Prevention of Hospital Infection by Intervention and Training (PROHIBIT)

Dr Walter Zingg
1. Objectives

The aim of the *Prevention of hospital infection by intervention and training* (PROHIBIT) project was to provide a global perspective of infection control activities in Europe on several levels.
2. Context/Public health problem

Healthcare-associated infections are frequent adverse events: 6.0%
(country range 2.3%–10.8%)
2. Context/Public health problem

Healthcare-associated infections can be prevented by best practice procedures rather than by technology.
## 2. Context/Public health problem

<table>
<thead>
<tr>
<th>Key components</th>
<th>Indicators</th>
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<tbody>
<tr>
<td>1. An effective infection control programme in an acute care hospital must</td>
<td>- Detailed infection control activities: number of ongoing surveillance and prevention programmes, outbreaks, number of performed audits</td>
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<td>include at least: one full-time specifically trained IC-nurse ≤ 250 beds; a</td>
<td>- Established infection control: appropriate staffing, IC committee in place, defined goals for IC, identified IC budget, IC on the agenda of the hospital administration, defined outbreak management, vaccination programmes for healthcare workers</td>
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<td>dedicated physician trained infection control; microbiological support; data</td>
<td>- Average bed occupancy at midnight</td>
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<td>management support</td>
<td>- Average staffing of frontline workers</td>
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<td>2. To make sure that the ward occupancy does not exceed the capacity for</td>
<td>- Average proportion of pool/agency professionals</td>
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<td>which it is designed and staffed; staffing and workload of frontline</td>
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<td>healthcare workers must be adapted to acuity of care; and the number of pool/agency nurses and physicians minimized</td>
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<td>3. Sufficient availability of and easy access to material and equipment and</td>
<td>- Alcohol-based handrub at the point of care</td>
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<td>optimized ergonomics</td>
<td>- Sinks stocked with soap and single-use towels</td>
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<td>4. Use of guidelines in combination with practical education and training</td>
<td>- Guidelines locally adapted</td>
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<td>5. Education and training involves frontline staff, and is team- and task-</td>
<td>- Number of new staff trained using the local guidelines</td>
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<td>oriented</td>
<td>- Teaching programmes are based on local guidelines</td>
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<td>6. Organizing audits as a standardized (scored) and systematic review of</td>
<td>- Audit of education and training programmes</td>
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<td>practice with timely feedback</td>
<td>- Results of knowledge tests and competency assessments</td>
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<td>7. Participating in prospective surveillance and offering active feedback,</td>
<td>- Number of audits (overall, and stratified by departments/units and topics) for specified time period</td>
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<td>preferably as part of a network</td>
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<td>8. Implementing infection control programmes follow a multimodal strategy</td>
<td>- Participation of (inter-) national surveillance initiatives</td>
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<td>including tools such as bundles and checklists developed by multidisciplinary</td>
<td>- Number and type of wards with a surveillance</td>
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<td>teams and taking into account local conditions</td>
<td>- Regular review of the feedback strategy</td>
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<td>9. Identifying and engaging champions in the promotion of a multimodal</td>
<td>- Verification that established prevention programmes follow a multimodal strategy</td>
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<td>intervention strategy</td>
<td>- Process indicators: hand hygiene compliance, compliance with medical/care procedures by checklists, compliance with cleaning/disinfection procedures</td>
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<td>10. A positive organizational culture by fostering working relationships and</td>
<td>- Outcome indicators: standardized rates for HAI, Infections with MDROs, transmission of MDROs</td>
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<tr>
<td>communication across units and staff groups</td>
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</tbody>
</table>

ECDC-initiated systematic review and evidence-based guidance on organisation of hospital infection control (SIGHT)
Zingg W. Lancet Infect Dis 2014; online: doi:10.1016/S1473-3099(14)70854-0
3. Key activities

- Systematic review of guidelines in Europe
- Multimodal intervention for CRBSI reduction in different socio-economic contexts
- European-wide questionnaire about organisation and activity of infection control
- Qualitative study about barriers and facilitators in the implementation process
4. Results

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- Systematic review of guidelines in Europe
4. Results

Variations in scope, update, and quality among the many documents

Some websites were not user-friendly and the documents proved difficult to retrieve
4. Results

Guidelines were **not transparent** and did not state how the information was obtained and how **selection** was done about practice to include.

![Table showing guidelines and practices](image)

*Martin M. J Hosp Infect* 2014;83:94
4. Results

The stated **strength of evidence** for similar measures varied across different guidelines.

![Table of guidelines and recommendations](image)
4. Results

Less than 70% of hospitals implemented national recommendations!

*Example*

Prevention of central line-associated bloodstream infections:
- 79% vs. 78% for maximal sterile precautions
- 91% vs. 92% for avoiding the femoral insertion site

Adoption of evidence-based best practice may precede provision of national documents
4. Results

- Multimodal intervention for CRBSI reduction in different socio-economic contexts
- Qualitative study about barriers and facilitators in the implementation process
- European-wide questionnaire about organisation and activity of infection control
- Systematic review of guidelines in Europe
4. Results

More than 300 European hospitals provided data about organisation of infection control
4. Results

*Organisation of Infection Prevention and Control (IPC)*

**Median** [IQR] of 4 IPC nurses [2; 6] and 1 IPC doctor [0; 3] per 1000 beds

\[ \cong 1 : 250 \text{ beds}\]

Most hospitals (96%) defined IPC objectives:

- Hand hygiene (91%)
- Reduction of healthcare-associated infections (87%)
- Antibiotic stewardship (69%)

*Haley RW. Am J Epidemiol 1985; 121:182*
4. Results

- Median [IQR] hospital-wide handrub consumption per patient-day: **21 ml** [9-37] (ECDC PPS: 19 ml)
- Countries spending more than the European average of 6.5% of the GDP for healthcare had significantly higher consumption of handrub
- Countries spending more than the European average for healthcare had better provision of handrub at the point of care (>75%): 96% vs. 74% in intensive care; 80% vs. 43% in medical wards; and 81% vs. 44% in surgical wards
4. Results

- Systematic review of guidelines in Europe
- European-wide questionnaire about organisation and activity of infection control
- Qualitative study about barriers and facilitators in the implementation process
- Multimodal intervention for CRBSI reduction in different socio-economic contexts
4. Results

14 hospitals participated in a randomized stepped-wedge designed trial about the prevention of central venous catheter-related bloodstream infections.
4. Results

Reduction from 2.4/1000 catheter-days to 0.9/1000 catheter-days
4. Results

59’122 opportunities for hand hygiene were observed
4. Results

- Qualitative study about barriers and facilitators in the implementation process
- Systematic review of guidelines in Europe
- Multimodal intervention for CRBSI reduction in different socio-economic contexts
- European-wide questionnaire about organisation and activity of infection control
4. Results

Staff issues

- **Staffing shortage** was common in infection control
- **High staff turnover** was considered as a barrier due to re-training – at the same time it is a facilitator when young teams emerge who are more open to change and innovation

- Specific in **Eastern European** study sites:
  - Nurse salaries lower than that of a cashier in a supermarket
  - Emigration to Western Europe (Brain drain)
4. Results

**Resources**

- This theme was omnipresent and almost always referred to as a barrier to implementation.
- Resource problems impacted on an organisational level and interfered with decisions concerning purchasing materials for the programme (hand rub, sterile drapes).
4. Results

**Attitude of excellence**
Positive association between attitude of excellence, safety culture (understood as an attitude of learning and speaking up), and low baseline rates of catheter-related bloodstream infection
4. Results

_Influential individuals..._

... were able to overcome organisational and financial barriers by **networking**

... became central to implementation success through **continuity, presence** in the units, **street credit** with frontline staff, **boundary spanning** between infection control and frontline, and **personality** and **social talent**
5. Conclusion

- Establish a European infection control strategy
- Establish an authoritative body for state-of-the-art guideline production
- Consider European train-the-trainer workshops
- Consider providing dedicated salaries for a limited time period to get infection programmes off the ground
5. Conclusion

- Foster a positive organisational culture and teamwork in European hospitals
- Encourage (or mandate) hospitals to establish infection control standards of staffing and organisation/structure
- Fund research in the field of infection control emphasizing implementation and behaviour change
6. The PROHIBIT study team

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http://www.prohibit.unige.ch
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