

Resistance among the Pathogens of Bacteremia in the UK assessed by Sentinel Surveillance and Routine Data

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Background

Antibiotic resistance is a rising concern that demands surveillance. We compared susceptibility results from sentinel and routine methods of surveillance in bacteremia.

Sentinel Survey - BSAC Bacteremia Resistance Surveillance

In 2001, 24 laboratories in England, Wales, Scotland, N. Ireland and Eire each collected up to 10 consecutive isolates of each of the commonest agents of bacteremia. A central laboratory identified them to species level by defined methods, tested them by the BSAC agar dilution MIC method and categorised them by BSAC breakpoints (including intermediate with resistant).

Routine Data - LabBase system, PHLS

In the same year, >200 hospitals in England and Wales only contributed susceptibility results to LabBase from bacteremia isolates using local, possibly varied, methods of identification, testing and interpretation.

Results

Most resistance rates agreed well between the two studies. Differences for penicillin / *S. pneumoniae*, ampicillin / *E. faecalis*, and gentamicin / *P. aeruginosa* may be explained by routine under-detection of penicillin resistance², routine mis-identification among enterococci, and inconsistent use of breakpoints. The sentinel study showed very high susceptibility to piperacillin/tazobactam among *P. aeruginosa* (93%), *E. coli* (98%), *Klebsiella* spp. (90%) and Proteaeae (100%), to imipenem in Enterobacteriaceae (see charts), and to linezolid among Gram-positive cocci (100%).

Acknowledgements

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Collecting Laboratories: Ashford PHL, Bangor PHL, City Belfast, City Birmingham, Bristol PHL, Cardiff PHL, Chelmsford PHL, Chester PHL, University Cork, Coventry PHL, Beaumont Dublin, Ninewells Dundee, Royal Glasgow, St Mary's London, UCH London, Altnagelvin Londonderry, Manchester PHL, Middlesbrough PHL, Freeman Newcastle, Norwich PHL, Queens Nottingham, Sheffield PHL, Shrewsbury PHL, Southampton PHL, Truro PHL.

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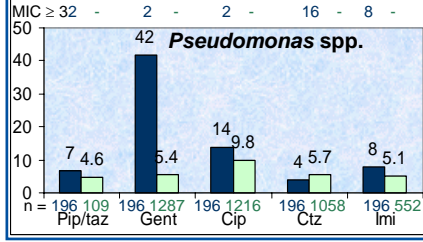
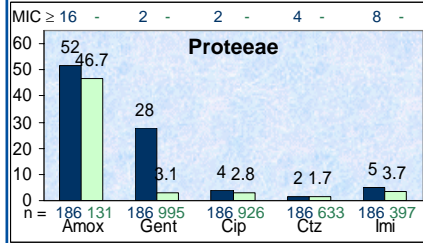
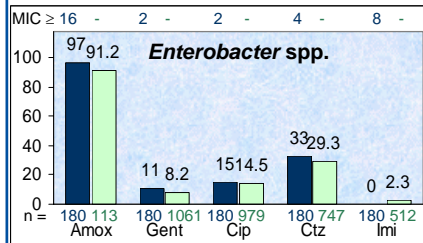
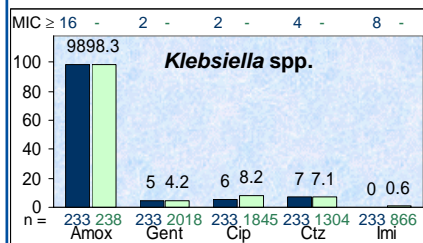
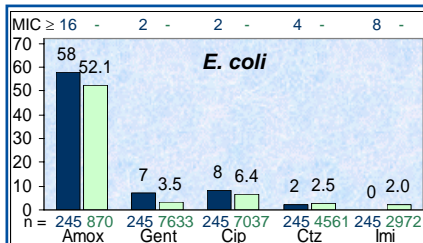
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Abbreviations:

BSAC British Society for Antimicrobial Chemotherapy;
CPHL Central Public Health Laboratory;
EARSS European Antimicrobial Resistance Surveillance System;
PHLS Public Health Laboratory Service

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Enterobacteriaceae

There is generally good agreement between sentinel testing and routine data collection in Enterobacteriaceae.

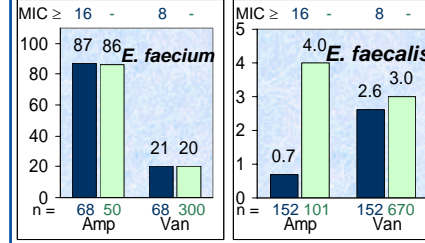
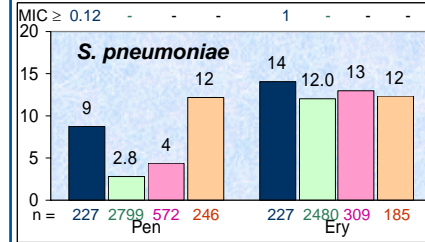
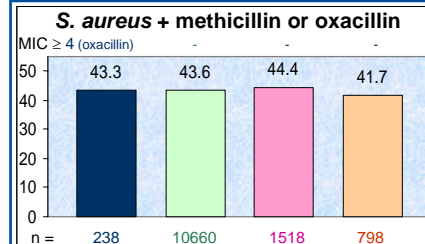
There were a few imipenem-resistant *E. coli*, *Klebsiella* spp. and *Enterobacter* spp. in LabBase but none in BSAC.

However, there was borderline imipenem resistance (MIC 8 mgL⁻¹) in 1.3% of *P. mirabilis* in the BSAC study.

There was about 10 times more gentamicin resistance among both *P. mirabilis* and *M. morgani* than from LabBase but it was low level (MIC 2-4 mgL⁻¹).

P. aeruginosa

Most of the gentamicin resistance in BSAC was intermediate (MIC 2-4 mgL⁻¹). Only 6% were fully resistant with MIC ≥ 8 mgL⁻¹. LabBase reports may use the higher breakpoint.



KEY

■ BSAC (England, Wales, Scotland, N. Ireland & Eire)
■ LabBase (England & Wales only)
■ EARSS (England) ■ EARSS (Eire)

amox amoxicillin
amp ampicillin
cip ciprofloxacin
ctz ceftazidime
ery erythromycin
gent gentamicin
imi imipenem
pen penicillin
pip/taz piperacillin/tazobactam
van vancomycin

Charts show % resistant, with isolate numbers (n) and breakpoints (MIC ≥) if known.

References

- www.earss.rivm.nl
- Henwood CJ, et al. JAC 2001; 47: 897-900

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Routine data from EARSS¹ are also shown for *S. aureus* and *S. pneumoniae*.

MRSA

There is very close agreement between BSAC, LabBase and EARSS¹ data.

S. pneumoniae

The higher rate of penicillin resistance in the BSAC study may be due to the inclusion of Ireland, and also the under-estimation of resistance rate by LabBase².

Enterococci

The higher resistance rates for *E. faecalis* in LabBase are probably due to mis-identification. The BSAC ampicillin rate is consistent with all previous studies using precise speciation.