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Paper Poster Session

Lessons from surveillance of resistance in Gram-negatives

Resistance patterns among *Escherichia coli* and *Klebsiella pneumoniae* isolates from four European Regions: SMART 2012-2014

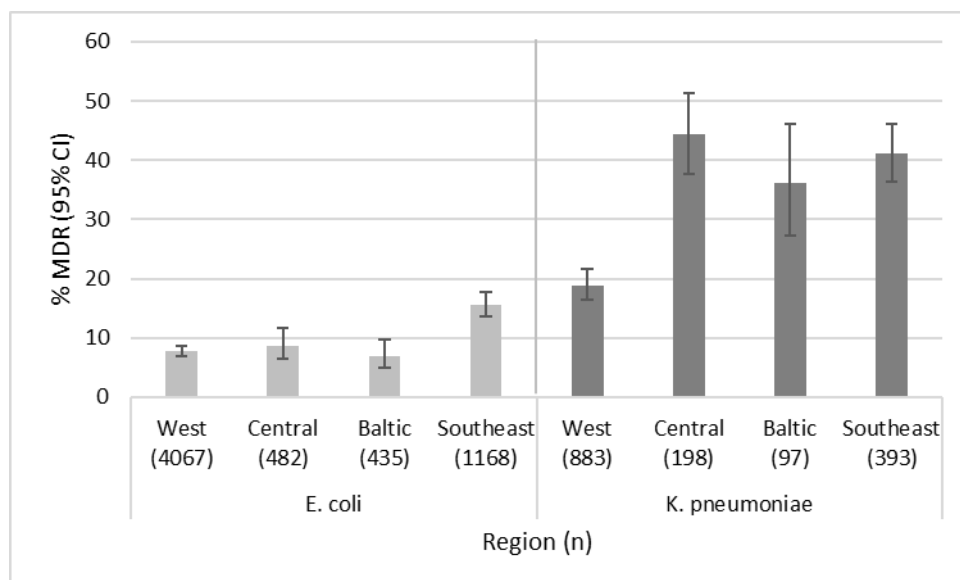
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**Background:** Large-scale international surveillance studies often contend with limitations regarding relatively low isolate and site counts per country. Solutions have included combining years of data to try to have meaningful numbers at the national level at the expense of longer-term trends, or aggregating data across a large region like Europe at the expense of showing national variations. In this report, we use another approach, combining only the three most recent available years and examining four smaller regions within Europe to assess resistance patterns among *E. coli* and *K. pneumoniae* from intra-abdominal infections (IAI).

**Material/methods:** 49 hospitals in the West region (France, Germany, Italy, Portugal, Spain, UK; 30 sites), Central (Croatia, Czech Republic, Hungary, Slovenia; 5), Baltic (Estonia, Latvia, Lithuania; 4), and Southeast (Greece, Romania, Serbia, Turkey; 10) collected up to 100 consecutive gram-negative IAI isolates each year 2012-2014 as part of the SMART surveillance program. Susceptibility was determined for 6,152 *E. coli* and 1,571 *K. pneumoniae* using CLSI broth microdilution guidelines and EUCAST breakpoints. MDR was defined as resistance seen in  $\geq 3$  drug classes (aminoglycosides,  $\beta$ -lactam/ $\beta$ -lactamase inhibitor combinations, cepheims, penems, and quinolones).

**Results:** MDR rates with 95% confidence intervals are shown below.



MDR rates also varied within regions, especially for *E. coli* in Southeast, ranging from 7.2% in Romania to 27.6% in Turkey, and *K. pneumoniae* in West from 1.8% in UK to 44.6% in Italy (albeit with small sample sizes).

Only ertapenem, imipenem, and amikacin inhibited >90% of *E. coli* isolates in all regions, and piperacillin-tazobactam in West, Central, and Baltic. Only carbapenems inhibited >90% of MDR *E. coli*

in all regions. Susceptibility of *K. pneumoniae* was >90% only to carbapenems and amikacin and only in West, Central, and Baltic. Against MDR *K. pneumoniae* 90% activity was exceeded only by ertapenem and imipenem in Baltic, and imipenem and amikacin in Central. Cephalosporins, quinolones, and piperacillin-tazobactam did not exceed 38% susceptibility anywhere.

Among the MDR isolates, CTX-M-15 was the most commonly detected ESBL in all regions and in both species. Among MDR *K. pneumoniae*, the most common carbapenemases were KPC-2/KPC-3 (almost exclusively found in Southeast and West) and OXA-48 (predominantly in Southeast). Carbapenemases in *E. coli* were extremely rare.

**Conclusions:**

- MDR rates varied within regions, but overall rates were high in Southeast for both *E. coli* and *K. pneumoniae*, and in Central and Baltic for *K. pneumoniae*. Susceptibility was especially low to cephalosporins, quinolones, and  $\beta$ -lactam/ $\beta$ -lactamase inhibitor combinations in these regions.
- When local resistance data are unavailable and national estimates may be sub-optimal due to small sample sizes, resistance patterns for smaller regions may be helpful for empiric IAI treatment decision.