Correlation between antibiotic use and *E. coli* resistance in a Swiss tertiary care hospital

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**Background:**  
Antimicrobial stewardship programs aim to optimize antimicrobial use in order to prevent the emergence of resistance, improve patient outcomes, and reduce healthcare costs without compromising quality of care. Monitoring antimicrobial use and local antimicrobial susceptibility in healthcare institutions are important tools of such programs.

**Objectives:**  
We aimed to correlate use of frequently prescribed antimicrobials and level of *E. coli* resistance in our institution.

**Methods:**  
The hospital pharmacy calculated the antibiotic use in grams for each department of the hospital for the years 2008-2011. We converted the use into defined daily doses (DDD) and expressed it as DDD/100 bed days, using the ATC/DDD system promoted by the WHO. Routine antimicrobial susceptibility tests (ASTs) were performed using the disk diffusion method and results interpreted according to CLSI criteria.

**Results:**  
The total antibiotic consumption for the hospital was 64 DDD/100 hospital days and varied significantly between the different departments. The hospital-wide resistance rates of *E. coli* are summarized in Figure 1. Antibiotic use correlated with *E. coli* resistance for amoxicillin-clavulanic acid \( r^2 = 0.409 \) (p: 0.019), trimethoprim-sulfamethoxazole \( r^2 = 0.367 \) (p: 0.028) and for fluoroquinolones (ciprofloxacin and norfloxacin), \( r^2 = 0.566 \) (p: 0.003). (Figure 2) There was no correlation between use and resistance for amoxicillin, cefuroxime, ceftriaxone, cefepime, meropenem and gentamicin.

**Conclusions:**  
A correlation between inpatient antibiotic use and the respective resistance in *E. coli* was documented for:  
- Antibiotics with a high consumption rate  
- Antibiotics that are available in parenteral and oral form  
- Two antibiotics that are frequently prescribed for treatment of urinary tract infections

Despite the limitations of the study (small isolate number, exclusion of outpatient antibiotic use) our data will be the basis for antibiotic-specific stewardship interventions in departments with high antibiotic use.

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