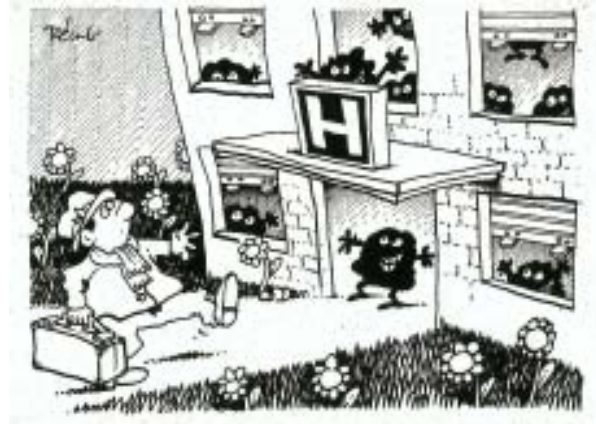


# Current Best Practices In Hand Hygiene

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ast v.25.9.02DPHHIHumantbespractices



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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

Author	Year	Setting	Compliance
Preston	1981	Open ward	16%
		ICU	30%
Albert	1981	ICUs	41%
		ICUs	28%
Larson	1983	All wards	45%
Donowitz	1987	PICU	30%
Graham	1990	ICU	32%
Dubbert	1990	ICU	81%
Pettinger	1991	SICU	51%
Larson	1992	NICU/others	29%
Doebbeling	1992	ICUs	40%
Zimakoff	1993	ICUs	40%
Meengs	1994	Emergency Room	32%
Pittet	1999	All wards	48%
		ICUs	36%

*Nurses complied more frequently than physicians in all but one study*

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## Hand Hygiene

### Self-reported factors for poor compliance

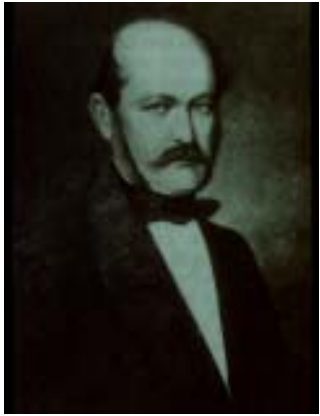
- Lack of time (understaffing, overcrowding)
- Shortage of sinks / often inconveniently located
- Lack of soap, paper, ...
- Skin damage / fear that hands will be damaged after frequent hand hygiene
- Beliefs that glove use dispenses from hand hygiene
- No role model from colleagues or superior(s)
-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

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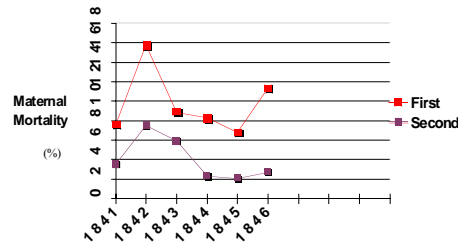
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Ignaz Philipp Semmelweis

Maternal mortality rates,  
First and Second Obstetrics Clinics,  
GENERAL HOSPITAL OF VIENNA, 1841-1846



Semmelweis IP, 1861

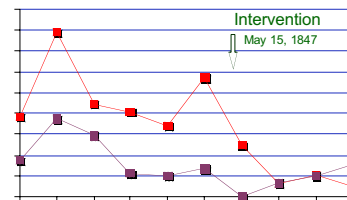
## Intervention

### 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



Maternal mortality rates,  
First and Second Obstetrics Clinics,  
GENERAL HOSPITAL OF VIENNA, 1841-1850



Semmelweis IP, 1861

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

*Pittet, Infect Control Hosp Epidemiol 2000 / Pittet & Boyce, Lancet Infectious Diseases 2001, April, 9-20*

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

## Parameters associated with successful hand hygiene promotion

*Pittet, Infect Control Hosp Epidemiol 2000 / Pittet & Boyce, Lancet Infectious Diseases 2001, April, 9-20*

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 antiseptis 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

$$\text{Compliance} = \frac{\text{number of actions}^*}{\text{number of observed opportunities}} \quad **$$

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

\*\* Predetermined opportunities for HW/HA

$$\text{Activity Index} = \frac{\text{number of opportunities}}{\text{total duration of observation}} \quad [\text{opp}/\text{hour}]$$

## 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

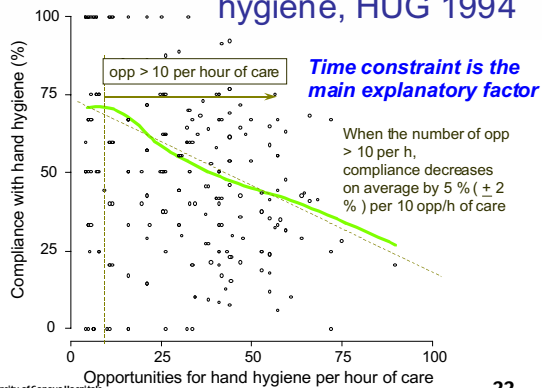
## Compliance and Professional Activity

*Pittet et al, Ann Intern Med 1999, 130:126*

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

## Non-Compliance with hand hygiene, HUG 1994

*Pittet et al, Ann Intern Med 1999, 130:126*

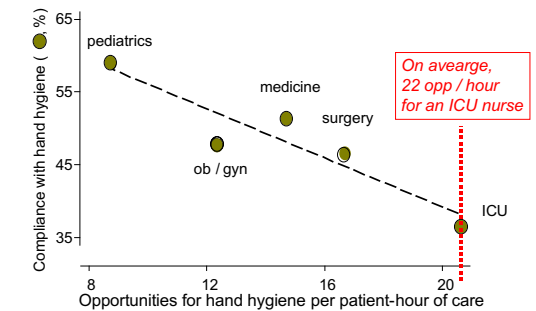


## Compliance and Hospital Department

Departement	Opportunities (%)	Compliance
<b>Pediatrics</b>	<b>133</b> (4.7 %)	<b>59 %</b>
<b>Medicine</b>	<b>1114</b> (39 %)	<b>52 %</b>
<b>Surgery</b>	<b>990</b> (35 %)	<b>47 %</b>
<b>Obs / Gyn</b>	<b>147</b> (5.2 %)	<b>48 %</b>
<b>ICUs</b>	<b>450</b> (16 %)	<b>36 %</b>

*Pittet et al, Ann Intern Med 1999, 130:126*

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



*adapted from Pittet D et al. Annals Intern Med 1999; 130:126*

**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

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

Time constraint is a major obstacle for hand hygiene ...

Would it be possible to bypass the time constraint ?

Yes or No ?

Time constraint = major obstacle for hand hygiene



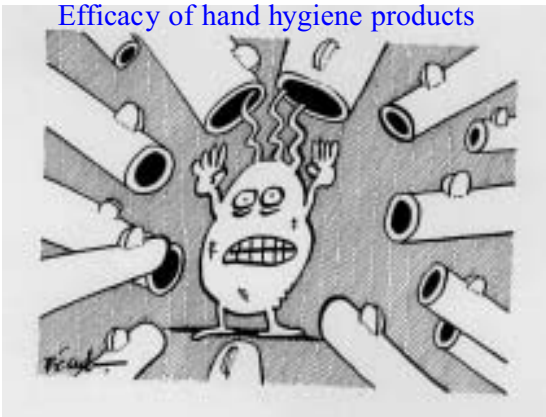
handwashing  
hand antiseptis

1 to 1.5  
min

alcohol-based  
hand rub

15 to 20  
sec

**Efficacy of hand hygiene products**

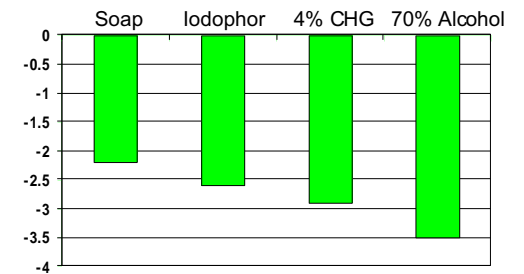


Alcohol-based handrub is more efficacious than handwashing with medicated soap

True or False ?

**Efficacy of hand hygiene products**

Log reduction in bacterial counts after 30 sec



*Aylliffe GAJ et al. J Hosp Infection 1988;11:226*

## Advantages of alcohol-based hand antiseptics 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

Alcohol-based hand rub



Before and after any patient contact  
Before and after glove use

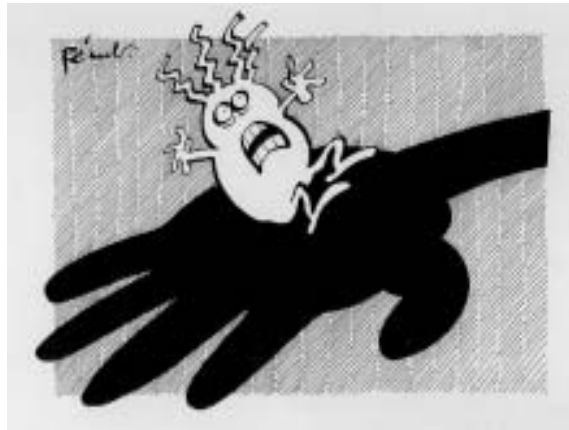


**BEFORE AFTER**

« Talking walls »



My son,  
if they don't get me,  
you will become  
multiresistant





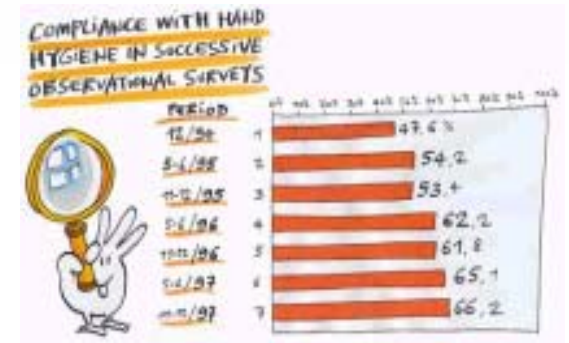
Doctor, in this hospital, it becomes impossible to cause infections as we want!

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

## Outcome measures

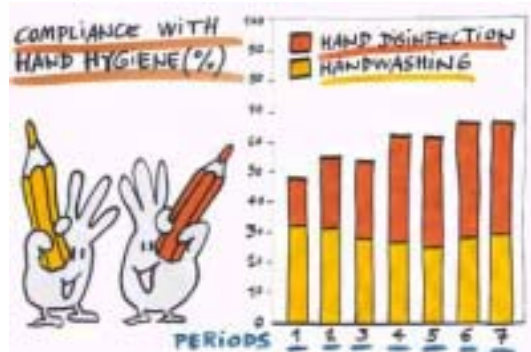
- The main outcome measure was overall compliance with hand hygiene

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



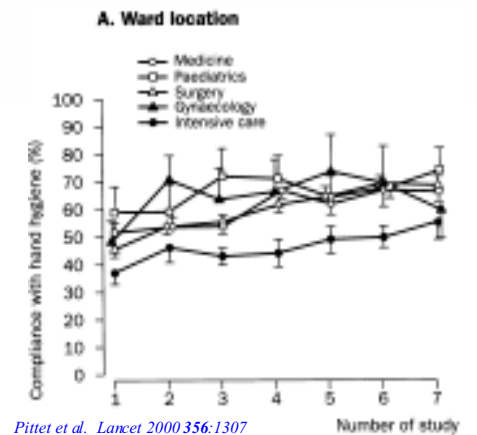
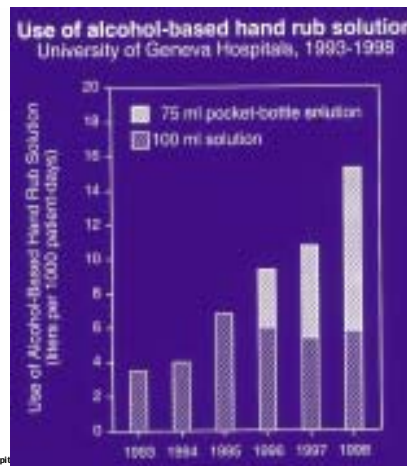
www.hopisafe.ch

Pittet D et al, *Lancet* 2000; 356: 1307-1312



www.hopisafe.ch

Pittet D et al, *Lancet* 2000; 356: 1307-1312



Pittet et al. *Lancet* 2000 356:1307



Alcohol-based handrub can bypass the time constraint

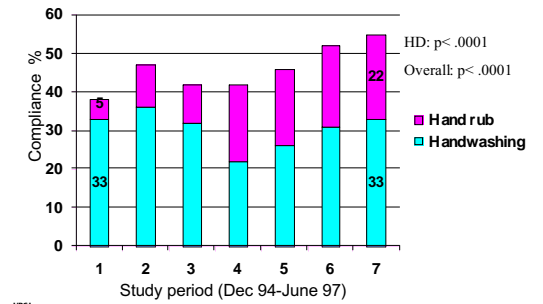
Beliefs or Science ?



*Time constraint is high in the ICU and bugs are everywhere*

### Trends over time in compliance with hand hygiene in ICUs, 1994-1997

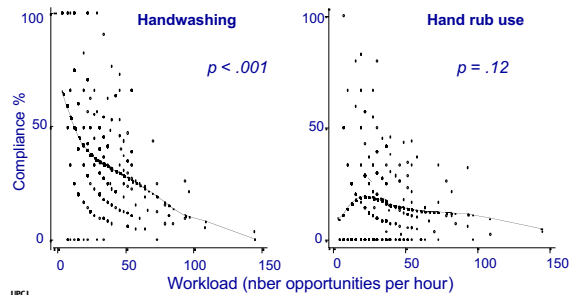
Hugonnet, Pemeger, and Pittet - Arch Intern Med 2002, 162:1037



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

Adapted from Pittet D et al, Lancet 2000; 356: 1307-1312  
Hugonnet S et al, Arch Internal Med 2002; 162:1037-1043

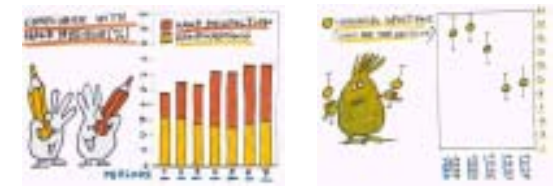


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Improved compliance with hand hygiene decreases nosocomial infections

Beliefs or Science ?

### Compliance with hand hygiene, HUG 1994-1998

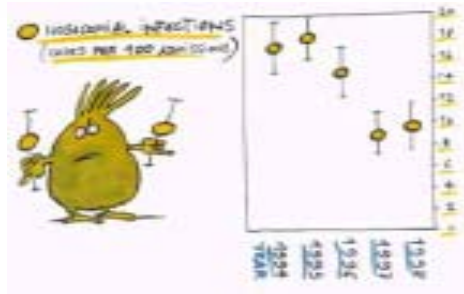


www.hopisafe.ch

Pittet D et al, Lancet 2000; 356: 1307-1312

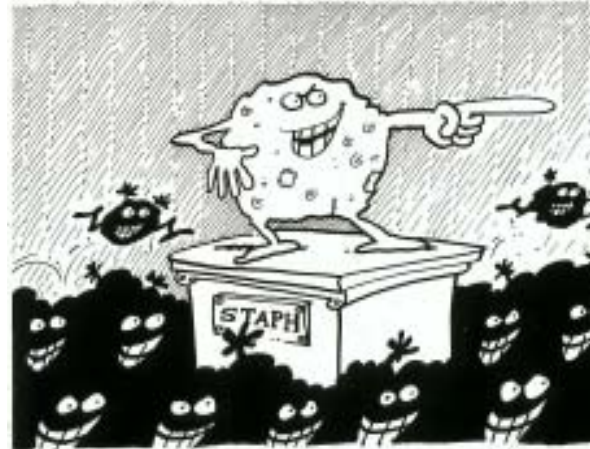
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## Hospital-wide nosocomial infections; trends 1994-1998



www.hopisafe.ch

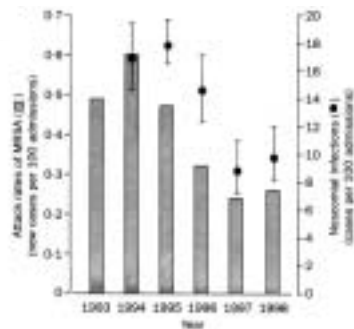
Pittet D et al, *Lancet* 2000; 356: 1307-1312



Hand rub

MRSA spread is essentially via the hands of healthcare workers... Thus, it can be stopped

## Trends in prevalence of nosocomial infections and MRSA cross-transmission, HUG 1993-1998



Pittet et al. *Lancet* 2000 356:1307

## 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

Hand hygiene promotion is costly

True or False ?

## Objective

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

[www.hopisafe.ch](http://www.hopisafe.ch)  
 Pittet D et al, *Lancet* 2000; 356: 1307-1312

## Direct costs

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

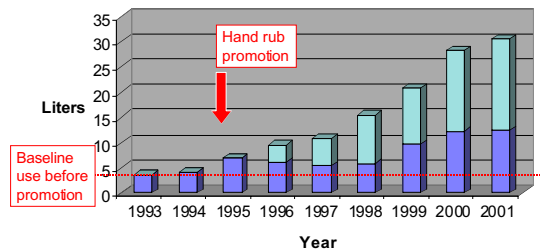
## Indirect costs (Personnel time)

- 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

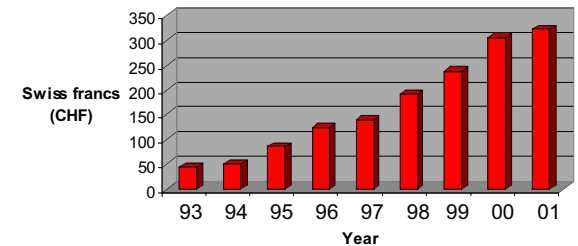
- Annual nosocomial infection (NI) rates assessed by repeated prevalence surveys
- Overall consumption of handrub solution from 1993 to 2001
- Additional use of handrub, from 1995
- Adjustment for hospital demographics, 1993–2001

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



75 mL pocket-sized bottle, introduced in 1996  
 100 mL bedside bottle, used since 1970 at HUG

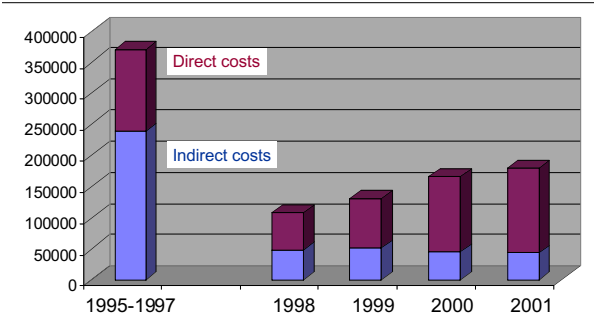
Hand rub use: cost per 100 admissions



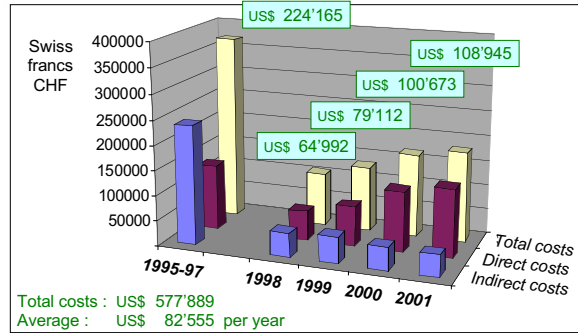
Change rate: US\$ 1 ~ CHF 1.65

An average of US\$ 1.22 per admission since 1995  
 Cost per admission in 2001 : US\$ 1.96

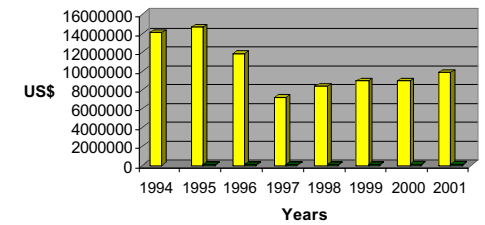
**Hand hygiene promotion campaign, HUG 1995-2001**  
Direct and indirect costs of intervention



**Hand hygiene promotion campaign, HUG 1995-2001**  
Overall costs of intervention



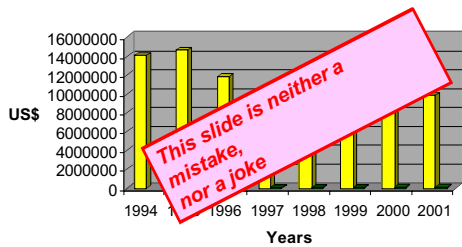
**Cost comparison: nosocomial infections vs. hand hygiene promotion campaign, HUG 1994-2001**



Costs of NI

Costs of hand hygiene

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

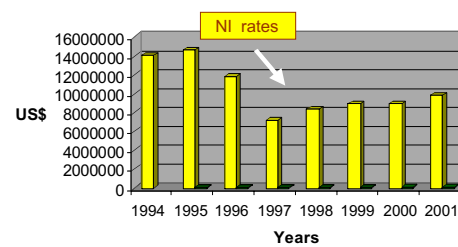


*This slide is neither a mistake, nor a joke*

Costs of NI

Costs of hand hygiene

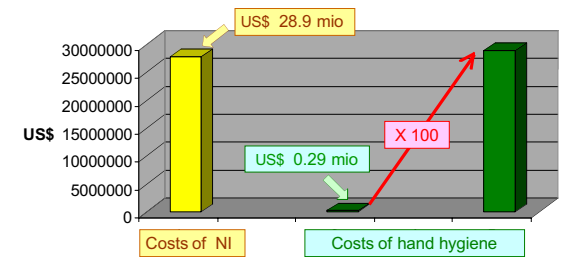
**Cost comparison: nosocomial infections vs. hand hygiene promotion campaign, HUG 1994-2001**



Costs of NI

Costs of hand hygiene

**Cost comparison: nosocomial infections vs. hand hygiene promotion campaign, HUG 1999-2001**



Costs of NI

Costs of hand hygiene

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
  - 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

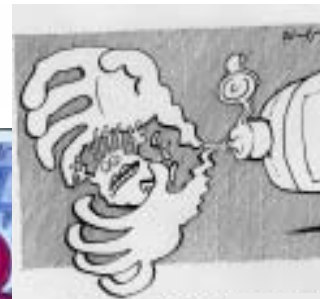


You can do it too ...



Rub hands ... it saves money

*Handwashing ...  
an action of the past  
(except when hands are soiled)*



**Alcohol-based hand rub is standard of care**

---

Hand hygiene:  
compliance  
and how to get things done

---

Poor compliance should be viewed only as a problematic individual behavior

True or False ?

## Hand Hygiene (HH) Pittet - Infect Control Hosp Epidemiol 2000

### 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

## Hand Hygiene (HH) Pittet - Infect Control Hosp Epidemiol 2000

### Factors associated with noncompliance

#### 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

Parameters for successful hand hygiene promotion are many

True or False ?

### Parameters associated with successful hand hygiene promotion ... used in Geneva

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

### Parameters associated with successful hand hygiene promotion ... used in Geneva

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 *?*
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)

