Hand hygiene and other standard precautions

B. Allegranzi

Clean Care is Safer Care

WHO Patient Safety

Educational Workshop, "Infection control issues in different types of long-term healthcare facilities", 23rd ECCMID, Berlin, Germany
Outline

- Burden of HAI in long-term care facilities (LTCFs) and nursing homes (NHs)
- Causes of HAI and AMR in LTCFs
- IC resources in LTCFs
- Infection control and prevention guidelines
- IC Interventions to reduce HAI in LTCFs
- Factors influencing implementation
- Hand hygiene
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HAI burden in LTCFs

- HAI prevalence in LTCF: **6-10 per 100 residents**
- In USA LTCFs, **1.6 to 3.8 million** infections occur each year
- On average, any LTCF resident develops **1 to 3 infections per year**, mainly UTI and pneumonia
- The onset of infection is the most common cause of hospital admission (26-50% of transfers to hospitals from LTCF) and death among residents in LTCF, mainly from pneumonia
- **19% of infections occurs in clusters/outbreak**

Estimates for Europe*

- LTCF residents with signs and symptoms of an infection on any given day in the EU: 117,800-140,600
- Average duration of an infection episode: 10 days
- Total number of infections in LTCFs in EU/EEA countries: 4.3 million each year based on signs and symptoms
- 2.6 million would be confirmed as HAIs

* Assuming an occupancy rate of 95%

European prevalence survey of antibiotic & infection in nursing homes (HALT) 2010

- First EU-wide point prevalence survey from May to September 2010
- Total of 64,007 residents surveyed in 722 LTCFs in 25 countries
- Participating LTCFs: nursing homes (75%), mixed facilities (15%) and residential homes (7%)
- Confirmed HAI in 1,488 (2.4%) residents
- Most frequently reported HAI types: respiratory tract infections (33.6%), urinary tract infections (22.3%), skin and soft tissue infections (21.4%), conjunctivitis (8%) and gastro-intestinal infections (4.6%)
- 4.3% received at least one antimicrobial agent
- 48.9% of all antimicrobial agents prescribed for a UTI
- Uro-prophylaxis: 27.7% of all prescribed antimicrobial agents

<table>
<thead>
<tr>
<th>Country</th>
<th>Protective factors</th>
<th>Risk factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Italy [14]</td>
<td>None</td>
<td>Degree of dependency(^3), the presence of co-morbidities and invasive devices</td>
</tr>
<tr>
<td>Ireland [16]</td>
<td>None</td>
<td>Urinary catheter, incontinence, pressure sores, other wounds, surgery in the past 30 days</td>
</tr>
<tr>
<td>France, Switzerland [21]</td>
<td>Presence of a psycho-behavioural disorder</td>
<td>Nutrition abnormalities, diabetes, chronic bronchitis, swallowing disorders, intravenous catheter, urinary catheter and other catheters</td>
</tr>
<tr>
<td>Germany [22]</td>
<td>None</td>
<td>Urinary catheters, gastric tubes, age &gt;80 years</td>
</tr>
<tr>
<td>Norway [28]</td>
<td>None</td>
<td>Bedridden or a stay of &lt;28 hours in the facility, presence of chronic heart disease, urinary incontinence, an indwelling catheter, a skin ulcer</td>
</tr>
</tbody>
</table>

\(^3\) The degree of dependency was derived from the number of disabilities for activities for daily living (ADL): 3–4 and 5–6 were risk factors [29].
## Table 1: Considerations for Inclusion of Infections in Long-Term Care Facilities (LTCFs) into Facility Infection Surveillance Programs

<table>
<thead>
<tr>
<th>Points to consider</th>
<th>Infections</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Infections that should be included in routine surveillance</strong></td>
<td>Viral respiratory tract infections, viral gastroenteritis, and viral conjunctivitis</td>
<td>Associated with outbreaks among residents and healthcare personnel in LTCFs.</td>
</tr>
<tr>
<td>1. Evidence of transmissibility in a healthcare setting</td>
<td>Pneumonia, urinary tract infection, gastrointestinal tract infections including <em>Clostridium difficile</em>, and skin and soft tissue infections</td>
<td>Associated with hospitalization and functional decline in LTCF residents.</td>
</tr>
<tr>
<td>2. Processes available to prevent acquisition of infection</td>
<td>Any invasive group A <em>Streptococcus</em> infection, acute viral hepatitis, norovirus, scabies, influenza</td>
<td>A single laboratory-confirmed case should prompt further investigation.</td>
</tr>
<tr>
<td>3. Clinically significant cause of morbidity or mortality</td>
<td>Ear and sinus infections, fungal oral and skin infections, and herpetic skin infections</td>
<td>Associated with underlying comorbid conditions and reactivation of endogenous infection.</td>
</tr>
<tr>
<td>4. Specific pathogens causing serious outbreaks</td>
<td>Surgical site infections, central-line-associated bloodstream infections, and ventilator-associated pneumonia</td>
<td>LTCF-specific definitions were not developed. Refer to the National Healthcare Safety Network’s criteria (<a href="http://www.cdc.gov/nhsn/TOC_PSCManual.html">http://www.cdc.gov/nhsn/TOC_PSCManual.html</a>).</td>
</tr>
<tr>
<td><strong>B. Infections that could be considered in surveillance</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Infections with limited transmissibility in a healthcare setting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Infections with limited preventability</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>C. Infections for which other accepted definitions should be applied in LTCF surveillance (may apply to only specific at-risk residents)</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
*Klebsiella pneumoniae* carbapenemase (KPC)-producing Enterobacteriaceae

- Outbreak investigation (2008)
- 14 acute care hospitals, 2 LTACHs, and 10 nursing homes
- 42 cases
- 27.5% mortality
- 60% of cases were in one LTCFs
- Only 10% of cases were acquired in acute care hospital

 Won et al, CID 2011
MRSA colonization among LTCF residents

Studies in Europe: 0.9-22%

Methicillin-Resistant *Staphylococcus aureus* (MRSA) Nasal Carriage in Residents of Veterans Affairs Long-Term Care Facilities: Role of Antimicrobial Exposure and MRSA Acquisition

*Infect Control Hosp Epidem* 2012;33(6):551-557

Nimalie D. Stone, MD; Donna R. Lewis, MSN; Theodore M. Johnson II, MD; Thomas Hartney, MD; Doris Chandler, MSN; Johnita Byrd-Sellers; John E. McGowan Jr, MD; Fred C. Tenover, PhD; John A. Ferreiro, MD; Robert P. Gaynes, MD

for the Southeast Veterans Affairs Long-Term Care Methicillin-Resistant *Staphylococcus aureus* Cooperative

**OBJECTIVE.** To identify risk factors associated with methicillin-resistant *Staphylococcus aureus* (MRSA) acquisition in long-term care facility (LTCF) residents.

**DESIGN.** Multicenter, prospective cohort followed over 6 months.

**SETTING.** Three Veterans Affairs (VA) LTCFs.

**PARTICIPANTS.** All current and new residents except those with short stay (<2 weeks).

**METHODS.** MRSA carriage was assessed by serial nares cultures and classified into 3 groups: persistent (all cultures positive), intermittent (at least 1 but not all cultures positive), and noncarrier (no cultures positive). MRSA acquisition was defined by an initial negative culture followed by more than 2 positive cultures with no subsequent negative cultures. Epidemiologic data were collected to identify risk factors, and MRSA isolates were typed by pulsed-field gel electrophoresis (PFGE).

**RESULTS.** Among 412 residents at 3 LTCFs, overall MRSA prevalence was 58%, with similar distributions of carriage at all 3 facilities: 20% persistent, 39% intermittent, 41% noncarriers. Of 254 residents with an initial negative swab, 25 (10%) acquired MRSA over the 6 months; rates were similar at all 3 LTCFs, with no clusters evident. Multivariable analysis demonstrated that receipt of systemic antimicrobials during the study was the only significant risk factor for MRSA acquisition (odds ratio, 7.8 [95% confidence interval, 2.1–28.6]; *P* = .002). MRSA strains from acquisitions were related by PFGE to those from a roommate in 9/25 (36%) cases; 6 of these 9 roommate sources were persistent carriers.
**C. difficile in LTCF/nursing homes**

- Large outbreak of CDIs 2006-07, ribotype 027 in Northern France.
- 38 healthcare facilities (mainly LTCF and nursing homes), 529 CDIs over a 22-month period *(281 laboratory-confirmed 027)*
- Most cases were over 80 years-old (mean age: 79.8 years)
- Incidence: 1.19 cases/10,000 hospitalisation days in acute care facilities (range: 0.1 to 4.5) and **2.39 in LTCF** (range: 0.15 to 19.8)

37 pathogens associated with 206 outbreaks in Nursing Homes, 1996-2008

<table>
<thead>
<tr>
<th>Microorganism</th>
<th>Median attack rate %</th>
<th>Median case fatality rate %</th>
<th>Median duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>RSV</td>
<td>40</td>
<td>20</td>
<td>60</td>
</tr>
<tr>
<td>Norovirus</td>
<td>45</td>
<td>0</td>
<td>18</td>
</tr>
<tr>
<td>GAS</td>
<td>8</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Sarcoptes scabei</td>
<td>70</td>
<td>120</td>
<td></td>
</tr>
</tbody>
</table>

Source: Utsumi M, Age and Aging 2010
Courtesy: ML Moro
"Never Events": Hepatitis B Outbreaks and Patient Notifications Resulting from Unsafe Practices during Assisted Monitoring of Blood Glucose, 2009–2010

Nicola D. Thompson, Ph.D. and Melissa K. Schaefer, M.D.
Journal of Diabetes Science and Technology
Volume 5, Issue 6, November 2011

Multiple Outbreaks of Hepatitis B Virus Infection Related to Assisted Monitoring of Blood Glucose Among Residents of Assisted Living Facilities — Virginia, 2009–2011

Weekly
May 18, 2012 / 61(19);339-343
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43 participating NHs (38.1%) had an IC practitioner in a stable job position

- 21/43 had both an IC nurse and an IC doctor
- 16/43 (37.2%) had an IC nurse, 6 (14.0%) had an IC doctor
- 20.7% of ICPs were external persons

*Healthcare Associated Infections In Long-term Care Facilities. Results Of The Pilot Point Prevalence Survey. Nov 2009*
Figure 9: Overall frequencies of the reported tasks of the infection control practitioner (n=41)

## HALT Pilot Survey - ICP Resources in NH

Table 6: Overview of the available infection control resources in the participating nursing homes

<table>
<thead>
<tr>
<th>Country</th>
<th>IC structure</th>
<th>IC protocols</th>
<th>IC activities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Single room</td>
<td>MRS A</td>
<td>Hand hygiene</td>
</tr>
<tr>
<td></td>
<td>Md</td>
<td>Min</td>
<td>Max</td>
</tr>
<tr>
<td>Belgium</td>
<td>92.1</td>
<td>26.6</td>
<td>100.0</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Croatia</td>
<td>63.0</td>
<td>3.7</td>
<td>68.2</td>
</tr>
<tr>
<td>England</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>Finland</td>
<td>73.6</td>
<td>21.6</td>
<td>98.0</td>
</tr>
<tr>
<td>France</td>
<td>84.4</td>
<td>68.8</td>
<td>100.0</td>
</tr>
<tr>
<td>Germany</td>
<td>72.6</td>
<td>6.9</td>
<td>100.0</td>
</tr>
<tr>
<td>Hungary</td>
<td>1.8</td>
<td>0.0</td>
<td>24.1</td>
</tr>
<tr>
<td>Italy</td>
<td>0.0</td>
<td>0.0</td>
<td>31.3</td>
</tr>
<tr>
<td>Lithuania</td>
<td>25.2</td>
<td>2.0</td>
<td>28.3</td>
</tr>
<tr>
<td>Netherlands</td>
<td>74.1</td>
<td>37.3</td>
<td>100.0</td>
</tr>
<tr>
<td>Norway</td>
<td>n.a.</td>
<td>n.a.</td>
<td>1/1</td>
</tr>
<tr>
<td>Poland</td>
<td>83.5</td>
<td>0.0</td>
<td>82.9</td>
</tr>
<tr>
<td></td>
<td>64.0% 0.0% 100%</td>
<td>43/113</td>
<td>34/112</td>
</tr>
</tbody>
</table>

IC = infection control; Md = median; n.a. = data not available
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Available guidelines

SHEA/APIC Guideline: Infection Prevention and Control in the Long-Term Care Facility

Guidelines for infection control in nursing homes: a Delphi consensus web-based survey

Journal of Hospital Infection 79 (2011) 75–89
Infection control for MDROs in LTCFs

Administrative support
HCW education
Surveillance
Judicious use of antimicrobial agents

Routine control
• Monitoring MRSA and VRE culture results
• Communicating MDRO data to HCWs
• Assessing compliance with isolation precautions and HH
• Monitoring antimicrobial usage
• Notifying receiving or transmitting facilities of the presence of a MDRO
• Environmental cleaning for residents previously known to be infected or colonized with MDROs

Additional control measures
• Consultation from experts
• Intensification of education
• Increased efforts to control antimicrobial use
• Active surveillance cultures
• Point-prevalence culturing of targeted units
• Intensification of isolation with compliance assessment
• Monitoring environmental cleaning

SHEA/APIC Guidelines 2008
UTI prevention in LTCF – same as in acute care

- Limiting use of catheters
- Insertion of catheters aseptically by trained personnel
- Use of as small diameter a catheter as possible
- HH before and after catheter manipulation
- Maintenance of a closed catheter system
- Avoiding irrigation unless the catheter is obstructed
- Keeping the collecting bag below the bladder
- Maintaining good hydration in residents
- Urinary catheters coated with antimicrobial materials: have the potential to decrease UTIs but have not been studied in the LTCF setting

SHEA/APIC Guidelines 2008
Conclusions

- Silver alloy-coated catheters were not effective for reduction of incidence of symptomatic CAUTI
- Reduction in CAUTI associated with nitrofural-impregnated catheters less than that regarded as clinically important
- Routine use of antimicrobial-impregnated catheters is not supported by this trial
LRTI prevention in LTCF

• HH after contact with respiratory secretions
• Wearing gloves for suctioning
• Elevating the head of the bed 30 to 45 degrees during tube feeding and for at least 1 h after to decrease aspiration
• Vaccination with pneumococcal vaccine in individuals over the age of 65 years

SHEA/APIC Guidelines 2008
The example of France

Burden of infections among 44,869 elderly in nursing homes: a cross-sectional cluster nationwide survey

K. Chami a,b,c,d,*, G. Gavazzi a,e, F. Carrat a,b,c,f, B. de Wazières a,g, B. Lejeune a,h,i,j, F. Piette a,b,k, M. Rothen-Tondeur a,b,c,d

Guidelines for infection control in nursing homes: a Delphi consensus web-based survey

Journal of Hospital Infection 79 (2011) 75–89

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A Short-Term, Multicomponent Infection Control Program in Nursing Homes: A Cluster Randomized Controlled Trial


Kathleen Chami PharmD, MSPH, PhD a,b,c,d,*, Gaëtan Gavazzi MD, PhD a,e, Avner Bar-Hen PhD f, Fabrice Carrat MD, PhD b,c,g, Benoît de Wazières MD, PhD a,h, Benoist Lejeune MD, PhD a,i,j,k, Nathalie Armand PharmD l,m, Muriel Rainfray MD b,o, Joseph Hajjar MD l,m, François Piette MD, PhD a,p, Monique Rothen Tondeur PhD a,b,c,d,m
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First round: 301 recommendations
Second round: 125 recommendations

First round:
Ranking by <10% of raters
Second round: Ranking by <80% of raters
First & second rounds: Discarded

First round: Ranking by 10–90% of raters
First round: Differed until the second round

First round:
Ranking by ≥90% of raters
Second round: Ranking by ≥80% of raters
First round: Differed until the second round

First round:
Median score (7–9)
Median score (4–6)
Median score (1–3)
First round: Differed until the second round
Second round: Discarded
First & second rounds: Discarded

264 recommendations (240 with high-grade of consensus) retained
<table>
<thead>
<tr>
<th>Topic 1: standard precautions (N = 22)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Exposure to bloodborne pathogens</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Use of single-use items</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Glove use</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Hand hygiene</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Face mask use</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Apron/gown and personal protective equipment use</strong></td>
<td></td>
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<tr>
<td><strong>NHs environmental hygiene</strong></td>
<td></td>
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<tr>
<td><strong>Safe laundry collection</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Waste collection and disposal</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Reference</strong></td>
<td>Refer to local mandatory guidelines (high agreement).</td>
</tr>
<tr>
<td><strong>Single-use items</strong></td>
<td>Single-use items should be used when commercially available (examples: devices, supplies, oral care kits, kits for aerosol therapy, humidification kits for oxygen therapy) (high agreement).</td>
</tr>
<tr>
<td><strong>Hands should be decontaminated before putting on gloves and after removing gloves</strong> (high agreement).</td>
<td></td>
</tr>
<tr>
<td><strong>Gloves should be discarded between the treatments of two residents or between different care activities for a single resident</strong> (high agreement).</td>
<td></td>
</tr>
<tr>
<td><strong>Reusable housework gloves</strong> (neoprene, rubber or butyl) or single-use non-sterile gloves should be worn for housekeeping activities and instrument cleaning (high agreement).</td>
<td></td>
</tr>
<tr>
<td><strong>Hands that are not visibly soiled must be decontaminated with an alcohol-based hand rub</strong> (high agreement).</td>
<td></td>
</tr>
<tr>
<td><strong>Improved adherence to hand-hygiene practices should become an institutional priority; availability of alcohol-based hand rub, hand-hygiene policy and protocols, implementation of healthcare workers’ education, clinical audits and awareness of the residents and their relatives</strong> (high agreement).</td>
<td></td>
</tr>
<tr>
<td><strong>Face masks (standard EN 14683) must be worn and selected according to the risk of splashing: either Type I (non-splash resistant) or Type IR (splash resistant)</strong> (high agreement).</td>
<td></td>
</tr>
<tr>
<td><strong>Healthcare workers with coughs should wear facemasks</strong> (high agreement).</td>
<td></td>
</tr>
<tr>
<td><strong>Residents with coughs should wear facemasks when they are out of their rooms</strong> (agreement).</td>
<td></td>
</tr>
<tr>
<td><strong>Protective equipment (gown, eye protection and face masks) must be worn if healthcare workers face a risk of contamination from patients’ blood or other body fluids, secretions or excretions</strong> (high agreement).</td>
<td></td>
</tr>
<tr>
<td><strong>Gowns must be discarded and disposed of as clinical waste or sent for laundering as soon as the activity is completed</strong> (high agreement).</td>
<td></td>
</tr>
<tr>
<td><strong>Basic hygiene procedures should be grouped together in a document accessible anytime to everybody</strong> (high agreement).</td>
<td></td>
</tr>
<tr>
<td><strong>Maintenance staff should be educated via continuous in-service training on infection control measures</strong> (high agreement).</td>
<td></td>
</tr>
<tr>
<td><strong>For low level disinfection, devices that cannot be submerged should be disinfected with wipes</strong> (high agreement).</td>
<td></td>
</tr>
<tr>
<td><strong>For low level disinfection, disinfectant products should be chosen from the positive list of the SFHH</strong> (high agreement).</td>
<td></td>
</tr>
<tr>
<td><strong>For intermediate or high level disinfection, disinfectant products should be chosen from the SFHH’s recommended list</strong> (high agreement).</td>
<td></td>
</tr>
<tr>
<td><strong>Washer-disinfectors should be used to heat or chemically disinfect commode seats/buckets, urinals and collection jars</strong> (high agreement).</td>
<td></td>
</tr>
<tr>
<td><strong>Contracts should be signed for the upkeep and maintenance of the washer-disinfectors</strong> (high agreement).</td>
<td></td>
</tr>
<tr>
<td><strong>Sterile devices should be stored in a specific place, shielded from any contamination (such as water projections or dust)</strong> (high agreement).</td>
<td></td>
</tr>
<tr>
<td><strong>Every facility should designate a person in charge of making a policy for sorting waste</strong> (high agreement).</td>
<td></td>
</tr>
</tbody>
</table>
50 nursing homes (NHs) randomly assigned to either a multi-component intervention* (25 NHs) or assessment only (25 NHs) over a 5-month period

*Based on the 2011 national recommendations

**Implementation strategy:**
- Interactive educational meetings
- Color posters on hand hygiene
- Kit of hygienic products (ABHR)
- Knowledge and self-perceived compliance surveys

**Primary outcome:** first infection episode
Results:

Incidence rate of the 1st episodes of infections (ITT analyses):

- **Intervention group:** 2.11/1000 resident-days
- **Control group:** 2.15/1000 resident-days
- HR=1.00 (95% CI 0.89-1.13, P= .93) (unadjusted Cox regression model)
- HR=0.99 (95% CI 0.87-1.12; P= .15) (adjusted model)

Limitations: neither evaluation of implementation indicators or feedback (inadequate compliance?); diagnosis challenges; study not powered to detect differences smaller than 5%; not blinded intervention; short follow-up; 1st infection only; insufficient evidence to guide targeted IC interventions in this population.
MRSA prevalence did not change

The relative risk of a resident being colonised with MRSA in an intervention home compared with a control home at 12 months: 0.99 (95% CI: 0.69-1.42) after adjustment for clustering.

Mean infection control audit scores were significantly higher in the intervention homes (82%) compared with the control homes (64%) at 12 months (P< 0.0001).
Factors influencing IC and MRSA decolonization in NHs:

- **Organizational factors** (e.g. time, financial resources, environment, management and culture)
- **External factors** (e.g. hospitals, regulation and general practitioners)
- Unmanageable **workload** (IC not adhered to)
- More financial **resources** necessary
- Conflict in maintaining an **environment** both ‘homely’ and clinical
- Difficult to achieve good ICP with confused residents, some families, GPs and members of staff **resistant to change**
- **Risk of re-colonization**, particularly from hospital admissions

**Conclusions:** IC and MRSA decolonization in the NH environment appear to be affected by many factors, some of which may be beyond the direct control of staff
Outbreak of Carbapenem-Resistant Enterobacteriaceae at a Long-Term Acute Care Hospital: Sustained Reductions in Transmission through Active Surveillance and Targeted Interventions

Amit S. Chitnis, MD, MPH;1,2 Pam S. Caruthers, RN;2 Adam K. Rao, MD;1,2 JoAnne Lamb, MPH;3
Robert Lurvey, MD, JD;1 Valery Beau De Rochars, MD, MPH;1,3 Brandon Kitchel, MS;2
Margarita Cancio, MD;1 Thomas J. Török, MD, MPH;4,5 Alice Y. Guh, MD, MPH;1
Carolyn V. Gould, MD, MSCR; Matthew E. Wise, PhD, MPH1

OBJECTIVE. To describe a Klebsiella pneumoniae carbapenemase (KPC)-producing carbapenem-resistant Enterobacteriaceae (CRE) outbreak and interventions to prevent transmission.

DESIGN, SETTING, AND PATIENTS. Epidemiologic investigation of a CRE outbreak among patients at a long-term acute care hospital (LTACH).

METHODS. Microbiology records at LTACH A from March 2009 through February 2011 were reviewed to identify CRE transmission cases and cases admitted with CRE. CRE bacteraemia episodes were identified during March 2009–July 2011. Biweekly CRE prevalence surveys were conducted during July 2010–July 2011, and interventions to prevent transmission were implemented, including education and auditing of standard isolation and cohorting of CRE patients with dedicated nursing staff and shared medical equipment. Trends were evaluated using weighted linear or Poisson regression. CRE transmission cases were included in a case-control study to evaluate risk factors for acquisition. A real-time polymerase chain reaction assay was used to detect the blaoCX gene, and pulsed-field gel electrophoresis was performed to assess the genetic relatedness of isolates.

RESULTS. Ninety-nine CRE transmission cases, 16 admission cases (from 7 acute care hospitals), and 29 CRE bacteraemia episodes were identified. Significant reductions were observed in CRE prevalence (49% vs 8%), percentage of patients screened with newly detected CRE (44% vs 0%), and CRE bacteraemia episodes (2.5 vs 0.0 per 1,000 patient-days). Cases were more likely to have received β-lactams, have diabetes, and require mechanical ventilation. All tested isolates were KPC-producing K. pneumoniae, and nearly all isolates were genetically related.

CONCLUSION. CRE transmission can be reduced in LTACHs through surveillance testing and targeted interventions. Sustainable reductions within and across healthcare facilities may require a regional public health approach.
- KPC-producing *K. pneumoniae*, nearly all genetically related
- 99 CRE transmission cases, 16 admission cases, 29 CRE bacteremia episodes
- CRE prevalence: 49% vs 8%
- Patients screened with newly detected CRE: 44% vs 0%
- CRE bacteremia episodes: 2.5 vs 0.0 per 1,000 patient-days
C. difficile outbreak control

• **Control measures:** isolation precautions according to standards, reinforcement of hand hygiene (ABHR + HW) wearing gloves, dedicating equipment, environmental cleaning with hypochlorite solutions (0.5%), and a specific process for waste management

• **Reinforcement:** implementation of cohorting units with isolation in private rooms and dedicated staff personnel

Outline

- Burden of HAI in long-term care facilities (LTCFs) and nursing homes (NHs)
- Causes of HAI and AMR in LTCFs
- IC resources in LTCFs
- Infection control and prevention guidelines
- IC Interventions to reduce HAI in LTCFs
- Factors influencing implementation
- Hand hygiene
Hand hygiene compliance in LTCFs

<table>
<thead>
<tr>
<th>Facility</th>
<th>Compliance %</th>
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<tbody>
<tr>
<td>Eveillard-Rehab</td>
<td>71</td>
</tr>
<tr>
<td>Girou-Rehab</td>
<td>61</td>
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<tr>
<td>Vernon-LTCF</td>
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<tr>
<td>Pan-LTCF</td>
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<td>Ho-LTCF</td>
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<td>Pozzetti-Nursing Homes</td>
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## Hand hygiene improvement and HAI reduction in LTCFs (1)

<table>
<thead>
<tr>
<th>Author</th>
<th>Type of study</th>
<th>Setting</th>
<th>Intervention</th>
<th>Results</th>
</tr>
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<tbody>
<tr>
<td>Loeb M, 2003</td>
<td>Observational, prospective</td>
<td>50 Nursing Homes, Canada and US</td>
<td>Increased staffing, antibacterial soap use, number of sinks</td>
<td>Reduced risk of MRSA: Reduced risk of TMP-SMX R Enterobacteriaceae</td>
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<tr>
<td>Huang TT, 2008</td>
<td>Before-after</td>
<td>LTCFs, Taiwan</td>
<td>HH training program</td>
<td>HH compliance from 9.3% to 30.4%. Infection incidence from 1.7% to 1.5%</td>
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<td>Makris AT, 2000</td>
<td>Controlled trial, before-after</td>
<td>LTCFs, US</td>
<td>IC educational program including HH</td>
<td>Infection incidence from 6.3% to 4.1%</td>
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<tr>
<td>Author</td>
<td>Type of study</td>
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<td>Intervention</td>
<td>Results</td>
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<tr>
<td>Yeung WK, 2011</td>
<td>Clustered randomized controlled trial, before-after</td>
<td>7 LTCFs in Hong Kong</td>
<td>Pocket- sized containers of ABHR reminder materials, education</td>
<td>HH compliance from 25.8% to 33.3%. Incidence of serious infections from 1.42/1000 to 0.65/1000</td>
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<tr>
<td>Ho M, 2012</td>
<td>Clustered randomized controlled trial, before-after</td>
<td>18 LTCFs in Hong Kong</td>
<td>ABHR (WHO formulation), ABHR racks, pull reels, HH posters and reminders, a health talk, video clips, training materials, and performance feedback</td>
<td>Significant increase of HH compliance in intervention arms (27% to 61% and 22% to 49%) Decrease of respiratory outbreaks (IRR, 0.12; 95% CI, 0.01–0.93; P 0.04) and MRSA infections requiring hospital admission (IRR, 0.61; 95% CI, 0.38–0.97; P 0.04)</td>
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</table>
Effectiveness of WHO Multimodal Hand Hygiene Improvement Strategy in LTCFs in Hong Kong

- Cluster randomized controlled trial
- Nov 2009-July 2010
- 18 LTCFs with only 1 IC nurse
- 2 interventions (HH promotion with slightly powdered gloves or powderless gloves) + 1 control arms

Results

- 11,669 HH opportunities
- HH compliance increased from 27.0% to 60.6% and from 22.2% to 48.6% in intervention arms I and II respectively.
- Increase in HH compliance of 21.6% after intervention in both intervention arms compared to controls (both \( p<0.001 \))
- Mean knowledge score increased from 5.5 to 6.6 in the intervention arms
- Factors associated with less improvement: “Before touching patient” opportunity, activity index >40 opportunities/h, physiotherapist/occupational therapist

Ho M et al. ICHE 2012; 33:761-767
Hand Hygiene in Outpatient and Home-based Care and Long-term Care Facilities

A Guide to the Application of the WHO Multimodal Hand Hygiene Improvement Strategy and the “My Five Moments for Hand Hygiene” Approach

http://www.who.int/gpsc/5may/en
Critical elements for evaluation of hand hygiene opportunities

- Transmission risk according to procedure
- Infection risk for the patient
- Patients' susceptibility status
- Patients' colonization status
- Infection risk for the healthcare worker
- Frequency of the procedure
The geographical conceptualization of the transmission risk in the hospital setting


My 5 moments for HAND HYGIENE

1. BEFORE TOUCHING A PATIENT
2. BEFORE CLEAN ASEPTIC PROCEDURE
3. AFTER BODY FLUID EXPOSURE RISK
4. AFTER TOUCHING A PATIENT
5. AFTER TOUCHING PATIENT SURROUNDINGS
Hand hygiene in LTCFs – expert consensus

■ In **specialized nursing homes** (mentally or physically disabled residents and mainly cared for in a dedicated space with dedicated equipment), the patient zone concept and hand hygiene recommendations should be applied in the same way as for hospitals.

■ In **residential facilities** (semi-autonomous residents living in a community, having their own room or shared accommodation and moving within the home facility) hand hygiene recommendations apply only to situations where health care is delivered to residents (e.g. rehabilitation sessions, vital signs check), i.e. at the **point of care** (where the care procedure takes place) and do not cover any social contacts with or among LTCF residents unrelated to health-care delivery.
Your Moments for **Hand Hygiene**

**Care in a residential home**

1. **BEFORE TOUCHING A PATIENT**
   - **WHY?** Clean your hands before touching a patient.
   - **WHY?** To protect the patient against harmful germs carried on your hands.

2. **BEFORE CLEAN/ASEPTIC PROCEDURE**
   - **WHY?** Clean your hands immediately before performing a clean/aseptic procedure.
   - **WHY?** To protect the patient against harmful germs, including the patient’s own, from entering his/her body.

3. **AFTER BODY FLUID EXPOSURE RISK**
   - **WHY?** Clean your hands immediately after a procedure involving exposure risk to body fluids and after glove removal.
   - **WHY?** To protect yourself and the environment from harmful patient germs.

4. **AFTER TOUCHING A PATIENT**
   - **WHY?** Clean your hands after touching the patient at the end of the encounter or when the encounter is interrupted.
   - **WHY?** To protect yourself and the environment from harmful patient germs.
Practical examples

- Public vaccination campaign
- Blood drawing in a laboratory
- Visit to a general practitioner's office
- Mother-and-child consultation in a health post
- Consultation in an emergency policlinic
- Home care
- Chest radiograph in a diagnostic centre
- Haemodialysis in a specialized ambulatory clinic
- Labour and delivery assistance
- Dental care in a clinic
- **Long-term care facilities**
Monitoring hand hygiene compliance...

### Observation Form: Outpatient care / Moments 1&4

<table>
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<tr>
<th>Prof. cat. Code N°</th>
<th>Indication</th>
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### Observation Form: Outpatient care / Moments 2&3

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German National Hand Hygiene Campaign „AKTION Saubere Hände“ 2008 -2013

Participating Institutions by March 2012

- **Inpatient Module**: 707 hospitals, 51 rehabilitation clinics
- **Long Term Care Module**: 115 facilities
- **Outpatient Care Module**: 171 facilities

Courtesy, Christiane Reichard
My 5 moments of hand hygiene: the immobile* and the mobile resident

*bedridden
Hand hygiene and aseptic tasks and method of hand rub

**Händedesinfektion**

**Vor aseptischen Tätigkeiten**

- Vor jeglicher Art von Konnektion bzw. Diskonnektion an einem invasiven Device, z. B.:*
  - VOR dem Legen jeglicher Art von Kathetern durch die durchzuführende und assistierende Person
  - VOR jeder Konnektion / Diskonnektion jeglicher Art von Katheter und Drainagesystemen
  - VOR der Zubereitung von parenteralen, parenteralen Medikamenten und Infusionlösungen
  - Vor der Konnektion/Diskonnektion am Infusionsystem
  - Vor dem Abziehen
  - Vor Konnektion / Diskonnektion an Flüssigkeiten
  - Vor Manipulation an der Trachealkanüle

- **Vor jedem Kontakt mit Wunden, nicht intakter Haut und Schleimhaut, z. B.:**
  - Vor jedem Verbandswechsel und Kontakt mit der Wunde
  - Zwischen septischen und aseptischen Arbeits- schritten beim Verbandswechsel
  - VOR dem Verarbeiten von Augentropfen
  - VOR der Mundpflege

*unabhängig davon ob Handschuhe getragen werden

Alle Informationen zur AKTION Saubere Hände unter: www.aktion-sauberehaende.de

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**Einreibemethode**

**für Ihre Händedesinfektion**

Desinfektionsmittel auf die trockenen Hände!

- Die Hände müssen nass sein
- Daumen, Fingerkuppen und Nagelfalz nicht vergessen
- 30 Sekunden Einwirkzeit

Bitte beachten:

- Nur Waschen mit Wasser und Seife bei sichtbarer Verschmutzung
- Kurze, unlackierte Fingernägel
- Keine Ringe
- Keine Uhren

Alle Informationen zur AKTION Saubere Hände unter: www.aktion-sauberehaende.de
Before a clinical examination
Before helping the patient to mobilize
Before aseptic task
After body fluid exposure
After patient contact
After contact with patient surroundings
Hand hygiene and glove use

GLOVES PLUS HAND HYGIENE = CLEAN HANDS

GLOVES WITHOUT HAND HYGIENE = GERM TRANSMISSION
Hand hygiene and glove use

- The use of gloves does not replace the need for cleaning your hands!
- You should remove gloves to perform hand hygiene, when an indication occurs while wearing gloves.
- You should wear gloves only when indicated (see the Pyramid in the Hand Hygiene Why, How and When Brochure and in the Glove Use Information Leaflet) – otherwise they become a major risk for germ transmission.
STERILE GLOVES INDICATED
Any surgical procedure; vaginal delivery; invasive radiological procedures; performing vascular access and procedures (central lines); preparing total parental nutrition and chemotherapeutic agents.

EXAMINATION GLOVES INDICATED IN CLINICAL SITUATIONS
Potential for touching blood, body fluids, secretions, excretions and items visibly soiled by body fluids.

DIRECT PATIENT EXPOSURE: Contact with blood; contact with mucous membrane and with non-intact skin; potential presence of highly infectious and dangerous organism; epidemic or emergency situations; IV insertion and removal; drawing blood; discontinuation of venous lines; pelvic and vaginal examination; suctioning non-closed systems of endotracheal tubes.

INDIRECT PATIENT EXPOSURE: Emptying emesis basins; handling/cleaning instruments; handling waste; cleaning up spills of body fluids.

GLOVES NOT INDICATED (except for CONTACT precautions)
No potential for exposure to blood or body fluids, or contaminated environment

DIRECT PATIENT EXPOSURE: Taking blood pressure, temperature and pulse; performing SQ and IM injections; bathing and dressing the patient; transporting patient; caring for eyes and ears (without secretions); any vascular line manipulation in absence of blood leakage.

INDIRECT PATIENT EXPOSURE: Using the telephone; writing in the patient chart; giving oral medications; distributing or collecting patient dietary trays; removing and replacing linen for patient bed; placing non-invasive ventilation equipment and oxygen cannula; moving patient furniture.
Wearing gloves: the worst enemy of hand hygiene?

"While numerous studies have been undertaken to improve our understanding of the determinants of hand hygiene behavior, it seems urgent to improve our understanding of the determinants of glove usage behavior as well."

Matthieu Eveillard

Future Microbiology 2011; 6(8), 835-837

Brief report

Correlation between glove use practices and compliance with hand hygiene in a multicenter study with elderly patients

Matthieu Eveillard PharmD, PhD a,b,* Marie-Laure Joly-Guillou MD, PhD a,b P. Brunel MD c
Conclusions

- Inadequate resources for IC
- Issues related to adequate surveillance (definitions, skills...)
- Insufficient evidence to guide targeted IC interventions in this population
- Need for taking the peculiarity of the setting and the risks and frailty of the hosts into account
- Need for understanding barriers to behavioural change
- Effective multimodal implementation strategies poorly understood
- Successful experiences in outbreak control and hand hygiene improvement
We have a very long way to go yet...but the demand is high and our commitment and motivation too!
5 May 2013

Promote healthcare facilities registrations for SAVE LIVES: Clean Your Hands

Help WHO to reduce the number of countries with NO or low numbers!

http://www.who.int/gpsc/5may/registration_update/en/index.html

Hand hygiene monitoring and feedback and encouraging patient participation in hand hygiene promotion are the twin goals for

SAVE LIVES: Clean Your Hands 5 May 2013

To know more, access

http://www.who.int/gpsc/5may/EN_PSP_GPSC1_5May_2013/en/
Thank you

WHO Clean Care is Safer Care

WHO SAVE LIVES: Clean Your Hands
5 May 2013

Find all information at
http://www.who.int/gpsc/5may/EN_PSP_GPSC1_5May_2013/en/

Send enquiries to savelives@who.int