

Key messages for hospital prescribers

What is the problem?

Antibiotic-resistant bacteria have become an everyday occurrence and problem in hospitals across Europe (1).

Misuse of antibiotics may cause patients to become colonised or infected with antibiotic-resistant bacteria, such as methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin-resistant *enterococci* (VRE) and highly-resistant Gram-negative bacilli (2-3).

Misuse of antibiotics is associated with an increased incidence of *Clostridium difficile* infections (4-5).

The emergence, selection and spread of resistant bacteria is a threat to patient safety in hospitals because:

- Infections with antibiotic-resistant bacteria result in increased patient morbidity and mortality, as well as increased hospital length of stay (6-7).
- Antibiotic resistance frequently leads to a delay in appropriate antibiotic therapy (8).
- Inappropriate or delayed antibiotic therapy in patients with severe infections is associated with worse patient outcomes and sometimes death (9-11).
- The current pipeline for new antibiotics is limited and, if antibiotic resistance continues to grow, there will be no effective antibiotics for treatment (12).

How does the use of antibiotics contribute to the problem?

Patients who are hospitalized have a high probability of receiving an antibiotic (13) and 50% of all antibiotic use in hospitals can be inappropriate (4, 14);

Misuse of antibiotics in hospitals is one of the main factors that drive development of antibiotic resistance (15-17);

Misuse of antibiotics can include any of the following (18):

- When antibiotics are prescribed unnecessarily;
- When antibiotic administration is delayed in critically ill patients;
- When the spectrum of antibiotic therapy is either too narrow or too broad;
- When the dose of antibiotic is either too low or too high compared to what is indicated for that patient;
- When the duration of antibiotic treatment is too short or too long;
- When antibiotic treatment is not streamlined when microbiological culture data become available.

Why promote prudent use of antibiotics?

Prudent use of antibiotics can prevent the emergence and selection of antibiotic-resistant bacteria (4, 17, 19-21).

Decreasing antibiotic use has been shown to result in decreasing incidence of *Clostridium difficile* infections (4, 19, 22).

How to promote prudent use of antibiotics?

Multifaceted strategies which include use of ongoing education, use of evidence-based hospital antibiotic guidelines and policies, restrictive measures and consultations from infectious disease physicians, microbiologists and pharmacists, may result in better antibiotic prescribing practices and decreasing antibiotic resistance (4, 19, 23).

Monitoring of hospital antibiotic resistance and antibiotic use data has been shown to provide useful information to guide empirical antibiotic therapy in severely ill patients (24)

Correct timing and optimal duration of antibiotic prophylaxis for surgery is associated with a lower risk of surgical site infections (25) and lower risk of emergence of antibiotic-resistant bacteria (26)

Studies show that, for some indications, shorter rather than longer duration of treatment can be administered without differences in patient outcome and this has also been associated with lower frequencies of antibiotic resistance (15, 27-28).

Taking microbiological samples before initiating empiric antibiotic therapy, monitoring culture results and streamlining antibiotic treatment based on culture results is a means to reduce unnecessary antibiotic use (29).

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