OUTCOME AND PROCESS SURVEILLANCE

Dr. Victor D. Rosenthal, MD, MSc, CIC
INTERNATIONAL NOSOCOMIAL INFECTION CONTROL CONSORTIUM (INICC)
www.INICC.org

INTERNATIONAL ORGANIZATIONS DEDICATED TO INFECTION CONTROL

INICC Program

• The International Nosocomial Infection Control Consortium (INICC) (www.INICC.org) is a non-profit, open, multi-center, international, collaborative program modeled on the US National Nosocomial Infection Surveillance system (NNIS).

• It is the first international research network, formed in 1998, and is responsible for much national and global progress.

• Founded in Argentina, it is a prospective, targeted, outcome and process surveillance system designed to identify and reduce HAI rates and their consequences in the participating facilities.

INICC Program

• Hospitals review the protocol with their research committees and agree to full participation signing a commitment sheet, and sending it to the INICC central office in Buenos Aires, which then provides analysis and reports monthly, answers questions and augments the tutorial with personal instruction when needed.

INICC Program

• Forms and software designed to record patient data are used for both control patients without HAI and for cases with HAI.

• These patients forms include name, medical record, age, gender, underlying diseases, and severity of illness score at the time of entrance to the ICU. On a daily basis, information regarding temperature, blood pressure, devices days, cultures taken, and presence of clinical pneumonia, antibiotic use, and characteristics of any infection are collected both for cases and controls.

• Thus, by outcome surveillance it is also possible to analyze cases and controls in a prospective cohort nested study.

INICC Program

• INICC employs a multiple-approach strategy combining the following interventions:
  • outcome surveillance;
  • process surveillance;
  • performance feedback;
  • targeted interventions guided by risk factor analysis;
  • cost-effective interventions guided by cost analysis;
  • tutorial for surveillance;
  • training in infection control guidelines application;
  • secretarial and administrative support in entering data and developing charts;
  • scientific data analysis and data interpretation to guide actions;
  • sharing data at scientific meetings and in peer reviewed journals;
  • and cooperating with hospitals and organizations worldwide.

INICC Program

• Forms and software designed to record patient data are used for both control patients without HAI and for cases with HAI.
INICC/IFIC Program

At the same time, process surveillance and performance feedback is done for hand hygiene compliance, vascular and urinary catheter care, and mechanical ventilator care.

INICC Program

In 2005 INICC has joined with the International Federation of Infection Control (IFIC) because both organizations concur on the same vision and mission.
Outcome Surveillance and Process Surveillance

Dr. Victor Rosenthal
A Webber Training Teleclass

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Outcome Surveillance and Process Surveillance
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Outcome surveillance

- Outcome surveillance is the measurement of the rates and consequences of health care-associated infections (HAI), including but not limited to the following few variables: HAI rates, mortality, extra length of stay, attributable cost, and bacterial resistance.

- Development of infection control programs in industrialized countries has been supported by outcome surveillance data. Baseline epidemiology should include the above-mentioned items in order to plan specific targeted interventions, the most relevant one being the HAI rate.

- Surveillance

  Outcome surveillance

  - Outcome surveillance allows evaluation of the cost-effectiveness of specific infection control interventions.

  - It is also used to analyze case control studies in order to establish risk factors, and match patients to find extra cost and mortality. In summary, outcome surveillance is often the infrastructure for management of HAI.

- Surveillance

  Outcome surveillance

  - These industrialized countries report infection rates as DAI per 1000 device days, allowing them to further analyze the impact of specific risk factors and guide their targeted interventions.

  - Developing countries more frequently report percentage (cases over discharges or admissions) of HAI.

- Surveillance

  Outcome surveillance

  - Risk for infection is higher among seriously ill patients who often have several indwelling devices; thus, the higher infection rates in ICUs.

  - Since the denominator of number of device days is unknown, it is impossible to compare rates among the hospitals and the rates are less useful for comparisons of time periods within the same hospital because the specific risk factor is not captured.

- Surveillance

  Outcome surveillance

  - Standards for institutional surveillance have been adopted in the United States, UK, Australia, Canada, Germany, among other countries.

- Surveillance

  Outcome surveillance

  - Outcome surveillance of device-associated infections (DAI) has become an integral feature of infection control and quality assurance in the industrialized countries since more precise assignment of risk is possible.

- Surveillance

  Outcome surveillance

  - Outcome surveillance allows evaluation of the cost-effectiveness of specific infection control interventions.
Sometimes HAI rate is reported as number of infections per 1000 patient days, but again the rates may not be compared because of the lack of appropriate denominators.

Device days were reported in few recent studies and infection rates were calculated by number of infections per 1000 device days following NHSN (formerly NNIS) methodology.

INICC Program

INICC has reported HAI and mortality rates from several participating hospitals that applied both outcome and process surveillance.

Outcome Surveillance

Device Associated Infection Rates

Device-associated nosocomial infection rates in intensive care units in four Mexican public hospitals


CVC-BSI per 1,000 CVC days

CAUTI per 1,000 device days

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Surveillance

Rates of DAI in developing countries were far higher than reported by the NHSN system:

- The overall rate of CVC-associated BSI in the International Nosocomial Infection Control Consortium (INICC) medical-surgical ICUs, 11.4 per 1000 CVC days, is around six-fold higher than the 2 per 1000 CVC-days reported by comparable U.S. ICUs by NHSN.

- The overall rate of CAUTI was also higher, 7.4 as compared with 2 per 1000 catheter-days.

- And the overall rate of VAP was also higher than pooled NNIS rates, 21.4 vs. 4 per 1000 ventilator-days.

There are a number of explanations for the higher rates of DAI representative of developing country ICUs, as previously suggested by several investigators:

- Most developing countries do not have mandatory laws for HAI control programs, and also hospital accreditation is not mandatory. Hand hygiene is highly variable.

- There are very limited funds and resources for infection control, and nurse-to-patient staffing ratios are lower than in most industrialized countries ICUs.

- Use of outdated technology is also a factor: i.e., developing countries use open intravenous infusion and urinary collection systems rather than closed systems that are the standard of care in industrialized countries.
• In developing countries even with different health care systems, generally, the perception is that rates of HAI are low and that compliance with hand hygiene recommendations always occurs. However, frequently, no formal outcome and process surveillance is conducted to validate the perception.

• Outcome surveillance of DAIs defines the magnitude of the problem, identifies the highest risk devices, and provides the framework for planning to reduce infection risk.
Outcome Surveillance and Process Surveillance
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The attributable cost, length of hospital stay, and mortality of central line-associated bloodstream infection in intensive care departments in Argentina: A prospective, matched analysis.

Table 1. Baseline characteristics of patients

<table>
<thead>
<tr>
<th>Case patients</th>
<th>Control patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = 142</td>
<td>N = 142</td>
</tr>
<tr>
<td>Average length of stay (days)</td>
<td>74 (SE 7.4)</td>
</tr>
<tr>
<td>Mean age (SD)</td>
<td>70.09 (14.17)</td>
</tr>
<tr>
<td>Male (%)</td>
<td>83 (58.5)</td>
</tr>
<tr>
<td>No. admitted to medical/surgical ICU (%)</td>
<td>116 (81.7)</td>
</tr>
<tr>
<td>Mean ASIS (SD)</td>
<td>3.30 (1.08)</td>
</tr>
<tr>
<td>Number included in study by year</td>
<td></td>
</tr>
<tr>
<td>1998</td>
<td>25 (17.6)</td>
</tr>
<tr>
<td>1999</td>
<td>50 (35.3)</td>
</tr>
<tr>
<td>2000</td>
<td>46 (32.6)</td>
</tr>
<tr>
<td>2001</td>
<td>19 (13.9)</td>
</tr>
<tr>
<td>2002</td>
<td>2 (1.4)</td>
</tr>
</tbody>
</table>

ASIS: Average severity of illness score; ICU: intensive care unit.


The Attributable Cost, And Length Of Hospital Stay Of Central Line Associated Blood Stream Infection In Intensive Care Units In Mexico. A Prospective, Matched Analysis

<table>
<thead>
<tr>
<th>Case patients</th>
<th>Control patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = 55</td>
<td>N = 55</td>
</tr>
<tr>
<td>Average length of stay in ICU (days)</td>
<td>406</td>
</tr>
<tr>
<td>Antibiotics (US$)</td>
<td>13,554.56</td>
</tr>
<tr>
<td>Other medications (US$)</td>
<td>128,415.14</td>
</tr>
<tr>
<td>Disposables (US$)</td>
<td>219,345.42</td>
</tr>
<tr>
<td>Culture (US$)</td>
<td>1,711.40</td>
</tr>
<tr>
<td>Other lab tests (US$)</td>
<td>37,441.19</td>
</tr>
<tr>
<td>X ray, Scan, etc (US$)</td>
<td>15,198.40</td>
</tr>
<tr>
<td>Other costs (US$)</td>
<td>44,395.46</td>
</tr>
<tr>
<td>Hospitalization (fixed costs) (US$)</td>
<td>490,926.78</td>
</tr>
<tr>
<td>Total cost (US$)</td>
<td>955,648.55</td>
</tr>
</tbody>
</table>


The Attributable Cost, And Length Of Hospital Stay Of Central Line Associated Blood Stream Infection In Intensive Care Units In Brazil: A Prospective, Matched Analysis

<table>
<thead>
<tr>
<th>Case patients</th>
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</tr>
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<td>N = 142</td>
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</tr>
<tr>
<td>Average length of stay in ICU (days)</td>
<td>406</td>
</tr>
<tr>
<td>Antibiotics (DDD)</td>
<td>60.80</td>
</tr>
<tr>
<td>Antibiotics cost (US$)</td>
<td>35,520.54</td>
</tr>
<tr>
<td>Cost (US$)</td>
<td>4,888.42</td>
</tr>
<tr>
<td>Total cost (US$)</td>
<td>1,632,052.56</td>
</tr>
<tr>
<td>Total patients (n)</td>
<td>70</td>
</tr>
<tr>
<td>Total Antibiotic DDD (DDD)</td>
<td>2423</td>
</tr>
<tr>
<td>Antibiotic DDD per patient</td>
<td>60.80</td>
</tr>
<tr>
<td>Antibiotic cost per patient</td>
<td>35,520.54</td>
</tr>
<tr>
<td>Total cost per patient</td>
<td>4,888.42</td>
</tr>
<tr>
<td>Total death (days)</td>
<td>20.58</td>
</tr>
<tr>
<td>Total death (days)</td>
<td>30.58</td>
</tr>
<tr>
<td>Average mortality</td>
<td>32.0%</td>
</tr>
</tbody>
</table>


The attributable cost and length of hospital stay because of nosocomial pneumonia in intensive care units in 3 hospitals in Argentina: a prospective, matched analysis.

Table 1. Baseline characteristics of patients with and without nosocomial pneumonia

<table>
<thead>
<tr>
<th>Cases, N = 307 (%)</th>
<th>Control, N = 307 (%)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOS (7 or more days)</td>
<td>307 (100)</td>
<td>307 (100)</td>
</tr>
<tr>
<td>Age, mean, SD, years</td>
<td>73.79 (11.97)</td>
<td>69.90 (11.48)</td>
</tr>
<tr>
<td>Sex (male)</td>
<td>157 (51.1)</td>
<td>157 (51.1)</td>
</tr>
<tr>
<td>ICU (in ICU)</td>
<td>247 (80.5)</td>
<td>247 (80.5)</td>
</tr>
<tr>
<td>Average severity of illness score, mean, SD</td>
<td>3.34 (0.95)</td>
<td>3.11 (0.83)</td>
</tr>
<tr>
<td>Year</td>
<td>1998 (5.2)</td>
<td>1998 (6.8)</td>
</tr>
<tr>
<td>1999</td>
<td>300 (19.8)</td>
<td>200 (13.9)</td>
</tr>
<tr>
<td>2000</td>
<td>240 (13.9)</td>
<td>200 (13.9)</td>
</tr>
<tr>
<td>2001</td>
<td>40 (6.9)</td>
<td>200 (13.9)</td>
</tr>
<tr>
<td>2002</td>
<td>40 (6.9)</td>
<td>200 (13.9)</td>
</tr>
</tbody>
</table>

ICU: Intensive care unit; LOS: length of stay; NS: Not significant.


The attributable cost and length of hospital stay because of nosocomial pneumonia in intensive care units in 3 hospitals in Argentina: a prospective, matched analysis.

<table>
<thead>
<tr>
<th>Case patients</th>
<th>Control patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = 307</td>
<td>N = 307</td>
</tr>
<tr>
<td>Total cost (US$)</td>
<td>1,158,585.49</td>
</tr>
<tr>
<td>Total Antibiotic DDD (DDD)</td>
<td>24,044.48</td>
</tr>
<tr>
<td>Total Antibiotic cost (US$)</td>
<td>1,009.00</td>
</tr>
<tr>
<td>Total Antibiotic DDD (DDD)</td>
<td>19</td>
</tr>
<tr>
<td>Total Antibiotic cost (US$)</td>
<td>585,894.00</td>
</tr>
<tr>
<td>Total cost (US$)</td>
<td>3,250.00</td>
</tr>
<tr>
<td>Total Antibiotic DDD (DDD)</td>
<td>100</td>
</tr>
<tr>
<td>Total Antibiotic cost (US$)</td>
<td>839.95</td>
</tr>
</tbody>
</table>


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**Process Surveillance**
- Process surveillance is the standardized collection of data regarding the infection control practices actually used in the facility.
- This includes compliance with recommendations for hand hygiene, vascular catheter care, urinary catheter care, measures to prevent VAP such as position of the head, type of secretion suctioning, and measures to prevent surgical site infections as pre-surgical shower, clipping and antibiotic prophylaxis, or others.
- Hand hygiene is a fundamental aspect of infection control; several studies reported a decline in HAI rates when compliance with hand hygiene was enhanced.

**Surveillance**
- Despite universal acknowledgement of the pivotal role that hand hygiene and device care play in reducing infection risk, hand hygiene compliance among healthcare workers in developing countries remains poor, with rates ranging from 9% to 75%.
- Several interventions have been attempted to improve hand hygiene practices; among the most effective ones are those that emphasize targeted education, process surveillance and frequent performance feedback.

**Dubbert**, et al found that while education alone improved compliance rates in a transient way, process surveillance and performance feedback resulted in sustained improvement in compliance.

In developing countries, implementation of education, process surveillance and performance feedback, improved considerably the adherence to hand hygiene; examples from developing countries were reported from Argentina, China, Mexico, Russia, Turkey, and others.
Improvement of Hand Hygiene Compliance

Effect of education and performance feedback on handwashing: The benefit of administrative support in Argentinean hospitals

Hand Hygiene Compliance Improvement.

Hand Hygiene Compliance Improvement.

Outcome Surveillance and Process Surveillance

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One sink every two beds
Alcohol Gel Available at each bed side

Hand Hygiene using antiseptic soap, disposable paper towels, no rings, no watch

- In Argentina between April 1999 and October 2003; 15,531 patient contacts were observed in one hospital. The baseline rate of HW before contact with patients was 17%. With education and process surveillance and performance feedback, hand hygiene before contact with the patients increased to 58%.

Hand Hygiene Compliance Improvement.

Hand Hygiene Compliance Improvement.

Survey
Process Surveillance

8/03 to 9/03
4/3
8/4-11/4
8/04 to 1/04
1/04 to 5/04
Baseline
11/03 to 2/04
29.6%
12/04 to 4/05
54.5%
12/04 to 4/06
58%
2.33
95% CI
1.84
1.45 - 2.36
1.97
1.45 - 2.61
P
0.1396
0.0000
0.0000
0.0000

Argentina
Nestor
Buenos Aires
General Hospital
10/98 to 6/00
35.5%
3/04 to 11/03
46.6%
9/00 to 2/01
48.0%
Pittet
104
3,25 - 7,63
2,46 - 4,63
29.6%
12/04 to 4/05
54.5%
12/04 to 4/06
58%
Hand Hygiene Compliance Improvement.

<table>
<thead>
<tr>
<th>Country</th>
<th>City</th>
<th>Hospital</th>
<th>Baseline period</th>
<th>Pre Intervention period</th>
<th>Post Intervention period</th>
<th>RR</th>
<th>95% CI</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Philippines</td>
<td>Quezon</td>
<td>Saint Luke’s Medical Center</td>
<td>1/26/06 to 1/15/06</td>
<td>22.7%</td>
<td>29.7%</td>
<td>0.76</td>
<td>0.65 - 1.02</td>
<td>0.1021</td>
</tr>
<tr>
<td>India</td>
<td>Bangalore</td>
<td>Apollo Hospitals</td>
<td>3/1/04 to 3/24/04</td>
<td>33.6%</td>
<td>69.2%</td>
<td>2.15</td>
<td>1.82 - 2.60</td>
<td>0.0001</td>
</tr>
<tr>
<td>Indonesia</td>
<td>Jakarta</td>
<td>University Hospital</td>
<td>1/1/06 to 1/15/06</td>
<td>25.6%</td>
<td>47.9%</td>
<td>0.75</td>
<td>0.59 - 1.01</td>
<td>0.0653</td>
</tr>
<tr>
<td>Pakistan</td>
<td>Karachi</td>
<td>Liaquat National Hospital</td>
<td>8/1/06 to 8/15/06</td>
<td>33.6%</td>
<td>42.0%</td>
<td>1.45</td>
<td>1.32 - 1.61</td>
<td>0.0001</td>
</tr>
<tr>
<td>Turkey</td>
<td>Samsun</td>
<td>Dokuz Eylül University</td>
<td>1/3/06 to 1/15/06</td>
<td>27.3%</td>
<td>40.5%</td>
<td>1.63</td>
<td>1.32 - 2.03</td>
<td>0.0001</td>
</tr>
<tr>
<td>Turkey</td>
<td>Samsun</td>
<td>Hacettepe University School of Medicine</td>
<td>1/20/04 to 1/15/06</td>
<td>9.2%</td>
<td>18.6%</td>
<td>1.65</td>
<td>1.21 - 2.23</td>
<td>0.0546</td>
</tr>
<tr>
<td>turkey</td>
<td>Istanbul</td>
<td>Hacettepe University School of Medicine</td>
<td>5/04 to 5/15/06</td>
<td>21.8%</td>
<td>38.3%</td>
<td>1.77</td>
<td>1.54 - 2.03</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

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Hand Hygiene Compliance Improvement.

<table>
<thead>
<tr>
<th>Country</th>
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<th>P Value</th>
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<tr>
<td>Turkey</td>
<td>Istanbul</td>
<td>Hacettepe University School of Medicine</td>
<td>10/04 to 10/15</td>
<td>28.3%</td>
<td>60.0%</td>
<td>2.11</td>
<td>1.80 - 2.50</td>
<td>0.0001</td>
</tr>
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<td>Hacettepe University School of Medicine</td>
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</tr>
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<td>1.80 - 2.50</td>
<td>0.0001</td>
</tr>
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<td>10/04 to 10/15</td>
<td>28.3%</td>
<td>60.0%</td>
<td>2.11</td>
<td>1.80 - 2.50</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

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Surveillance

Outcome Surveillance

- The second step is to implement targeted specific infection control practices that have been shown to prevent HAI.
- INICC have evaluated hospitals in which outcome and process surveillance have been the driving force to reduce infection risk and infection-related mortality.

Process Surveillance

- In Argentina, a program was developed consisting of frequent focused education of healthcare workers, process surveillance and performance feedback.
- Simultaneously, HAI rates were measured at baseline and during the intervention to determine whether improved compliance would be associated with a reduction in HAI. A 42% relative reduction in HAI rates was reported from conducting process surveillance and emphasizing compliance with hand hygiene.

- It was the first study of reduction in HAI made by improving hand hygiene in Latin America and the investigators inferred that similar improvement could occur in similar developing countries.
- The authors found lower adherence among physicians, which is similar to results reported in industrialized countries.

Overall HCAI Rate Reduction

Reduction in nosocomial infection with improved hand hygiene in intensive care units of a tertiary care hospital in Argentina

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Overall HAI Rate

<table>
<thead>
<tr>
<th>Country</th>
<th>City</th>
<th>Hospital</th>
<th>Baseline Rate</th>
<th>Intervention Rate</th>
<th>Reduction Rate</th>
<th>RR</th>
<th>CI</th>
<th>P Value</th>
<th>Ref</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brazil</td>
<td>Rio de Janeiro</td>
<td>Porto Alegre Osp. Hospital</td>
<td>18.8%</td>
<td>76%</td>
<td>0.24</td>
<td>0.07</td>
<td>0.037</td>
<td>&lt;0.0001</td>
<td>2</td>
</tr>
<tr>
<td>Colombia</td>
<td>Bogota</td>
<td>La Victoria</td>
<td>21.5%</td>
<td>82%</td>
<td>0.29</td>
<td>0.10</td>
<td>0.0161</td>
<td>0.0001</td>
<td>5</td>
</tr>
<tr>
<td>India</td>
<td>Bangalore</td>
<td>Whistling Swan Hospital</td>
<td>2.5%</td>
<td>1.7%</td>
<td>0.07</td>
<td>0.07</td>
<td>0.0133</td>
<td>0.0001</td>
<td>1</td>
</tr>
<tr>
<td>India</td>
<td>Kolkata</td>
<td>KRM Hospital</td>
<td>12.3%</td>
<td>9.5%</td>
<td>0.50</td>
<td>0.61</td>
<td>0.0001</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>India</td>
<td>Vellore</td>
<td>Christian Medical College</td>
<td>16.3%</td>
<td>5.1%</td>
<td>0.64</td>
<td>0.61</td>
<td>0.0001</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Mexico</td>
<td>Mexico DF</td>
<td>De la Mujer Hospital</td>
<td>3.6%</td>
<td>4.9%</td>
<td>0.50</td>
<td>0.36</td>
<td>0.0001</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Peru</td>
<td>Lima</td>
<td>San Juan de Dios Hospital</td>
<td>16.1%</td>
<td>15.0%</td>
<td>0.93</td>
<td>0.70</td>
<td>0.0001</td>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>


Mortality Rate

<table>
<thead>
<tr>
<th>Country</th>
<th>City</th>
<th>Hospital</th>
<th>Baseline Rate</th>
<th>Intervention Rate</th>
<th>Reduction Rate</th>
<th>RR</th>
<th>CI</th>
<th>P Value</th>
<th>Ref</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>New Delhi</td>
<td>Escorts Heart Institute</td>
<td>1.7%</td>
<td>0.3%</td>
<td>0.31</td>
<td>0.10</td>
<td>0.0013</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Mexico</td>
<td>Mexico DF</td>
<td>General Hospital</td>
<td>46.5%</td>
<td>32.2%</td>
<td>0.66</td>
<td>0.69</td>
<td>0.001</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Peru</td>
<td>Lima</td>
<td>Victor Lararte-Echegaray y Hospital</td>
<td>32.3%</td>
<td>14.8%</td>
<td>0.46</td>
<td>0.46</td>
<td>0.0004</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>


Surveillance Outcome Surveillance

- Targeted incidence of CVC-associated BSIs, CAUTI and VAP in many developing countries hospitals have been substantially reduced by the institution of outcome surveillance, process surveillance, and targeted performance feedback programs for hand-hygiene, central venous catheter, ventilator and urinary catheter

Hosted by Paul Webber paul@webbertraining.com www.webbertraining.com
Process Surveillance

- Process surveillance for vascular and urinary catheter care, and mechanical ventilator care was also effective to reduce associated HAI in several previous studies conducted in developing countries, such as Argentina, Brazil, Colombia, India, México, Turkey, among others.

Position of the urinary catheter regarding the leg, and position of urine bag regarding the bed and other practices were assessed and entered into a standard form by local researchers who observed healthcare worker (HCW) behaviors in the study units daily five days a week.

CAUTI Rate

<table>
<thead>
<tr>
<th>Country</th>
<th>City</th>
<th>Hospital</th>
<th>Baseline Rate</th>
<th>Intervention Rate</th>
<th>Reduction Rate</th>
<th>RR</th>
<th>CI (95%)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>Buenos Aires</td>
<td>Colegiales</td>
<td>21.3 p/1000 catheter days</td>
<td>12.39 p/1000 catheter days</td>
<td>42%</td>
<td>0.58</td>
<td>0.39-0.86</td>
<td>0.006</td>
</tr>
<tr>
<td>India</td>
<td>Kolkata</td>
<td>AMRI Hospital</td>
<td>7.4 p/1000 catheter days</td>
<td>2.2 p/1000 catheter days</td>
<td>70%</td>
<td>0.30</td>
<td>0.12-0.77</td>
<td>0.048</td>
</tr>
</tbody>
</table>

Outcome Surveillance and Process Surveillance

Dr. Victor Rosenthal
A Webber Training Teleclass

Surveillance

Process Surveillance

• Position of the bed head, cleanliness of tubes, aspiration technique, hand hygiene with alcohol hand rub or hand washing with water and antiseptic soap prior to patient contact and other practices were assessed and entered into a standard form by local researchers who observed healthcare worker (HCW) behaviors in the study units daily five days a week.

VAP Rate Reduction

Impact of an infection control program on rates of ventilator-associated pneumonia in intensive care units in 2 Argentinean hospitals

A. L. Fernandez, MD, CC, MG, P. de la Serna, MD, K. Zerr, MD and C. Crouc, MD
Intensive Care Units, Argentina, and Nationally, Taiwan

Background: Ventilator-associated pneumonia (VAP) occurs in 6% to 12% of patients mechanically ventilated for at least 48 hours. Thecidicidal effect of VAP may be reduced through the use of outcome and process surveillance. The impact of an infection control program in rates of VAP was assessed in 2 Argentinean hospitals.

Methods: A total of 1049 patients who received VAP for at least 24 hours in 2 level II/III hospitals were included in this study. Patients were included in the control group if they received traditional antibiotic treatment or if they were involved in environmental surveillance. The intervention group received additional microbiological and surveillance feedback compared to the control group.

Results: Over a 6-month period, a 62% reduction in VAP was observed in the intervention group versus only a 14% reduction in the control group. The intervention group had a significantly lower VAP rate compared to the control group (RR = 0.36; 95% CI = 0.18-0.70, p = 0.0016).

Conclusion: Implementation of an intervention program in critical care units was associated with significant reductions in rates of VAP. (Infection Control & Hospital Epidemiology, 2006, 27:566-67).

Surveillance

Process Surveillance

• Placement of gauze on IVD insertion sites, marking the date on the IV administration set, condition of the gauze dressing (the presence or absence of moisture, gross soilage and the appearance of the insertion site is checked) and other practices were assessed and entered into a standard form by local researchers who observed healthcare worker (HCW) behaviors in the study units daily five days a week.

IVD-BSI Rate Reduction

The effect of processes on the incidence of bloodstream infections associated with intravascular devices in 2 hospitals in Argentina

A. L. Fernandez, MD, CC, MG, P. de la Serna, MD, K. Zerr, MD and C. Crouc, MD
Intensive Care Units, Argentina, and Nationally, Taiwan

Background: Bloodstream infections (BSIs) associated with intravascular devices are common in critically ill patients. Variability in the processes related to intravascular device insertion and maintenance can be a significant factor in the occurrence of BSIs. The aim of this study was to evaluate the impact of processes related to intravascular device insertion and maintenance on the incidence of IVD-BSIs.

Methods: A total of 1049 patients who received a central venous catheter (CVC) or an IVD were included in the study. Patients were included in the control group if they received traditional antibiotic treatment or if they were involved in environmental surveillance. The intervention group received additional microbiological and surveillance feedback compared to the control group.

Results: Over a 6-month period, a 62% reduction in IVD-BSIs was observed in the intervention group versus only a 14% reduction in the control group. The intervention group had a significantly lower IVD-BSI rate compared to the control group (RR = 0.36; 95% CI = 0.18-0.70, p = 0.0016).

Conclusion: Implementation of an intervention program in critical care units was associated with significant reductions in rates of IVD-BSIs. (Infection Control & Hospital Epidemiology, 2006, 27:566-67).
**Outcome Surveillance and Process Surveillance**

**Dr. Victor Rosenthal**

**A Webber Training Teleclass**

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**Peripheral catheter insertion place without sterile gauze**

**Central catheter insertion place without sterile gauze**

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**Country** | City | Hospital | Baseline Rate | Intervention Rate | Reduction | RR | CI | P Value | Ref
---|---|---|---|---|---|---|---|---|---
Argentina | Buenos Aires | General Hospital | 4.5 p/1000 CVC-days | 2.5 p/1000 CVC-days | 50% | 0.55 | – | – | 0.005

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**Peripheral catheter insertion place with sterile gauze**

**Central catheter insertion place with sterile gauze and closed**

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**CVC-BSI Rate**

| Country | City | Hospital | Baseline Rate | Intervention Rate | Reduction | RR | CI | P Value | Ref
---|---|---|---|---|---|---|---|---|---
Mexico | México DF | CVC-Dod | 0.67 p/1000 CVC-days | 0.42 p/1000 CVC-days | 45% | 0.11 | – | – | 0.0001

---

**Vials multi-doses with needle**

**Infusion system with administration set and stopcock**

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**Conclusions**

- In developing Countries HAI Rates and Bacterial Resistance are 3-5 times higher than international standards.
- The HAI increase length of stay (10 days), cost ($US 5,000-12,000) and mortality (2 times).
- By applying Process Surveillance, plus Education and Performance Feedback we were able to increase HH compliance, and other Infection Control Interventions compliance.
- By applying Outcome and Process Surveillance plus Feedback we were able to reduce Mortality, Overall HAI rates, and Device Associated HAI rates.

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**Every hospital are invited to incorporate into the INICC nonprofit research project.**

To incorporate, please only send an email to INICC with the following details:
- Your name,
- Your email,
- Your working phone number,
- Your hospital’s name,
- Your city.

**www.INICC.org**

**victor_rosenthal@inicc.org**

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Dr. Victor Rosenthal
A Webber Training Teleclass

Thank you very much for your attention

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The Next Few Teleclasses

August 16  What Can We Learn From the History of Communicable Disease Control? (free teleclass)
… with Prof. Peter Curson, University of Sydney
Broadcast live from the New Zealand Infection Control Association conference
Sponsored by Johnson & Johnson

August 22  ESBL's - Where are We Now? (free teleclass)
… with Dr. Fong Chiew, Christchurch, NZ

September 20  Extreme Makeover - ICP Edition: Exploring Challenges to Our Identity in Infection Control (free teleclass)
… with Gwyneth Meyers, Calgary, Canada

September 24  Infection Prevention: Challenging Behavior, Changing the Culture (free teleclass)
… with Dr. Elaine Larson, Columbia University

For the full teleclass schedule – www.webbertraining.com
For registration information www.webbertraining.com/howtoc8.php

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