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Objectives: Increasing resistance in gram-negative pathogens, especially due to extended-spectrum β -lactamases (ESBLs), has been reported worldwide, seriously limiting treatment options in some regions. This report uses data from the Study for Monitoring Antimicrobial Resistance Trends (SMART) to examine resistance patterns in *Klebsiella pneumoniae* from intra-abdominal infections (IAI) collected in Western Europe from 2009 to 2013.

Methods: 34 laboratories in France (6 sites), Germany (5), Italy (4), Portugal (3), Spain (12), and the United Kingdom (UK, 4 sites) collected up to 100 consecutive gram-negative IAI isolates each year. Susceptibility was determined for 1,367 *K. pneumoniae* using CLSI broth microdilution and EUCAST breakpoints. ESBL status was determined phenotypically using the CLSI method. Linear trends in susceptibility and MDR and ESBL rates were assessed with the Cochran-Armitage test. An IAI was defined as hospital-associated (HA) or community-associated (CA) if cultured ≥ 48 hours or < 48 hours post-admission, respectively. Multi-drug resistance (MDR) was defined as resistance to three or more of the tested drug classes.

Results: MDR rates in 2013 were 29.4% (10 of 34) in France, 8.0% (4/50) in Germany, 53.3% (24/45) in Italy, 10.0% (3/30) in Portugal, 9.6% (12/125) in Spain, 5.0% (1/20) in the UK. MDR rates and % susceptible for selected agents for Western Europe are shown in the table below.

| | 2009 | 2010 | 2011 | 2012 | 2013 |
|--------------------|------|------|------|------|------|
| %MDR - overall* | 13.2 | 12.0 | 17.1 | 20.6 | 17.8 |
| %MDR - HA* | 11.9 | 15.1 | 16.7 | 22.1 | 24.4 |
| %MDR - CA | 13.0 | 4.7 | 11.0 | 17.6 | 9.1 |
| %S CRO - overall** | 83.6 | 85.7 | 81.2 | 76.5 | 79.6 |
| %S CAZ - overall | 78.2 | 83.1 | 79.6 | 73.9 | 79.9 |
| %S TZP - overall | 78.2 | 82.3 | 78.4 | 82.0 | 82.2 |
| %S ETP - overall | 95.0 | 98.9 | 92.7 | 97.1 | 96.1 |
| %S LVX - overall | 84.3 | 83.1 | 83.3 | 78.3 | 80.6 |
| %S AMK - overall | 95.0 | 95.1 | 93.9 | 94.5 | 94.4 |
| n | 280 | 266 | 245 | 272 | 304 |

S, susceptible; CRO, ceftriaxone; CAZ, ceftazidime; TZP, piperacillin-tazobactam; ETP, ertapenem; LVX; levofloxacin; AMK, amikacin.

* Significant increasing trend ($p < 0.05$).

** Significant decreasing trend ($p < 0.05$).

ESBL rates showed similar trends as MDR rates, increasing from 15.0% in 2009 to 17.9% in 2013 overall ($p = 0.07$) and from 14.5% to 24.0% in HA IAI ($p = 0.006$). A sensitivity analysis was conducted using only the 21 sites that submitted isolates in all 5 years. The significant increasing trends for MDR rates were confirmed overall and in HA IAI, as was the increasing ESBL rate in HA IAI (all $p < 0.05$).

Conclusions:

- *K. pneumoniae* MDR rates varied widely between countries in Western Europe with highest rates in France and Italy and lowest in Germany and UK.
- MDR rates increased significantly in Western Europe from 2009 to 2013, with an especially sharp increase among isolates from HA IAI ($p < 0.05$); interestingly, the susceptibility for most tested agents did not show a statistically significant decrease when analyzed individually. ESBL rates showed a similar pattern as MDR rates.
- Of the tested agents, only amikacin, ertapenem, and imipenem showed susceptibility $> 90\%$ against *K. pneumoniae*.
- Monitoring of MDR and ESBL rates must continue in Western Europe, and national and preferably local resistance patterns should be taken into account when making empiric treatment decisions for IAI patients.