60	160	13.7	11.6-16.0
1.501-2.50	32	5598	14,328	83	88	171	11.9	10.2-13.9
>2.50	33	6670	10,890	55	54	109	10.0	8.2-12.1
Overall	36	15,420	47,030	310	264	574	12.2	11.2-13.2

CI, confidence interval.

*LCBI, laboratory-confirmed BSI.

†CSEP, clinical sepsis without laboratory confirmation.

Table 9

Pooled means and 95% CIs of central line DU ratios for level III NICUs

Birth weight category, kg	Units, n	Patient-days	Central line-days	Pooled mean DU ratio	95% CI
<0.75	9	2716	1104	0.41	0.39-0.43
0.75-1.00	27	22,796	9008	0.40	0.39-0.40
1.001-1.50	30	40,875	11,700	0.29	0.28-0.29
1.501-2.50	32	65,358	14,328	0.22	0.22-0.22
>2.50	33	59,569	10,890	0.18	0.18-0.19
Overall	36	191,314	47,030	0.25	0.24-0.25

CI, confidence interval.

Table 10

Pooled means and 95% CIs of the distribution of VAP rates per 1000 ventilator-days for level III NICUs

Birth weight category, kg	Units, n	Patients, n	Ventilator-days	VAPs, n	Pooled mean VAP rate	95% CI
<0.75	9	73	1272	4	3.1	0.08-0.81
0.75-1.00	27	1163	7121	51	7.2	5.3-9.4
1.001-1.50	30	1916	5424	48	8.8	6.5-11.7
1.501-2.50	32	5598	6900	70	10.1	7.9-12.8
>2.50	33	6670	6936	77	11.1	8.8-13.9
Overall	36	15,420	27,653	250	9.0	7.9-10.2

CI, confidence interval.

Table 11

Pooled means and 95% CIs of ventilator DU ratios by type of adult or pediatric ICU

Birth weight category, kg	Units, n	Patient-days	Ventilator-days	Pooled mean DU ratio	95% CI
<0.75	9	2716	1272	0.47	0.45-0.49
0.75-1.00	27	22,796	7121	0.31	0.31-0.32
1.001-1.50	30	40,875	5424	0.13	0.13-0.14
1.501-2.50	32	65,358	6900	0.11	0.10-0.11
>2.50	33	59,569	6936	0.12	0.11-0.12
Overall	36	191,314	27,653	0.14	0.14-0.15

CI, confidence interval.

Table 12

Pooled means and 95% CIs of the distribution of crude mortality and crude excess mortality* of ICU patients with DA-HAIs, adult and pediatric ICUs combined

	Deaths, n	Patients, n	Pooled crude mortality, %	95% CI
Crude mortality of patients without DA-HAI	11,908	119,501	10.0	9.8-10.14
Crude mortality of patients with CLABSI	414	1679	24.7	22.6-26.8
Crude excess mortality of patients with CLABSI	414	1679	14.7	12.8-16.6
Crude mortality rate of patients with CAUTI	290	1677	17.3	15.5-19.2
Crude excess mortality of patients with CAUTI	290	1677	7.3	5.7-9.1
Crude mortality rate of patients with VAP	1265	5020	25.2	24.0-24.5
Crude excess mortality of patients with VAP	1265	5020	15.2	14.2-14.3

CI, confidence interval.

*Crude excess mortality of DA-HAI 5 crude mortality of ICU patients with DA-HAI -

crude mortality of patients without DA-HAI.

Table 13

Pooled means and 95% CIs of the distribution of crude mortality and crude excess mortality* of infants in NICUs, all birth weight categories combined

	Deaths, n	Patients, n	Pooled crude mortality, %	95% CI
Crude mortality of infants without DA-HAI	537	5910	9.1	8.4-9.9
Crude mortality of infants with CLABSI	72	204	35.3	28.7-42.3
Crude excess mortality of infants with CLABSI	72	204	26.2	20.3-32.4
Crude mortality of infants with VAP	42	175	24.0	17.9-31.0
Crude excess mortality of infants with VAP	42	175	14.9	8.9-21.1

CI, confidence interval.

*Crude excess mortality of DA-HAI 5 crude mortality of ICU patients with DA-HAI -

crude mortality of patients without DA-HAI.

Table 14
Pooled means and 95% CIs of the distribution of the length of stay and crude excess length of stay* of ICU patients with DA-HAI, adult and pediatric ICUs combined

	LOS, total days	Patients, n	Pooled average LOS, days	95% CI
LOS of patients without DA-HAI	746,251	119,501	6.2	6.2-6.3
LOS of patients with CLABSI	28,709	1679	17.1	16.3-17.9
Extra LOS of patients with CLABSI	28,709	1679	10.9	10.1-11.6
LOS of patients with CAUTI	30,982	1677	18.5	17.6-19.4
Extra LOS of patients with CAUTI	30,982	1677	12.2	11.4-13.1
LOS of patients with VAP	90,146	5020	18.0	17.5-18.5
Extra LOS of patients with VAP	90,146	5020	11.7	11.3-12.2

CI, confidence interval; LOS, length of stay.

Table 15
Pooled means and 95% CIs of the distribution of the length of stay and crude excess length of stay* of infants in NICUs, all birth weight categories combined

	LOS, total days	Patients, n	Pooled average LOS, days	95% CI
LOS of infants without DA-HAI	537	5910	9.1	8.4-9.9
LOS of infants with CLABSI	72	204	35.3	28.7-42.3
Extra LOS of infants with CLABSI	72	204	26.2	20.3-32.4
LOS of infants with VAP	42	175	24.0	17.9-31.0
Extra LOS of infants with VAP	42	175	14.9	8.9-21.1

CI, confidence interval; LOS, length of stay.

Table 16
Antimicrobial resistance rates in the INICC ICUs

Pathogen, Antimicrobial	Pathogenic isolates tested, pooled, CLABSI, n	Resistance, CLABSI, %	Pathogenic isolates tested, pooled, VAP, n	Resistance, VAP, %	Pathogenic isolates tested, pooled, CAUTI, n	Resistance, CAUTI, %
<i>Staphylococcus aureus</i>						
Oxacillin	646	84.4	634	73.2	42	71.4
<i>Enterococcus faecalis</i>						
Vancomycin	98	5.1	18	11.1	59	5.1
<i>Pseudomonas aeruginosa</i>						
Fluoroquinolones*	285	42.1	997	46.2	148	50.7
Piperacillin or piperacillin-tazobactam	589	36.2	1789	40.2	254	41.7
Amikacin	278	27.7	1008	28.3	127	29.9
Imipenem or meropenem	517	47.2	1777	42.7	255	36.5
Cefepime	2	100.0	8	37.5	2	50.0
<i>Klebsiella pneumoniae</i>						
Ceftriaxone or ceftazidime	447	76.3	662	68.9	194	72.2
Imipenem, meropenem, or ertapenem	508	7.9	688	7.0	237	7.2
<i>Acinetobacter baumannii</i>						
Imipenem or meropenem	667	55.3	1466	66.3	113	52.2
<i>Escherichia coli</i>						
Ceftriaxone or ceftazidime	171	66.7	323	67.5	320	49.7
Imipenem, meropenem, or ertapenem	182	4.4	360	4.2	326	5.5
Fluoroquinolones*	133	53.4	164	54.9	211	32.2

*Fluoroquinolones include ciprofloxacin, levofloxacin, moxifloxacin, and ofloxacin.

Table 17
Distribution of hand hygiene compliance rates by ICU type

Type of ICU	ICUs, n	Opportunities for HH, n	HH compliance, n	Pooled mean compliance, %	95% CI
Medical	7	7889	6038	76.5	75.6-77.5
Medical cardiac	9	9275	5637	60.8	59.8-61.8
Medical/surgical	61	74,557	39,581	53.1	52.7-53.5
Neurologic	2	1436	587	40.9	38.3-43.5
Neurosurgical	3	5773	4633	80.3	79.2-81.3
Neonatal	16	6940	5428	78.2	77.2-79.2
Pediatric	8	3620	2160	59.7	58.0-61.3
Respiratory	2	1183	443	37.4	34.7-40.3
Surgical	6	7868	5284	67.2	66.1-68.2
Surgical cardiothoracic	3	5412	4204	77.7	76.5-78.8
Trauma	2	6106	4880	79.9	78.9-80.9
Overall	119	130,059	78,875	60.6	60.4-60.9

CI, confidence interval; HH, hand hygiene.

limited-resources countries—pose a grave and often concealed risk to patient safety. The INICC's main goal is to enhance infection control practices by facilitating elemental, feasible, and

inexpensive tools and resources to tackle this problem effectively and systematically, leading to stricter adherence to infection control programs and guidelines, with a correlated reduction in

Table 18
Comparison of DA-HAI rates per 1000 device-days in the ICUs of the INICC and the US NHSN

	INICC 2004-2009, pooled mean (95% CI)	US NHSN 2006-2008, pooled mean (95% CI)
Medical cardiac ICU		
CLABSI	6.2 (5.6-6.9)	2.0 (1.8-2.1)
CAUTI	3.7 (3.2-4.3)	4.8 (4.6-5.1)
VAP	10.8 (9.5-12.3)	2.1 (1.9-2.3)
Medical-surgical ICU		
CLABSI	6.8 (6.6-7.1)	1.5 (1.4-1.6)
CAUTI	7.1 (6.9-7.4)	3.1 (3.0-3.3)
VAP	18.4 (17.9-18.8)	1.9 (1.8-2.1)
Pediatric ICU		
CLABSI	4.6 (3.7-5.6)	3.0 (2.7-3.1)
CAUTI	4.7 (4.1-5.5)	4.2 (3.8-4.7)
VAP	6.5 (5.9-7.1)	1.8 (1.6-2.1)
Newborn ICU (1501-2500 g)		
CLABSI	11.9 (10.2-13.9)	1.5 (1.2-1.9)
VAP	10.1 (7.9-12.8)	0.8 (0.04-1.5)

CI, confidence interval.

DA-HAI and its adverse effects, in the ICUs participating in the INICC, as well as in all other health care facilities in the developing world.

Table 19
Comparison of antimicrobial resistance rates in the ICUs of the INICC and the US NHSN

Pathogen, antimicrobial	INICC 2004-2009 Resistance, % (CLABSI)	US NHSN 2006-2007 Resistance, % (CLABSI)
<i>Staphylococcus aureus</i>		
Oxacillin	84.4	56.8
<i>Enterococcus faecalis</i>		
Vancomycin	5.1	78.9
<i>Pseudomonas aeruginosa</i>		
Fluoroquinolones*	42.1	30.5
Piperacillin or piperacillin-tazobactam	36.2	20.2
Amikacin	27.7	4.3
Imipenem or meropenem	47.2	23.0
Cefepime	100.0	12.6
<i>Klebsiella pneumoniae</i>		
Ceftriaxone or ceftazidime	76.3	27.1
Imipenem, meropenem, or ertapenem	7.9	10.8
<i>Acinetobacter baumannii</i>		
Imipenem or meropenem	55.3	29.2
<i>Escherichia coli</i>		
Ceftriaxone or ceftazidime	66.7	8.1
Imipenem, meropenem, or ertapenem	4.4	0.9
Fluoroquinolones*	53.4	30.8

CI, confidence interval.

*Fluoroquinolones include ciprofloxacin, levofloxacin, moxifloxacin, and ofloxacin.

Table 20
Comparison of DA-HAI rates per 1000 device-days in the INICC ICUs, 2006, 2008, 2010, and 2011 reports

	INICC 2002-2005 (published in 2006), ³ pooled mean (95% CI)	INICC 2002-2007 (published in 2008), ¹⁰ pooled mean (95% CI)	INICC 2003-2008 (published in 2010), ¹³ pooled mean (95% CI)	INICC 2004-2009 (this report), pooled mean (95% CI)
Number of countries	8	18	25	36
Participating countries	Argentina, Brazil, Colombia, India, Mexico, Morocco, Peru, Turkey	Argentina, Brazil, Chile, Colombia, Costa Rica, Cuba, India, Kosovo, Lebanon, Macedonia, Mexico, Morocco, Nigeria, Peru, Philippines, El Salvador, Turkey, Uruguay.	Argentina, Brazil, China, Colombia, Costa Rica, Cuba, Greece, India, Jordan, Kosovo, Lebanon, Lithuania, Macedonia, Mexico, Morocco, Pakistan, Panama, Peru, Philippines, El Salvador, Thailand, Tunisia, Turkey, Venezuela, Uruguay	Argentina, Brazil, Bulgaria, China, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, Egypt, Greece, India, Jordan, Kosovo, Lebanon, Lithuania, Macedonia, Malaysia, Mexico, Morocco, Pakistan, Panama, Peru, Philippines, Puerto Rico, El Salvador, Saudi Arabia, Singapore, Sri Lanka, Sudan, Thailand, Tunisia, Turkey, Venezuela, Vietnam, Uruguay

(continued on next page)

Table 20 Continued

	INICC 2002-2005 (published in 2006), ³ pooled mean (95% CI)	INICC 2002-2007 (published in 2008), ¹⁰ pooled mean (95% CI)	INICC 2003-2008 (published in 2010), ¹³ pooled mean (95% CI)	INICC 2004-2009 (this report), pooled mean (95% CI)
Number of ICUs	55	98	173	422
CLABSI rate				
Pooled	12.5 (11.7-13.3)	9.2 (8.8-9.7)	7.6 (7.4-7.9)	6.8 (6.7-7.0)
Medical cardiac ICU	-	9.9 (8.7-11.3)	8.5 (7.5-9.7)	6.2 (5.6-6.9)
Medical-surgical ICU	-	8.9 (8.4-9.4)	7.4 (7.2-7.7)	6.8 (6.6-7.1)
Pediatric ICU	-	6.9 (5.6-8.3)	7.8 (7.1-8.5)	4.6 (3.7-5.6)
Neonatal ICU (1501-2500 g)	-	15.2 (10.3-21.5)	13.9 (12.4-15.6)	11.9 (10.2-13.9)
CAUTI rate				
Pooled	8.9 (8.3-9.5)	6.5 (6.1-6.9)	6.3 (6.0-6.5)	6.3 (6.2-6.5)
Medical cardiac ICU	-	6.4 (5.3-7.7)	4.4 (3.5-5.3)	3.7 (3.2-4.3)
Medical-surgical ICU	-	6.6 (6.2-7.0)	6.1 (5.9-6.4)	7.1 (6.9-7.4)
Pediatric ICU	-	4.0 (2.4-6.2)	4.4 (3.6-5.4)	4.7 (4.1-5.5)
VAP rate				
Pooled	24.1 (22.8-25.5)	19.5 (18.7-20.3)	13.6 (13.3-14.0)	15.8 (15.5-16.1)
Medical cardiac ICU	-	20.2 (17.0-23.9)	14.9 (12.4-17.9)	10.8 (9.5-12.3)
Medical-surgical ICU	-	19.8 (14.2-27.1)	14.7 (14.2-15.2)	18.4 (17.9-18.8)
Pediatric ICU	-	7.9 (6.0-10.1)	5.5 (4.9-6.0)	6.5 (5.9-7.1)
Neonatal ICU (1501-2500 g)	-	6.68 (3.0-12.7)	9.50 (7.9-11.3)	10.1 (7.9-12.8)

CI, confidence interval.

Acknowledgment

We thank the many health care professionals at each member hospital who assisted with the surveillance in their hospital, including the surveillance nurses, clinical microbiology laboratory personnel, and physicians and nurses providing care for patients during the study; Mariano Vilar, Debora Lopez Burgardt, and Alejo Ponce de Leon at INICC headquarters in Buenos Aires for their hard work and commitment to achieving INICC goals; INICC country coordinators (Altaf Ahmed, Carlos A. Álvarez Moreno, Apisarntharak Anucha, Luis E. Cuéllar, Bijie Hu, Hakan Leblebicioglu, Eduardo A. Medeiros, Yatin Mehta, Lul Raka, Toshihiro Mitsuda, and Virgilio Bonilla Sanchez); the INICC Advisory Board (Carla J. Alvarado, Gary L. French, Nicholas Graves, William R. Jarvis, Patricia Lynch, Dennis Maki, Russell N. Olmsted, Didier Pittet, Wing Hong Seto and William Rutala), who have so generously supported this unique international infection control network; and especially Patricia Lynch, who inspired and supported us to follow our dreams despite obstacles.

References

- Rosenthal VD, Guzman S, Orellano PW. Nosocomial infections in medical-surgical intensive care units in Argentina: attributable mortality and length of stay. *Am J Infect Control* 2003;31:291-5.
- Rosenthal VD, Guzman S, Crnich C. Device-associated nosocomial infection rates in intensive care units of Argentina. *Infect Control Hosp Epidemiol* 2004;25:251-5.
- Rosenthal VD, Maki DG, Salomao R, et al. Device-associated nosocomial infections in 55 intensive care units of 8 developing countries. *Ann Intern Med* 2006;145:582-91.
- Ramirez Barba EJ, Rosenthal VD, Higuera F, et al. Device-associated nosocomial infection rates in intensive care units in four Mexican public hospitals. *Am J Infect Control* 2006;34:244-7.
- Moreno CA, Rosenthal VD, Olarte N, et al. Device-associated infection rate and mortality in intensive care units of 9 Colombian hospitals: findings of the International Nosocomial Infection Control Consortium. *Infect Control Hosp Epidemiol* 2006;27:349-56.
- Leblebicioglu H, Rosenthal VD, Arikan OA, et al. Device-associated hospital-acquired infection rates in Turkish intensive care units: findings of the International Nosocomial Infection Control Consortium (INICC). *J Hosp Infect* 2007;65:251-7.
- Mehta A, Rosenthal VD, Mehta Y, et al. Device-associated nosocomial infection rates in intensive care units of seven Indian cities: findings of the International Nosocomial Infection Control Consortium (INICC). *J Hosp Infect* 2007;67:168-74.
- Salomao R, Rosenthal VD, Grimberg G, et al. Device-associated infection rates in intensive care units of Brazilian hospitals: findings of the International

- Nosocomial Infection Control Consortium. *Rev Panam Salud Publica* 2008;24:195-202.
- Cuellar LE, Fernandez-Maldonado E, Rosenthal VD, et al. Device-associated infection rates and mortality in intensive care units of Peruvian hospitals: findings of the International Nosocomial Infection Control Consortium. *Rev Panam Salud Publica* 2008;24:16-24.
- Rosenthal VD, Maki DG, Mehta A, et al. International Nosocomial Infection Control Consortium report, data summary for 2002-2007, issued January 2008. *Am J Infect Control* 2008;36:627-37.
- Pawar M, Mehta Y, Purohit A, Trehan N, Rosenthal VD. Resistance in gram-negative bacilli in a cardiac intensive care unit in India: risk factors and outcome. *Ann Card Anaesth* 2008;11:20-6.
- Madani N, Rosenthal VD, Dendane T, Abidi K, Zeggwagh AA, Abouqal R. Healthcare-associated infection rates, length of stay, and bacterial resistance in an intensive care unit of Morocco: findings of the International Nosocomial Infection Control Consortium (INICC). *Int Arch Med* 2009;2:29.
- Rosenthal VD, Maki DG, Jamulitrat S, et al. International Nosocomial Infection Control Consortium (INICC) report, data summary for 2003-2008, issued June 2009. *Am J Infect Control* 2010;38:95-104.
- Navoa-Ng JA, Berba R, Arreza-Galapia Y, et al. Device-associated infection rates in adult, pediatric and neonatal intensive care units of hospitals from the Philippines: International Nosocomial Infection Control Consortium (INICC) findings. *Am J Infect Control*; 2011. in press.
- Guanche-Garcell H, Requejo-Pino O, Rosenthal VD, Morales-Pérez C, Delgado-González O, Fernández-González D. Device-associated infection rates in adult intensive care units of Cuban university hospitals: International Nosocomial Infection Control Consortium (INICC) findings. *Int J Infect Dis*; 2011. in press.
- Kanj SS, Nada Z, Rosenthal VD, Nisreen S, Lamia A, Zeina K. Device-associated infections rate in an intensive care unit of a Lebanese university hospital: International Nosocomial Infection Control Consortium (INICC) findings. *J Global Infect Dis*; 2011. in press.
- Dueñas L, Bran-de-Casares A, Rosenthal VD, Jesús ML. Device-associated infections rates in ICUs from El Salvador: INICC findings. *J Infect Devel Countries*; 2011. in press.
- Edwards JR, Peterson KD, Andrus ML, Dudeck MA, Pollock DA, Horan TC. National Healthcare Safety Network (NHSN) report, data summary for 2006 through 2007, issued November 2008. *Am J Infect Control* 2008;36:609-26.
- Horan TC, Andrus M, Dudeck MA. CDC/NHSN surveillance definition of health care-associated infection and criteria for specific types of infections in the acute care setting. *Am J Infect Control* 2008;36:309-32.
- Emori TG, Culver DH, Horan TC, et al. National Nosocomial Infections Surveillance System (NNIS): description of surveillance methods. *Am J Infect Control* 1991;19:19-35.
- Rosenthal VD, Udwardia FE, Munoz HJ, et al. Time-dependent analysis of extra length of stay and mortality due to ventilator-associated pneumonia in intensive-care units of ten limited-resources countries: findings of the International Nosocomial Infection Control Consortium (INICC). *Epidemiol Infect*; 2011:1-7.
- Barnett AG, Graves N, Rosenthal VD, Salomao R, Rangel-Frausto MS. Excess length of stay due to central line-associated bloodstream infection in intensive care units in Argentina, Brazil, and Mexico. *Infect Control Hosp Epidemiol* 2010;31:1106-14.
- Rosenthal VD, Dwivedy A, Calderon ME, et al. Time-dependent analysis of length of stay and mortality due to urinary tract infections in ten developing countries: INICC findings. *J Infect* 2010;62:136-41.

24. Barnett AG, Beyersmann J, Allignol A, Rosenthal VD, Graves N, Wolkewitz M. The time-dependent bias and its effect on extra length of stay due to nosocomial infection. *Value Health* 2011;14:381-6.
25. Rosenthal VD, Maki DG, Graves N. The International Nosocomial Infection Control Consortium (INICC): goals and objectives, description of surveillance methods, and operational activities. *Am J Infect Control* 2008;36:e1-e12.
26. Garner JS, Jarvis WR, Emori TG, Horan TC, Hughes JM. CDC definitions for nosocomial infections, 1988. *Am J Infect Control* 1988;16:128-40.
27. Hidron AI, Edwards JR, Patel J, et al. NHSN annual update: antimicrobial-resistant pathogens associated with healthcare-associated infections. Annual summary of data reported to the National Healthcare Safety Network at the Centers for Disease Control and Prevention, 2006-2007. *Infect Control Hosp Epidemiol* 2008;29:996-1011.
28. Hughes JM. Study on the efficacy of nosocomial infection control (SENIC Project): results and implications for the future. *Chemotherapy* 1988;34:553-61.
29. Rosenthal VD. Health care-associated infections in developing countries. *Lancet* 2011;377:186-8.
30. Allegranzi B, Bagheri Nejad S, Combescurie C, et al. Burden of endemic health care-associated infection in developing countries: systematic review and meta-analysis. *Lancet* ;377:228-41.
31. World Bank. The World Bank list of economies. Available from: <http://www.worldbank.org/>. Accessed May 12, 2010.
32. Rosenthal VD, Lynch P, Jarvis RW, et al. Socioeconomic impact on device-associated infections in limited-resource neonatal intensive care units: findings of the INICC. *Infection* 2011; in press.
33. Rosenthal VD, McCormick RD, Guzman S, Villamayor C, Orellano PW. Effect of education and performance feedback on handwashing: the benefit of administrative support in Argentinean hospitals. *Am J Infect Control* 2003;31:85-92.
34. Rosenthal VD, Guzman S, Pezzotto SM, Crnich CJ. Effect of an infection control program using education and performance feedback on rates of intravascular device-associated bloodstream infections in intensive care units in Argentina. *Am J Infect Control* 2003;31:405-9.
35. Rosenthal VD, Guzman S, Safdar N. Effect of education and performance feedback on rates of catheter-associated urinary tract infection in intensive care units in Argentina. *Infect Control Hosp Epidemiol* 2004;25:47-50.
36. Higuera F, Rosenthal VD, Duarte P, Ruiz J, Franco G, Safdar N. The effect of process control on the incidence of central venous catheter-associated bloodstream infections and mortality in intensive care units in Mexico. *Crit Care Med* 2005;33:2022-7.
37. Rosenthal VD, Guzman S, Safdar N. Reduction in nosocomial infection with improved hand hygiene in intensive care units of a tertiary care hospital in Argentina. *Am J Infect Control* 2005;33:392-7.
38. Rosenthal VD, Guzman S, Crnich C. Impact of an infection control program on rates of ventilator-associated pneumonia in intensive care units in 2 Argentinean hospitals. *Am J Infect Control* 2006;34:58-63.
39. Rosenthal VD, Maki DG, Rodrigues C, et al. Impact of International Nosocomial Infection Control Consortium (INICC) strategy on central line-associated bloodstream infection rates in the intensive care units of 15 developing countries. *Infect Control Hosp Epidemiol* 2010;31:1264-72.

APPENDIX. INICC MEMBERS, LISTED BY COUNTRY ALPHABETICALLY

Argentina: María Laura Frías, Griselda Churrarín (Clínica Modelo de Lanús, Lanús); Daniel Sztokhamer (Clínica Estrada, Buenos Aires); Luis Pedro Flynn, Diego Rausch, Alejandro Spagnolo (Sanatorio Británico, Rosario); Beatriz Santero, Luisa C. Soroka (Hospital Interzonal General de Agudos Evita, Lanús); Silvia Forciniti, Marta Blasco, Carmen B. Lezcano (Hospital Interzonal General de Agudos Pedro Fiorito, Avellaneda); Carlos Esteban Lastra (Hospital Narciso López, Lanús); Miguel Ángel Fernández Bedoya, Adrián Costamagna, Gustavo Ruiz Dheza, Jorge Ávalos, Marcelo Álvarez (Centro Médico Bernal, Buenos Aires); Guillermo Bencheit, Claudio Bonaventura, María de los Ángeles Caridi, Adriana Messina, Beatriz Ricci (Centro Gallego de Buenos Aires, Buenos Aires); Mónica Viegas, Beatriz Marta Alicia Di Núbila, Diana Lanzetta, Leonardo J. Fernández, María Adelaida Rossetti, Adriana Romani, Claudia Migazzi, Clarisa Barolin, Estela Martínez (Hospital Interzonal General de Agudos Presidente Perón, Avellaneda); Marisa Liliana Bernan, María Rosa Bay, Flavia Ruiz Diaz (HGZA San Roque de Gonnet, La Plata); Claudia Beatriz Dominguez, Gloria Ester Coria, María Elena Martinelli (Obra Social de Empleados Públicos Sanatorio Fleming, Mendoza)

Brazil: Gorki Grinberg, Iselde Buchner Ferreira, Raquel Bauer Cechinel (Hospital General Porto Alegre, Porto Alegre); Bruna

Boaria Zandrea, Carolina Rohnkohl, Marcos Regalin: (Hospital Sao Miguel, Joaçaba/SC); Jamile Leda Spessatto, Ricardo Scopel Pasini, Shaline Ferla (Hospital Universitario Santa Teresina, Joaçaba/SC); (Maternidade e Hospital D'ia Santa Luíza, Balneario Camboriú); Reinaldo Salomao, Maria Ângela Maretti da Silva, Clélia Heloísa de Jesus Silva, Margarete Vilins, Sergio Blecher (Hospital Santa Marcelina, São Paulo); Daniela Bicudo Angelieri (Hospital São Paulo, São Paulo); Ricardo de Souza Kuchenbecker, Márcia Rosane Pires, Rodrigo Pires dos Santos, Nádia Mora Kuplich (Hospital de Clínicas de Porto Alegre, Porto Alegre); Eraci Maria Onzi Siliprandi, Rodrigo Pires dos Santos (Instituto de Cardiologia do Rio Grande do Sul, Porto Alegre); Raquel Bauer Cechinel, Angélica Peres Do-Amaral (Complexo Hospitalar Santa Casa de Porto Alegre, Porto Alegre); Cristiane Pavanello Rodrigues Silva, María Lucia Neves Biancalana (Hospital Samaritano, São Paulo); Tarquino Erástides G. Sánchez, Roberto Valente, Daniele Apolinário (Hospital Anchieta LTDA, Taguatinga); Luiz Fernando Baqueiro Freitas, Maria Cecilia Imori dos Santos (Hospital Santa Lydia, Ribeirao Preto); Julia Marcia Maluf Lopes, Paula Cristina Pinto Valadares, Joana Paula Batista, María Aparecida dos Santos Campos (Hospital Infantil João Paulo II- FHEMIG, Belo Horizonte); María Luiza Moretti, Luiz Gustavo Cardoso, Alinio Trabaos (Hospital de Clínicas FCM-UNICAMP, Campinas); Ianick Souto Martins, Patricia Tavares Dos Santos, Debora Otero Brjtto Passos Pinheiro, Juliana Silva De Abreu, (Hospital do Câncer/ Instituto Nacional do Câncer, Rio de Janeiro); Rosana Richtmann, Tatiana Rodríguez, Sandra Regina Baltieri (Hospital Maternidade Santa Joana, São Paulo); Marina Moreira, Gabriela Fagundes Stadtlober, Adriana Giunta Cavaglieri (Hospital Universitario de Taubate, Taubaté)

Bulgaria: D. Karadimov, V. Velinova (Queen Joana, Sofia)

China: Jin Ai Qin, Huang Juan, Huang Chun Fang (First Affiliated Hospital of Guangxi Medical University, Nanning); Xiandong Gao, Tao Lili (Zhongshan Hospital, Shanghai); Suo Yao, Wang Hungmei (The Second Affiliated Hospital of Xi'an Jiaotong University, Medical College, Xi'an); Cao Bin, Li Ruisheng (Chaoyang Hospital, Beijing); Yun Yang (The First Affiliated Hospital Shanxi Medical University, Tai Yuan); Yeguxiang (Yangpu Hospital, Shanghai); Xu Ziqin, Wu Hong Mei, Gao Sheng Chun (Third People's Hospital of Wenzhou, Wenzhou); Xuesong Yang (Peking University Third Hospital, Beijing); Aiguo Gan (Zhongshan Hospital Cancer Center, Shanghai); Aiguo Zhang, Jiangmeng Luo (Songjian Hospital Affiliated to Shanghai Jiaotong University School of Medicine, Shanghai); Aihua Zhao, Fenghong Li (Zhabei District Central Hospital, Shanghai); Baozheng Liu, Meiying Gao (Jinshan Central Hospital, Shanghai); Bo Zhao, Ling Wei (Huashan Hospital Baoshan Fudan University, Shanghai); Chuanqing Wang, Lanzhi Fang (Children's Hospital of Fudan University, Shanghai); Chuntao Yi, Xiaoling Xie (Shanghai Eighth People's Hospital, Shanghai); Fang Ling, Yuxin Wu (Zhongshan Hospital Qingpu Branch, Shanghai); Fangrui Xu, Fang Feng (Minhang District Central Hospital, Shanghai); Fangyi Weng, Guihong Dong (Longhua Hospital, Shanghai); Guxiang Ye, Wenwei Yang (Yangpu District Central Hospital, Shanghai); Hong Yu, Huiying Yang (Shanghai Tenth People's Hospital, Shanghai); Huafang Yan, Aihua Mao (Nanhui District Central Hospital, Shanghai); Huamin Zhou, Wei Chen (Baogang Hospital Attached No. 2 Shanghai Medical University, Shanghai); Huang Gong (Shanghai Post and Tele Hospital, Shanghai); Huifang Tan, Yanping Liu (Shanghai Gongli Hospital, Shanghai); Huiping Wu, Dongping Tang (Changning Center Hospital, Shanghai); Jianguo Hao, Hongyu Zhang (Shanghai Seventh People's Hospital, Shanghai); Jianguo Wang, Youdi Qiu (Jinshan Hospital, Fudan University, Shanghai); Jianhua Yu, Xiaohong Gu (Shanghai Municipal Hospital of Traditional Chinese Medicine, Shanghai); Jianxin Jiang, Min Zhang (Shanghai East Hospital, Tongji University, Shanghai); Jin Miu,

- 1151 Wenqi Zhao (Huangpu District Central Hospital, Shanghai); Junfeng
1152 Shi, Lei Li (Xinhua Hospital of Shanghai Second Medical University,
1153 Shanghai); Kewei Duo, Lixia Cai (Fudan University Shanghai Cancer
1154 Center, Shanghai); Lei Liu (Shanghai Peoples Armed Police Corps
1155 Hospital, Shanghai); Li Li, Lei Hua (Shanghai No. 6 People's Hospital,
1156 Shanghai); Qihui Shao, Yi An (Tongji Hospital Of Tongji University,
1157 Shanghai); Qing Lu, Guanghui Li (Shanghai Huashan Hospital,
1158 Shanghai); Rui Zheng Sun, Haichun Yu (Pla No. 411 Hospital,
1159 Shanghai); Weiming Zhang, Zhenmei Tao (Jiading District Central
1160 Hospital of Shanghai, Shanghai); Weixiu Wang, Yimian Shen (Putuo
1161 District Center Hospital, Shanghai); Wenji Fan, Haiwei Chen
1162 (Shanghai First People's Hospital, Shanghai); Xiaoping Yao, Hui
1163 Wen (Jian'an District Center Hospital Of Shanghai, Shanghai);
1164 Xudong Xiong, Hongmei Xu (Shuguan Hospital, Shanghai); Xueqing
1165 Liu, Mingmin Huang (Shanghai St Luck's Hospital, Shanghai);
1166 Xuewen Wang, Guangnan Shao (Yueyan Hospital of Intergrated
1167 Traditional Chinese and Western Medicine, Shanghai); Yanling
1168 Yuan, Yan Cao (Shanghai People's Hospital Baoshan Branch,
1169 Shanghai); Yanyin Chen, Xiaomei Chen (Shanghai Xuhui Central
1170 Hospital, Shanghai); Yaping Gu, Laifeng Zhu (Renji Hospital
1171 Chongming Branch, Shanghai); Yaping Huang, Meijuan Wang
1172 (Shanghai Second People's Hospital, Shanghai); Yaping Wang, Ying
1173 Shen (Fifth People's Hospital of Shanghai, Fudan University,
1174 Shanghai); Yindi Wu, Yanhua Mao (Shanghai Pulmonary Hospital,
1175 Shanghai); Yinling Cheng, Chunjiang Zhao (Changhai Hospital of
1176 Shanghai, Shanghai); Yongli Sun, Biqing Zhu (Yangpu East Hospital,
1177 Shanghai); Yulan Sun, Mingzheng Cai (Hospital of the Second
1178 Military Medical University, Shanghai); Yun Zhang, Min Xue
1179 (Shanghai Jiangong Hospital, Shanghai); Yunfang Zhou, Ruhui
1180 Zhang (Shanghai Children's Medical Center, Shanghai); Yuping Du,
1181 Dongmei Li (Shanghai Tcm-Integrated Hospital, Shanghai); Yuxing
1182 Ni, Lijun Zhang (Rui Jin Hospital, Shanghai Jiao Tong University
1183 School of Medicine, Shanghai); Zhiqiong Zhong, Guoming Zhu
1184 (Putuo District People's Hospital, Shanghai); Zhizhen Yu, Minhua
1185 Cao (Huadong Hospital Affiliated to Fudan University, Shanghai);
1186 Zhongxian Song, Jiali Xu (455th Hospital of People's Liberation
1187 Army, Shanghai); Zimei Tong, Peihua Gu (International Peace
1188 Maternity and Children's Hospital of the China Welfare Institute,
1189 Shanghai)
- 1190 **Colombia:** Julio Garzón Agudelo (Hospital Videlmédica,
1191 Bogotá); Otto Sussmann, Beatriz Eugenia Mojica (Clínica Nueva,
1192 Bogotá); Catherine Rojas, Humberto Beltran, Jerson Paez (Centro
1193 Policlínico del Olaya, Bogotá); Wilmer Villamil Gómez, Luis Dajud,
1194 Mariela Mendoza, Patrick Arrieta (Clínica de la Sabana, Sucre);
1195 Laline Osorio (Hospital Simón Bolívar ESE, Bogotá); Narda Olarte,
1196 Alberto Valderrama (Hospital El Tunal ESE, Bogotá); Heidi Johanna
1197 Muñoz (Clínica Reina Sofía, Bogotá); Nayide Barahona Guzmán,
1198 Marena Rodríguez Ferrer, Guillermo Sarmiento Villa, Alfredo
1199 Lagares Guzmán (Universidad Simón Bolívar, Barranquilla); Claudia
1200 Linares (Hospital Universitario San Ignacio, Universidad Pontificia
1201 Javeriana, Bogotá); Lorena Matta Cortés, Luis Fernando Rendon
1202 Campo (Corporación Comfenalco Valle-Universidad Libre, Santiago
1203 de Cali); Wilmer Villamil Gómez, Antonio Menco, Patrick Arrieta
1204 (Clínica Santa María, Sucre); María Eugenia Rodríguez Calderón
1205 (Hospital La Victoria, Bogotá); Dr Edwin Chapeta Parada (Hospital
1206 San Vicente de Arauca, Arauca); Ana María Pérez Fernandez, Ivan
1207 Francisco Pinilla Martínez, Paula Andrea Martínez Saleg (Clínica
1208 Central Del Quindío, Armenia); Yazmín León Vega, Elkin Lemos
1209 Luengas, Carolina Romero Ramos (Clínica del Occidente, Bogotá);
1210 Herlidia Taboada Hernández (Hospital de San José, Bogotá); David
1211 Yepes Gomez, Bernarda Maria Vergara Gomez, Marcel Gaviria Ruiz
1212 (Clínica CES, Medellín); Juan Carlos Torres Millán, Moisés Ulises
1213 Torres López (UCI Valle de San Nicolás, Antioquia). Edwin Chapeta
1214 Parada, Andrés Eduardo Mindiola Rochel (Hospital San Vicente de
1215 Arauca, Arauca)
- Costa Rica:** Rosalía Fernández Hidalgo, Juan Manuel Aragón
1216 Calzada, Gabriel Muñoz, Adela Ruiz Argüello (Hospital Clínica BÍ-
1217 blica, San José); (Hospital Hotel La Católica, San José)
1218
Cuba: Clara Morales Pérez (Hospital Docente Clínico Quirúrgico
1219 "Joaquín Albarrán Domínguez," La Habana); Osiel Requejo Pino,
1220 Orlando Delgado González, Dania Fernández González (Hospital
1221 Universitario Gral Calixto García, La Habana)
1222
Dominican Republic: Carolina Martínez Rodríguez de Wang,
1223 Ramona Severino, Gilda Tolari (Santo Domingo)
1224
Ecuador: Jorge Washington Vélez, Mario Alejandro Cadena
1225 Zapata, Marcia Jacqueline Valle, Silvia Guayasamín (Hospital
1226 Eugenio Espejo, Quito)
1227
Egypt: Zeinab Salah Seliem, El Kholy Amani Ali, Doaa Abdel-Aziz
1228 (Abo El Reesh, Cairo); Muhamed Abd El Sabour, Mahmoud Kalil,
1229 Adel Saeed, Maha El Gafarey, Lamia Fouad, Tamer Muhamed, Hedya
1230 Saeed (Ain Shams Faculty of Medicine, Cairo)
1231
El Salvador: Ana Concepción Bran de Casares, Lilian de Jesús
1232 Machuca (Hospital Nacional de Niños Benjamin Bloom, San
1233 Salvador)
1234
Greece: Kalliopi Chaniotaki, Constantinos Tsioutis, Dimitris
1235 Bampalis (University Hospital of Heraklion, Heraklion)
1236
India: Ramachandran Gopinath, Nallagonda Ravindra (Nizam
1237 Institute of Medical Sciences, Hyderabad); Anil Karlekar (Escorts
1238 Heart Institute and Research Centre, New Delhi); Sanjeev Sood,
1239 Neeru Verma (Military Hospital, Jodhpur); Nagamani Sen, Kan-
1240 dasamy Subramani, John Prakash Raj (Christian Medical College,
1241 Vellore); Purva Mathur, Subodh Kumar (JPNA Trauma Centre, All-
1242 India Institute of Medical Sciences, New Delhi); Samir Sahu
1243 (Kalinga Hospital, Bhubaneswar); Deepak Govil, Namita Jaggi,
1244 Shaleen Bhatnagar (Artemis Health Institute, New Delhi); Sheila
1245 Nainan Myatra, Divatia, Rohini Kelkar, Sanjay Biswas, Sandhya Raut,
1246 Sulochana Sampat, Rishi Kumar (Tata Memorial Hospital, Mumbai);
1247 Subhash Kumar Todi, Arpita Bhakta, Mahuya Bhattacharjee (AMRI
1248 Hospitals, Kolkata); Dr Bala Ramachandran (KK Childs Trust
1249 Hospital, Chennai); Murali Chakravarthy, B. N. Gokul, Sukanya R.,
1250 Leema Pushparaj (Wockhardt Hospitals, Bangalore); Sanjeev Singh,
1251 Kavitha Radhakrishnan (Amrita Institute of Medical Sciences and
1252 Research Center, Kochi); F. E. Udwardia, Reshma Ansari, Aruna
1253 Poojary, Geeta Koppikar, Lata Bhandarkar, Shital Jadhav (Breach
1254 Candy Hospital Trust, Mumbai); Arpita Dwivedy, Suvin Shetty,
1255 Sheena Binu (Dr L. H. Hiranandani Hospital, Mumbai); Mandakini
1256 Pawar, Amit Gupta, Narinder Saini (Pushpanjali Crosslay Hospital,
1257 Ghaziabad); Vatsal Kothari, Tanu Singhal, Sweta Shah (Kokilaben
1258 Dhirubhai Ambani Hospital, Mumbai); Camilla Rodrigues, Ashit
1259 Hegd, Farahad Kapadia (PD Hinduja National Hospital and Medical
1260 Research Centre, Mumbai); Preeti Mehta, Pallavi Surase, Vatsal
1261 Kothari (Seth GS Med College, Mumbai); Sathyanarayanan Nar-
1262 ayanan (Malabar Institute of Medical Sciences, Calicut); Nita
1263 Munshi (Ruby Hall Clinic, Pune); Vikram Padbidri, Romini Dawhale,
1264 Sheena Mary Jacobs (Jehangir Hospital, Pune)
1265
Jordan: Najwa Khuri-bulos, Azmi Mahafzah (Jordan University
1266 Hospital, Amman)
1267
Kosovo: Nehat Baftiu, Gazmend Spahija (National University
1268 Clinical Center of Kosovo, Prishtina)
1269
Lebanon: Nada Zahreddine, Lamia Alamuddin, Zeina Kanafani
1270 (American University of Beirut Medical Center, Beirut)
1271
Lithuania: Algirdas Dagys, Tomas Kondratas (Hospital of Kaunas
1272 University of Medicine, Kaunas); Rimantas Kevalas (Kaunas
1273 University of Medicine, Children's Clinic, Kaunas)
1274
Macedonia: Tanja Anguseva, Vilma Ampova, Snezana Tufek-
1275 cievaska Guroska (Filip II Special Hospital for Surgery, Skopje)
1276
Malaysia: Jegathesan Manikavasagam, Lian Huat Tan, Kerinjeet
1277 Kaur (Sunway Medical Centre Berhad and Monash University
1278 Sunway Campus, Petaling Jaya); Ojan Assadian, Roswitha Wolfram,
1279 Paramjit Kaur (Prince Court Medical Center, Kuala Lumpur)
1280

- 1281 **Mexico:** Martha Sobreyra Oropeza (Hospital de la Mujer, México
1282 DF); Alberto Armas Ruiz, Roberto Campuzano, Jorge Mena Brito
1283 (Centro Médico La Raza IMSS, México DF); Irma Pérez Serrato,
1284 Martha Sánchez López (Hospital General de la Celaya, Celaya);
1285 Héctor Torres Hernández, Amalia Chávez Gómez, Jaime Rivera
1286 Morales, Julián Enrique Valero Rodríguez (Hospital General de
1287 Irapuato, Irapuato); Jorge Horacio Portillo Gallo, Fernando Aguilera
1288 Almazán, Gaspar Iglesias Miramontes, Ma Del Rosario Vázquez
1289 Olivas, Alicia Sánchez Chávez, Yolcey Angulo Espinoza (Hospital
1290 CIMA Chihuahua, Chihuahua); Lauro Armenta Gallegos, Dr Joaquín
1291 Sánchez González, Alfonso Monjardín Rochín, Marcos José Serrato
1292 Félix (Hospital Gral De Sonora "Dr Ernesto Ramos Bours," Hermo-
1293 sillo); Rafael Díaz Peña, Ana Bertha Zavala Gómez, Carlos Ariel
1294 Espinoza Gutiérrez (Unidad Médica de Alta Especialidad, Hospital
1295 de Pediatría, Guadalajara); María Guadalupe Miranda Novales
1296 (Hospital de Pediatría CMN Siglo XXI, IMSS, México DF); María De
1297 Jesús Herver (Hospital General La Villa, México DF); Jacobo Ayala
1298 Gaytan (Hospital San José-Tec de Monterrey, Monterrey); Jesús A.
1299 Galindo Olmeda (Instituto Mexicano del Seguro Social, Torreón);
1300 Martha Yolanda Martínez-Marroquín, Andrés Hernández, Enrique
1301 Ortíz García, Rafael Venegas Cervantes (Centro Médico "Lic Adolfo
1302 López Mateos," Toluca); Gabriel Arteaga-Troncoso, Fernando M.
1303 Guerra Infante, Iyari Morales Méndez (Instituto Nacional de Peri-
1304 natología, Mexico City), Martha Cecilia Culebro Burguete (Hospital
1305 de Especialidades Pediátricas, Chiapas)
- 1306 **Morocco:** Amina Barkat, Naima Lamdouar Bouazzaoui, Kabiri
1307 Meryem (Children's Hôpital of Rabat, Rabat); Naoufel Madani, Amine
1308 Ali Zeggwagh, Khalid Abidi, Tarek Dendane (Ibn Sina Medical ICU,
1309 Rabat)
- 1310 **Pakistan:** Safdar Ghayur Khan, Farheen Ali (Liaquat National
1311 Hospital, Karachi); Yasser Hussain, Farhana Butt, Ajaz Fakir (Shau-
1312 kat Khanum Cancer Hospital and Research Centre, Lahore); Syed
1313 Faisal Mahmood, Bushra Jamil, Farheen Ali (Aga Khan University
1314 Medical Collage, Karachi); Badaruddin A. Memon, Gul Hassan
1315 Bhutto (Public Sector Hospital Khairpur, Khairpur)
- 1316 **Panama:** Fernando G. Alfaro, Cecilia Alvarado, Luz Marina De
1317 León, Rodolfo Navarro, José Luis Moreno, Rigoberto Cerrad (Clínica
1318 Hospital San Fernando, Panama City)
- 1319 **Peru:** Alex Castañeda Sabogal, Iliana Paredes Goicochea, Abel
1320 Arroyo Sanchez, Guillermo Rios Alva, Jorge García Ventura, Miguel
1321 Ramírez Aguilar, Niler Segura Plasencia, Teófilo Rodríguez (Hospital
1322 Victor Lazarte Echegaray, Trujillo); Eduardo Fernández Maldonado,
1323 Manuel Jesús Mayorga Espichan, Liliana Echenique (Clínica San
1324 Pablo, Lima); Rosa Rosales, Luis Isidro Castillo Bravo, María Linares
1325 Cáceres (Instituto Nacional de Enfermedades Neoplásicas, Lima);
1326 Teodora Atencio Espinoza, Favio Sarmiento López (Hospital
1327 Regional de Pucallpa, Pucallpa); María Edelmira Cruz Saldarriaga,
1328 Eloy U. Villena Morvelí, Herly Barriga, Milena Sánchez Villacorta,
1329 Sandro Castillo Barrios (Hospital Nacional Adolfo Guevara Velasco,
1330 Cusco); Socorro Liliana Torres Zegarra, Nazario Silva Astete, Fran-
1331 cisco Campos Guevara, Carlos Bazan Mendoza., Augusto Valencia
1332 Ramírez, Javier Soto Pastrana (Hospital San Bartolomé, Lima); Fer-
1333 nando Martín Ramírez Wong, Carmen Saman Ángeles, Zoila Díaz
1334 Tavera (Hospital María Auxiliadora, Lima); Eliza Ramirez (ESSALUD
1335 Red Asistencial ANCASH Hospital III, Chimbote); Carlos Enrique La
1336 Hoz Vergara, Liliana Mendoza, Gladys Bonzano Sosa (ESSALUD,
1337 Huancayo); Celene Manga Chávez (Hospital Nacional Cayetano
1338 Heredia de Lima, Lima); Socorro Liliana Torres Zegarra, Nazario
1339 Silva Astete, Dr Francisco Campos Guevara, Dr Carlos Bazan Men-
1340 doza, Augusto Valencia Ramírez, Dr Javier Soto Pastrana (Hospital
1341 Nacional Docente Madre Niño San Bartolomé, Lima)
- Philippines:** Regina Berba, Glenn Angelo S. Genuino, Rafael J. Consunji, Jacinto Blas V. Mantaring III (Philippine General Hospital, Manila); Victoria D. Villanueva, María Corazon V. Tolentino (St. Luke's Medical Center, Quezon City); Yolanda Arreza Galapia (Infection Control Team of National Kidney and Transplant Institute, Quezon City)
- Singapore:** Paul Anantharajah Tambyah (National University Hospital, Singapore)
- Saudi Arabia:** Ahmed Hakawi (King Fahad Medical City, Riyadh)
- Sri Lanka:** Nishanthi Nawamalika Kaluarachchi, Geethani Anuruddika Samaraweera (Sri Jayewardenepura General Hospital, Nugegoda)
- Sudan:** Ibrahim M. Sid Ahmed Ali, Asim A. Satti (Bahry Accident and Emergency Hospital, Khartoum)
- Thailand:** Silom Jamulitrat (Songklanagarind Hospital, Songkla); Visanu Thamlikitkul (Siriraj Hospital, Mahidol University, Bangkok)
- Tunisia:** Khaldi Ammar, Asma Hamdi (Hôpital d'Enfants, Tunis)
- Turkey:** Recep Öztürk, Yalim Dikmen, Gökhan Aygün (Istanbul University Cerrahpasa Medical School, Istanbul); Sercan Ulusoy, Bilgin Arda, Feza Bacakoglu (Ege University Medical Faculty, Izmir); Yesim Cetinkaya Sardan, Gonul Yildirim, Arzu Topeli (Hacettepe University School of Medicine, Ankara); Özyay Arıkan Akan, Melek Tulunay, Mehmet Oral, Necmettin Ünal (Ankara University School of Medicine Ibni-Sina Hospital, Ankara); Emine Alp, Bilgehan Aygen (Erciyes University, Faculty of Medicine, Kayseri); Fatma Sirmatel, Mustafa Cengiz, Leyla Yilmaz (Harran University, Faculty of Medicine, Sanliurfa); Asu Özgültekin, Gül-dem Turan, Nur Akgün (Haydarpasa Hospital, Istanbul); Davut Ozdemir, Ertugrul Guclu, Selvi Erdogan (Duzce Medical School, Duzce); Nurettin Erben, Ilhan Ozgunes, Gaye Usluer (Eskisehir Osmangazi University, Eskisehir); Canan Aygun, Sukru Küçüködük (Ondokuz Mayıs University Medical School (Neo), Samsun); Dilek Arman, Kenan Hizel (Gazi University Medical School, Ankara); Cengiz Uzun (German Hospital, Istanbul); Huseyin Turgut, Suzan Sacar, Hülya Sungurtekin, Doğaç Uğurcan (Pamukkale University, Denizli); İftihar Koksall, Gürdal Yılmaz, Selçuk Kaya, Hülya Ulusoy (Karadeniz Technical University School of Medicine, Trabzon); Gulden Ersoz, Ali Kaya, Necdet Kuyucu (Mersin University, Faculty of Medicine, Mersin); Saban Esen, Fatma Ulger, Ahmet Dilek (Ondokuz Mayıs University Medical School, Samsun); A. Nevzat Yalcin, Ozge Turhan, Sevim Keskin, Eylul Gumus, Oguz Dursun (Akdeniz University, Antalya); Tanil Kendirli, Erdal Ince, Ergin Cliftci, Halil Özdemir (Ankara University School of Medicine, Ankara); A. Pekcan Demiroz, M. Arzu Yetkin, Cemal Bulut, F. Sebnem Erdinc, Cigdem Ataman Hatipoglu (Ankara Training and Research Hospital, Ankara); F. Sebnem Erdinc (Health Ministry Ankara Training and Research Hospital, Ankara); Ayse Erbay (Turkiye Yuksek Ihtisas Education and Research Hospital, Ankara); Ayse Willke, Meliha Meric, Emel Azak (Kocaeli University Faculty of Medicine, Kocaeli); Oral Oncul, Tuncer Haznedaroglu, Levent Gorenek, Ali Acar (Gulhane Military Medical Academy, Haydarpasa Training Hospital, Istanbul)
- Uruguay:** Eduardo Silvera, Silvia Techera, Adrián Frachia, Gabriela Algorta (Centro Hospitalario Pereira Rosell Bouar, Montevideo)
- Venezuela:** Zenaida Durán Gil de Añez, Luis Montes Bravo, Nelva Orozco, Eugenia Mejías (Hospital Militar Dr Carlos Arvelo, Caracas)
- Vietnam:** Dang Thi Van Trang, Thai Thi Kim Nga, Pham Hong Zruong (Cho Ray Hospital, Ho Chi Minh City)