Clean Care Is Safer Care and the WHO Guidelines on Hand Hygiene in Health Care

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Section A

Burden of Health Care-Associated Infections (HAI) and Importance of Hand Hygiene
The Big Picture

- Huge global burden of health care-associated infections
- One in 10 hospital admits results in HAI
- Approximately 770 million admissions globally each year
- 72 million patients affected by HAI
- Death rate due to HAI (~3.0%)
- Among top three killers
Health Care-Associated Infection (HAI)

- 1.4 million people worldwide affected at any given time
- 5% to 10% of hospital patients in developed countries
- Two to 20 times higher HAI risk in developing countries
- In some countries 25% of patients are affected
- In the UK there are 100,000 case of HAI per year and 5,000 deaths
## Costs of Common HAIs

<table>
<thead>
<tr>
<th>HCAI type</th>
<th>Attributable costs in U.S. Dollars</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Bloodstream infection</td>
<td>36,441</td>
<td>37,078</td>
</tr>
<tr>
<td>Surgical site infection</td>
<td>25,546</td>
<td>39,875</td>
</tr>
<tr>
<td>Ventilator-associated pneumonia</td>
<td>9,969</td>
<td>2,920</td>
</tr>
<tr>
<td>Urinary tract infection</td>
<td>1,006</td>
<td>503</td>
</tr>
</tbody>
</table>

Source: Bennett.
First Global Patient Safety Challenge

- To reduce health care-associated infections worldwide

Image source: WHO
Launch of the First Global Patient Safety Challenge

- WHO HQ, October 13, 2005

Image source: WHO
The First Global Patient Safety Challenge

- Five integrated action areas

- Clean blood
- Clean equipment
- Clean water
- Clean procedures
- Clean hands

Image source: WHO
Hand Hygiene Is the Entrance Door ...

To safer patient care
Ignaz Philipp Semmelweis

- The pioneer of hand hygiene
- Austria
- General Hospital of Vienna, 1841-1850
- Fighting puerperal fever
Studies Showing Effectiveness of Hand Hygiene

- From 1975 to 2005, 17 studies demonstrated the effectiveness of hand hygiene promotion to reduce health care-associated infections—the most relevant are listed in the table below.

<table>
<thead>
<tr>
<th>Year</th>
<th>Authors</th>
<th>Hospital setting</th>
<th>Significant results</th>
<th>Duration of follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>Pittet et al.</td>
<td>Hospital-wide</td>
<td>Significant (p=0.04 and p&lt;0.001) reduction in the annual overall prevalence of health care-associated infections (41.5%) and MRSA cross-transmission rates (87%)</td>
<td>5 years</td>
</tr>
<tr>
<td>2004</td>
<td>Won et al.</td>
<td>NICU</td>
<td>Significant (p=0.003) reduction in health care-associated infection rates (from 15.1/1000 patient-days to 10.7/1000 patient-days), in particular of respiratory infections</td>
<td>2 years</td>
</tr>
<tr>
<td>2005</td>
<td>Rosenthal et al.</td>
<td>Adult ICUs</td>
<td>Significant (p&lt;0.0001) reduction in health care-associated infection rates (from 47.5/1000 patient-days to 27.9/1000 patient-days)</td>
<td>21 months</td>
</tr>
<tr>
<td>2005</td>
<td>Johnson et al.</td>
<td>Hospital-wide</td>
<td>Significant (p=0.01) reduction (57%) in MRSA bacteremia</td>
<td>36 months</td>
</tr>
</tbody>
</table>

Bottom Line

- Strong evidence between improved adherence of hand hygiene practice and reduction in health care-associated infection rates

- Hand hygiene is the single most effective intervention to reduce HAIs—reduction seen from 30% to 50%

- Either hand washing or hand rubbing reduces HAIs

- Scientific basis/models for hand transmission well established

- Tools and training material available
The Magnitude

- Reported hand hygiene compliance within different hospitals

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Sector</th>
<th>Compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preston</td>
<td>1981</td>
<td>General wards</td>
<td>16%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ICU</td>
<td>30%</td>
</tr>
<tr>
<td>Albert</td>
<td>1981</td>
<td>ICU</td>
<td>41%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ICU</td>
<td>28%</td>
</tr>
<tr>
<td>Larson</td>
<td>1983</td>
<td>Hospital-wide</td>
<td>&lt;40%</td>
</tr>
<tr>
<td>Donowitz</td>
<td>1987</td>
<td>Neonatal ICU</td>
<td>30%</td>
</tr>
<tr>
<td>Graham</td>
<td>1990</td>
<td>ICU</td>
<td>32%</td>
</tr>
<tr>
<td>Dubbert</td>
<td>1990</td>
<td>ICU</td>
<td>81%</td>
</tr>
<tr>
<td>Pettinger</td>
<td>1991</td>
<td>Surgical ICU</td>
<td>5%</td>
</tr>
<tr>
<td>Larson</td>
<td>1992</td>
<td>Neonatal unit</td>
<td>2%</td>
</tr>
<tr>
<td>Doebbeling</td>
<td>1992</td>
<td>ICU</td>
<td>40%</td>
</tr>
<tr>
<td>Zimakoff</td>
<td>1993</td>
<td>ICU</td>
<td>40%</td>
</tr>
<tr>
<td>Meengs</td>
<td>1994</td>
<td>Emergency room</td>
<td>32%</td>
</tr>
<tr>
<td>Pittet</td>
<td>1999</td>
<td>Hospital-wide</td>
<td>48%</td>
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Question?

- Hand hygiene: Why is something that is seemingly so simple to perform so complex?

- Why is it so hard to get health care workers to wash/rub their hands despite the hard evidence?
Section B

Reasons for Non-compliance and the WHO Multi-modal Hand Hygiene Strategy
First Global Patient Safety Challenge

- To reduce health care-associated infections worldwide

Image source: WHO
Designing More Efficient Intervention Strategies

- Understanding the key determinants underlying a given behavior in a specific situation: one of the first steps to design more efficient public health intervention strategies

- To identify the factors that define an individual’s behavioral intention
**Hand Hygiene (HH)**

- **Main reasons for poor compliance**

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<th>Observed</th>
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<td>1. Skin irritation by HH agents</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>2. Inaccessible HH supplies</td>
<td>X</td>
<td>(X)</td>
</tr>
<tr>
<td>3. Interference with HCW-patient relation</td>
<td>X</td>
<td>?</td>
</tr>
<tr>
<td>4. Patient needs take priority</td>
<td>X</td>
<td>?</td>
</tr>
<tr>
<td>5. Wearing of gloves</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>6. Not thinking about it/forgetfulness</td>
<td>X</td>
<td>(X)</td>
</tr>
<tr>
<td>7. Lack of knowledge of guidelines</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Relevant Obstacles in Some Settings

- Lack of facilities (sinks) and of continuous access to clean water, soap, and paper towels

Image source: WHO
Hand Hygiene (HH)

- **Main reasons for poor compliance**

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Overcoming the Time Constraint Obstacle

- Handrubbing with alcohol-based solutions to overcome the time constraint obstacle
  - Handwashing - 1 to 1.5 minutes
  - Alcohol-based handrubbing - 15 to 20 seconds
Maternal Mortality Rates, First and Second Obstetrics Clinics, General Hospital of Vienna

Intervention
May 15, 1847

Adapted by CTLT from Semmelweis, I.P. (1861).
At the University Hospitals of Geneva, compliance with hand hygiene was higher among midwives and nurses, and lower among doctors.

At the University Hospitals of Geneva, the lowest compliance with hand hygiene was observed in the intensive care unit (ICU), where patients at highest risk of infection are admitted.

Compliance and Opportunities for HH

Relation between opportunities for hand hygiene for nurses and compliance across hospital wards

- Pediatrics
- Ob/gyn
- Medicine
- Surgery
- ICU

On average, 22 opportunities per hour for an ICU nurse

Non-compliance with Hand Hygiene, HUG 1994

- Time constraint is the main explanatory factor
- When the number of opportunities is greater than 10 per hour, compliance decreases on average by 5% (+2%) per 10 opportunities per hour of care

Application time of hand hygiene (handwashing and handrubbing) and reduction of bacterial contamination

Handrubbing is also more effective!

Bacterial contamination (mean log 10 reduction)

Seconds

Minutes

The WHO Multimodal HH Implementation Strategy

- An evidence-based approach made up of five core components to improve hand hygiene in health care settings

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
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<tr>
<td>System change</td>
<td>Alcohol-based handrubs at point of care and access to safe continuous water supply, soap, and towels</td>
</tr>
<tr>
<td>Training and education of staff</td>
<td></td>
</tr>
<tr>
<td>Observation of hand hygiene and feedback to staff</td>
<td></td>
</tr>
<tr>
<td>Reminders in the workplace (posters)</td>
<td></td>
</tr>
<tr>
<td>Establishment of a safety climate</td>
<td>Individual active participation and institutional support</td>
</tr>
</tbody>
</table>
WHO-RECOMMENDED HAND ANTI-SEPSIS FORMULATION
Guide to Local Production

MATERIALS REQUIRED (SMALL VOLUME PRODUCTION)

<table>
<thead>
<tr>
<th>REAGENTS FOR FORMULATION 1:</th>
<th>REAGENTS FOR FORMULATION 2:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethanol 69%</td>
<td>Isopropyl alcohol 99.6%</td>
</tr>
<tr>
<td>Hydrogen peroxide 1%</td>
<td>Hydrogen peroxide 2%</td>
</tr>
<tr>
<td>Chlorine 99%</td>
<td>Chlorine 99%</td>
</tr>
<tr>
<td>Sterile distilled or boiled cold water</td>
<td>Sterile distilled or boiled cold water</td>
</tr>
</tbody>
</table>

- 10-litre glass or plastic bottles with screw-threaded stoppers (1, 4) or
- 50-litre plastic tanks (preferably in polypropylene or high density polyethylene, translucent so as to see the liquid level) (2) or
- Stainless steel tanks with a capacity of 80 to 100 litres (not mixing without overflows) (1, 4).

1. 10-litre glass or plastic bottle
2. 50-litre plastic tank
3. Stainless steel tank
4. 80-100 litre stainless steel tank

Guide to Local Production
Local Production: Alcohol-Based Handrubs?

Image source: WHO
Hong Kong 2007

- 41 public hospitals: 18,150 gallons per month
- More than 5 million x 100 ml bottles annually
  - Economies of scale—approximately $4 HK a bottle (50 cents U.S., 25 pence)

Image source: WHO
Easy Infection Control for Everyone ...
Cost Comparison

- Average infection rate, 1999-2001: 9.7 per 100 admissions
- Estimates in Euros: 31.8 million from nosocomial infections
- Total costs in Euros: 0.312 million for hand hygiene promotion
The total costs of the campaign averaged 2.53 Euros per admission in 2001.

It corresponded to approximately 1% of costs attributable to nosocomial infections.
Expanding the Multimodal Strategy

- Expanding the multimodal strategy to a hand hygiene national campaign

- 25% increase of hand hygiene compliance in four months
- 17,000 infections prevented in 2006
- Cost savings: 60 million CHF in 2006
Simple measures save lives!

It is now possible to improve hand hygiene in your facility! It’s your duty, to protect patients and yourself! You can make a change!

Image source: WHO
- Two international consultations
- Nine task forces
- Over 100 international experts
- Over 700 references
- Testing of the implementation strategy
- Translation into WHO official languages
Save Lives: Clean *Your* Hands Initiative

- Next logical step is to move toward “point of care”
- Endorsement from over 5,700 health care facilities from 122 countries
- Tools and guidelines freely made available
  - Tools for system change
  - Tools for training and education
  - Tools for evaluation and feedback
  - Tools for assessing institutional safety climate
  - Tools as reminders in the work place
- For further information, please visit the Web site
- Any facility can access the WHO guidelines and a suite of tools from the Web site