Enhanced performance feedback and patient participation to improve hand hygiene compliance

Andrew Stewardson, Melbourne, Australia
Hugo Sax, Zurich, Switzerland

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paul@webbertraining.com

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www.webbertraining.com  December 14, 2017

Enhanced performance feedback and patient participation to improve hand hygiene compliance of health-care workers in the setting of established multimodal promotion: a single-centre, cluster randomised controlled trial

Andrew James Stewardson*, Hugo Sax*, Angélique Gayet-Ageron, Sylvie Touchais, Yves Longtin, Walter Zingg, Didier Pittet

The Lancet Infectious Diseases 2016;16:1345
http://dx.doi.org/10.1016/S1473-3099(16)30256-0

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Content

1. Discuss how to design a best practice implementation trial
2. Evaluate the results of a large cluster-randomised controlled trial to evaluate enhanced feedback and patient participation: what would we do differently next time
3. Determine how to build an intervention using qualitative inquiry
4. Evaluate methodologic considerations relating to interventional studies in hand hygiene
With the identified variability in certainty of evidence, interventions, and methods, there remains an urgent need to undertake methodologically robust research to explore the effectiveness of multimodal versus simpler interventions to increase hand hygiene compliance, and to identify which components of multimodal interventions or combinations of strategies are most effective in a particular context.

Performance feedback

Should be framed to maximise the behaviour change

Should minimise the risk of the healthcare worker either “giving up” or “rationalizing away”

**Tools**
Goal-setting = explicitly fixing an achievable target
Action planning = establishing how this goal can be reached
Rewards = meaningful in the targeted populations value space
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Average
Goal-setting
Trend over time

Patient participation

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PATIENTPARTICIPATION
500 mg CAPSULES
Effective Patient Safety
Capsules

Guardian of the patient’s interest. All decisions rely entirely on the knowledge of the health care worker

Passive recipient of care.

The Paternalistic Model of Care

Longtin et al. Mayo Clinic Proceedings. 2010;85:53

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Conclusions. This study identifies several sociodemographic characteristics associated with the intention to ask nurses and physicians about hand hygiene and underscores the importance of a direct invitation from healthcare workers to increase patient participation and foster patient empowerment. These findings could guide the development of future hand hygiene–promotion strategies.

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<table>
<thead>
<tr>
<th>Qualitative</th>
<th>Quantitative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quotes</td>
<td>Numbers</td>
</tr>
</tbody>
</table>

“They said it was a priority...but then, they actually never showed up, we never saw them here at the bedside...”

11.5% (p=.3)

Qualitative research

Qualitative Research is intended to deeply explore, understand and interpret social phenomena within its natural setting.

[...] to explore the why and how of a situation, not only what, where, when.

Focus groups for intervention design - **Methods**

1. Scenario of patient asking for hand hygiene
2. Discussion
3. Videotaping > Analysis

Focus groups for intervention design - **Results**

1. Refusal > Engagement
2. Critique is a ‘difficult’ emotional experience
3. Inventing range of solutions
Hypothesis

Implementation of enhanced performance feedback or enhanced performance feedback plus patient participation in wards with ongoing multimodal hand hygiene promotion would lead to a clinically significant increase (defined a priori as ≥15 percentage points) in hand hygiene compliance compared with multimodal hand hygiene promotion alone.

Trial design

Setting
- University of Geneva Hospitals (HUG)
- 2200-bed primary and tertiary institution
- Long history of multimodal hand hygiene promotion

Design
- Single-centre, cluster-randomised controlled trial
- Unit of randomisation & implementation = ward

Population
- All patients & healthcare workers in study wards included
- Waiver of individual participant consent
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Performance feedback

Individual
Immediate & written

Feedback card

Aggregate
Ward & department
Every three months

Posters

Email

Both were accompanied by ward-level benchmarking and goal-setting (80%)

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Department of Infectious Diseases

Result: Numeric & graphic
Target setting

Result
Signatures

My 5 Moments
Comments

UNITE Q-DL
L'hygiène des mains a été correctement effectuée
9 fois sur 10
Votre tendance

Ward name & time period
Benchmark
Trend

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Patient Participation

Admission
(If healthcare worker judges the patient capable)
- Patient education:
  - Patient indications for hand hygiene
  - Healthcare worker indications
- Welcome pack: Brochure and bottle of alcohol-based hand rub (100ml)
- Partnership: Agreement to remind each other – focus on Moment 1

Throughout admission
- Repetition of message
- Badge for healthcare workers
- Posters in clinical zone

Implementation
- Healthcare worker education: 3 × 15 minute workshops
- Quarterly visit from study team members
Outcomes

Primary outcome
- Healthcare worker hand hygiene compliance
  - 12 trained infection control nurses
  - WHO “My 5 Moments”
  - Purpose built database - validation

Secondary outcomes
- Hand hygiene behaviour
  - Moment 1 hand hygiene compliance
  - ABHR requisition (100mL bottles)
- Healthcare associated infections
  - Bloodstream infection: primary & secondary
  - Period prevalence
- Hospital pathogen clinical isolates
  - Clinical isolates: MRSA & ESBL-PE
  - Clostridium difficile positive results
- Acquisition of multidrug-resistant organisms
  - MRSA
  - ESBL-PE
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Statistical methods

Sample size
• Baseline compliance 60%
• Clinically significant increase = 15 percentage points (60% to 75%)
• Alpha 5%, power 80%, accounting for clustering
• Require 1100 opportunities per group per study period

Analysis
• Generalised linear mixed-effects models
• Hand hygiene
  • Mixed effects logistic regression with interaction term between period & study group
  • Interaction term for study period (baseline/intervention) & study arm
• ABHR consumption: mixed-effects linear regression after log transformation
• Infections: mixed-effects Poisson regression models

Results: Study Profile
Results

• 39 months (baseline & intervention)

Hand hygiene
• 12 observers
• 1,367 observation sessions
• 3,973 “healthcare workers”
• 12,579 opportunities

Alcohol-based handrub
• 34,714 litres
• 1,169,567 bed days

### Overall hand hygiene compliance

<table>
<thead>
<tr>
<th></th>
<th>Actions</th>
<th>Opportun.</th>
<th>Mean compliance</th>
<th>Absolute change</th>
<th>Odds ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>935</td>
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</tr>
<tr>
<td>Intervention</td>
<td>1631</td>
<td>2239</td>
<td>73% (70–77)</td>
<td>7% (4–10)</td>
<td>1.41 (1.21–1.63)</td>
</tr>
<tr>
<td>Follow-up</td>
<td>631</td>
<td>949</td>
<td>70% (66–75)</td>
<td>4% (0–8)</td>
<td>1.21 (1.00–1.47)</td>
</tr>
<tr>
<td>Enhanced performance feedback</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>1040</td>
<td>1629</td>
<td>65% (62–69)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intervention</td>
<td>2160</td>
<td>2920</td>
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<td>72% (68–75)</td>
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<tr>
<td>Enhanced performance feedback plus patient participation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>1024</td>
<td>1594</td>
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<td></td>
<td></td>
</tr>
<tr>
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### Enhanced Performance Feedback and Patient Participation to Improve Hand Hygiene Compliance

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#### Absolute difference attributable to interventions

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*3 percentage points (95% CI 0–7; p=0.19) for enhanced performance feedback*
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*4 percentage points (1–8; p=0.048) for enhanced performance feedback plus patient participation.*

### Alcohol-based handrub consumption

- **Baseline:**
- **Intervention:**
- **Follow-up:**

* "H1N1" pandemic refers to influenza H1N1 pandemic.*

---

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## Alcohol-based handrub consumption

<table>
<thead>
<tr>
<th>n=2516 observations</th>
<th>Coeff.</th>
<th>CI95%</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change in AHBR consumption after the intervention</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In the control arm</td>
<td>0.0003</td>
<td>-0.0064;0.0070</td>
<td>0.93</td>
</tr>
<tr>
<td>In the feedback arm</td>
<td>0.0025</td>
<td>-0.0040;0.0091</td>
<td>0.444</td>
</tr>
<tr>
<td>In the feedback plus patient participation arm</td>
<td>0.0079</td>
<td>0.00013;0.014</td>
<td>0.015</td>
</tr>
<tr>
<td>AHBR change explained by the intervention</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effect of feedback alone compared to control</td>
<td>0.0022</td>
<td>-0.0025;0.007</td>
<td>0.349</td>
</tr>
<tr>
<td>Effect of combination of feedback plus PP compared to control</td>
<td>0.0076</td>
<td>0.0018;0.0123</td>
<td>0.002</td>
</tr>
<tr>
<td>Effect of PP compared to feedback</td>
<td>0.0053</td>
<td>0.0008;0.0099</td>
<td>0.021</td>
</tr>
<tr>
<td>AHBR consumption across time (centered on the intervention)</td>
<td>-0.0014</td>
<td>-0.0057;0.003</td>
<td>0.54</td>
</tr>
</tbody>
</table>

Mixed linear model with a random effect on the intercept (ward) assessing the effect of the intervention on AHBR consumption in liters per 1000 patients-days by study period (interaction term).

---

### Other secondary outcomes, refer to...

Implementation

- Feedback card distribution
  - PF: 36% (331/908)
  - PF&PP: 32% (280/884)

- Welcome pack distribution
  - 33 (IQR 21–47) welcome packs per 100 admissions

HCW awareness of study allocation

<table>
<thead>
<tr>
<th>Response</th>
<th>Nurses</th>
<th>Nursing assistants</th>
<th>Doctors</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance feedback</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No intervention</td>
<td>52 (37.7%)</td>
<td>34 (50.0%)</td>
<td>23 (63.9%)</td>
<td>109 (45.0%)</td>
</tr>
<tr>
<td>Performance feedback</td>
<td>85 (61.6%)</td>
<td>33 (48.5%)</td>
<td>13 (36.1%)</td>
<td>131 (54.1%)</td>
</tr>
<tr>
<td>Patient participation</td>
<td>1 (0.7%)</td>
<td>1 (1.5%)</td>
<td>0</td>
<td>2 (0.8%)</td>
</tr>
<tr>
<td>Both interventions</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Performance feedback plus patient participation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No intervention</td>
<td>23 (14.1%)</td>
<td>18 (21.7%)</td>
<td>46 (70.8%)</td>
<td>87 (28.0%)</td>
</tr>
<tr>
<td>Performance feedback</td>
<td>5 (3.1%)</td>
<td>4 (4.8%)</td>
<td>2 (3.1%)</td>
<td>11 (3.5%)</td>
</tr>
<tr>
<td>Patient participation</td>
<td>83 (50.9%)</td>
<td>50 (60.2%)</td>
<td>13 (20.0%)</td>
<td>146 (46.9%)</td>
</tr>
<tr>
<td>Both interventions</td>
<td>52 (31.9%)</td>
<td>11 (13.3%)</td>
<td>4 (6.2%)</td>
<td>67 (21.5%)</td>
</tr>
</tbody>
</table>
Patient Survey

Total eligible 1002

Exposed 316

Non-exposed 686

Non-respondents (149)
  Undeliverable: 13
  Returned blank: 20
  Incapable: 11
  Language barrier: 0
  Dead: 1
  No response: 104

Respondents 167 (53%)

Non-respondents (308)
  Undeliverable: 16
  Returned blank: 47
  Incapable: 12
  Language barrier: 3
  Dead: 1
  No response: 229

Respondents 378 (56%)

Results: Descriptive

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female sex, n (%)</td>
<td>307 (57%)</td>
</tr>
<tr>
<td>Age, median (IQR)</td>
<td>58 (38-74)</td>
</tr>
<tr>
<td>Previous admission</td>
<td>411 (75%)</td>
</tr>
<tr>
<td>Length of stay (days)</td>
<td>6.2 (3.2-12-9)</td>
</tr>
</tbody>
</table>
Do you think that patients should remind healthcare workers to perform hand hygiene?

|       | Yes 28% (147/531) | No 59% (311/531) | I don’t know 14% (73/531) |

<table>
<thead>
<tr>
<th>Odds Ratio</th>
<th>95% CI</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention</td>
<td>1.36</td>
<td>0.89-2.08</td>
</tr>
<tr>
<td>Female sex</td>
<td>1.25</td>
<td>0.83-1.89</td>
</tr>
<tr>
<td>Age group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤35</td>
<td>reference</td>
<td></td>
</tr>
<tr>
<td>35 – 49</td>
<td>1.19</td>
<td>0.61-2.33</td>
</tr>
<tr>
<td>50 – 65</td>
<td>1.67</td>
<td>0.88-3.17</td>
</tr>
<tr>
<td>65 – 79</td>
<td>2.17</td>
<td>1.16-4.09</td>
</tr>
<tr>
<td>≥ 80</td>
<td>1.39</td>
<td>0.66-2.90</td>
</tr>
<tr>
<td>HAI exposure*</td>
<td>1.58</td>
<td>1.04-2.39</td>
</tr>
</tbody>
</table>

*HAI exposure: awareness that they themselves or a close friend or family member has had an HAI
Healthcare worker survey

Total eligible (estimation) 1530

Exposed 531

Non-exposed 999

Non-respondents (301)

Respondents 230 (43%)

Non-respondents (563)

Results: Descriptive

<table>
<thead>
<tr>
<th>Characteristic</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Female sex, n (%)</td>
<td>512 (80%)</td>
</tr>
<tr>
<td>Age, median (IQR)</td>
<td>38 (31-47)</td>
</tr>
<tr>
<td>Hand hygiene compliance estimation, median (IQR)</td>
<td>80% (70-90%)</td>
</tr>
<tr>
<td>Profession</td>
<td></td>
</tr>
<tr>
<td>Doctor</td>
<td>108 (17%)</td>
</tr>
<tr>
<td>Nurse</td>
<td>392 (61%)</td>
</tr>
<tr>
<td>Nursing assistant</td>
<td>140 (22%)</td>
</tr>
</tbody>
</table>
If you forget to perform hand hygiene prior to patient care, would you like your patient to remind you?

<table>
<thead>
<tr>
<th></th>
<th>Yes (%)</th>
<th>No (%)</th>
<th>2009 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>67% (439/658)</td>
<td>28% (181/658)</td>
<td>29%</td>
</tr>
<tr>
<td>I don't know</td>
<td>6% (38/658)</td>
<td></td>
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If you forget to perform hand hygiene prior to patient care, would you like your patient to remind you?

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<td>Intervention</td>
<td>1.53</td>
<td>1.01-2.30</td>
<td>0.04</td>
</tr>
<tr>
<td>Nurse/nursing assistant</td>
<td>1.70</td>
<td>1.06-2.83</td>
<td>0.03</td>
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<td>Age category</td>
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<tr>
<td>≤33</td>
<td>reference</td>
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<tr>
<td>34-43</td>
<td>1.29</td>
<td>0.82-2.02</td>
<td>0.26</td>
</tr>
<tr>
<td>≥44</td>
<td>1.56</td>
<td>0.97-2.53</td>
<td>0.07</td>
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Back to the patients…

HAI are important.
To what extent do you agree with the following statement: Hospital-acquired infections (nosocomial infections) are a serious problem

Strongly disagree
Strongly agree
HAI can be prevented by hand hygiene.
What proportion of hospital-acquired infections could be avoided if healthcare workers frequently practiced hand washing or handrubbing with alcohol-based handrub?

...but healthcare workers already perform hand hygiene well.
In your opinion, how frequently do nurses wash or rub their hands before providing patient care?

P=0.681
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Prof. Andrew Stewardson, Australia and Prof. Hugo Sax, Switzerland
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Importance of explicit invitation.
If a nurse invited you to remind him/her to perform hand hygiene, would you do so?

Qualitative results

• Patient participation:
  • Acceptance & implementation variable
  • Dependent on local ward leadership
  • Main impact = awareness raising (patient reminders very rare)
  • A new sense of partnership was developed
  • HCWs appreciated shifted focus of attention
  • At trial end: strong wish to continue but without reminders

• Performance feedback
  • Well received (especially when positive)
    ...but not hand hygiene observation
  • Stimulated competition

• Control wards
  • Very aware of exclusion from interventions – strong motivator
Discussion

• Hand hygiene improved in all study groups
  • Sustained during follow-up period
  • Effect of interventions was therefore not clinically significant
  • Potential explanations: cross-contamination & study effect in control wards

• Enhanced performance feedback
  • Accepted by healthcare workers & generated competition
  • Technical challenge of low numbers when reporting by ward

• Patient participation
  • Variable implementation among wards – dependent on ward leadership
  • Surveys indicated greater impact on HCW than patients

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| January 18, 2018| USING THE RIGHT MODEL TO CALCULATE THE FINANCIAL IMPLICATIONS OF CLOSTRIDIUM DIFFICILE INFECTION  
Speaker: Dr. Mairead Skally, Beaumont Hospital, Dublin |
| January 24, 2018| (FREE Teleclass) - WHO Teleclass - Europe  
GLOBAL INFECTION PREVENTION AND CONTROL PRIORITIES 2018-2022: A CALL FOR ACTION  
Speaker: Prof. Benedetta Allegranzi, World Health Organization, Geneva  
Sponsored by the World Health Organization, Infection Prevention and Control Global Unit |
| January 25, 2018| PRACTICAL APPROACHES FOR MONITORING CLEANING IN HEALTHCARE FACILITIES  
Speaker: Prof. Curtis Donskey, Case Western Reserve University, Cleveland |
| February 8, 2018| (FREE Teleclass) - PATIENTS ARE YOUR PARTNERS - WHY AND HOW THIS PARTNERSHIP WORKS  
Speaker: Ioana Popescu, Canadian Patient Safety Institute, Judy Birdsell and Kim Neudorf, Patients for Patient Safety Coalition |
| February 15, 2018| REFUGEE HEALTH: A NEW PERSPECTIVE FOR INFECTION PREVENTION AND CONTROL |