Ways to Increase the Compliance

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World Health Organization campaign on hand hygiene

World Health Organization | Patient Safety
A World Alliance for Safer Health Care

- Hand hygiene is regarded as an essential tool for the prevention of nosocomial infection
- BUT compliance in clinical practice is often low
- What is the reason for this controversial finding?
- How can compliance be increased?

WHO Guidelines on Hand Hygiene in Health Care

First Global Patient Safety Challenge
Clean Care is Safer Care

Colonisation of Hands and Persistence

Pathogen	Frequent cause of NI	Frequency on hands	Persistence on hands
S. aureus	Surgical site infection, pneumonia, sepsis	10 – 78 %	≥ 2.5 h
Pseudomonas spp.	Lower respiratory tract infection	1 - 25 %	0.5 – 3 h
E. coli	Urinary tract infection	unknown	up to 1.5 h
Yeasts incl. C. albicans	Lower respiratory tract infection, urinary tract infection, sepsis	23 – 81 %	1 h
Rotavirus	Viral gastroenteritis, particularly in children	20 – 79 %	up to 4 h

Source: Kampf G et al. (2004) Clin. Microbiol. Rev. 17: 863-893.

Levels of compliance

Author	Year	Setting	Compliance
Preston	1981	Open ward / ICU	16 / 30 %
Albert	1981	ICUs / ICUs	41 / 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	Emerg. Room	32 %
Pittet	1999	All wards	48 %

Non-Compliance – Barriers

- Insufficient knowledge
- Lack of products or dispensers
- Lack of time
- Cutaneous irritation: skin problems with use
- Lack of role models to set an example

Source: Kampf G et al. (2009) Dtsch. Arztebl Int 106(40): 649-55

How can these barriers be overcome?

- Successful hand hygiene improvement strategies are multi-faceted
- WHO campaign:
  - System change
    - essential: ABHR have to be procured & be available at point of care
  - Staff training
  - Monitoring of hand hygiene indicators & performance feedback
  - Reminders in the work place
  - Improvement of the institutional patient safety climate

Source: Allegranzi B et al. (2013) J Hosp Infect 83(S1): S3-S10

German campaign „Aktion Saubere Hände“

- Measures which have to be implemented by participating hospitals

1. Support by hospital management of campaign implementation
2. Implementation of the WHO „My five moments for Hand Hygiene“
3. Training of HCW at least once a year
4. Measurement of ABHR consumption & feedback of resulting data
5. Increase in hand-rub availability
   - Minimum standard: 1 dispenser per bed (ICU) and per 2 beds (non-ICUs) respectively

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Source: Reichardt C et al. (2013) J Hosp Infect 83(S1): S11-S16

Implementation of "My five moments in hand hygiene"

- 5 Moments for HAND HYGIENE:
  - **BEFORE** patient contact
  - **BEFORE** aseptic task
  - **AFTER** body fluid exposure risk
  - **AFTER** patient contact
  - **AFTER** contact with patient surroundings

Source: Sax H et al. (2007) J Hosp Infect 67: 9 - 21

Hand Rub availability – Design and Setting

- MICU, 53 HCW
- Period 1: only hand washing
- Introduction of Sterillium
- Period 2: hand washing <u>or</u> hand disinfection
- Outcome: compliance

Source: Maury E et al. (2000) Am. J. Resp. Crit. Care Med. 162: 324-327.

Hand Rub availability - Outcome

- Compliance: 42.2% ⇒ 60.9% ($p < 0.001$)
  - ✓ Nurses: 45.9% ⇒ 66.9% ($p < 0.001$)
  - ✓ Senior physicians: 37.2% ⇒ 55.5% ($p < 0.001$)
  - ✓ Residents: 46.9% ⇒ 59.1% ($p = 0.03$)

- After 3 months: 51.3% ($p = 0.007$)

Source: Maury E et al. (2000) Am. J. Resp. Crit. Care Med. 162: 324-327.

Options to Improve Hand Rub Availability

- Optimal locations of dispensers:
  - Next to the patient bed
  - At the basin
  - Near the door
  - Easy access
  - Make sure that dispensers are functional
- Provide staff with pocket-sized bottles
  - availability of ABHR is guaranteed at point of care

Promotion, education and availability of ABHR

- Introduction of propanol-based hand rub
- Promotion of hand disinfection
- 1994 – 1997

- Outcome:
  - Rate of nosocomial infections
  - Rate of new MRSA cases
  - Compliance rate in hand hygiene

Source: Pittet D et al. (2000) Lancet 356: 1307-12.

Promotion, education and availability of ABHR

Study on nosocomial infection

- 2629 observation periods
- 20082 opportunities for hand hygiene

- Compliance rate: 48% ⇒ 66% ($p < 0.001$)
- Hand disinfection: 13.6% ⇒ 37% ($p < 0.001$)
- NI: 16.9% ⇒ 9.9% ($p = 0.04$)
- MRSA transmission rates (/10000 patient days): 2.16 ⇒ 0.93 ($p < 0.001$)
- Use hand rub: 3.5 ⇒ 15.4 l per 1000 patient days ($p < 0.001$)

Source: Pittet D et al. (2000) Lancet 356: 1307-12.

Cost benefit calculation

- Cost of program: ~ SFr 380000
- Save per NI: ~ SFr 3500
- Prevention of 108 NI: cost effective
- Assumption: 25% of reduction associated with hand hygiene
- ~ 900 NI prevented (~ 3.15 Mio SFr)

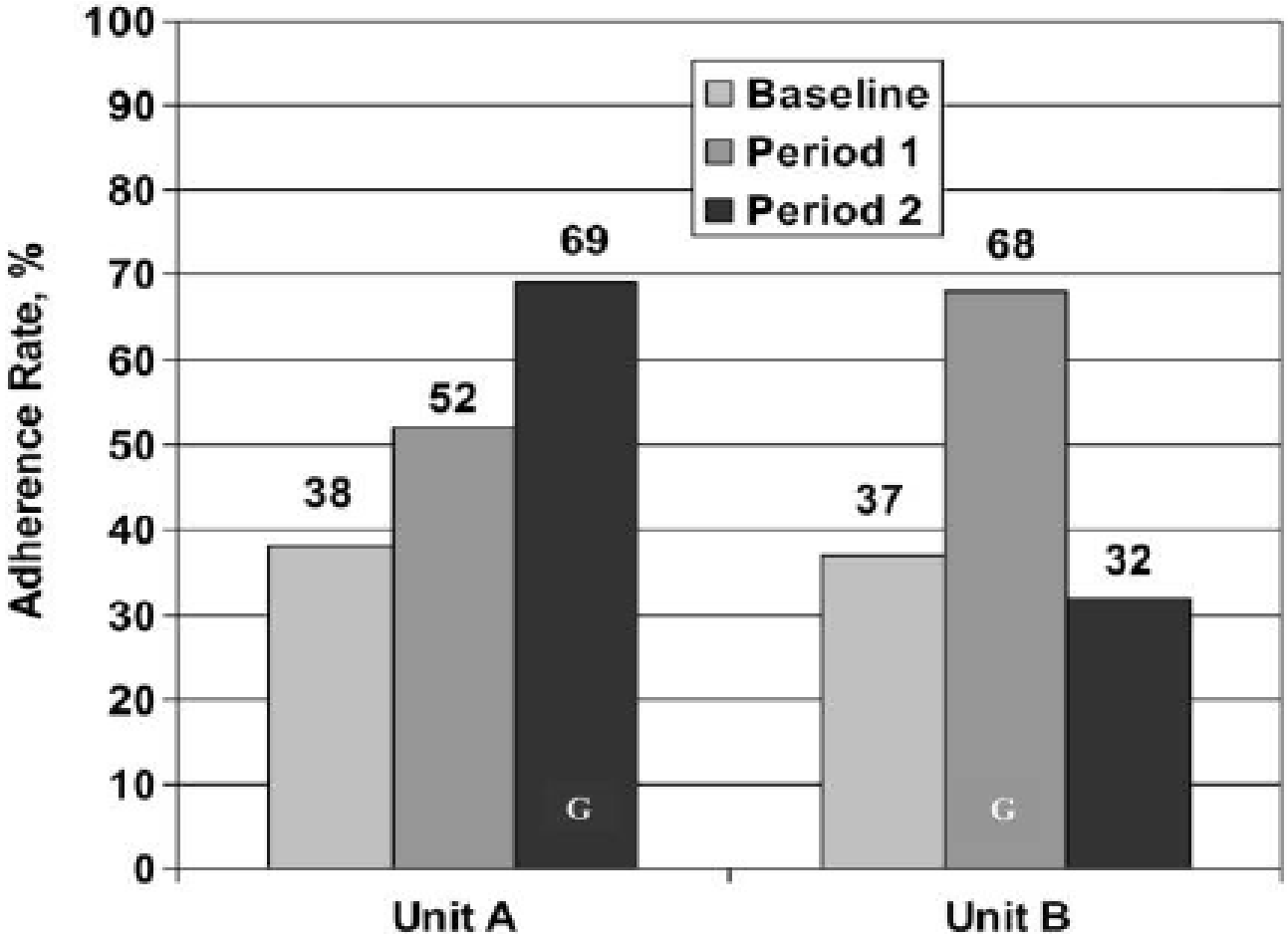
Source: Pittet D et al. (2000) Lancet 356: 1307-12.

No effect on nosocomial infections

- 2 year, prospective controlled cross-over trial
- 2 medical-surgical ICUs
- Gel based on **62% ethanol** and 0.3% triclosan was provided in one ICU but not in the other
- 3678 opportunities for hand hygiene
- Outcome
  - Compliance rate
  - Incidence of healthcare-associated infections

Source: Rupp ME et al. (2008) Inf. Control Hosp. Epidemiol. 29: 8-15.

Compliance Rate



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Incidence of nosocomial infections

TABLE 2. Comparison of Rates of Device-Associated Infection in Intensive Care Unit (ICU) A and ICU B According to the Availability of Alcohol-Based Hand Gel

	No. of infections per 1,000 device-days					
	Unit A, by study period			Unit B, by study period		
Infection	Baseline	No gel[a]	Gel[b]	Baseline	No gel[a]	Gel[b]
Catheter-associated UTI	1.10	1.98	3.87	2.99	4.37	3.37
CVC-associated BSI	1.51	3.49	1.49	3.01	3.49	3.22
VAP	0.00	0.68	0.73	2.95	0.00	0.75

NOTE. BSI, bloodstream infection; CVC, central venous catheter; UTI, urinary tract infection; VAP, ventilator-associated pneumonia.

[a] Period when alcohol-based hand gel was not available for hand hygiene.

[b] Period when alcohol-based hand gel was available for hand hygiene.

Source: Rupp ME et al. (2008) Inf. Control Hosp. Epidemiol. 29: 8-15.

Conclusions

- "The introduction of alcohol-based gel resulted in a significant and sustained improvement in the rate of hand hygiene adherence".
- "This improvement in the hand hygiene adherence rate was not associated with detectable changes in the incidence of healthcare-associated infection."

Source: Rupp ME et al. (2008) Inf. Control Hosp. Epidemiol. 29: 8-15.

Reactions by key opinion leaders

- Andreas Widmer, Manfred Rotter: "We congratulate the authors for conducting this important trial. It may be the first hint that the antimicrobial activity of such gels is not sufficient to reduce the incidence of nosocomial infections."
- Matthias Maiwald: "Even high compliance with products that have limited activity may not sufficiently decrease the rate of nosocomial infection.“
- Leonard Mermel et al.: "There is an ongoing debate about the efficacy of alcohol-based hand rub formulations with an ethyl alcohol content lower than 80%, in particular with gels and foam formulations".

Source: Various authors (2008) Inf. Control Hosp. Epidemiol. 29: 576-582.

Alcohol-based hand rub consumption (AHC)

- Monitoring AHC is part of campaigns of various European countries
- **France**: AHC is one of five quality indicators
  - Ministry of Health: Minimum expected consumption of Healthcare facility
  - 43 % of HCF reached minimum target value in 2008 (2006: 11 %; 2007: 24 %)
- **Germany**: AHC Measurement is mandatory to participate in campaign
  - AHC in mL, annual number of patient days, unit type and specialty have to be provided annually

Alcohol-based hand rub consumption – 2009 in Germany

- 362 hospitals with 3882 units

AHC	ICU (n = 543) [mL/PD]	Non-ICU (n = 3339) [mL/PD]
median	83	18
range*	43 - 141	10 - 38

* between 10th and 90th percentile

- Highest AHC:
  - Pediatric ICU: 99 mL/PD
  - Pediatric & neonatal Non-ICU: 38 mL/PD
- Trend:
  - + 30.7 % of AHC within two years!

Source: Reichardt C et al. (2013) J Hosp Infect 83S1: S11-S16

Compliance observation – direct measure I

- Direct measure of hand hygiene compliance
  - Actual number of activities, HHOs and indications for HH are documented
- Gold standard although it faces also limitations, e.g. time, cost, standardization, „Hawthorne effect“
- Integral part of most national campaigns
  - Belgium: 1st 50% ⇨ 69%; 2nd 53% ⇨ 70%; 3rd 58% ⇨ 69%; 4th 62% ⇨ 73%
  - Hong Kong: 21% ⇨ 57%
  - Australia: 44% ⇨ 68%

Source: Reichardt C et al. (2013) J Hosp Infect 83S1: S11-S16
Costers M et al. (2012) Euro Surveill. 17(18):pii=20161

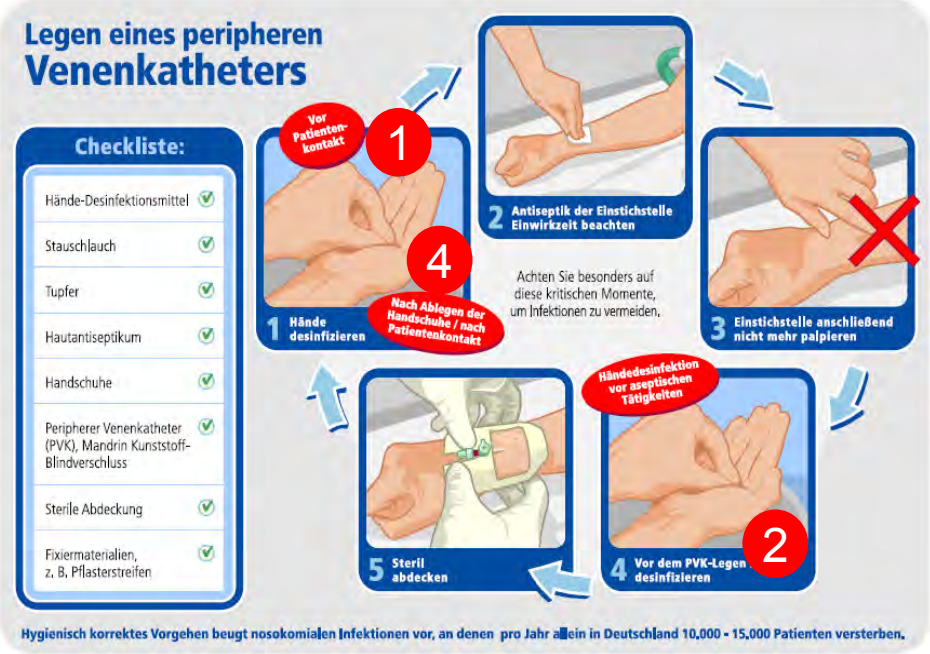
Compliance observation – direct measure II

- Indication specific compliance (WHO 5 moments)
  - 2 indications BEFORE patient contact ⇨ ~ 21 % compliance rate
  - 3 indications AFTER patient contact ⇨ ~ 47 % compliance rate
- Focus on the indications with the highest potential to reduce
  - Cross-transmission of organisms
  - HCAI
- Combination of both methods seems to be the best option
  - Short and representative observation period
  - AHC during the year

Source: Scheithauer S et al. (2013) J Hosp Infect 83S1: S17-S22

Establishment of SOPs for certain interventions

- Checklist for insertion of a peripheral venous catheter
- Moments:
  - 1 before patient contact
  - 2 before aseptic procedure
  - 4 after removal of gloves



Source: Kampf G et al. (2013) GMS Hygiene and Infection Control; 8(2):DOC18

Summary

Compliance in Hand Hygiene

- Can be increased by multi-faceted campaigns incl.
  - Education of staff and promotion of hand hygiene
  - Availability of well-tolerated and efficient ABHR at the point of care
  - Support by Board/Administration incl. adjusted budgets for hand hygiene

It is less expensive/more cost saving to invest in prevention than in treating HCAI