Strategies to Improve Hand Hygiene Compliance in the ICU
Dr. Alexandre Marra, Hospital Israelita Albert Einstein, Sao Paulo, Brazil
Teleclass sponsored by Deb Ltd. (www.debgroup.com)

Strategies for Improving Hand Hygiene Compliance in the ICU

Alexandre R. Marra
Hospital Israelita Albert Einstein
Sao Paulo, Brazil

Hosted by
Dr. Jon Lloyd, MD
Plexus Institute, Washington, DC
Sponsored by Deb Ltd. (www.debgroup.com)

Disclosure of Conflicts of Interest

• Nothing to declare

My Outlines Are:

• The intersection of ICU and Hospital Epidemiology
• Discussing about hand hygiene (HH) considering study designs
• Strategies for improving HH compliance
• Positive Deviance
• From lab to clinic battle

From Creation to the Application of Evidence

Making clinical decisions
Implement the policies
Develop medical practices based on evidence
Synthesize evidence
Create evidence from research

Adapted: BMJ 1998;317:273-6
BMJ 2002;324:1350

Definition
Intervention
Follow up
Outcome
Population
Sample
Experimental Group
Control Group
Time
+ result
- result
+ result
- result

The evidence does not make decisions, people do

Study designs – Interventions in ICU

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The Hierarchy of Evidence

Selection
Intervention
Follow up
Analysis
Publication

Systematic review
Meta-analyses
Randomized Studies
Cohort Studies
Case Control Studies
Cross-sectional study
Case series
Case report
in vitro research
individual expertise

THE CONTROL GROUP IS THE KEY

Patients increasingly complex – sepsis, mechanical ventilation and high severity score

Intensive interaction with the multidisciplinary team
(including infection control bundles as vap, bsi…)

Multiple logistic regression analysis – lower mortality within 30 days for the group in which the multidisciplinary team interacted with the ICU doctor

Kim et al. Arch Intern Med 2010;170:369-376

1950 1970 1980 2010

Guidelines for the Prevention of Invasive Catheter-Related Infections
Guidelines for Hand Hygiene in Healthcare Settings - 2009

Communicable Disease Control & Prevention
Centers for Disease Control

Guidelines for the Prevention of Catheter-Associated Urinary Tract Infections

Evidence-Based Medicine

Intensive Care Medicine
Hospital Epidemiology

Goal
Evidence-based Medicine

Intensive Care Medicine
Hospital Epidemiology

SAVE LIVES
Clean your Hands

Scientific evidence - CDC

Category | Recommendation | Study design
--- | --- | ---
A | Strongly recommended for implementation | Well-designed randomized studies
B | Strongly recommended for implementation | Well-designed non-randomized studies
C | Required for implementation | Cohort or case-control studies
D | Suggested for implementation | Historical cohort
No recommendations; unresolved issues | Recommendations for which insufficient evidence or consensus regarding efficacy exists |

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Background: Health care-associated infections are major costs in patient safety. Most published rates of ICU-acquired infections have been calculated within countries. A study for the program Brazilian SCOPE (2007-2010) conducted in 16 hospitals throughout Brazil, observed that the rate of device-associated infections in 16 ICUs was 1.2 per 1000 CVC-days and 0.9 per 1000 catheter-days. In the 16 ICUs, the rate of device-associated infections varied from 0.6 to 2.8 per 1000 CVC-days and from 0.3 to 1.6 per 1000 catheter-days. The main reasons for non-compliance were: insufficient time, work overload, excess of patients, lack of knowledge of the recommendations, skeptical about hand hygiene as a prevention method, inconvenient locations from sinks and soap dispensers, and lack of incentive for promotion of hand hygiene.

Conclusion: Hand hygiene is a major factor in reducing transmission of microorganisms. Observational studies have reported hand hygiene compliance rates of 5-81%.

Hand hygiene – Category IA

<table>
<thead>
<tr>
<th>Hand Hygiene Compliance</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Background</td>
<td>Observational studies have reported hand hygiene compliance rates of 5-81%</td>
</tr>
<tr>
<td>Main reasons for non-compliance</td>
<td></td>
</tr>
<tr>
<td>- Insufficient time</td>
<td></td>
</tr>
<tr>
<td>- Work overload</td>
<td></td>
</tr>
<tr>
<td>- Excess of patients</td>
<td></td>
</tr>
<tr>
<td>- Lack of knowledge of the recommendations</td>
<td></td>
</tr>
<tr>
<td>- Skeptical about hand hygiene as a prevention method</td>
<td></td>
</tr>
<tr>
<td>- Inconvenient locations from sinks and soap dispensers</td>
<td></td>
</tr>
<tr>
<td>- Lack of incentive for promotion of hand hygiene</td>
<td></td>
</tr>
</tbody>
</table>

Wisplinghoff H et al. CID 2004;39:306-17
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Time Line – Infection Control

Compliance with Handwashing in a Teaching Hospital
Dider Pitz, MD, MSc; Philippe Moreaux, MD, MSc; Thomas V. Prager, MD, PhD; and the Members of the Infection Control Program

Once upon a time...

1847
1999

1. Maternal Mortality Rate of the First and the Second Clinic Maternity of the Vienna General Hospital

<table>
<thead>
<tr>
<th>Year</th>
<th>Primera Clínica</th>
<th>Segunda Clínica</th>
</tr>
</thead>
<tbody>
<tr>
<td>1841</td>
<td>20%</td>
<td>15%</td>
</tr>
<tr>
<td>1842</td>
<td>15%</td>
<td>10%</td>
</tr>
<tr>
<td>1843</td>
<td>10%</td>
<td>5%</td>
</tr>
<tr>
<td>1844</td>
<td>5%</td>
<td>0%</td>
</tr>
<tr>
<td>1845</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>1846</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>1847</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>1848</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>1849</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>1850</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

2. Factors Associated with Noncompliance with Handwashing at the University of Geneva Hospitals

<table>
<thead>
<tr>
<th>Variable</th>
<th>Handwash (%)</th>
<th>Compliance</th>
<th>p value ( log rank test )</th>
<th>p value ( Fisher exact test )</th>
</tr>
</thead>
<tbody>
<tr>
<td>High prevalence</td>
<td>62 (3.4)</td>
<td>2.0</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Low prevalence</td>
<td>61 (3.4)</td>
<td>2.04</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Patients age</td>
<td>61 (3.4)</td>
<td>2.04</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Patients age &lt; 50</td>
<td>61 (3.4)</td>
<td>2.04</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Patients age &gt; 50</td>
<td>61 (3.4)</td>
<td>2.04</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Patients gender</td>
<td>61 (3.4)</td>
<td>2.04</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Patients gender male</td>
<td>61 (3.4)</td>
<td>2.04</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Patients gender female</td>
<td>61 (3.4)</td>
<td>2.04</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Patients country</td>
<td>61 (3.4)</td>
<td>2.04</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Patients country Asia</td>
<td>61 (3.4)</td>
<td>2.04</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Patients country Europe</td>
<td>61 (3.4)</td>
<td>2.04</td>
<td>0.000</td>
<td>0.000</td>
</tr>
</tbody>
</table>

3. Infection control process measures: some examples of compliance

48% overall compliance
36% ICU compliance

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Many opportunities for hand hygiene

HAND HYGIENE – CATEGORY IA

It is quick: 5-15 seconds

Easy

Alcohol gel

CDC. Guideline for prevention of healthcare-associated pneumonia, 2004

It is effective for hand antisepsis due to the bactericidal properties of alcohol

HAND HYGIENE IN HOSPITALS: US, EUROPE AND BRAZIL

<table>
<thead>
<tr>
<th>STUDY YEAR</th>
<th>% COMPLIANCE</th>
<th>SETTINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995 (1)</td>
<td>29%</td>
<td>Hospital and ICU</td>
</tr>
<tr>
<td>1995 (2)</td>
<td>41%</td>
<td>Hospital</td>
</tr>
<tr>
<td>1996 (3)</td>
<td>41%</td>
<td>ICU</td>
</tr>
<tr>
<td>1998 (4)</td>
<td>30%</td>
<td>Hospital</td>
</tr>
<tr>
<td>2005 (5)</td>
<td>48%</td>
<td>Hospital</td>
</tr>
<tr>
<td>2002 (6)</td>
<td>52%</td>
<td>ICU</td>
</tr>
</tbody>
</table>

Interventions for improving hand hygiene compliance

• What is the best evidence?

Study designs – Interventions in ICU

The first studies

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The practice of hand hygiene can be improved with education and a greater accessibility of alcohol gel formulations.

Increased hand hygiene compliance

Hand hygiene: Alcohol gel vs. Chlorhexidine

Replacing chlorhexidine...
Marra et al. Infect Control Hosp Epidemiol 2010;31:796-801

Some studies for improving hand hygiene compliance

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Limitations of Hand Hygiene Studies
- Observers (Hawthorne’s effect)
- Sustainability? (studies with time less than 6 months)


Observers (the gold-standard!)

Volume (in liters)
Electronic counter

Marra AR et al. Infect Control Hosp Epidemiol 2010;31:796-801

% hand hygiene compliance

West side ICU – 4 units (total = 18 beds)
Period: April - June 2009 (12 weeks)
Prospective randomized controlled study


Methods for monitoring hand hygiene (HH) compliance

Observer (Hawthorne’s effect)

Sustainability? (studies with time less than 6 months)

West side ICU – 4 units (total = 18 beds)
Period: April - June 2009 (12 weeks)
Prospective randomized controlled study


Feedback method for hand hygiene

- Prospective controlled study
- Infection control in two ICUs (20 beds per ICU)
- MRSA surveillance at admission and every 4 days
- Period: from April to September 2007 (6 months)

CDC/NIS standards
- Electronic counter devices for HH in each room and product usage (chlorhexidine + alcohol gel)
- Contact precautions for + nasal MRSA patients
- Feedback (twice per week) in the intervention ICU

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Feedback method for hand hygiene

<table>
<thead>
<tr>
<th>Alcohol-gel</th>
<th>Chlorhexidine</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>72.5</td>
<td>26.7</td>
<td>0.93</td>
</tr>
</tbody>
</table>

Feedback Method for Hand Hygiene

<table>
<thead>
<tr>
<th>Outcome</th>
<th>East SDU Intervention</th>
<th>West SDU Control</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSI/1,000 CVC-days</td>
<td>3.5</td>
<td>0.79</td>
<td>0.18</td>
</tr>
<tr>
<td>UTI/1,000 UC-days</td>
<td>15.8</td>
<td>15.7</td>
<td>1.0</td>
</tr>
<tr>
<td>Pneumonia/1,000 tracheo-days</td>
<td>10.7</td>
<td>5.1</td>
<td>0.13</td>
</tr>
</tbody>
</table>

Positive deviance

In every community or organization there are certain individuals or groups whose uncommon practices/behaviors enable them to find better solutions to problems than their neighbors or colleagues who have access to the same resources.

Only those behaviors/strategies that are accessible to all are maintained, any other are discharged.

In any group…

Better performance

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Positive deviance: A new strategy for improving hand hygiene compliance

- 2 (20 bed each) step-down units (E & W): 9 mo period (3 phases)
  - 1st: Pre-intervention: counted hand hygiene episodes (electronic counters)
  - 2nd: implemented PD strategy in E unit
  - 3rd: PD applied in both units

- HAIs surveillance: performed by trained ICNs

Positive deviance Approach

- Meeting of all HCWs (2x/mo).
- Opportunities to express their feelings about hand hygiene.
- Needs to improve (changing experiences).
- Monthly HAI rates were shown to HCW.
- Identified "positive deviants" HCWs. They identified others and so forth... (*Are those who wanted to change and develop new ideas for improving hand hygiene and who stimulated other HCWs).

Results

<table>
<thead>
<tr>
<th>Study outcomes from July to September 2008 - Positive Deviance</th>
<th>Intervention unit (E)</th>
<th>Control unit (W)</th>
<th>p</th>
</tr>
</thead>
</table>
| Hand hygiene
| Alcohol gel dispensed (items) | 106,461 | 62,178 | - |
| Alcohol gel dispensed per room (mean ICU) | 136.41±42.37 | 68.14±33.81 | <0.01 |
| Alcohol gel used (L/1000 patient days) (mean±SD) | 83.2±3.02 | 42.03±4.55 | <0.01 |
| Chlorhexidine used (L/1000 patient days) (mean±SD) | 21.2±11.30 | 16.7±6.07 | 0.57 |
| Incidence density of HAIs/1000 patient days | 6.5 | 12.7 | 0.04 |

Reduction on HAI

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Positive Deviance: a program for sustained improvement in hand hygiene compliance

Hand Hygiene
Our evolution in Albert Einstein ICU, Sao Paulo, Brazil

<table>
<thead>
<tr>
<th>Study Year</th>
<th>% Compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002 (1)</td>
<td>52.0%</td>
</tr>
<tr>
<td>2008</td>
<td>52.5%</td>
</tr>
<tr>
<td>2009 (2)</td>
<td>62.3%</td>
</tr>
<tr>
<td>2010</td>
<td>78.5%</td>
</tr>
</tbody>
</table>

There is a large gap between what is discovered (science) and what in fact is applied in our clinical practice

THE ROLE OF THE UNIVERSITY - TRANSLATIONAL SCIENCE

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TRANSLATIONAL SCIENCE

- "it comprises a meaning that should be considered science and academic activity with the development of strategies and tools that actually lead to discoveries that will benefit both patient and society"

- "Considerable gap between basic acquired science and its application: long period between initial experimental results and their transformation into new technologies for health purposes"

Humanitarian Mission – Einstein Hospital in Haiti
February 2010

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