WHO World Alliance for Patient Safety
Global Patient Safety Challenge
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Nosocomial infections

Every year in the US, preventable hospital-acquired diseases, including nosocomial infections, are responsible for 44,000-98,000 deaths.

Kohn Institute of Medicine 1999

US$17 to US$29 billion/year

At least £1 billion/year

In UK, nosocomial infections responsible for > 5,000 deaths/year

BMJ 2.12.2000
Maternal mortality rates, First and Second Obstetric Clinics, GENERAL HOSPITAL OF VIENNA, 1841-1846

Maternal Mortality (%)

Semmelweis IP, 1861
Intervention

May 1847

- Students and doctors were required to:
  - clean their hands with a chlorinated lime solution when entering the labor room
  - in particular when moving from the autopsy to the labor room
Maternal mortality rates,
First and Second Obstetrics Clinics,
GENERAL HOSPITAL OF VIENNA, 1841-1850

Semmelweis IP, 1861
Florence Nightingale, 1820 - 1907
Plan of Lavatory, Baths, and Water-closets for Hospital Wards.

from *Notes on Hospitals* published in 1863
The very first requirement in a hospital is that it should do the sick no harm.
Early days of infection control

1847

1863
Infection Control and Quality Healthcare in the New Millennium

What did we learn from the early days?

Recognize
Explain
Act
Does infection control control infections?
SENIC study


Study on the Efficacy of Nosocomial Infection Control

Relative change in NI in a 5 year period (1970-1975)

Without infection control

With infection control

<table>
<thead>
<tr>
<th>Infection Type</th>
<th>Without</th>
<th>With</th>
</tr>
</thead>
<tbody>
<tr>
<td>LRTI</td>
<td>-27%</td>
<td>9%</td>
</tr>
<tr>
<td>SSI</td>
<td>-35%</td>
<td>14%</td>
</tr>
<tr>
<td>UTI</td>
<td>-31%</td>
<td>19%</td>
</tr>
<tr>
<td>BSI</td>
<td>-35%</td>
<td>26%</td>
</tr>
<tr>
<td>Total</td>
<td>-32%</td>
<td>18%</td>
</tr>
</tbody>
</table>
1 infection control nurse per 200 to 250 beds

1 hospital epidemiologist per hospital (1000 beds)

Organized surveillance for nosocomial infections

Feedback of nosocomial infection rates

Approach to infection control

1847

1863

1958

1970

1980
1st principle of infection prevention

35-50% of all nosocomial infections are associated with only 5 patient care practices:

- Use and care of urinary catheters
- Use and care of vascular access lines
- Therapy and support of pulmonary functions
- Experience with surgical procedures
- Hand hygiene and standard precautions
1st principle of infection prevention

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1. Recognize
2. Explain
3. Act
Prevention of vascular access line infection in intensive care

University of Geneva Hospitals
Education-based prevention of catheter-related infection

Eggimann and Pittet Sepsis Monitor 2000
Education-based prevention of vascular catheter-associated bloodstream infection

Primary bacteremia / 1000 CVC-days

- 112 MICUs (NNIS)
- 146 SICUs (NNIS)


- Eggimann et al. 
  ICAAC 2001
- Eggimann et al. 
  ICAAC 2004
- Sherertz 
  Ann Intern Med 2000
- Coopersmith et al. 
  CCM 2002
- Warren et al. 
  CCM 2003
- NNIS Am J Infect Control 1999
Stepwise prevention of catheter-related infection

**Efficacy of prevention**

- **Level 1** basic measures: 30%
- **Level 2** optimalization: 60-80%
- **Level 3** new technologies: >90%

- Basic hygiene
- Surveillance
- Feedback
- Education
- Technical aspects
- Global approach
- Catheters coated with antibiotics / antiseptics
1st principle of infection prevention

35-50% of all nosocomial infections are associated with only 5 patient care practices:

- Use and care of urinary catheters
- Use and care of vascular access lines
- Therapy and support of pulmonary functions
- Experience with surgical procedures
- Hand hygiene
Relation between opportunities for hand hygiene and compliance across hospital wards.

1. Recognize
2. Explain

On average, 22 opp / hour for an ICU nurse

adapted from Pittet D et al. Annals Intern Med 1999; 130:126
Observed reasons for not washing hands

*Time and system constraints*

- High demand for hand hygiene is associated with low compliance
- Full compliance with conventional guidelines is unrealistic

*Voss and Widmer - Inf Control Hosp Epidemiol 1997; 18:205*
*Pittet et al, Annals Intern Med 1999; 130:126*
Time constraint = major obstacle for hand hygiene

- **handwashing**: 1 to 1.5 min
- **hand antisepsis**: 15 to 20 sec
- **alcohol-based hand rub**: 15 to 20 sec
Handwashing ... an action of the past (except when hands are visibly soiled)

1. Recognized
2. Explained
3. Act

Alcohol-based hand rub is standard of care
Alcohol-based hand rub at the point of care

Before and after any patient contact
Before and after glove use
In between different body site care
AVANT, APRÈS
Ignaz Philipp Semmelweis before and after he insisted that students and doctors clean their hands with a chlorine solution between each patient.
« Talking walls »
LES MAINS QUI SAVENT SE LAVENT

MÂS QUI, DONC, A INVENTÉ L'ASEPSIE ?

LES MAINS QUI SAVENT SE LAVENT !

LES MAINS QUI SAVENT SE LAVENT !
My son, if they don’t get me, you will become multiresistant.
Handrub is the natural killer of cross transmission

DANS LA GRANDE CHAÎNE DE L’INFECTION, QUI EST LE PRÉDATEUR NATUREL DU GERME?
DIRTY STAPH
out of hospital

OUT OF HÔPITAL!
Doctor, in this hospital, it’s become impossible to cause infections any more!

The University of Geneva Hospitals against DIRTY STAPH: war has been declared
Hospital-wide nosocomial infections; trends 1994-1998

www.hopisafe.ch

Key parameters for success

- System change
- Administrative support
- Education of healthcare workers
- Monitoring and feedback of performance
- Change in behavior
- Associated with compliance improvement and reduction in cross-transmission and infection rates
Rub hands ... it saves money

Infection control in developing countries
Infection control in developing countries: main issues

- Unfavorable social background
- Facilities badly structured and equipped
- Technological gap
Lack of adequate conditions in hospitals

- Inadequately/insufficiently equipped
- Inadequate hygiene conditions
- Lack of microbiological data
- Understaffing
- Overcrowding
    - Bed occupancy exceeding capacity: 140%!
- Low staff preparedness
    - Unnecessary measures / lack of adequate measures
Consequences

- **Unsafe invasive procedures**
    - 50% injections = unsafe in 14 out of 19 countries
    - ↑ sepsis, hepatitis B and C, HIV, Ebola, Lassa and malaria

- **Nosocomial outbreaks of introduced community pathogens**
    - *Shigella spp. / Salmonella spp.*

- **Spread of multiresistant microorganisms**

- **Higher healthcare-associated infection rates**
## Consequences

Higher device-associated nosocomial rates

<table>
<thead>
<tr>
<th>Author, year, country</th>
<th>Setting</th>
<th>CR-BSI*</th>
<th>VAP*</th>
<th>CR-UTI*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abramczyk, 2003, Brazil</td>
<td>PICU</td>
<td>10.2</td>
<td>18.7</td>
<td>1.8</td>
</tr>
<tr>
<td>NNIS, USA</td>
<td>PICU</td>
<td>5.9</td>
<td>2.2</td>
<td>4.3</td>
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<tr>
<td>Rosenthal, 2003,</td>
<td>Med/Surg</td>
<td>44.6</td>
<td>51.0</td>
<td>22.6</td>
</tr>
<tr>
<td>Argentina</td>
<td>ICU</td>
<td></td>
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* Device-related rate = Number of infections/1000 device-days
Consequences
Inadequate use of technology

Review of cases of nosocomial Lassa fever in Nigeria: the high price of poor medical practice
- 34 cases (9 HCWs)
- 55% attack rate
- **65% fatality rate**
- Outbreak linked to:
  - Hospitals inadequately equipped and staffed
  - Poor medical practice
  - Sharing of syringes
  - Staff contamination during emergency surgery
Perspectives

- Improvement in hygiene conditions
- Staff training
    - ↓ HAI rates
    - Savings: ~ US$ 2 million
    - ↓ 20% atb use

- Surveillance strategy
  - Selective surveillance
  - Feasible epidemiologic markers
Hygiene & reduction of infectious diseases

Armstrong et al. 1999.

Armstrong et al. 1999.
Impact of hand hygiene education in the community in a developing country

Luby et al. *JAMA* 2004; 291: 2547-2554

- Cluster-randomized study (villages)
- Rural community in Pakistan
- Intervention: education with focus on hand hygiene and distribution of soap

**Results**
- ↓ diarrhoea
- ↓ skin infections
- ↓ respiratory infections
- ↓ mortality among children
Healthcare-associated infections
- affect millions of patients worldwide every year
- more serious illness
- prolong hospital stay
- long-term disability
- high costs on humans and their families
- excess deaths
- massive additional financial burden
Health-care associated infection is a major patient safety problem

- Affects a large number of individuals worldwide
- Multifaceted causation related to
  - systems and processes of care provision
  - human behavior
  - political and economical constraints on systems/countries
- Patient safety gap
  (some healthcare institutions/systems control the risk to patients much better than others)
- Data to assess the size and nature of the problem and to create the basis for monitoring the effectiveness of actions
World Alliance for Patient Safety

Clean Care is Safer Care

Major action areas
- Improve hand hygiene
- Injection safety
- Blood safety
- Safety associated with healthcare-related procedures
- Environment-related issues
Clean Care is Safer Care

- Driven by WHO
- Association with key partners
- Countries invited to adopt the challenge for their own healthcare system
- Work closely with one healthcare area in each of the 6 WHO regions
Clean Care is Safer Care

Countries (almost 200 members) will be invited to adopt the challenge for their own healthcare systems with the following principles:

- Assess the scale and nature of HAI
- Adopt an internationally recognized approach to surveillance so that a baseline can be established and changes monitored
- Conduct root causes analyses with particular emphasis on «system thinking»
- Develop solutions to improve safety and reduce risk
Countries (almost 200 members) will be invited to adopt the challenge for their own healthcare systems with the following principles (continued):

- Rely on evidence-based best practice
- Fully engage patients and service users as well as healthcare professionnals in improvement and action plans
- Ensure the sustainability of all actions beyond the initial 2-year period of the Challenge
Countries (almost 200 members) will be invited to adopt the challenge for their own healthcare systems with the following principles:

- Assess the scale and nature of HAI
- Adopt an internationally recognized approach to surveillance so that a baseline could be established and change monitored
- Conduct root causes analyses with particular emphasis on « system thinking »
- Develop solutions to improve safety and reduce risk
World Alliance for Patient Safety

*Clean Care is Safer Care*

To develop solutions to improve safety and reduce risk by focusing on 5 action areas:

- Clean hands
- Clean practices
- Clean products
- Clean environment
- Clean equipment
Clean Care is Safer Care

- WHO guidelines for hand hygiene
- WHO strategy for hand hygiene promotion
- WHO strategy for promotion of clean practices
  - clean products
  - clean environment
  - clean equipment

Implementation of whole / part of WHO strategies for prevention of healthcare associated infections by members

- Before / After evaluation in 6 WHO districts

World Alliance for Patient Safety

Gather together WHO material for infection prevention
- injection safety
- blood safety
- procedure safety
- environment

From second part of 2005
Making healthcare safer
Global implications…
Easy infection control for everyone…