Healthcare-associated infections in Europe: the state of play

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Six sigma quality comparisons defect rates


Healthcare-associated infections (ECDC PPS, 2016-2017)
• An agency of the European Union, located in Stockholm, Sweden
• Founded in 2005; nearly 300 employees
• Mandate to ‘identify, assess and communicate current and emerging threats to human health from communicable diseases’
• European Union (EU) (27) and European Economic Area (EEA) (3) = 30 countries with a total of more than 450 million people

www.ecdc.europa.eu
### ECDC point prevalence surveys (PPSs) in acute care hospitals and long-term care facilities, 2016-2017: prevalence and estimated incidence of healthcare-associated infections (HAIs)

<table>
<thead>
<tr>
<th></th>
<th>Acute care hospitals</th>
<th>Long-term care facilities (LTCFs)</th>
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<tbody>
<tr>
<td>Number of facilities, EU/EEA countries</td>
<td>1209 hospitals, 28 countries</td>
<td>1788 LTCFs, 23 countries</td>
</tr>
<tr>
<td>Number of included patients/residents</td>
<td>310 755</td>
<td>102 301</td>
</tr>
</tbody>
</table>
| Patients/residents with a least one healthcare-associated infection on any given day | 6.5%*  
1 in 15 patients | 3.9%*  
1 in 26 residents |
| Healthcare-associated infections each year (estimated total) | 4.5 million | 4.4 million |


*Country-weighted and corrected after validation.
Burden of healthcare-associated infections (HAIs)

HAIs account for **twice the burden** of 31 other infectious diseases

- **Approx. 9 million HAIs** each year in acute care hospitals and long-term care facilities in the EU/EEA (3)
- **91,000 deaths** each year directly attributable to HAIs in acute care hospitals in the EU/EEA (1)
- **35–55% of HAIs preventable** with multifaceted interventions, depending on type of HAI (4)

Patient safety, healthcare-associated infections and antimicrobial resistance

Adverse events/patient safety

Healthcare-associated infections

Healthcare-associated, antimicrobial-resistant infections (selected MDROs)

Community-acquired infections

Community-acquired, antimicrobial-resistant infections

Composite index* of antimicrobial resistance (AMR) in healthcare-associated infections from acute care hospitals, EU/EEA countries and Serbia, 2016-2017

*Percentage of isolates resistant to first-level antimicrobial resistance markers in healthcare-associated infections, i.e.:
- *Staphylococcus aureus* resistant to meticillin (MRSA),
- *Enterococcus faecium* and *Enterococcus faecalis* resistant to vancomycin,
- Enterobacteriaceae resistant to third-generation cephalosporins,
- *Pseudomonas aeruginosa* and *Acinetobacter baumannii* resistant to carbapenems.

* Bulgaria and the Netherlands: poor national representativeness of acute care hospital sample;
** Norway: national protocol;
Norway and UK-Scotland did not collect microbiological data.

Main actions to prevent and control antimicrobial resistance

**Prudent use of antimicrobial agents**
(only when needed, correct dose, correct dose intervals, correct duration)

**Infection prevention and control**
(hand hygiene, screening, isolation)

**New antimicrobial agents**
(with a novel mechanism of action, research, development)
Countries with a higher prevalence of antibiotic use have a higher composite index of AMR, but countries with more frequent review and change of antibiotic prescriptions have a lower composite index of AMR.

*Antibacterials for systemic use (ATC J01)

Countries with more resources for infection prevention and control have a lower composite index of AMR

**Preliminary results**

- Beds with alcohol hand rub dispenser at point of care (%): $r = -0.57$, $p = 0.003$
- Beds in single rooms (mean %): $r = -0.58$, $p = 0.004$

Additional preliminary result: Hospitals with at least 0.4 FTE infection prevention and control nurse for 250 beds ($r = -0.35$, $p = 0.04$)

## Determinants of composite index of AMR
(multiple ordinal logistic regression, n=625 acute care hospitals)

<table>
<thead>
<tr>
<th>Determinant</th>
<th>Regression coefficient</th>
<th>P-value</th>
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<tbody>
<tr>
<td>Prevalence of antimicrobial use (% patients with at least one antimicrobial)</td>
<td>0.032</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Antimicrobial prescriptions reviewed and changed during treatment (%)</td>
<td>-0.006</td>
<td>0.026</td>
</tr>
<tr>
<td>Beds with alcohol hand rub dispenser at point of care (%)</td>
<td>-0.005</td>
<td>0.013</td>
</tr>
<tr>
<td>Beds in single rooms (% beds)</td>
<td>-0.015</td>
<td>0.001</td>
</tr>
<tr>
<td>Infection prevention and control nurse staffing levels (FTE / 250 beds)</td>
<td>-0.178</td>
<td>0.001</td>
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<tr>
<td>Case-mix severity (predicted HAI prevalence)</td>
<td>0.106</td>
<td>0.009</td>
</tr>
<tr>
<td>Blood culture use rate (N per 1000 patient-days)</td>
<td>0.000</td>
<td>0.944</td>
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Economic assessment* of a ‘mixed-intervention’ package†
Just a few Euros more lead to substantial savings in healthcare expenditure

In the **EU/EEA and the UK**, €1 spent on these interventions would save approx. €2.5

**Implementation cost**

**Impact on healthcare expenditure**

†‘Mixed-intervention’ package:

- **Improve hospital hygiene**
  (starting with hand hygiene)

- **Antimicrobial stewardship**

- **Rapid diagnostic tests**
  (bacterial vs. viral infection)

- **Delayed prescription**

- **Public awareness campaigns**

Source: OECD. Stemming the Superbug Tide: just a few dollars more. 2018. oe.cd/amr-2018

*Including effect on susceptible infections.
Antimicrobial resistance (AMR) and COVID-19?

'Yes, AMR will increase’

- About 70% hospitalised COVID-19 patients receive antibiotics (Rawson et al., Langford et al.)
- Often broad-spectrum antibiotics, empirically (Rawson et al.)
- Secondary bacterial infection in 16% (95% CI: 11-20%) hospitalised COVID-19 patients (Langford)
- AMR control and antimicrobial stewardship efforts may be temporarily discontinued
- Difficulties to comply with infection prevention and control because of increased workload
- Self-medication with antibiotics may increase

'No, AMR will not increase’

- Bacterial infection in 8% hospitalised COVID-19 patients vs. 11% in non-COVID-19 patients (Rawson et al.)
- Bacterial co-infection (estimated on presentation) in only 3.5% (95% CI: 1-7%) patients (Langford et al.)
- Increased compliance with hand hygiene and other infection control measures in healthcare; COVID-19 cohorting units
- Fewer admissions of chronically ill patients
- Planned surgical interventions postponed
- Increased hand hygiene in the community
- Less patient transfers between countries and interruption of international travel

Conclusions

• Healthcare-associated infections represent the largest health burden of all infectious diseases in the EU/EEA (COVID-19 not included)
• Up to one half of these HAIs are preventable
• Challenge = local implementation of prevention and control measures
• Structure and process indicators of infection prevention and control and antimicrobial stewardship in all ECDC protocols for HAI surveillance.
• Monitoring and benchmarking of countries, hospitals, wards and long-term care facilities on these indicators should contribute to improving practices, and subsequently reducing HAIs and AMR in Europe.
Thank you!

EUROPEAN ANTIBIOTIC AWARENESS DAY

A EUROPEAN HEALTH INITIATIVE

18 November 2020

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