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Pseudomonas aeruginosa in the UK and Ireland Susceptibility to Old and New Agents

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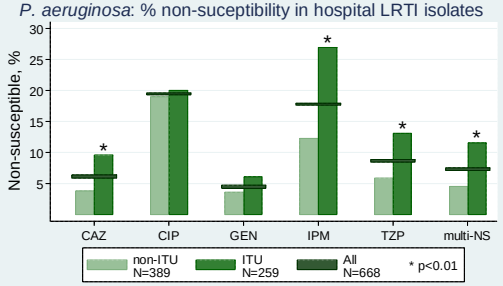
BACKGROUND

- ***Pseudomonas aeruginosa*** is an important opportunist pathogen. The BSAC Resistance Surveillance Project† monitors its antimicrobial susceptibility.
- **Ceftolozane** is a broad-spectrum bactericidal cephalosporin particularly active against *P. aeruginosa*. Its combination with **tazobactam** is in phase 3 development.
- Interest in **colistin** (available since 1959) has increased with the recent rise of multi-resistance in Gram-negative pathogens.

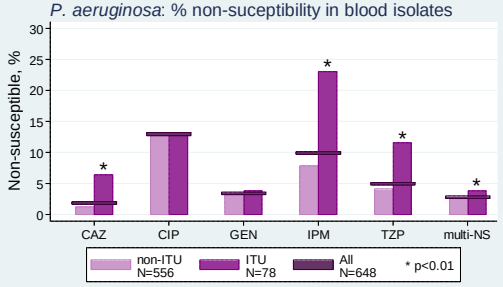
METHODS

- Forty-five centres in the UK and Ireland supplied *P. aeruginosa* from blood (Jan 2009 - Dec 2011) and hospital-onset (>48 hours) lower respiratory tract infection (LRTI, Oct 2008 - Sept 2011).
- MICs were measured centrally by BSAC agar dilution and interpreted by BSAC/EUCAST breakpoints.
- Colistin and ceftolozane tazobactam were tested only for 2011 (blood) and 2010/11 (LRTI).

P. aeruginosa: % non-suceptibility in hospital LRTI isolates



P. aeruginosa: % non-suceptibility in blood isolates



RESULTS

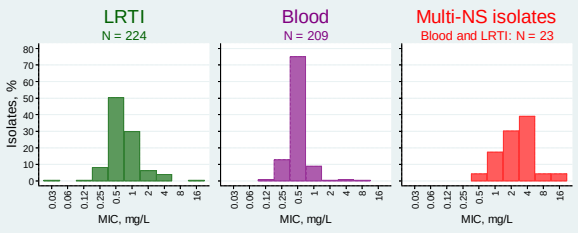
- 50% of bacteraemias were of hospital onset. 19% of hospital-onset bacteraemias, 4% of community-onset bacteraemias, and 46% of hospital-onset LRTI were from ITU.
- Non-susceptibility was significantly more likely in ITU than non-ITU patients for CAZ, IPM, TZP and multi-NS, but not for GEN or CIP.
- Overall, 3% of blood and 7% of LRTI isolates were multi-NS and, in ITU, 4% and 12% respectively.
- In ITU, IPM had the highest rate of non-susceptibility (23-25%, of which about 1/2 was intermediate). Outside ITU, CIP had the highest rate of non-susceptibility (13-19%, of which about 1/3 intermediate).

CONCLUSION

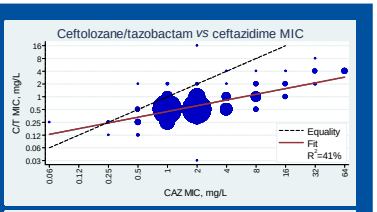
- **Non-susceptibility among *P. aeruginosa* is occasionally problematic in the UK and Ireland, especially in ITU.**
- **Both older (colistin) and developmental (ceftolozane/tazobactam) agents extend coverage against some otherwise difficult-to-treat isolates.**

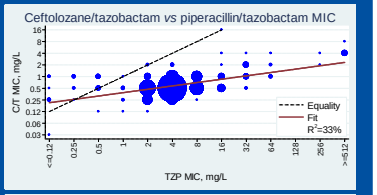
RESULTS - Ceftolozane/tazobactam (CXA201)

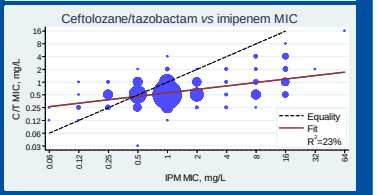
Ceftolozane/tazobactam MIC distributions



- Ceftolozane/ tazobactam MICs had a range of 0.03-16 mg/L, with only 1 out of 433 above 8 mg/L.
- The mode was 0.5 mg/L and MIC_{90} was 2 mg/L.
- Among 23 multi-NS isolates, the mode and MIC_{90} were 4 mg/L.
- MICs of ceftolozane/ tazobactam were clearly related to those of CAZ (mode 1, MIC_{90} 8 mg/L), TZP (mode 4, MIC_{90} 16 mg/L) and IPM (mode 1, MIC_{90} 8 mg/L) in the same isolates, but were lower on average.

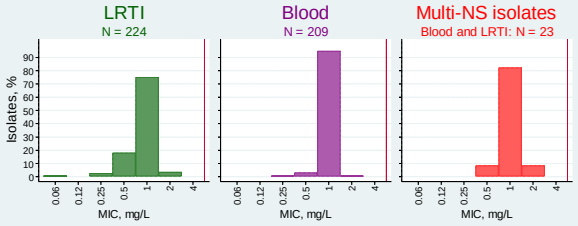






RESULTS - Colistin

Colistin MIC distributions



- Colistin MICs were narrowly distributed between 0.06 and 2 mg/L, with mode and MIC_{90} at 1 mg/L.
- All isolates were susceptible (≤4 mg/L) and the distribution was similar for 23 multi-NS isolates.

Abbreviations and susceptible breakpoints (mg/L):

CAZ ceftazidime (≤8)
CIP ciprofloxacin (≤0.5)
GEN gentamicin (≤4)
IPM imipenem (≤4)
TZP piperacillin/ tazobactam (≤16)

S = susceptible
NS = non-susceptible.
Multi-NS = NS to ≥3 of agents listed above.

CST colistin (≤4)
C/T ceftolozane/ tazobactam

ITU intensive therapy unit.

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Organism ID and Susceptibility Testing: A. Kidney[7], S. Mushtaq[8] and staff of central laboratories.

Collecting Laboratories: *See* www.bsacsurv.org *or* White 2008, JAC 62 (Suppl 2) ii3–ii14.

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Central Laboratories: Public Health England, London; Quotient Bioresearch, Fordham.

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Support: BSAC.

†Reynolds 2008, JAC 62 (Suppl 2) ii15–ii18.

QUOTIENT BIORESEARCH MICROBIOLOGY

Health Protection Agency

BSAC british society for antimicrobial chemotherapy

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