

Improving Hand Hygiene Behavior – The Effects of Social Influence and Leadership

Dr. Anita Huis, Radboud University Nijmegen Medical Centre, The Netherlands
Teleclass Broadcast Sponsored by GOJO www.gojo.com

Improving Hand Hygiene Behavior

The Effects of Social Influence and Leadership

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University Hospital of Zurich, Switzerland

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Patient safety

'The first requirement of a hospital is that it should do the sick no harm'

Florence Nightingale



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Outline 1

- The burden of Hospital Acquired Infections (HAIs)
- Implementation of change
- Effective hand hygiene (HH) strategies
- The development of 2 HH strategies
- Compare both strategies on effectiveness

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Outline 2

- Economic evaluation: is a team and leaders-directed strategy cost-effective?
- Integrating process and outcome evaluations: explaining the effects
- The team and leaders-directed strategy in a multidisciplinary setting
- Future directions

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The burden of HAIs

- Annually 100,000 HAIs in the Netherlands
- Prevalence rate of 7.2% in hospital wards in the Netherlands
- One thousand cases of excess mortality per year
- Estimated costs by prolonged hospital stay: € 337 million annually (1.7% of total hospital costs)

Literature: van Benthem 2010; Groeneveld 2007

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Simple and effective

Hand hygiene (HH) is the most important measure to reduce HAIs

'The treatment effect is so great that if hand hygiene were a new drug it would be used by all'

Stone 2001



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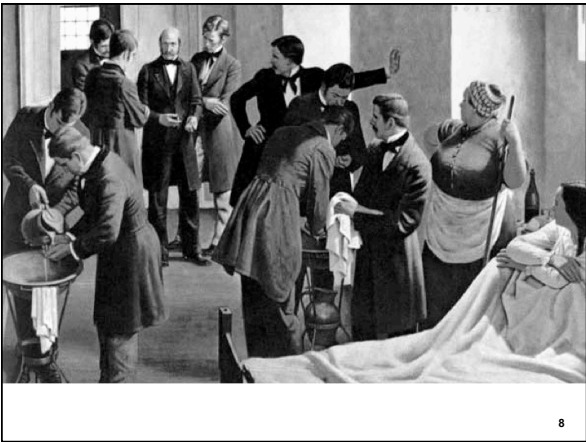
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But not that simple at all!

In the Netherlands, HH is performed in only 19.5% of the relevant opportunities




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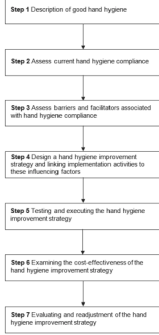

Implementation problem

- Innovations do not implement themselves
- Specific programs are required to implement innovations
- Implementation activities require a systematic approach and good planning




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Changing HH behavior

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Barriers



Focus of barriers	Difficulties to change	Percentage ¹
Cognition	Seldom see complications	61%
	Lack of hard evidence for some of the prescriptions	43%
Attitude & motivation	Iritation of the hands	81%
	Takes too much time	50%
Routine	Forgetting	65%
Social	Nobody controls	50%
	Management not interested	45%
Organisational	Not feasible in work	61%
	No hospital guideline	49%
Recourses	Lack of facilities	42%

Adapted from Grol and Guimshaw, 2003.⁷ ¹Number (%) of people seeing this obstacle as a problem

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Effectiveness HH strategies

Table 2. Evidence for strategies aimed at improving hand hygiene in health care workers (33 studies).

No. of studies	Mostly effective	No. of studies	Mostly ineffective
7	Performance feedback	7	Education
5	Improved products	3	Reminders
3	Improved facilities		
1	Patient involvement		
1	Social influence		
12	Combined strategies		

Adapted from Van Achterberg et al., 2008.³³

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Something is missing

Barriers at team level not addressed!

- Social norm is lacking
- Social support and 'model behavior' is lacking
- Ward management is not interested in HH
- Insight into team performance is lacking



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Theories on behavior change

- Social learning theory (Bandura 1986)
 - Example behavior and reinforcement of correct behavior
- Social influence theory (Mittman 1992)
 - Social norm determines what correct behavior is
- Theory on team effectiveness (West 1990; Shortell 2004)
 - Orientation on team climate and willingness to change
- Theory of leadership (Øvretveit 2004)
 - Active participation of the ward management

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Review

Huis et al. Implementation Science 2012, 7:92
<http://www.implementationscience.com/content/7/1/92>



SYSTEMATIC REVIEW Open Access

A systematic review of hand hygiene improvement strategies: a behavioural approach

Anita Huis^{1*}, Theo van Achterberg¹, Marijn de Bruin², Richard Gro¹, Lisette Schoonhoven^{1,3} and Marlies Hulscher¹

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Building 2 HH strategies


- Literature based state-of-the-art strategy
- Theory based team and leaders-directed strategy



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Building 2 HH strategies

Huis et al. Implementation Science 2011, 6:101
<http://www.implementationscience.com/content/6/1/101>



STUDY PROTOCOL Open Access


Helping hands: A cluster randomised trial to evaluate the effectiveness of two different strategies for promoting hand hygiene in hospital nurses

Anita Huis^{*}, Lisette Schoonhoven, Richard Gro, George Borm, Eddy Adang, Marlies Hulscher and Theo van Achterberg

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State-of-the-art strategy

- Individual
 - Education and instruction
 - Reminders
 - Performance feedback
- Organizational
 - Products
 - Facilities



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Hospital wide campaign

- Hand hygiene promotion meetings
- Leaflets (HH indications, instruction)
- Adequate products and facilities
- Website, including hand hygiene quiz
- Posters (awareness)
- Performance feedback



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Team and leaders-directed strategy

- Setting norms and targets within the team
- Social influence, role modeling
- Measuring compliance, problem analysis and improvement
- Active commitment/participation in performance improvement initiatives of ward manager



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Improving team performance 1

Norm setting and goal setting regarding HH

- Three interactive team sessions
- Analysis of barriers and facilitators
- Defining improvement activities
- Nurses address each other in case of undesirable hand hygiene behaviour



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Improving team performance 2

Modeling by informal leaders at the ward

- Informal leaders demonstrate good hand hygiene behavior
- Informal leaders model social skills in addressing behavior of colleagues
- Informal leaders instruct and stimulate their colleagues in providing good hand hygiene behavior



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Improving team performance 3

Gaining active commitment of ward manager

- Ward manager designates hand hygiene as a priority
- Ward manager actively supports team members and informal leaders
- Ward manager discusses hand hygiene compliance rates with team members



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Compare effectiveness

International Journal of Nursing Studies 50 (2013) 464–474



Contents lists available at ScienceDirect

International Journal of Nursing Studies

journal homepage: www.elsevier.com/ijns



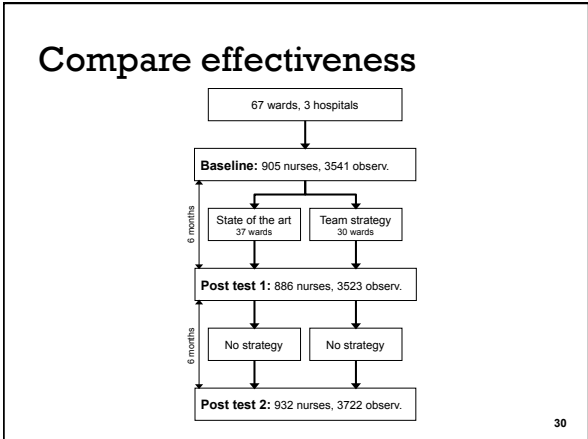
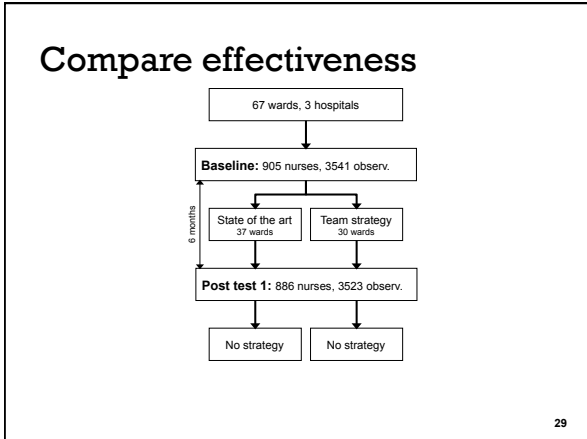
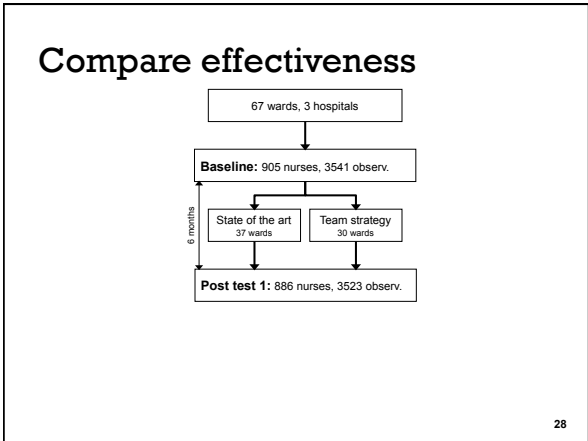
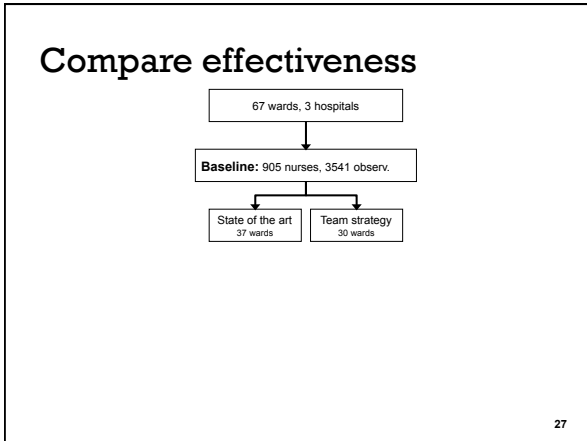
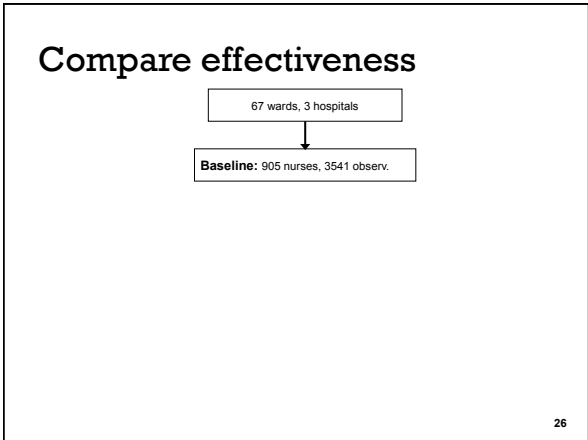
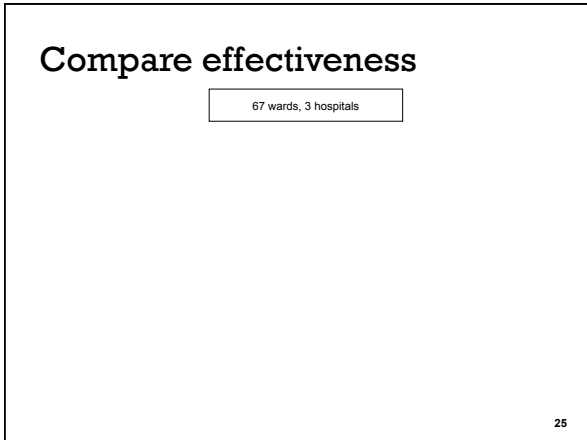
Impact of a team and leaders-directed strategy to improve nurses' adherence to hand hygiene guidelines: A cluster randomised trial

Anita Huis^{a,*}, Lisette Schoonhoven^a, Richard Grol^a, Rogier Donders^b, Marlies Hulscher^a, Theo van Achterberg^a

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Outcome measures

Primary

- Compliance with hand hygiene guidelines
 - The percentage of nurses' actions in line with hand hygiene guidelines in case of an opportunity to perform this action

Secondary

- The presence of jewelry (ring, watch or other jewelry), and long-sleeved clothes
 - Compliance with specific type of hand hygiene opportunity representing the required moments for hand hygiene

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Data collection

Direct unobtrusive observations

- At point of care
- ± 60 Observations per ward involving 15 nurses
- Observations introduced as research on medication and other patient safety errors
- 10,785 opportunities for hand hygiene in 2733 nurses

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Score form

Atkling: [] [] [] [] (bv C44) Observatiedate: [] [] [] []

Datum: [] [] [] [] [] []

Verpleegkundige: [] [] [] [] DM DV
Handpols sensor: Ja Nee
Lange mouwen: Ja Nee
Begrip: [] [] [] []

Andere professional: [] [] [] [] DM DV
Handpols sensor: Ja Nee
Lange mouwen: Ja Nee
Begrip: [] [] [] []

1. Indicator	Actie	1. Indicator	Actie
<input type="checkbox"/> voor - invasief	<input type="checkbox"/> wassen	<input type="checkbox"/> voor - invasief	<input type="checkbox"/> wassen
<input type="checkbox"/> vol - schoon	<input type="checkbox"/> desinfectie	<input type="checkbox"/> vol - schoon	<input type="checkbox"/> desinfectie
<input type="checkbox"/> na - direct contact	<input type="checkbox"/> geen actie	<input type="checkbox"/> na - direct contact	<input type="checkbox"/> geen actie
<input type="checkbox"/> na - contact isolat		<input type="checkbox"/> na - contact isolat	
<input type="checkbox"/> na - handschoenen		<input type="checkbox"/> na - handschoenen	
<input type="checkbox"/> na - verp. handen		<input type="checkbox"/> na - verp. handen	
2. Indicator	Actie	2. Indicator	Actie
<input type="checkbox"/> voor - invasief	<input type="checkbox"/> wassen	<input type="checkbox"/> voor - invasief	<input type="checkbox"/> wassen
<input type="checkbox"/> vol - schoon	<input type="checkbox"/> desinfectie	<input type="checkbox"/> vol - schoon	<input type="checkbox"/> desinfectie
<input type="checkbox"/> na - direct contact	<input type="checkbox"/> geen actie	<input type="checkbox"/> na - direct contact	<input type="checkbox"/> geen actie
<input type="checkbox"/> na - contact isolat		<input type="checkbox"/> na - contact isolat	
<input type="checkbox"/> na - handschoenen		<input type="checkbox"/> na - handschoenen	
<input type="checkbox"/> na - verp. handen		<input type="checkbox"/> na - verp. handen	
3. Indicator	Actie	3. Indicator	Actie
<input type="checkbox"/> voor - invasief	<input type="checkbox"/> wassen	<input type="checkbox"/> voor - invasief	<input type="checkbox"/> wassen
<input type="checkbox"/> vol - schoon	<input type="checkbox"/> desinfectie	<input type="checkbox"/> vol - schoon	<input type="checkbox"/> desinfectie
<input type="checkbox"/> na - direct contact	<input type="checkbox"/> geen actie	<input type="checkbox"/> na - direct contact	<input type="checkbox"/> geen actie
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<input type="checkbox"/> na - handschoenen		<input type="checkbox"/> na - handschoenen	
<input type="checkbox"/> na - verp. handen		<input type="checkbox"/> na - verp. handen	
4. Indicator	Actie	4. Indicator	Actie
<input type="checkbox"/> voor - invasief	<input type="checkbox"/> wassen	<input type="checkbox"/> voor - invasief	<input type="checkbox"/> wassen
<input type="checkbox"/> vol - schoon	<input type="checkbox"/> desinfectie	<input type="checkbox"/> vol - schoon	<input type="checkbox"/> desinfectie
<input type="checkbox"/> na - direct contact	<input type="checkbox"/> geen actie	<input type="checkbox"/> na - direct contact	<input type="checkbox"/> geen actie
<input type="checkbox"/> na - contact isolat		<input type="checkbox"/> na - contact isolat	
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<input type="checkbox"/> na - verp. handen		<input type="checkbox"/> na - verp. handen	

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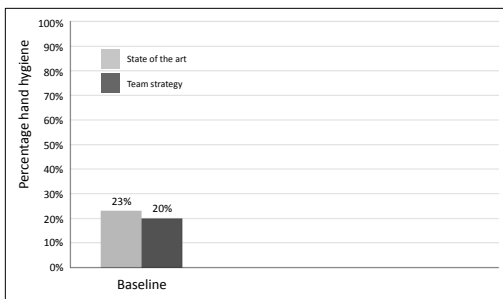
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Statistical methods

- Intention-to-treat
- Multilevel logistic analysis
 - Adjusted for clustering of data
- Random factors
 - Nurse and nursing ward
- Fixed factors
 - Strategy, timing of measurement, ward's HH compliance at baseline

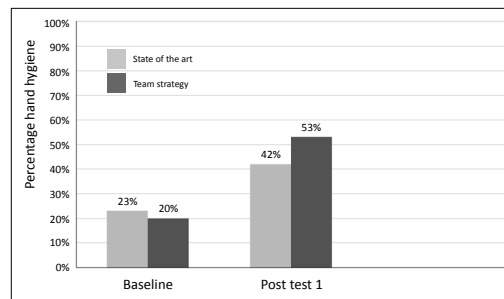
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Effects on HH compliance



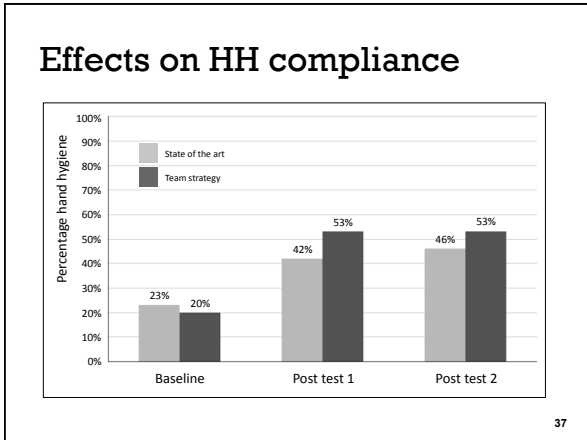
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Effects on HH compliance



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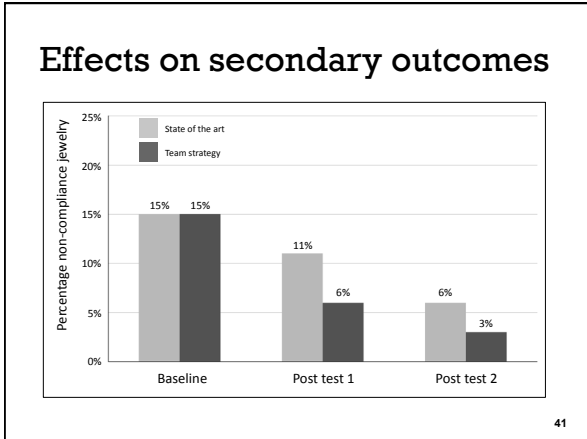
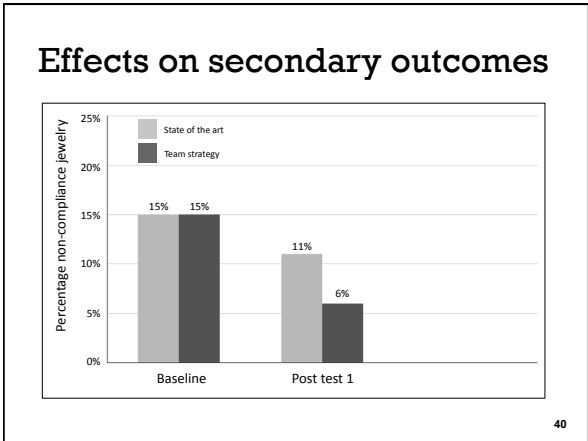
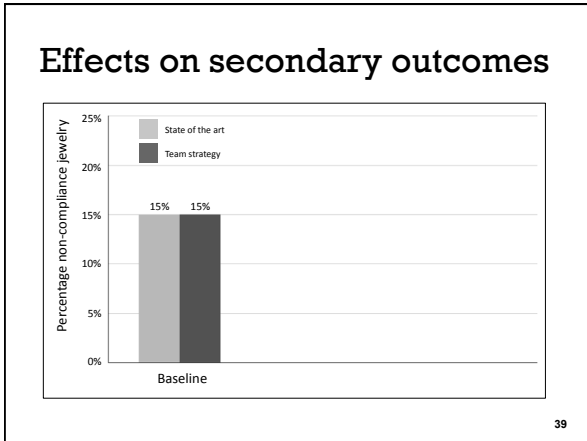
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Effects on HH compliance

We found an Odds Ratio of 1.64 (95% CI [1.33–2.02] and $p < 0.001$) in favour of the team-directed strategy

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Effects secondary outcomes

We found an Odds Ratio of 2.56 (95% CI [1.80–3.65], $p < 0.01$) in favour of the team and leaders-directed strategy.

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Economic evaluation

International Journal of Nursing Studies 50 (2013) 518–526

Contents lists available at SciVerse ScienceDirect



International Journal of Nursing Studies
journal homepage: www.elsevier.com/ijns

Cost-effectiveness of a team and leaders-directed strategy to improve nurses' adherence to hand hygiene guidelines: A cluster randomised trial[†]

Anita Huis^{a,*}, Mariëes Hulscher^a, Eddy Adang^b, Richard Grol^a, Theo van Achterberg^a, Lisette Schoonhoven^{a,c}

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^b Epidemiology, Biostatistics and HR, Radboud University Nijmegen Medical Centre, Nijmegen, The Netherlands
^c Faculty of Health Sciences, University of Southampton, Southampton, UK

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Economic evaluation

- Limited resources force us to choose the most cost-effective strategy
- No well-designed economic evaluations of hand hygiene improvement strategies available
- AIM – to determine whether the additional increase in hand hygiene compliance due to the team and leaders-directed strategy justifies the additional costs

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Cost-effectiveness

Two incremental cost-effectiveness ratios:

1. The incremental cost-effectiveness ratio per extra percentage of hand hygiene compliance gained
2. The incremental cost-effectiveness ratio per additional percentage reduction in the HAI rate

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Scenarios

- The evaluation used a hospital perspective
- Two scenarios of 15 and 30% were used to estimate the association between increased hand hygiene compliance and the reduction in HAIs

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Costs calculated

Table 1. Costs calculated for cost-effectiveness analysis.

Intervention component	Costs to be calculated	Average costs per ward (€)	Total costs (€)	
SAS N=17	Education	55	1301	
	Leaflets	27	980	
	Posters	44	1648	
	Newsletters	3	115	
	Article in hospital magazines	3	100	
	Observations baseline	84	3092	
	Observations during interventions	30	1104	
Feedback	Delivery of feedback (2 reports with bar charts)	5	192	
	Subtotal	231	8532	
	Hand rub	Costs of alcohol hand rub due to increased use	637	23 373
Staffing Time	Extra staffing time needed to perform HI	5791	214 263	
	Total	Total costs SAS strategy	6659	246 368
TDS N=30	SAS strategy	231	6930	
	Coaching	SAS intervention components	105	3150
	Team discussions	Staffing costs for managers and role models needed to participate in coaching sessions	497	14 923
		Staffing costs manager needed to prepare and evaluate team discussions	239	7170
		Staffing costs for nurses needed to participate in coaching sessions	1294	38 820
	External guidance by coach	917	27 510	
	Hand rub	Costs of alcohol hand rub due to increased use	907	27 205
Staffing Time		Extra staffing time needed to perform HI	7966	238 960
Total	Total costs TDS strategy	12 156	364 668	

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Cost and effects

Table 2. Cost and effects of the implementation strategies per ward.

		Mean	Mean difference	Confidence interval difference	
Effects	TDS [*]	33,07%	-8,91%	-17,06%	-0,75%
	SAS [†]	24,16%			
Costs	TDS	€12156	€5497	€9032	€1962
	SAS	€6659			

^{*} State-of-the-art strategy
[†] Team and leaders-directed strategy

Incremental cost-effectiveness ratio of € 622 (95% CI € 146 – € 1098) per extra percentage of hand hygiene compliance gained due to the team and leaders-directed strategy

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Health care costs

- The cost of a hospital infection consists mainly of extended hospital stay, increased medical and nursing care, operations and consumables, microbiology tests and investigations, and antibiotics and other drugs
- The cost estimate was set on 5455 euro per infection, based on previous estimates and indexed to the price level of 2009, using the Dutch consumer price index figures for health care costs

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Results modeling

30% scenario

- incremental cost-effectiveness ratio of € 2074 (95% CI, € 487 - € 3661) This means that a ward has to invest € 2074 for an additional percentage reduction in the HAI rate

15% scenario

- incremental cost-effectiveness ratio is € 4125 (95% CI, € 1016 - € 7234) This means that a ward has to invest € 4125 for an additional percentage reduction in the HAI rate

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Willingness to Pay

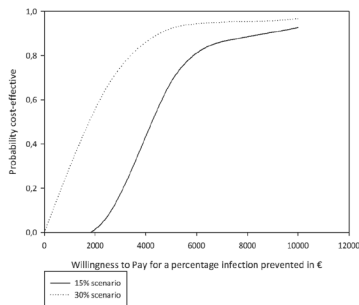


Figure 2. Acceptability curves for the team and leaders-directed strategy.

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Conclusions

- The team and leaders-directed strategy resulted in 9% more hand hygiene compliance at a cost of € 5497 per ward
- Savings in favour of the team and leaders-directed strategy:
 - 30% scenario: € 13,879 (reduction HAI 2.7%)
 - 15% scenario: € 6,939 (reduction HAI 1.35%)

- Is it a good deal?



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Explaining the effects

Huis et al. Implementation Science 2013, 8:41
<http://www.implementationscience.com/content/8/1/41>



RESEARCH Open Access

Explaining the effects of two different strategies for promoting hand hygiene in hospital nurses: a process evaluation alongside a cluster randomised controlled trial

Anita Huis^{1*}, Gerda Holleman¹, Theo van Achterberg¹, Richard Grof¹, Lisette Schoorhoven^{1,2} and Marlies Hulscher¹

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Explaining the effects

Integrating process and outcome evaluations



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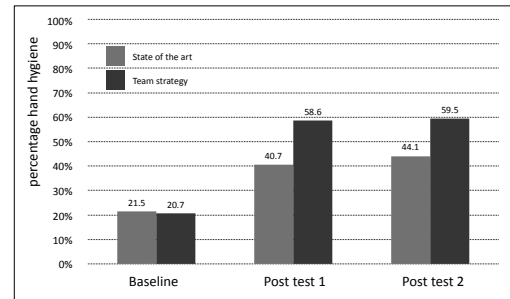
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Research questions

1. What impact might variation in adherence to the improvement strategies as planned have on changes in nurses' HH compliance?
2. What impact might specific contextual factors as hospital and ward characteristics have on changes in nurses' HH compliance?
3. What impact might differences in nurses' actual experiences with strategy components have on changes in nurses' HH compliance?

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As-received analysis



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Adherence to the strategies

- Both improvement strategies were carried out with good adherence to protocol
- The evaluation of strategy adherence did not provide any explanatory variables associated with changes in nurses' HH compliance



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Contextual factors

- For both study groups, baseline HH scores were negatively correlated with follow-up scores ($r = -0.693$; $p = 0.000$)
- We found a hospital effect on changes in HH compliance in long term ($p = 0.036$)

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Nurses' experiences 1

Positively correlated with increased HH compliance

- Feedback about team members HH performance
- Social influence
 - Colleagues support each other in performing HH
 - Team members address each other in case of undesirable HH behaviour



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Nurses' experiences 2

Positively correlated with increased HH compliance

- Leadership
 - Ward manager designates HH as a priority
 - Ward manager addresses barriers to enable HH as recommended
 - Ward manager holds team members accountable for HH performance
 - Ward manager actively supports team members



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Multidisciplinary settings



Major article

The short-term and long-term effectiveness of a multidisciplinary hand hygiene improvement program

Mirjam Tromp MA, RN^{a,b,c}, Anita Huis MSc^c, Inge de Guchteneire RN^{a,b}, Jos van der Meer MD, PhD^{a,b}, Theo van Achterberg PhD^c, Marlies Hulscher MSc, PhD^c, Chantal Bleeker-Rovers MD, PhD^{a,b}

^a Nijmegen Institute for Infection, Inflammation, and Immunity (N4I), Radboud University Nijmegen Medical Centre, The Netherlands
^b Department of Internal Medicine, Radboud University Nijmegen Medical Centre, The Netherlands
^c Scientific Institute for Quality of Healthcare, Radboud University Nijmegen Medical Centre, The Netherlands

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Problem

Multi-Resistant Medical Specialist (A. Voss, 2012)



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MRMS

- Resistant to good advice
- Allergic to (professional) guidelines
- Non-compliant with infection control measures
- Blind to HAIs (especially their own)
- Other priorities

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A pilot study

- Study setting and population
 - Department of Internal Medicine, 45 nurses and 54 physicians
- Intervention
 - Team and leaders-directed strategy
- Pre-post test design
- Outcome measures
 - HH compliance
 - HH knowledge

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Results

Table 3
Hand hygiene knowledge scores and hand hygiene compliance scores in the nursing ward

Variable	Baseline	Poststrategy	Follow-up
Hand hygiene knowledge			
Questionnaire scores (0-10)			
Overall (standard deviation)	7.4 (±1.2)	8.4 (±1.1)	8.3 (±1.2)
Nurses (n)	7.4 (29)	8.5 (28)	8.8 (25)
Staff physicians (n)	7.2 (15)	8.2 (13)	7.5 (14)
Hand hygiene compliance			
No. of opportunities	99	92	103
No. of indications	115	105	138
Compliance scores (%)			
Overall	27	83	75
Nurses (n)	17 (15)	83 (13)	63 (15)
Physicians (n)	43 (11)	83 (11)	91 (11)

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Conclusions

- Overall as well as in the subgroups of nurses and physicians, a considerable increase in the HH knowledge and in HH compliance was achieved
- In contrast to other studies, the overall compliance in our study was significantly higher in physicians than in nurses
- The team and leaders-directed strategy was well received by physicians

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Future directions

Patient involvement? Rewards and punishment?



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Thank you for attending this lecture



www.anitahuis.nl/dissertation/anita.huis_dissertation.pdf

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Coming Soon

07 August *(FREE ... WHO Teleclass – North America)*
DECONTAMINATION OF HIGH-TOUCH ENVIRONMENTAL SURFACES IN HEALTHCARE: A CRITICAL LOOK AT CURRENT PRACTICES AND NEWER APPROACHES
 Speaker: Prof. Syed A. Sattar, Centre for Research on Environmental Microbiology, University of Ottawa

22 August **THE INFECTIOUS DISEASE FOLLOUT FOLLOWING NATURAL DISASTERS – THE HURRICANE SANDY STORY**
 Speaker: Dr. Michael Tapper, Lenox Hill Hospital, New York

29 August *(FREE South Pacific Teleclass – Broadcast live from the IPCNC conference in New Zealand)*
FROM LITTLE THINGS BIG THINGS GROW: THE IMPORTANCE OF LEADERSHIP SKILLS IN INFECTION PREVENTION
 Speaker: Prof. Cathryn Murphy, Infection Control Plus, Australia

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