

Comparison of extended-spectrum beta-lactamase (ESBL) rates and susceptibility of organisms from urinary tract infections in four European regions: SMART 2010/11

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Background: The SMART program has monitored the in vitro susceptibility of organisms from urinary tract infections (UTI) in hospitalized patients since late 2009. This report summarizes occurrence of extended-spectrum beta-lactamase (ESBL) producers and susceptibility of *Escherichia coli*, *Klebsiella pneumoniae*, and *Proteus mirabilis* collected from UTI in 2010 and 2011. **Methods:** 2,951 *E. coli*, *K. pneumoniae*, and *P. mirabilis* were collected from hospitalized UTI patients by 51 labs in four European regions: Baltic (Estonia, Latvia, Lithuania), East (Czech Republic, Croatia, Hungary, Romania, Serbia, Slovenia), South (Portugal, Spain, Italy, Greece), and West (France, Germany, UK). MICs were determined by broth microdilution and interpreted using EUCAST guidelines. Differences in % ESBL between regions were assessed with the Fisher exact test. **Results:** *E. coli*, *K. pneumoniae*, and *P. mirabilis* were the three most commonly isolated species in the 4 regions, constituting 80% of all organisms. ESBL+ rates and % susceptible are shown below; % susceptible values $\geq 90\%$ are shaded. **Conclusions:** The highest ESBL+ rates for *E. coli* were found in the South, while the Baltic region showed by far the highest rates of ESBL+ *K. pneumoniae* and *P. mirabilis*. Largely due to higher ESBL+ rates, the susceptibility of many antimicrobials against *E. coli* was dramatically reduced in the South, and against *K. pneumoniae* and *P. mirabilis* in the Baltic region. Only amikacin and ertapenem consistently showed susceptibility higher than 90% across species and regions. Knowledge of local ESBL+ rates is important for the selection of empiric therapy for UTI.

	n	% ESBL	Ak	AS	Cpe	Cft	Caz	Cax	Cp	Etp	Imp	Lvx	PT
E. coli													
Baltic	149	10.1	97.3	59.1	88.6	89.9	89.3	89.9	79.2	99.3	99.3	79.9	89.3
East	374	17.1	95.2	44.9	83.7	82.6	83.4	82.9	67.7	99.7	100	69.3	90.6
South	1024	22.9*	92.3	35.7	77.2	75.6	77.4	75.5	57.2	99.8	99.9	59.0	87.1
West	609	9.5	97.4	48.3	89.8	88.7	88.8	88.2	78.2	99.8	100	80.3	92.1
K. pneumoniae													
Baltic	52	67.3*	84.6	19.2	34.6	32.7	34.6	30.8	40.4	92.3	100	38.5	42.3
East	97	42.3	87.6	35.1	53.6	52.6	52.6	51.6	48.5	86.6	95.9	52.6	52.6
South	293	37.5	90.4	38.2	58.0	57.7	55.3	56.7	52.2	93.5	94.5	59.7	59.4
West	95	20.0	97.9	59.0	81.1	79.0	82.1	79.0	74.7	97.9	99.0	81.1	84.2
P. mirabilis													
Baltic	30	36.7*	70.0	40.0	46.7	63.3	70.0	66.7	50.0	100	60.0	73.3	83.3
East	42	4.8	85.7	61.9	66.7	73.8	69.1	73.8	54.8	100	66.7	57.1	92.9
South	127	3.1	92.9	76.4	92.1	92.1	92.1	92.1	56.7	100	72.4	78.7	94.5
West	59	5.1	98.3	74.6	89.8	88.1	89.8	89.8	81.4	100	88.1	91.5	98.3

* Significant by higher than any other region ($p < 0.05$)

Ak=amikacin, AS=ampicillin-sulbactam, Cpe=cefepime, Cft=cefotaxime, Caz=ceftazidime, Cax=ceftriaxone, Cp=ciprofloxacin, Etp=ertapenem, Imp=imipenem, Lvx=levofloxacin, PT=piperacillin-tazobactam.