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

BSAC Extended Working Party on Bacteraemia Resistance Surveillance[1] and Central Public Health Laboratory[2] [1]British Society for Antimicrobial Chemotherapy, 16 Bridge Street, Birmingham, B1 2JS [2]61 Colindale Avenue, London, NW9 5HT

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 resistance[2], 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 Proteeae (100%), to imipenem in Enterobacteriaceae (see charts), and to linezolid among Gram-positive cocci (100%).

Acknowledgements

Working Party Members (July 2002): A. MacGowan[1] (Chair), M. Allen[2], D. Brown[3], N. Deaney[4], I. Harding[5], D. Livermore[6], N. Potz[6], V. Reed[5], R. Reynolds[7], C. Thomson[8], A. White[9], R. Wiltshire[10], R. Wise[11]

[1]Southmead Hospital, Bristol; [2]Wyeth Laboratories; [3]Addenbrookes Hospital, Cambridge; [4]Merck, Sharp & Dohme; [5]Micron Research; [6]Central Public Health Laboratory; [7]BSAC; [8]Bayer Pharmaceuticals; [9]GlaxoSmithKline; [10]Pharmacia; [11]City Hospital Birmingham.

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.

Sponsored by: Merck, Sharp & Dohme
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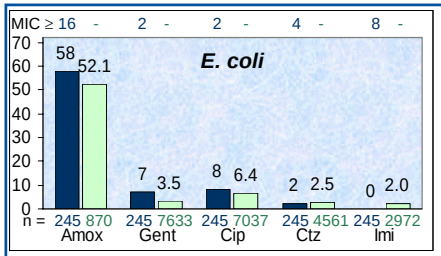
Wyeth

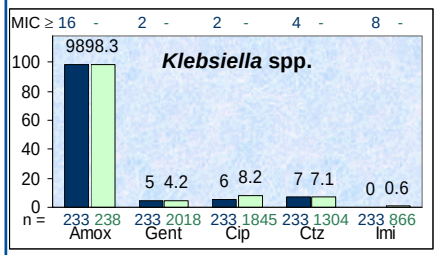
Supported by: BSAC

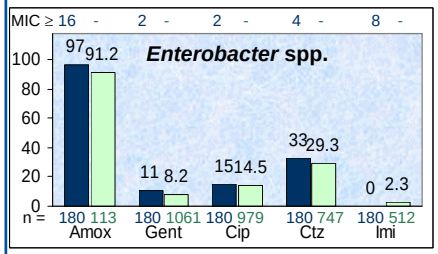
Central Laboratory: CPHL, London

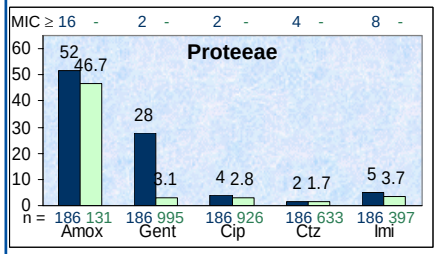
Abbreviations:
BSAC British Society for Antimicrobial Chemotherapy;
CPHL Central Public Health Laboratory;
EARSS European Antimicrobial Resistance Surveillance System;
PHLS Public Health Laboratory Service

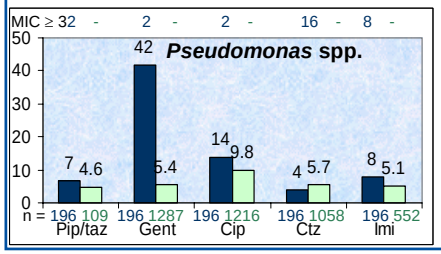
www.bsacsurv.org











Enterobacteriaceae

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

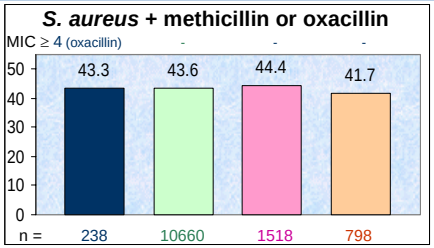
There were a few imipenem-resistant *E. coli*, *Klebsiella* spp. and *Enterobacter* spp. in LabBase but none in BSAC.

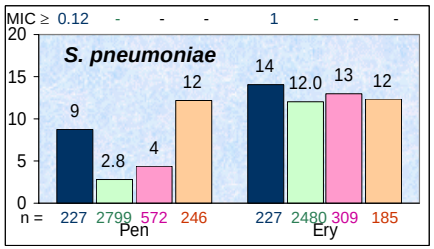
However, there was borderline imipenem resistance (MIC 8 mgL^{-1}) in 1.3% of *P. mirabilis* in the BSAC study.

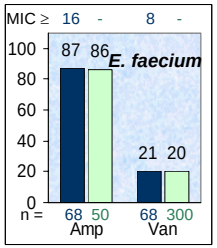
There was about 10 times more gentamicin resistance among both *P. mirabilis* and *M. morganii* from the BSAC study than from LabBase but it was low level (MIC 2-4 mgL^{-1}).

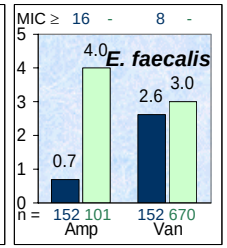
P. aeruginosa

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.

Routine data from EARSS[1] are also shown for *S. aureus* and *S. pneumoniae*.

MRSA

There is very close agreement between BSAC, LabBase and EARSS[1] 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 LabBase[2].

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.

References

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

Please address correspondence to:

Dr. R. Reynolds, BSAC Resistance Surveillance Co-ordinator, Department of Medical Microbiology, Southmead Hospital, Bristol, BS10 5NB, England.

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