Antibiotic resistance

Facts and figures

EUROPEAN ANTIBIOTIC AWARENESS DAY
A European Health Initiative

[Placeholder for national ministry logo]

Fact 1. Antibiotic resistance is an increasingly serious public health problem in Europe

The emergence, spread and selection of antibiotic-resistant bacteria is a threat to patient safety in hospitals[1, 2] because:

- Infections with antibiotic-resistant bacteria result in increased patient morbidity and mortality, as well as increased hospital length of stay[4-5];
- Antibiotic resistance frequently leads to a delay in appropriate antibiotic therapy[6];
- Inappropriate or delayed antibiotic therapy in patients with severe infections is associated with worse patient outcomes and sometimes death[7-9].

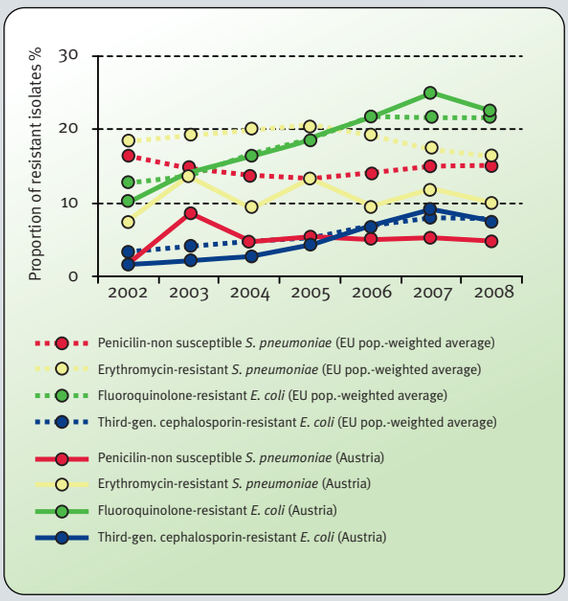

Figure 1. Trends of antibiotic resistance in *S. pneumoniae* and *E. Coli* as an EU population weighted average, 2002-2008. Source: EARSS, 2009.

[Instructions on how to adapt the graph to national data are included in the guidance note]

Fact 2. Misuse of antibiotics in hospitals is one of the factors driving antibiotic resistance

Patients who are hospitalised have a high probability of receiving an antibiotic[10] and 50% of all antibiotic use in hospitals can be inappropriate[2, 11]. Misuse of antibiotics in hospitals is one of the main factors driving development of antibiotic resistance[12-14].

Misuse of antibiotics can include any of the following[15]:

- When antibiotics are prescribed unnecessarily;
- When antibiotic administration is delayed in critically ill patients;
- When broad-spectrum antibiotics are used too generously, or when narrow-spectrum antibiotics are used incorrectly;
- When the dose of antibiotics is lower or higher than appropriate for the specific patient;
- When the duration of antibiotic treatment is too short or too long;
- When antibiotic treatment is not streamlined according to microbiological culture data results.

Fact 3. Benefits of prudent antibiotic use

Prudent use of antibiotics can prevent the emergence and selection of antibiotic-resistant bacteria[2, 14, 16-18] and decreasing antibiotic use has been shown to result in lower incidence of *Clostridium difficile* infections[2, 16, 19].

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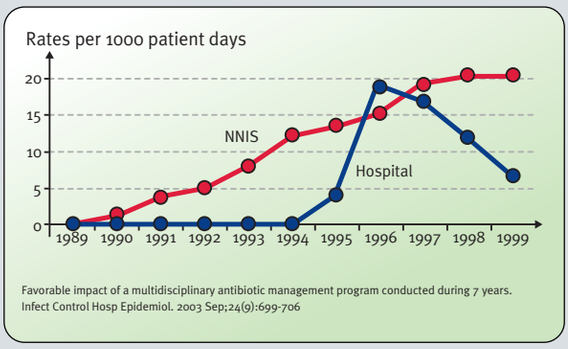

Favorable impact of a multidisciplinary antibiotic management program conducted during 7 years. Infect Control Hosp Epidemiol. 2003 Sep;24(9):699-706

Figure 2. Rates of Vancomycin-resistant *Enterococci* in hospital before and after implementation of the antibiotic management program compared with rates in National Nosocomial Infections Surveillance (NNIS) System* hospitals of similar size. Source: Carling P, et al 2003[16].

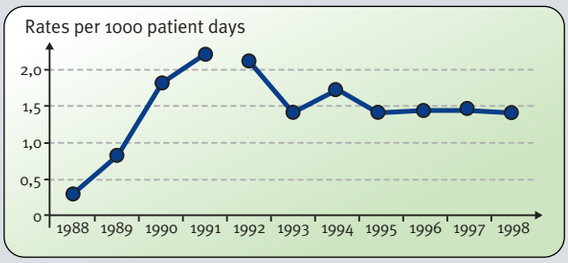

Figure 3. Rates of nosocomial *Clostridium difficile*, expressed per 1,000 patient-days, before and after implementation of the antibiotic management program. Source: Carling P, et al 2003[16].

Fact 4. Multifaceted strategies can result in prudent antibiotic use

As part of multifaceted strategies certain measures may result in better antibiotic prescribing practices and decreasing antibiotic resistance in hospitals. Multifaceted strategies include use of ongoing education, evidence-based hospital antibiotic guidelines and policies, restrictive measures and consultations from infectious disease physicians, microbiologists and pharmacists[2, 16, 20].
Measures to promote prudent use of antibiotics include[16, 20, 21, 22]:

- Continuous education of prescribers and specialists included in comprehensive hospital strategies[2];
- Evidence-based hospital antibiotic guidelines and policies[2, 16, 20];
- Monitoring of hospital antibiotic resistance and antibiotic use data to guide empiric antibiotic therapy in severely ill patients[21];
- Administering the correct timing and optimal duration of antibiotic prophylaxis for surgery[22];
- For some indications, using shorter rather than longer duration of treatment[12, 23-24];
- Taking microbiological samples before initiating empiric antibiotic therapy, monitoring culture results and streamlining antibiotic treatment based on the culture results[25].

*NNIS is now the National Healthcare Safety Network (NHSN).

European Centre for Disease Prevention and Control (ECDC)
Tel: +46 (0)8 5860 1000
Email: EAAD@ecdc.europa.eu

ecdc EUROPEAN CENTRE FOR DISEASE PREVENTION AND CONTROL

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