Sustained hand hygiene compliance – why we fail and what we could do better

Walter Zingg, PD, MD
Is hand hygiene effective?
Vienna, Austria – Semmelweis 1848!

Medical student teaching with cadavers starts

Division 2 opened

Medical students limited to division 2

Launch of chlorinated lime intervention

Semmelweis’ contract not renewed

Stewardson A Future Microbiol 2011;8:855
Geneva, Switzerland

![Bar chart showing the attack rates of MRSA (new cases per 100 admissions) and nosocomial infections (cases per 100 admissions) from 1993 to 1998.]

Pittet D Lancet 2000;56:1307
Missouri, USA

Hand hygiene compliance (%)

CLABSI (N/1000 device-days)

63'375 HH observations

Johnson L Am J Infect Control 2014;42:1146
Europe (PROHIBIT)

59,122 hand hygiene opportunities

\[ p < 0.0001 \]

van der Kooi T *Intensive Care Med* 2018;44:48
Europe (PROHIBIT)

Association between hand hygiene and CRBSI in the hand hygiene arm:
**IRR 0.95 (0.93-0.98)**

van der Kooi T *Intensive Care Med* 2018;44:48
What is “sustained” hand hygiene compliance?
Hand hygiene compliance and consumption of alcohol-based handrub at the University of Geneva Hospitals
Hand hygiene Australia

Grayson ML Med J Aust 2011;196:615
National University Hospital, Singapore

How achieve sustainability?
<table>
<thead>
<tr>
<th>Key components (ECDC – SIGHT)</th>
<th>Core components (WHO)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 An effective infection control programme in an acute care hospital must include at least: one full-time specifically trained IC-nurse ≤ 250 beds; a dedicated physician trained infection control; microbiological support; data management support</td>
<td>An IPC programme with a dedicated, trained team should be in place in each acute health care facility for the purpose of preventing HAI and combating AMR through IPC good practices</td>
</tr>
<tr>
<td>2 To make sure that the ward occupancy does not exceed the capacity for which it is designed and staffed; staffing and workload of frontline health-care workers must be adapted to acuity of care; and the number of pool/agency nurses and physicians minimized</td>
<td>In order to reduce the risk of HAI and the spread of AMR, the following should be addressed: (1) bed occupancy should not exceed the standard capacity of the facility; (2) health care worker staffing levels should be adequately assigned according to patient workload</td>
</tr>
<tr>
<td>3 Sufficient availability of and easy access to material and equipment and optimized ergonomics</td>
<td>At the facility level, patient care activities should be undertaken in a clean and/or hygienic environment that facilitates practices related to the prevention and control of HAI, as well as AMR, including all elements around the WASH infrastructure and services and the availability of appropriate IPC materials and equipment</td>
</tr>
<tr>
<td>4 Use of guidelines in combination with practical education and training</td>
<td>Evidence-based guidelines should be developed and implemented for the purpose of reducing HAI and AMR. Education and training of the relevant health care workers on guideline recommendations and monitoring of adherence with guideline recommendations should be undertaken to achieve successful implementation</td>
</tr>
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<td>5 Education and training involves frontline staff, and is team- and task-oriented</td>
<td>At the facility level, IPC education should be in place for all health care workers by utilizing team- and task-based strategies that are participatory and include bedside and simulation training to reduce the risk of HAI and AMR.</td>
</tr>
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<td>6 Organizing audits as a standardized (scored) and systematic review of practice with timely feedback</td>
<td>Regular monitoring/audit and timely feedback of health care practices should be undertaken according to IPC standards to prevent and control HAIs and AMR at the health care facility level. Feedback should be provided to all audited persons and relevant staff</td>
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<td>7 Participating in prospective surveillance and offering active feedback, preferably as part of a network</td>
<td>Facility-based HAI surveillance should be performed to guide IPC interventions and detect outbreaks, including AMR surveillance with timely feedback of results to health care workers and stakeholders and through national networks</td>
</tr>
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<td>8 Implementing infection control programmes follow a multimodal strategy including tools such as bundles and checklists developed by multidisciplinary teams and taking into account local conditions</td>
<td>At the facility level, IPC activities should be implemented using multimodal strategies to improve practices and reduce HAI and AMR</td>
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<td>9 Identifying and engaging champions in the promotion of a multimodal intervention strategy</td>
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<td>10 A positive organizational culture by fostering working relationships and communication across units and staff groups</td>
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</tbody>
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Zingg W Lancet Infect Dis 2015;15:212
Storr J Antimicrob Resist Infect Control 2017
Organisation of infection control

Key component

An effective infection control programme in an acute care hospital must include at least:

one full-time specifically trained IC-nurse ≤ 250 beds; a dedicated physician trained infection control; microbiological support; data management support

Core component

The panel recommends that an IPC programme with a dedicated, trained team should be in place in each acute health care facility for the purpose of preventing HAI and combating AMR through IPC good practices
Ward occupancy and workload

Key component

Ward occupancy must not exceed the capacity for which it is designed and staffed; **staffing** and **workload** of frontline staff must be adapted to acuity of care, and the number of pool or agency nurses and physicians used kept to a minimum.

Core component

The panel recommends that the following elements should be adhered to in order to reduce the risk of HAI and the spread of AMR:

1. Bed occupancy should not exceed the standard capacity of the facility;
2. Health care worker staffing levels should be adequately assigned according to patient workload.
Hand hygiene opportunities and compliance

On average, 22 opp / hour for an ICU nurse

(adapted from) Pittet D Ann Intern Med 1999;130:126
## Materials, equipment, and ergonomics

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<th>Core component</th>
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<tr>
<td>Sufficient <strong>availability</strong> of and <strong>easy access</strong> to materials and equipment, and optimisation of ergonomics</td>
<td>The panel recommends that materials and equipment to perform appropriate hand hygiene should be readily available at the point of care</td>
</tr>
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</table>
Handrub at the point of care

Pittet D Lancet 2000;56:1307
Handrub at the point of care

RCT; 52 physicians

14 (53.8%) physicians performed hand hygiene

Birnbach DJ Qual Saf Health Care 2010;19:462
Use of guidelines, education, and training

Key component

Use of **guidelines** in combination with practical **education** and **training**

Core component

The panel recommends that evidence-based guidelines should be developed and implemented for the purpose of reducing HAI and AMR. The education and training of relevant health care workers on the guideline recommendations and the monitoring of adherence with guideline recommendations should be undertaken to achieve successful implementation.
Guidelines if not part of an active prevention strategy do not change behaviour!

“Wide dissemination of this Guideline was not sufficient to change practice. Only some hospitals had initiated multidisciplinary programs; practice change is unlikely without such multidisciplinary efforts and explicit administrative support”
### Team- and task-oriented education and training

**Key component**

Education and training *involves frontline staff* and is team and task oriented

**Core component**

The panel recommends that IPC education should be in place for all health care workers by utilizing team- and task-based strategies that are participatory and include bedside and simulation training to reduce the risk of HAI and AMR.

The national IPC programme should support the education and training of the health workforce as one of its core functions.
Involvement of frontline workers in education and training improves outcome

✓ Organising multidisciplinary focus groups to engage frontline healthcare workers

✓ Peer-to-peer education

Joshi SC J Hosp Infect 2012;80:340
Marra AR Infect Control Hosp Epidemiol 2010;31:12
Thomas M Am J Infect Control 2005;33:368
van der Kooi T Intensive Care Med 2018;44:48
### Standardisation of audits

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<td>Organising <strong>audits</strong> as a <strong>standardised</strong> (scored) and <strong>systematic</strong> review of practice with timely feedback</td>
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The feedback intervention trial (FIT)
Direct and timely feedback with formulating an action plan: individual followed by team level

<table>
<thead>
<tr>
<th>Factor</th>
<th>Estimated odds ratio</th>
<th>95% CI</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITU</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before randomisation</td>
<td>Reference</td>
<td></td>
<td></td>
</tr>
<tr>
<td>After randomisation before implementation</td>
<td>1.70</td>
<td>1.26 to 2.30</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>After implementation</td>
<td>2.09</td>
<td>1.55 to 2.81</td>
<td>&lt;0.001</td>
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</table>

Fuller W *PLOS One* 2012;7:e41617
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<td>Participating in <strong>prospective surveillance</strong> and offering active feedback, preferably as part of a network</td>
<td>The panel recommends that facility-based HAI surveillance should be performed to guide IPC interventions and detect outbreaks, including AMR surveillance, with timely feedback of results to health care workers and stakeholders and through national networks</td>
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Enhanced performance feedback and patient participation

Hand hygiene before patient contact

A

B

Hand hygiene compliance (%)

Hand hygiene compliance (%)

Control
Enhanced performance feedback
Enhanced performance feedback plus patient participation

Stewardson A Lancet Infect Dis 2016;16:1345
Prevention by multimodal strategies

Key component
Implementing infection-control programmes following a multimodal strategy, including tools such as bundles and checklists developed by multidisciplinary teams, and taking into account local conditions

Core component
The panel recommends implementing IPC activities using multimodal strategies to improve practices and reduce HAI and AMR.

The panel recommends that national IPC programmes should coordinate and facilitate the implementation of IPC activities through multimodal strategies on a nationwide or subnational level.
“Multimodal” refers to a strategy addressing stakeholders on various levels by using different “modes” to pass education.

Examples: Leadership (management) commitment, opinion leaders, champions, positive reinforcement, principles of product marketing, financial incentives, emotional involvement.

...room for creativity and local adaptation.

References:
Johnson L Am J Infect Control 2014;42:1146
Talbot TR Infect Control Hosp Epidemiol 2013;34:1129
Lieber SR Infect Control Hosp Epidemiol 2014;35:313
Al-Tawfiq JA Am J Infect Control 2013;41:482
Higgins A J Hosp Infect 2013;84:32
Rodriguez V Int J Qual Health Care 2015;27:405
Stevenson KB Antimicrob Resist Infect Control 2014;3:10
Multimodal hand hygiene campaign in Saudi Arabia

Al-Tawfiq JA Am J Infect Control 2013;41:482
Role and engagement of champions
Creating a positive organisational culture

Key components

Identifying and engaging champions in the promotion of intervention strategies

A positive organizational culture by fostering working relationships and communication across units and staff groups
“State-of-the-art” versus team- and leaders-directed implementation strategy for hand hygiene improvement in the Netherlands

Compliance in the state-of-the-art strategy group improved from 21.8% to 45.9%, whereas the compliance in the team and leaders-directed strategy group increased from 19.1% to 52.1%
We need people to be in charge and do the job.

Alcohol-based handrub can be integrated better in the workflow than hand washing, but it must be available at the point of care.

Audits with direct feedback help sensitising.

Education and training follows a multimodal strategy.

Champions, leadership, role models.
The goal is “culture change”

“The way we do things around here”
How about context?
### InDepth study – PROHIBIT

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Alignment with implementation agendas</th>
<th>Availability of resources</th>
<th>Boundary spanners</th>
<th>Qualitative measures of implementation success</th>
<th>CVC insertion compliance†</th>
<th>Hand hygiene compliance†</th>
<th>CRBSI rate (N/1000 catheter-days) ††</th>
</tr>
</thead>
<tbody>
<tr>
<td>HH</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Satisfaction</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Both</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Fidelity</td>
<td>Mid</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>CVC</td>
<td>Mid</td>
<td>Mid</td>
<td>Mid</td>
<td>Context fit</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
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CVC, central venous catheter; CRBSI, catheter-related bloodstream infection; HH, hand hygiene; Both, both interventions; †, thresholds calculated based on terciles of overall compliance in study hospitals during study participation; ††, thresholds based on literature (see text); *, statistically significant improvement; **, statistically significant decline; †, low number of observations.
Context: Outer setting

Intervention
unadapted

Context: Hospital

Context: Individuals

Intervention
(adapted)

Implementation Process

Damschroder L *Implementation Sci* 2009;4:50
Context: Outer setting

Intervention: unadapted

Context: Hospital

Intervention: (adapted)

Implementation - Process

- Guidelines
- Equipment Ergonomics
- IPC
- Education Training
- Multimodal strategy
- Champions
- Organisational culture
- Staffing
- Workload

Damschroder L Implementation Sci 2009;4:50
Context: Outer setting

Intervention: unadapted

Context: Hospital

Intervention: (adapted)

Implementation:
- Process

Context: Individuals

Damschroder L. Implementation Sci 2009;4:50

Staffing
- P

Plan

Do

Study

Act
Summary
“The way we do things around here” → “The new way we do things around here”
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**May 2019**

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Thank you very much for your attention!

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Walter Zingg, PD, MD