EV0268 Epidemiology of Antibiotic Resistance of E.coli, S.aureus and P.aeruginosa Isolated From Bloodstream Infections (BSI) Across 5 Centres in England and Wales During 2010-2012

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Objectives

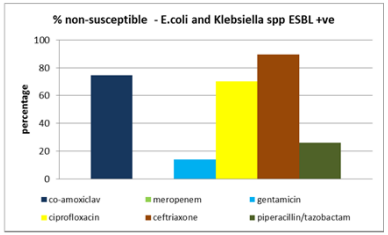
To describe the resistance patterns of E.coli, S.aureus and P.aeruginosa isolated from patients with hospital and community acquired bloodstream infections from 5 hospitals across England participating in an NIHR funded study investigating risk factors associated with all causes of death in patients with BSI during from October 2010-May 2012.

Materials and methods

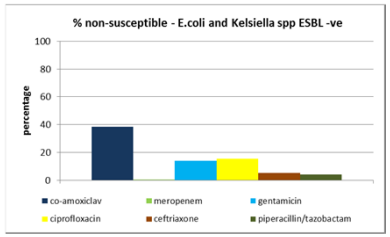
1621 BSI isolates comprising of E.coli (ESBL –ve, 603), E.coli (139) and Klebsiella spp (23) ESBL +ve; MSSA (503), MRSA (123) and P.aeruginosa (230) were collected and tested by the central laboratory. MICs were performed by CLSI methodology; non-susceptibility was determined using EUCAST breakpoints. MIC ranges, MIC50s and MIC 90s are shown in the Tables; the Figures chart the commonly prescribed antimicrobials.

Results

Only one in four of the listed E.coli were collected hence the ratio of ESBL +ve to ESBL –ve is high.
For ESBL +ve strains non susceptibility rates were; co-amoxiclav 74.5%; meropenem 0%; gentamicin 13.9%; ciprofloxacin 70.3%; ceftriaxone 89.7%, and piperacillin/tazobactam 26.1%.
For ESBL –ve strains non susceptibility rates and MIC 90s were co-amoxiclav 38.35%; meropenem 0.2%, ; gentamicin 14.1%; ciprofloxacin 15.3%; ceftriaxone 5.1% and piperacillin/tazobactam 4.1%.

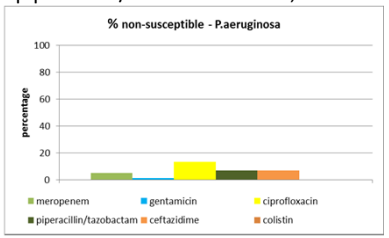


ESBL +ve MICs (mg/L) n=165				
	range	mic 50	mic90	%S
ampicillin	16->128	>128	>128	0
co-amoxiclav	1->128	64	>128	25.5
ertapenem	≤0.004-2	0.06	0.12	99.4
meropenem	0.008-0.25	0.15	0.03	100
gentamicin	0.12-64	0.5	64	86.1
ciprofloxacin	0.008->128	128	128	29.7
ceftriaxone	0.03->128	128	>128	10.3
pip/taz	0.12-128	16	32	73.9



ESBL -ve MICs (mg/L) n=603				
	range	mic 50	mic90	%S
ampicillin	0.5->128	128	>128	34.7
co-amoxiclav	0.125->128	8	128	61.7
ertapenem	≤0.004-8	0.06	0.008	99.5
meropenem	≤0.004-4	0.008	0.015	99.8
gentamicin	0.5-32	1	8	88.7
ciprofloxacin	≤0.004-128	0.06	16	84.7
ceftriaxone	≤0.004->128	0.06	0.12	94.9
pip/taz	0.12->128	1	4	95.9

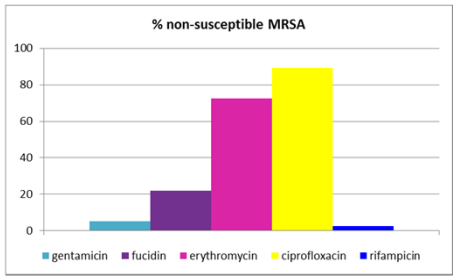
P.aeruginosa non-susceptibility rates were meropenem 5%; gentamicin 1.3%; ciprofloxacin 13.1%; piperacillin/tazobactam 6.9%; ceftazidime 7%. No resistance was noted for colistin.

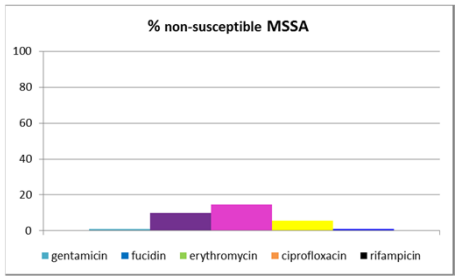


P.aeruginosa MICs (mg/L) n=230				
	range	mic 50	mic90	%S
meropenem	0.03-128	0.5	4	86
gentamicin	0.12-256	1	4	98.7
ciprofloxacin	0.03-32	0.25	1	66.5
pip/taz	0.03-256	4	16	57
ceftazidime	0.12->256	2	8	93
colistin	1-4	4	4	100

Results

For all S.aureus no resistance was observed for vancomycin, teicoplanin, linezolid or daptomycin.
For MRSA non susceptibility rates and MIC 90s were gentamicin 5%; fucidin 22%; erythromycin 72.4%; ciprofloxacin 89.4% and rifampicin 2.4%.
As expected MSSA rates were lower for gentamicin 0.8%; fucidin 9.8%; erythromycin 14.7%; ciprofloxacin 5.6% and rifampicin 0.8%.





MRSA MICs (mg/L) n=123				
	range	mic 50	mic90	%S
cefoxitn	8->128	32	128	0
gentamicin	0.25-64	0.25	0.5	95
fusidin	0.03-128	0.12	8	78
erythromycin	0.25->128	>128	>128	27.6
rifampicin	≤0.004->16	0.008	0.015	97.6
linezolid	1-4	4	4	100
ciprofloxacin	0.5->128	128	>128	10.6
daptomycin	0.12-0.5	0.25	0.5	100
vancomycin	0.5-1.75	0.75	1	100
teicoplanin	0.5-2	0.5	1.5	100

MSSA MICs (mg/L) n=503				
	range	mic 50	mic90	%S
cefoxitin	1-4	2	4	100
gentamicin	0.06-16	0.25	0.5	99.2
fusidin	≤0.015->128	0.06	1	90.2
erythromycin	0.008->128	0.5	>128	85.1
rifampicin	≤0.004->16	0.008	0.015	99
linezolid	1-4	2	4	100
ciprofloxacin	0.12->128	0.5	1	94.4
daptomycin	0.12-0.75	0.25	0.5	100
vancomycin	0.25-1.75	1	1	100
teicoplanin	0.25-2	0.75	1.25	100

Conclusions

Resistant rates for common empirical therapies such as co-amoxiclav, ceftriaxone, gentamicin and piperacillin/tazobactam for Enterobacteriaceae were >5%.
Similarly with P.aeruginosa piperacillin/tazobactam and ciprofloxacin resistance was >5%.
MSSA strains were mainly susceptible to empirical therapy.

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The views expressed are those of the author(s) and not necessarily those of the NHS, the NIHR or the Department of Health.

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