Current Best Practices In Hand Hygiene

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Background

- Hand hygiene is considered the most important measure for reducing the transmission of nosocomial pathogens in healthcare settings.
- Many studies have documented that compliance of healthcare workers with recommended practices is unacceptably low.

Compliance with Hand Hygiene, 1981-1999

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Setting</th>
<th>Compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preston</td>
<td>1981</td>
<td>Open ward</td>
<td>16%</td>
</tr>
<tr>
<td>Albert</td>
<td>1981</td>
<td>ICU</td>
<td>30%</td>
</tr>
<tr>
<td>Larson</td>
<td>1983</td>
<td>ICU</td>
<td>28%</td>
</tr>
<tr>
<td>Donowitz</td>
<td>1987</td>
<td>PICU</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>Pettenger</td>
<td>1991</td>
<td>SICU</td>
<td>51%</td>
</tr>
<tr>
<td>Larson</td>
<td>1992</td>
<td>NICU/others</td>
<td>29%</td>
</tr>
<tr>
<td>Doebbelin</td>
<td>1992</td>
<td>ICUs</td>
<td>40%</td>
</tr>
<tr>
<td>Zimakoff</td>
<td>1993</td>
<td>ICUs</td>
<td>40%</td>
</tr>
<tr>
<td>Meens</td>
<td>1994</td>
<td>Emergency Room</td>
<td>32%</td>
</tr>
<tr>
<td>Pittet</td>
<td>1999</td>
<td>All wards</td>
<td>48%</td>
</tr>
</tbody>
</table>

Hand Hygiene

Self-reported factors for poor compliance

- Lack of time (understaffing, overcrowding)
- Shortage of sinks / often inconveniently located
- Lack of soap, paper, ...
- Skin damage / fear that hands will be damage after frequent hand hygiene
- Beliefs that glove use dispenses from hand hygiene
- No role model from colleagues or superior(s)
- Scepticism ...
- Disagreement with the recommendations

Nurses complied more frequently than physicians in all but one study.
Maternal mortality rates, First and Second Obstetrics Clinics, GENERAL HOSPITAL OF VIENNA, 1841-1846

Intervention
May 1847
- Students and doctors were required to:
  - clean their hands with a chlorinated lime solution when entering the labor room
  - in particular when moving from the autopsy to the labor room

It is easy to promote hand hygiene among HCWs

True or False?
Ignaz Philipp Semmelweis before and after he insisted that students and doctors clean their hands with a chlorine solution between each patient.

**Parameters associated with successful hand hygiene promotion**

1. Education
2. Routine observation + feedback
3. Engineering control
   - Make HH possible / easy / convenient / ...
4. Patient education
5. Reminders in the workplace
6. Administrative sanction / rewarding
7. Change in HH agent (but not in winter ...!!!)
8. Promote / facilitate HCW’s skin care
9. Obtain active participation at individual and institutional level
10. Obtain / drive an institutional safety climate
11. Enhance individual and institutional self-efficacy
12. And last but not least: Use a multimodal strategy

**Study Objective**

To determine factors associated with poor compliance to hand hygiene practices in a large university hospital.

**Handwashing / Hand antisepsis**

Observational study - Methods

Information to HCW at HCUG : November 1994
- Observational study : December 5-18th, 1994
- Convenience sample of 48 wards
- 315 20-min observation periods (total,101 hours)
- Observation periods : morning - afternoon - night week - week-end
Definitions

Compliance = \frac{\text{number of actions}}{\text{number of observed opportunities}}

Action = 
- handwashing (soap + water / water)
- hand antisepsis (use of alcohol-based hand rub)

** Predetermined opportunities for HW/HA

Activity Index = \frac{\text{number of opportunities}}{\text{total duration of observation}}

Study variables

- hospital ward / department
- time of the day (morning - afternoon - night)
- time of the week (week / week-end)
- profession
- activity index (opportunities per hour)
- nursing census of the ward (at time of observation)
- patient census
- type of care provided
- bed occupancy rate of the ward

Compliance and Professional Activity

<table>
<thead>
<tr>
<th></th>
<th>Opportunities</th>
<th>Compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nurse (520)</td>
<td>1875 (66 %)</td>
<td>52 %</td>
</tr>
<tr>
<td>Student nurse (48)</td>
<td>131 (4.7 %)</td>
<td>43 %</td>
</tr>
<tr>
<td>Nurses' aide  (166)</td>
<td>378 (13 %)</td>
<td>47 %</td>
</tr>
<tr>
<td>Mid-wife (14)</td>
<td>35 (1.3 %)</td>
<td>66 %</td>
</tr>
<tr>
<td>Physician (158)</td>
<td>281 (10 %)</td>
<td>30 %</td>
</tr>
<tr>
<td>Phys/Resp therapist (23)</td>
<td>48 (1.7 %)</td>
<td>28 %</td>
</tr>
<tr>
<td>Radiology Technician (4)</td>
<td>12 (0.4 %)</td>
<td>8 %</td>
</tr>
<tr>
<td>Others (58)</td>
<td>74 (2.7 %)</td>
<td>27 %</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>2,834 (100 %)</strong></td>
<td><strong>48 %</strong></td>
</tr>
</tbody>
</table>

Non-Compliance with hand hygiene, HUG 1994

Compliance and Hospital Department

<table>
<thead>
<tr>
<th>Department</th>
<th>Opportunities (%</th>
<th>Compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pediatrics</td>
<td>133 (4.7 %)</td>
<td>59 %</td>
</tr>
<tr>
<td>Medicine</td>
<td>1114 (39 %)</td>
<td>52 %</td>
</tr>
<tr>
<td>Surgery</td>
<td>990 (35 %)</td>
<td>47 %</td>
</tr>
<tr>
<td>Obs / Gyn</td>
<td>147 (5.2 %)</td>
<td>48 %</td>
</tr>
<tr>
<td>ICUs</td>
<td>450 (16 %)</td>
<td>36 %</td>
</tr>
</tbody>
</table>

Relation between opportunities for hand hygiene for nurses and compliance across hospital wards
**Observed reasons for not washing hands**

*Time and system constraints*

- High demand for hand hygiene is associated with low compliance
- Full compliance with conventional guidelines may be unrealistic

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Voss and Widmer - Inf Control Hosp Epidemiol 1997; 18:205
Pittet et al. Annals Intern Med 1999; 130:126

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**Yes or No?**

Time constraint is a major obstacle for hand hygiene …

Would it be possible to bypass the time constraint?

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**Efficacy of hand hygiene products**

Alcohol-based handrub is more efficacious than handwashing with medicated soap

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**Efficacy of hand hygiene products**

Log reduction in bacterial counts after 30 sec

- Alc 70% Alcohol
- 4% CHG
- Iodophor
- Soap

Advantages of alcohol-based hand antisepsis vs. handwashing

- Faster and of greater efficacy than soap & water handwashing
- Improved accessibility
  - No sinks (plumbing) required
  - In rooms, corridors, nursing stations
- Effective against wide array of organisms, including multi-drug resistant pathogens

Successful hand hygiene promotion is an impossible task

True or False?

Objective

- To assess the effectiveness of a hospital-wide campaign to promote hand hygiene with an emphasis on bedside handrub

Design and Intervention

- Seven observational, hospital-wide surveys conducted on a bi-annual basis from December 1994 to December 1997
- Hospital-wide promotion of hand hygiene with a particular emphasis on hand rubbing
- Talking walls figuring the importance of hand hygiene associated with performance feedback
My son, if they don’t get me, you will become multi-resistant.
Doctor, in this hospital, it becomes impossible to cause infections as we want!

The University of Geneva Hospitals against DIRTY STAPH: war has started

### Outcome measures

- The main outcome measure was overall compliance with hand hygiene

Confounding variables included professional activity, hospital ward, time of the day/week, type and intensity of patient care at time of observation, and the use of standard handwashing with unmedicated soap and water or hand rub

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Alcohol-based handrub can bypass the time constraint

Beliefs or Science?

Time constraint is high in the ICU and bugs are everywhere

Relation between workload and compliance with handwashing vs. handrubbing in ICUs

Improved compliance with hand hygiene decreases nosocomial infections

Beliefs or Science?

Compliance with hand hygiene, HUG 1994–1998

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Conclusions

- The campaign resulted in a sustained and significant improvement in compliance with the rules of hand hygiene
- Promotion of alcohol-based hand rub was responsible for more active augmentation in compliance
- We observed a parallel decrease of nosocomial infection rates

True or False?
Hand hygiene promotion is costly
Objective

- To evaluate the cost-effectiveness of the successful hand hygiene promotion campaign
- Setting: University of Geneva Hospitals, Geneva, Switzerland

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Direct costs

- Artist work
- Color posters’ reproduction
- Creation / refreshments of «Talking Walls»
- Food during monthly meetings of the Team Performance
- Office supplies

Indirect costs (Personnel time)

- Team Performance (~40 individuals)
- Preparation of the Talking Walls (painter)
- Housekeeping time (poster renewal)
- Infection control team (PCI) time
  - Nurse 10%
  - Hospital epidemiologist 5%
  - Support team 2%
- Observation sessions and feedback
- Extra nurse for 4 months at beginning

Outcome indicators

- Annual nosocomial infection (NI) rates assessed by repeated prevalence surveys
- Overall consumption of handrub solution from 1993 to 2001
- Additional use of handrub, from 1995
- Adjustment for hospital demographics, 1993–2001

Use of alcohol-based hand rub, HUG 1993-2001

- Baseline use before promotion
- Hand rub promotion

Hand rub use: cost per 100 admissions

- Change rate: US$ 1 ~ CHF 1.65
- An average of US$ 1.22 per admission since 1995
- Cost per admission in 2001: US$ 1.96
Hand hygiene promotion campaign, HUG 1995-2001

Direct and indirect costs of intervention

<table>
<thead>
<tr>
<th>Year</th>
<th>Direct Costs</th>
<th>Indirect Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995-97</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1998</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1999</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Hand hygiene promotion campaign, HUG 1995-2001

Overall costs of intervention

Total costs: US$ 577,889
Average: US$ 82,555 per year

Cost comparison: nosocomial infections vs. hand hygiene promotion campaign, HUG 1994-2001

Years

### Cost comparison: nosocomial infections vs. hand hygiene promotion campaign, HUG 1994-2001

Costs of NI
Costs of hand hygiene

This slide is neither a mistake, nor a joke

Average infection rate, 1999-2001: 9.7 per 100 admissions
Estimates of US$ 28.9 mio from nosocomial infections
Total costs of US$ 0.29 mio for hand hygiene promotion
Conclusions

- The total costs of the campaign averaged US$ 82'555 per year; US$ 1.62 per admission in 2001; it reached US$ 2.30 per admission in 2001.
- While indirect costs remained stable, direct costs increased, in particular because of increased use of alcohol-based handrub that reached US$ 1.96 per admission in 2001 (85% of total costs).
- Costs of hand hygiene promotion including handrub use corresponded to ~ 1% of costs attributable to NI in a large teaching institution.

We can do it.

Hand hygiene:
- compliance
- and how to get things done.
Poor compliance should be viewed only as a problematic individual behavior

True or False?

Parameters for successful hand hygiene promotion are many

True or False?

Hand Hygiene (HH) Factors associated with noncompliance

Individual level
- lack of education / experience
- being a physician
- male gender
- lack of knowledge of guidelines
- being a refractory noncomplier

Group level
- lack of education / performance feedback
- working in critical care (high workload)
- downsizing / understaffing
- lack of encouragement from key staffs

Institutional level
- lack of guidelines (written)
- lack of administrative leadership / sanction / rewarding / support
- lack of available / suitable HH agents
- lack of skin care promotion / agent
- lack of HH facilities
- lack of culture / tradition of compliance

Hand Hygiene (HH) Factors associated with noncompliance

Parameters associated with successful hand hygiene promotion

1. Education yes
2. Routine observation + feedback yes
3. Ingeneering control yes
- Make HH possible, easy, convenient
4. Patient education yes
5. Reminders in the workplace no
6. Administrative sanction / rewarding yes

Parameters associated with successful hand hygiene promotion

7. Change in HH agent no
8. Promote / facilitate HCW’s skin care yes
9. Obtain active participation at individual and institutional level yes
10. Obtain / drive an institutional safety climate yes
11. Enhance individual and institutional self-efficacy may be
12. Use a multimodal strategy yes
Possible reasons for successful promotion

- Make hand hygiene possible in a timely fashion
- Observation and performance feedback
- Multimodal / multidisciplinary approach:
  - communication and education tools
  - reminders and performance feedback
  - active participation at individual level
  - active participation at institutional level
  - make hand hygiene compliance an institutional priority
  - enhance the image of the institution
  - enhance the sense of individual / collective commitment
  - enhance self-efficacy and perception to health threat

Each poster was created by the artist in wards with the collaboration of ward nurses and physicians.

Each poster carried the name of the ward that had proposed the message.

Text and wording were reviewed by a team of representative HCWs at HUG (Team Performance).