“Surgical Site Infection Rates: INICC Findings”

Dr. Victor D. Rosenthal, MD, MSC, CIC
INICC Founder and Chairman
victor_rosenthal@inicc.org
Burden of endemic health-care-associated infection in developing countries: systematic review and meta-analysis

Benedetta Allegranzi, Sepideh Bagheri Nejad, Christophe Combescure, Wilco Graafmans, Homa Attar, Liam Donaldson, Didier Pittet

Summary

Background Health-care-associated infection is the most frequent result of unsafe patient care worldwide, but few data are available from the developing world. We aimed to assess the epidemiology of endemic health-care-associated infection in developing countries.

Methods We searched electronic databases and reference lists of relevant papers for articles published 1995–2008. Studies containing full or partial data from developing countries related to infection prevalence or incidence—including overall health-care-associated infection and major infection sites, and their microbiological cause—were selected. We classified studies as low-quality or high-quality according to predefined criteria. Data were pooled for analysis.

Findings Of 271 selected articles, 220 were included in the final analysis. Limited data were retrieved from some regions and many countries were not represented. 118 (54%) studies were low quality. In general, infection frequencies reported in high-quality studies were greater than those from low-quality studies. Prevalence of health-care-associated infection (pooled prevalence in high-quality studies, 15·5 per 100 patients [95% CI 12·6–18·9]) was much higher than proportions reported from Europe and the USA. Pooled overall health-care-associated infection density in adult intensive-care units was 47·9 per 1000 patient-days (95% CI 36·7–59·1), at least three times as high as densities reported from the USA. Surgical-site infection was the leading infection in hospitals (pooled cumulative incidence 5·6 per 100 surgical procedures), strikingly higher than proportions recorded in developed countries. Gram-negative bacilli represented the most common nosocomial isolates. Apart from meticillin-resistant Staphylococcus aureus isolates (in eight studies), very few articles reported antimicrobial resistance.

Interpretation The burden of health-care-associated infection in developing countries is high. Our findings indicate a need to improve surveillance and infection-control practices.

Funding World Health Organization.
The burden of endemic health care-associated infection in low- and middle-income countries

- **Box plots contain results for first and third quartile. Medians are indicated as a black line. Whiskers indicate lower and upper limits of distribution.**
- **Incidence**

---

**Figure**

Comparison of device-associated infection densities in adult ICUs from developed and developing countries, 1995–2008.

Victor D. Rosenthal, MD; Rosana Richtmann, MD; Sanjeev Singh, MD; Anucha Apisarnthanarak, MD; Andrzej Kübler, MD; Nguyen Viet-Hung, MD; Fernando M. Ramírez-Wong, MD; Jorge H. Portillo-Gallo, MD; Jessica Toscani, MD; Achilleas Gikas, MD; Lourdes Dueñas, MD; Amani El-Kholy, MD; Sameeh Ghazal, MD; Dale Fisher, MD; Zan Mitrev, MD; May Osman Gamar-Elanbya, MD; Souha S. Kanj, MD; Yolanda Arreza-Galapia, MD; Hakan Leblebicioglu, MD; Soňa Hlinková, MD; Badaruddin A. Memon, MD; Humberto Guanche-Garcell, MD; Vaidotas Gurskis, MD; Carlos Álvarez-Moreno, MD; Amina Barkat, MD; Nepomuceno Mejía, MD; Magda Rojas-Bonilla, MD; Goran Ristic, MD; Lul Raka, MD; Cheong Yuet-Meng, MD on behalf of the International Nosocomial Infection Control Consortium
RESULTS:

- The collected data amounted to 260,973 surgical procedures.

- Most of INICC SSI rates were 2 to 5 times statistically significantly higher in international hospitals than in USA (CDC) report, such as the following:
SSI rates: Comparing CDC-NHSN (USA) and International data (INICC)

AAA: Abdominal Aortic Aneurysm Repair
AMP: Limb Amputation
APPY: Appendectomy
BILI: Bile duct, liver or pancreatic surgery
BRST: Biliary, renal or stomach surgery
CBGC: CABG-Chest only
CARD: Cardiac surgery
CHOL: Cholecystectomy
COLO: Colon Surgery
CRAN: Craniotomy
CSEC: Cesarean section

CDC-NNIS/NHSN vs INICC SSI rates for various procedures.
SSI rates: Comparing CDC-NHSN (USA) and International data (INICC)

FUSN: Spinal fusion
FX: Open Reduction of Fracture
GAST: Gastric surgery
HER: Herniorrhaphy
HPRO: Hip prosthesis
HYST: Abdominal hysterectomy
KPRO: Knee prosthesis
LAM: Laminectomy
NECK: Neck surgery
NEPH: Kidney surgery
SSI rates: Comparing CDC-NHSN (USA) and International data (INICC)

<table>
<thead>
<tr>
<th>Procedure</th>
<th>CDC-NNIS/NHSN</th>
<th>INICC</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRST: Prostatectomy</td>
<td>1.2%</td>
<td>2.1%</td>
</tr>
<tr>
<td>PVBY: Peripheral vascular bypass surgery</td>
<td>2.5%</td>
<td>6.7%</td>
</tr>
<tr>
<td>REC: Rectal surgery</td>
<td>2.3%</td>
<td>7.4%</td>
</tr>
<tr>
<td>SB: Small bowel surgery</td>
<td>6.1%</td>
<td>5.5%</td>
</tr>
<tr>
<td>SPLE: Spleen surgery</td>
<td>6.1%</td>
<td>5.6%</td>
</tr>
<tr>
<td>THOR: Thoracic surgery</td>
<td>2.3%</td>
<td>1.1%</td>
</tr>
<tr>
<td>THYR: Thyroid and/or parathyroid surgery</td>
<td>0.3%</td>
<td>0.9%</td>
</tr>
<tr>
<td>VHYS: Vaginal Hysterectomy</td>
<td>0.9%</td>
<td>2.0%</td>
</tr>
<tr>
<td>VSHN: Ventricular shunt</td>
<td>2.0%</td>
<td>5.6%</td>
</tr>
<tr>
<td>XLAP: Exploratory abdominal surgery</td>
<td>4.1%</td>
<td>12.9%</td>
</tr>
</tbody>
</table>

PRST: Prostatectomy  
PVBY: Peripheral vascular bypass surgery  
REC: Rectal surgery  
SB: Small bowel surgery  
SPLE: Spleen surgery  
THOR: Thoracic surgery  
THYR: Thyroid and/or parathyroid surgery  
VHYS: Vaginal Hysterectomy  
VSHN: Ventricular shunt  
XLAP: Exploratory abdominal surgery
Thank you very much

Contact us by email:
online@inicc.org

Contact us in our Web Page:
www.INICC.org

Follow us:
- in facebook in “Hospital Infection INICC”
- in twitter in “@inicc_org”