Infection Control in Developing Countries

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Deputy Lead
First Global Patient Safety Challenge
WHO Patient Safety

If healthcare-associated bugs would look like this - compliance with hand hygiene would be 100%!!!

Estimates of the global burden of health care-associated infection are hampered by limited availability of reliable data

First Challenge area of work on the burden of health care-associated infection

Definition of health care-associated infection

“An infection occurring in a patient during the process of care in a hospital or other health-care facility which was not present or incubating at the time of admission. This includes infections acquired in the hospital but appearing after discharge, and also occupational infections among staff of the facility”


IC constraints to IC in Africa at national level

Constraints
• Absence of policies
• Absence of guidelines for IC
• Insufficient funds
• Inappropriate organizational structures & coordination
• Lack of data collection
• Inadequate human resources
• Lack of monitoring & evaluation
• Insufficient commitment of partners
• Inadequate infrastructure
• Insufficient sensitization of HCWs to policies

First GPSC African workshop, Uganda, December 2007

Burden of major infections worldwide

<table>
<thead>
<tr>
<th></th>
<th>MALARIA</th>
<th>HIV</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N° annual episodes: 300-500 mio</td>
<td>N°affected: 39.5 mio</td>
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<tr>
<td></td>
<td>N° annual deaths: 1.5-2.7 mio</td>
<td>N° new infections/year: 4.3 mio</td>
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<tr>
<td></td>
<td>90 countries at risk worldwide</td>
<td>N° deaths in 2006: 2.9 mio</td>
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<tr>
<td></td>
<td></td>
<td>Most countries affected with different infection rates</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>TUBERCULOSIS</th>
<th>HEALTHCARE-ASSOCIATED INFECTIONS</th>
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<tbody>
<tr>
<td></td>
<td>N° new infections/year: 8 mio</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N° deaths in 2005: 1.6 mio</td>
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<tr>
<td></td>
<td>1/3 of the world currently affected</td>
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Global and regional burden of disease and risk factors, 2001: systematic analysis of population health data

Health care-associated infection is a major patient safety problem
Affects hundreds of millions of individuals worldwide each year
Multifaceted causation related to:
- systems and processes of care provision
- economic constraints on systems and countries
- human behaviour

Health care-associated infection is a major patient safety problem
Data to assess the size and nature of the problem and to create the basis for monitoring the effectiveness of actions

Patient safety gap:
Some healthcare institutions and systems control the risk to patients much better than others

HCAI burden in USA
- Incidence: 5–6%; 1.7 million affected patients
  - Urinary Tract Infection: 36%; 561,667 episodes, 13,088 deaths
  - Surgical Site Infection: 20%; 274,998 episodes (1.98%)
  - Catheter Related Bloodstream Infections: 11%; 250,000 episodes, 28,000 deaths
  - Ventilator Associated Pneumonia: 11%; 5,410,000 ventilator-days
  - Attributable mortality: 3.6%, approximately 99,000 deaths
  - Annual economic impact: about US$ 4.5 billion

HCAI burden in Europe
- Europe: prevalence 3.5–14.8%
  - Norway: nation-wide prevalence of 5.7% in 2007 (Eurosurveillance)
  - France: in a 4-year multicentre study (2001–2004), HCAI prevalence of 6.1%, varying from 1.9% (low risk patients) to 15.2% (high risk patients) (Floret N., et al. JHI 2004)
  - Switzerland: in 18 health-care facilities across the country, overall HCAI prevalence of 10.1%; 70,000 cases/year; annual cost: CHF 230-300 mio (Sax H., et al. Arch Int Med 2002)
  - UK and Republic of Ireland: overall prevalence of 7.6% (Smyth ETM et al. JHI 2008)
  - Scotland: overall prevalence 9.5% in acute hospitals; additional length of stay 3.2–13.7 days; annual costs: £183 mio per year (Reilly E. et al. JHI 2008)

CALCULATING ROUGH ESTIMATES OF THE HAI BURDEN...

HAI RATES IN MEMBER STATES
Average HAI rate: 10%
Average HAI attributable mortality: 5%
ALL countries affected worldwide
Global hospital admissions per year: ?
Affected patients/year: ?
N° deaths/year: ?

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The impact of HCAI

HCAI can cause:
- more serious illness
- prolongation of stay in a health-care facility
- long-term disability
- excess deaths
- high additional financial burden
- high personal costs on patients and their families

Facts about health-care associated infection in developing countries (1)

- The risk of infection is 2-20 times higher than in developed countries, and the proportion of patients infected can exceed 25% (Allegranzi B & Pittet D. ICHE 2007;28:1323-27)
- The rates of BSI in neonates are 3-20 times higher in developing countries, and, in some countries, approximately half of the patients in neonatal ICUs acquire an infection, and case fatality rates may reach 52% (Zaidi AKM et al. Lancet 2005; 365:1175-1188)
- The rates of VAP vary from 10 to 41.7 per 1000 ventilator-days; VAP is associated with a crude mortality ranging from 16% to 94% and with increased ICU LOS (Arabi Y et al. Int J Infect Dis 2008;12:505-12)

Facts about health-care associated infection in developing countries (2)

- Unsafe blood transfusion causes every year:
  - 16 million hepatitis B infections,
  - 5 million hepatitis C infections, and
  - 160 000 cases of HIV
- Reuse of contaminated syringes caused in 2000:
  - 21 million hepatitis B infections (33% of new infections)
  - 2 million hepatitis C infections (40% of new infections)
  - 260 000 HIV infections (5% of new infections)
- Unsafe waste disposal: in 22 developing countries, the proportion of facilities using inappropriate waste disposal methods ranges from 18% to 64%

Systematic literature review on HAI rates in developing countries 1995-2008

<table>
<thead>
<tr>
<th>Type of survey</th>
<th>Prevalence (%)</th>
<th>Incidence (%)</th>
<th>Incidence (per 1000 patient-days)</th>
<th>Incidence (per 1000 device-days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital-wide</td>
<td>4.6–19.1</td>
<td>2.5–5.1</td>
<td>9.7–41.0</td>
<td></td>
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<tr>
<td>Adult ICU</td>
<td>18.4–77.2</td>
<td>4.1–38.9</td>
<td>18.2–60.0</td>
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<tr>
<td>Neonatal ICU</td>
<td>2.9–57.7</td>
<td>2.6–62.0</td>
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<tr>
<td>SSI</td>
<td>1.2–38.7</td>
<td>2.9–23.0</td>
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<tr>
<td>VAP</td>
<td></td>
<td></td>
<td>1.7–44.6</td>
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<tr>
<td>CR-BSI</td>
<td></td>
<td></td>
<td>3.2–51.0</td>
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<tr>
<td>CR-UTI</td>
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HCAI rates reported from developing countries

Selected full papers on HAI rates from developing countries (1995-2008): 215*
Device-associated infection rates in ICUs in developing countries compared to NNIS rates

<table>
<thead>
<tr>
<th>Surveillance network, study period, country</th>
<th>Setting</th>
<th>N* patients</th>
<th>CR-BSI*</th>
<th>VAP*</th>
<th>CR-UTI*</th>
</tr>
</thead>
<tbody>
<tr>
<td>NNIS, 2006–2007, USAa</td>
<td>PICU</td>
<td>1,529</td>
<td>16.1</td>
<td>10.6</td>
<td>5.3</td>
</tr>
<tr>
<td>INICC, 2002–2007, 18 developing countriesb</td>
<td>ICU</td>
<td>43,114</td>
<td>9.2</td>
<td>19.5</td>
<td>6.5</td>
</tr>
<tr>
<td>NNIS, 2006–2007, USAa</td>
<td>Adult ICU</td>
<td>/</td>
<td>2.9</td>
<td>2.1</td>
<td>5.0</td>
</tr>
</tbody>
</table>

1. Overall guided daily infection rates
2. Daily device-days
3. NNIS = National Nosocomial Infection Surveillance system
4. INICC = International Nosocomial Infection Control Consortium

Surgical Site Infection rates (47 studies)

<table>
<thead>
<tr>
<th>Setting</th>
<th>SSI/100 surg patients (incidence)</th>
<th>SSI/100 surg patients (prevalence)</th>
<th>SSI/100 operations (Incidence)</th>
<th>SSI/100 operations (On-patients)</th>
<th>SSI/100 operations (Out-patients)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICU</td>
<td>3.1-30.9%</td>
<td>3.1-30.9%</td>
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<td>3.1-30.9%</td>
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Conditions leading to higher HAI burden in developing countries

- Inadequate hygiene conditions
- Poor infrastructure
- Inadequate / insufficient equipment
- Lack of microbiological information
- Understaffing
- Overcrowding
- Lack of knowledge and low staff preparedness
- Inappropriate use of antibiotics
- More diseased population
- Unfavorable social background
- Lack of national policies and programs
- Costs falling on individual patients

1st principle of infection prevention

- Use and care of urinary catheters
- Use and care of vascular access lines
- Therapy and support of pulmonary functions
- Surveillance of surgical procedures
- Hand hygiene and standard precautions

Health care-associated infection: solutions to the problem

- Prevention strategies reduce infections in developed, transitional and developing countries
- Most solutions are simple and not resource-demanding
- Several health-care settings have succeeded in reducing the risk to patients, but others have not

Consequences

- Unsafe invasive procedures
- Nosocomial outbreaks of introduced community pathogens
- Spread of multiresistant organisms
- Higher health care-associated infection rates

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WHO Guidelines on Hand Hygiene in Health Care

Hand Hygiene: the entrance door to safer patient care & infection control

Implementation strategy and toolkit for the WHO Guidelines on Hand Hygiene in Health Care

Knowledge → Action

WHO Multimodal Hand Hygiene Improvement Strategy

Evidence from the WHO Guidelines on Hand Hygiene in Health Care (2009), 5 core components, to improve hand hygiene in healthcare settings

ONE System change
Alcohol-based hand rubs at points of care and access to safe continuous water supply, soap and towels

TWO Training and education
Providing regular training to all healthcare workers

THREE Evaluation and feedback
Monitoring hand hygiene practices, infrastructure, perceptions & knowledge, while providing results feedback to healthcare workers

FOUR Reminders in the workplace
Prompting and reminding healthcare workers

FIVE Institutional safety climate
Individual active participation, institutional support, patient participation

Revised implementation toolkit

The “My 5 Moments for Hand Hygiene” approach

Proposes a unified vision:
• for trainers, observers and healthcare workers
• to facilitate education
• to minimize inter-individual variation
• to increase adherence

Implementation tools: key tools
• Guide to Implementation of the WHO Multimodal Hand Hygiene Improvement Strategy
• Template Action Plan

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Field testing the implementation

Hand hygiene compliance improvement in pilot sites

University Hospital Point G

Local production of ABHR according to the WHO formulation

Infrastructure deficiencies:
- Sink:pt bed ratio: 1:22
- Sinks equipped with soap: 0
- Gloves available: 38%

Commitment of ministerial and hospital authorities (Mali)

Mali - Impact on hand hygiene practices

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Compliance according to the indication

Impact on hand hygiene technique: HR vs HW at follow-up

Knowledge on hand hygiene before and after training sessions by professional category

Bangladesh - Chittagong Medical Hospital
162% bed occupancy

Perception Survey at baseline –
What is the average percentage of cases where health-care workers in your hospital really perform hand hygiene (%)

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20. In your opinion, how effective would the following actions be to increase hand hygiene permanently in your institution?

20.b. The health-care facility makes alcohol-based handrub available at each point of care (%)

WHO posters translated in local languages

Adaptation of the "My 5 moments concept" to overcrowding situations

Local production cost: US$ 0.30/100 ml

Senior managers' strong support is key to success

Hand hygiene compliance improvement in pilot sites
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Following pilot testing at Chittagong Medical Hospital:
• Ministry of Health is planning national scale-up
• "Institutionalization of infection control and hand hygiene"

3,100 sinks to be installed
25,000 x 100ml bottles handrub
110,000 x 1L bottles WHO hand rub to be produced
30,044 in-patient beds
3,100 national coordinators (doctors)
6 national coordinators (nurses)

SEARO

Registered health-care facilities - 2009
Work in progress….

Clean Care is Safer Care
The First Global Patient Safety Challenge
SAVE LIVES: Clean Your Hands
5 May 2009–2020
Through an annual day focused on hand hygiene improvement in health care, this initiative promotes continual, sustainable best practice in hand hygiene at the point of care in all health-care settings around the world

THANKS TO
• Loseni Bengaly (Mali)
• Debashish Dutta (Bangladesh)
• Raja Amjad Mahmood (Pakistan)
• Ziad Memish/Sahar Makki (Saudi Arabia)
• Maria Luisa Moro/Simona Nascetti (Italy)
• Wing-Hong Seto (Hong Kong)
• Orlando Urroz (Costa Rica)
• Didier Pittet
• Hugo Sax
• Sepideh Bagheri Nejad
• Marie-Noëlle Chraiti
• Nizam Damani
• Hervé Richet
• Julie Storr

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RECOMMENDED READING


THE NEXT FEW TELECLASSES

Speaker: Russell Osmestad, St. Joseph Mercy Health System

05 Nov. 09 Viruses and Hand Hygiene
Speaker: Prof. Byrd Satter, University of Ottawa

10 Nov. 09 (British Teleclass) Getting Guidelines Into Practice
Speaker: Prof Carol Petloeve, Thames Valley University

12 Nov. 09 Ceftriaxone d'Indice Associated Diseases: A Financial Burden Analyse
Speaker: Prof. Roll-Peter Vondz, Henover Medicion School, Germany

03 Dec. 09 Infection Control During In and After Natural Disasters
Speaker: Pam Falk, UTMB Healthcare

10 Dec. 09 Environmental Cleaning Audits: Do They Help Reduce the Spread of C. difficile and Antibiotic Resistant Organisms in Healthcare Facilities?
Speaker: Dr. Michelle Afx, Diagnostic Services Montco