Antimicrobial resistance in *K. pneumoniae* in hospitalised patients in Germany 2009-2011: are there any trends?

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### Objectives

The European Antimicrobial Resistance Surveillance Network (EARS-Net) Report 2011 reveals increasing trends of combined resistance to third-generation cephalosporins (3GC), fluoroquinolones (FQ) and aminoglycosides (AG) in invasive *K. pneumoniae* isolates from hospitalised patients over the past four years for many European countries but not for Germany. The German Antimicrobial Resistance Surveillance (ARS) System collects data for isolates from all specimen types thus allowing to study trends in isolates from urine and respiratory samples as well.

### Materials & Methods

Analysis is based on isolates of *K. pneumoniae* collected by eight laboratories covering 191 hospitals with continuous data submission for the period 2009 to 2011. Copy strain elimination is based on first isolate/patient/year for analysis of all specimen and first isolate/patient/specimen type/year for specimen specific analysis. Species identification and antimicrobial susceptibility testing is performed by VITEK 2.

Isolates are classified as non-susceptible to an antibiotic class if they show non-susceptibility to one of its agents:

- **3GC**: ceftazidime or cefotaxime or ceftriaxone
- **FQ**: ciprofloxacin or levofloxacin
- **AG**: gentamicin or tobramycin or amikacin.

Significance of differences of proportions is evaluated on the basis of 95%-confidence intervals.

### Results

**antibiotic class** | **year** | **all specimen** | **blood cultures** | **urines** | **respiratory**
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 | | | **R+I%** | **95%CI** | **R+I%** | **95%CI** | **R+I%** | **95%CI** | **R+I%** | **95%CI**
Aminoglycosides | 2009 | 11,0 | 10.3 - 11.7 | 13,0 | 9.7 - 16.3 | 12,0 | 11.0 - 13.0 | 11,0 | 8.8 - 13.2
 | 2010 | 10,9 | 10.3 - 11.6 | 14,2 | 10.9 - 17.5 | 11,3 | 10.4 - 12.2 | 14,7 | 12.3 - 17.0
 | 2011 | 10,7 | 10.0 - 11.3 | 11,6 | 8.6 - 14.6 | 10,6 | 9.7 - 11.4 | 12,5 | 10.4 - 14.7
Cephalosporines | 2009 | 13,1 | 12.3 - 13.8 | 12,8 | 9.5 - 16.1 | 13,7 | 12.7 - 14.7 | 13,2 | 10.8 - 15.6
 | 2010 | 13,1 | 12.4 - 13.8 | 14,0 | 10.7 - 17.3 | 13,4 | 12.5 - 14.4 | 16,2 | 13.7 - 18.6
 | 2011 | 13,5 | 12.8 - 14.2 | 11,6 | 8.6 - 14.6 | 13,1 | 12.2 - 14.0 | 14,5 | 12.2 - 16.9
Fluorchinolones | 2009 | 15,2 | 14.4 - 16.0 | 17,5 | 13.8 - 21.4 | 16,7 | 15.6 - 17.8 | 14,7 | 12.2 - 17.2
 | 2010 | 15,3 | 14.6 - 16.1 | 16,6 | 13.0 - 20.7 | 16,4 | 15.4 - 17.8 | 17,9 | 15.4 - 20.5
 | 2011 | 16,5 | 15.7 - 17.2 | 16,0 | 12.5 - 19.4 | 16,9 | 15.9 - 17.9 | 16,4 | 14.0 - 18.9
combined non-susceptibility | 2009 | 7,9 | 7.3 - 8.6 | 10,8 | 7.7 - 13.8 | 8,3 | 7.5 - 9.2 | 9,0 | 7.0 - 11.1
 | 2010 | 8,2 | 7.7 - 8.8 | 10,7 | 7.8 - 13.7 | 8,6 | 7.8 - 9.4 | 11,0 | 8.9 - 13.1
 | 2011 | 8,1 | 7.5 - 8.6 | 9,6 | 6.8 - 12.3 | 8,1 | 7.4 - 8.9 | 8,9 | 7.1 - 10.8

**Table 1**: Non-susceptibility in *K. pneumoniae* isolates from hospitalised patients in Germany 2009-2011: proportions of non-susceptibility (R+I%) against fluoroquinolones, third-generation cephalosporines, aminoglycosides and combined non-susceptibility to these antibiotic classes and confidence intervals (95%CI) stratified by year and specimen type: all specimen, blood cultures, respiratory and urine samples.

### References

ARS-Website: https://ars.rki.de


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### Conclusion

Proportions of non-susceptibility to the main antibiotic classes for the treatment of *K. pneumoniae* showed little variation over the period 2009 to 2011. This absence of increasing trends in contrast to many European countries is good news for Germany. Proportions of non-susceptibility to carbapenems remained below one per cent despite several outbreaks with carbapenem-resistant *K. pneumoniae* in Germany since 2010.

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