ARE RESISTANCE RATES AMONG BLOODSTREAM ISOLATES A GOOD PROXY FOR OTHER INFECTIONS: ANALYSIS FROM THE BSAC RESISTANCE SURVEILLANCE PROGRAMME

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INTRODUCTION

- Bacteraemia represents an invasive infection, whereas bacteria isolated from other sources (e.g. urine, sputum) may represent colonisation.

- Resistance rates of isolates from bloodstream infections (BSI) are often used as a general measure of resistance prevalence[1] but may not represent other infection types.

- Access to representative resistance rates in different infection types is important in guiding appropriate antibiotic therapy.

- Successful clinical outcome of an infection requires appropriate antibiotic treatment and source control; however, in the management of pneumonia, source control is rarely possible, making antibiotics the mainstay of treatment.

- We compared resistance rates between BSI and lower respiratory tract infection (LRTI) for isolates collected in a single season from the BSAC Resistance Surveillance Programme.

METHODS

- 24 laboratories collected isolates, to a fixed annual quota per species group.

- BSI isolates were collected during calendar 2018.

- LRTI isolates were collected between Oct 2017 - Sept 2018; *S. pneumoniae* were collected from community-onset (CO-) LRTI, whereas Enterobacterales, *P. aeruginosa* and *S. aureus* were collected from hospital-onset (HO-) LRTI.

- MICs were determined centrally by BSAC agar dilution.[3] EUCAST breakpoints (v9.0) were used.[4]

- Serotyping was completed for *S. pneumoniae*.

Organism	BSI (n=1670)	LRTI (n=1118)
P. aeruginosa	209	179
E. coli	475	241
K. pneumoniae	163	110
E. cloacae	159	73
S. pneumoniae	208	325
S. aureus	456	190
Methicillin-susceptible	428	172
Methicillin-resistant	28	18

TABLE 1. Number of isolates tested according to infection type. BSI, bloodstream infection; LRTI, lower respiratory tract infection.

RESULTS

- 2788 isolates were reviewed (Table 1).

- *S. pneumoniae* and *P. aeruginosa* from LRTI had higher resistance rates than BSI isolates (Fig. 1):
  - *S. pneumoniae*: five LRTI isolates were resistant to ceftobiprole.
  - *P. aeruginosa*: two BSI isolates were resistant to ceftazidime/avibactam; no isolates were resistant to colistin or ceftolozane/tazobactam.

- Enterobacterales and *S. aureus* from BSI and LRTI had similar resistance rates (Fig. 2) except:
  - A higher rate of amoxicillin/clavulanate resistance among LRTI *E. coli* (61% vs. 41%).
  - A higher rate of colistin resistance among BSI *E. cloacae* (12% vs. 7%).

- *S. aureus*: No resistance to ceftaroline or ceftobiprole.

- Gram-negatives: resistance to ceftazidime/avibactam, and ceftolozane/tazobactam was low (<1%).

- Enterobacterales: 12-19% resistance to ceftobiprole.

FIGURE 1. Rates of resistance among *S. pneumoniae* and *P. aeruginosa* in BSI (red bars) and LRTI (blue bars). Key: #MIC >0.06mg/L; $MIC >0.5mg/L. Antimicrobial abbreviations are per EUCAST system.[5]
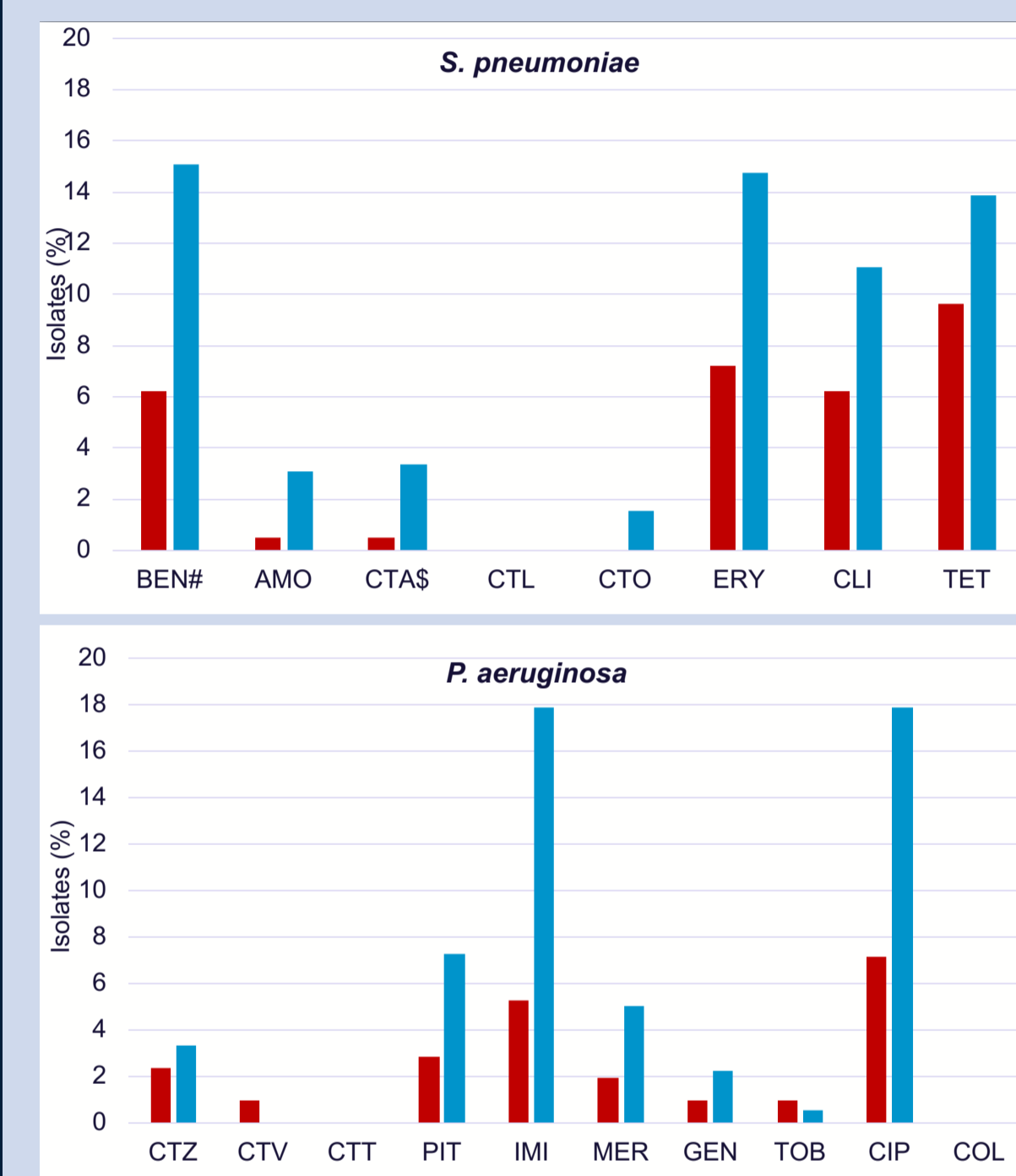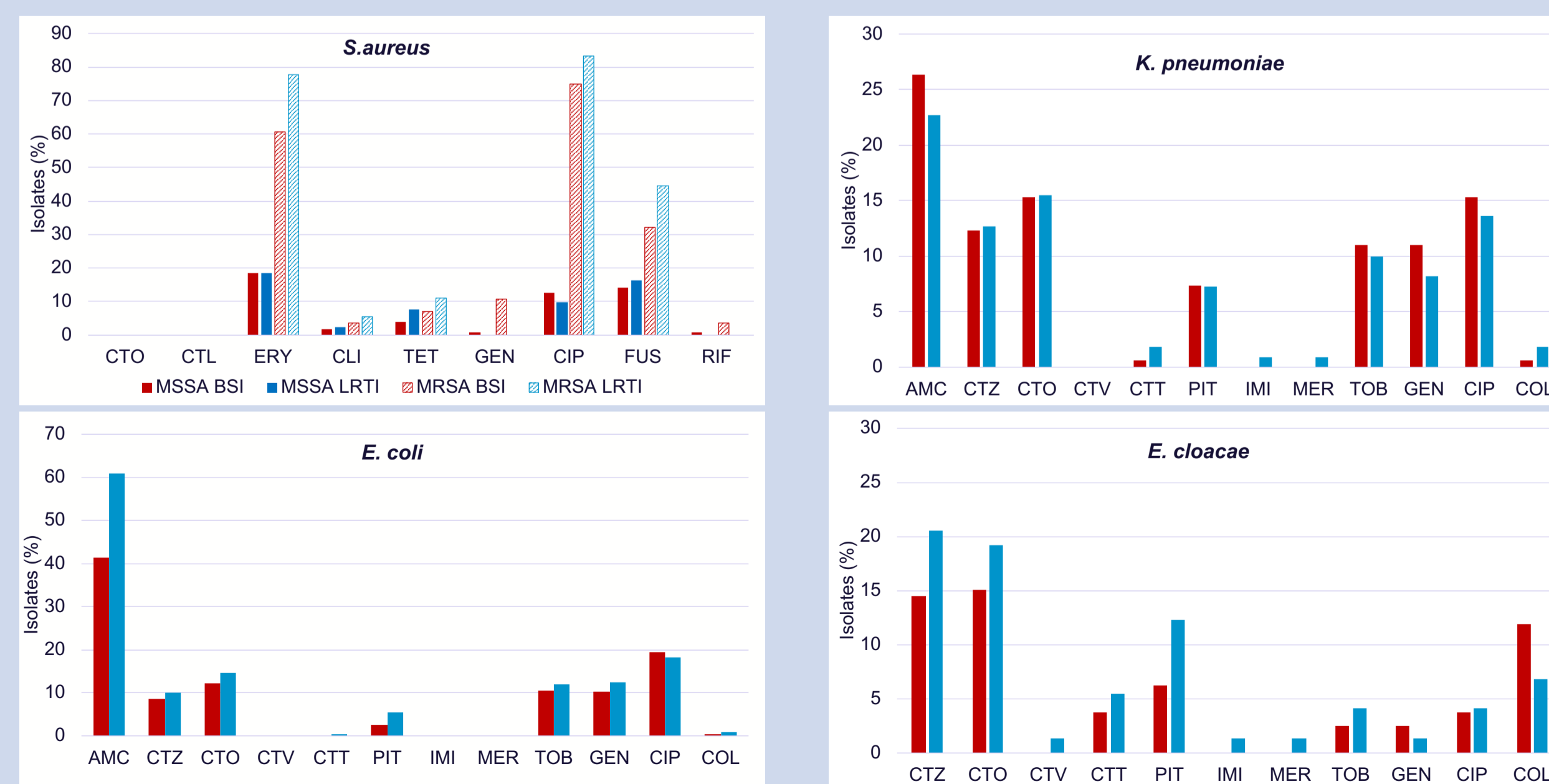

FIGURE 2. Rates of resistance among *S. aureus* and Enterobacterales (*E. coli, K. pneumoniae* and *E. cloacae*) in BSI (red bars) and LRTI (blue bars). Key: Antimicrobial abbreviations are per EUCAST system.[5]

CONCLUSIONS

- Rates of resistance among bloodstream isolates are a reasonable proxy for most antibiotics for Enterobacterales and *S. aureus*.

- Among *S. pneumoniae* and *P. aeruginosa* resistance to all agents was consistently more prevalent in LRTI.

- When using susceptibility data to guide appropriate antibiotic prescribing, linking antibiotic resistance trends to the specific clinical indication and/or site of infection should be considered.

- Relying on surveillance data from bacteraemia reports alone could lead to inappropriate/sub-optimal treatment for some infection types and may be of particular importance for hospital-acquired pneumonia.

ACKNOWLEDGEMENTS

REFERENCES

1) ECDC Surveillance Atlas: https://www.ecdc.europa.eu/en/ antimicrobial-resistance/surveillance-and-disease-data/data-ecdc

2) www.bsacsurv.org.uk, incl. sponsor list.

3) Reynolds et al. 2008. JAC, 62, suppl 2: ii15-28.

4) http://www.eucast.org/clinical_breakpoints.

5) EUCAST System for Antimicrobial Abbreviations. https://eucast.org/ast_of_bacteria/guidance_documents/

AMC, amoxicillin/clavulanate; AMO, amoxicillin; BEN, benzylpenicillin; CIP, ciprofloxacin; CLI, clindamycin; COL, colistin; CTL, ceftaroline; CTO, ceftobiprole; CTT, ceftolozane/tazobactam; CTV, ceftazidime/avibactam; CTZ, ceftazidime; FUS, fusidic acid; GEN, gentamicin; IMI, imipenem; MER, meropenem; PIT, piperacillin/tazobactam; TET, tetracycline; TOB, tobramycin.

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