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## BACKGROUND

There is renewed interest in aminoglycosides, given:

- the growing resistance to  $\beta$ -lactams,
- the non-selectivity for *Clostridium difficile*,
- the development of nebulised formulations.

Despite this interest, aminoglycoside resistance is less surveyed than resistance to  $\beta$ -lactams.

The BSAC Antimicrobial Resistance Surveillance Project has tested amikacin (AMK), gentamicin (GEN) and tobramycin (TOB) for all bacteraemia and hospital-onset lower respiratory tract infection (LRTI) isolates collected in the UK and Ireland since 2013/14.

## METHODS

- Forty clinical laboratories.
- 2117 Enterobacteriaceae and 452 *Pseudomonas* isolates from LRTIs (Oct 2013–Sept 2014) and blood (Jan–Dec 2014).
- Isolates were re-identified centrally by MALDI-TOF.
- MICs were determined by BSAC agar dilution and interpreted using EUCAST breakpoints.

## RESULTS

Aminoglycoside non-susceptibility rates did not differ between bloodstream and respiratory isolates.

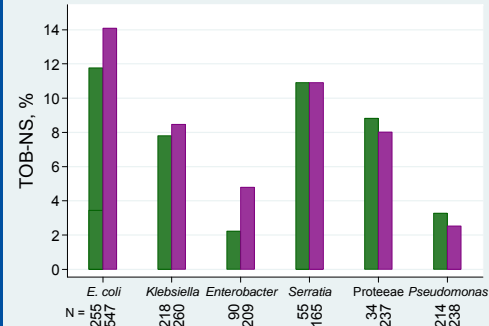
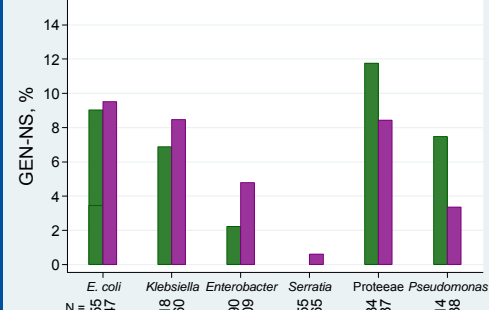
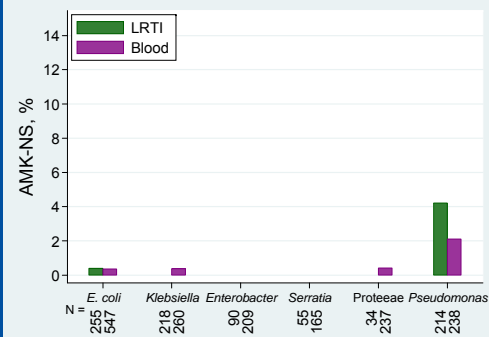
### EUCAST expert rules

- For Enterobacteriaceae, EUCAST's rule 12.7 (TOB-NS GEN-S AMK-S isolates count as AMK-I)\* affected non-susceptibility rates for AMK; other rules had no impact.

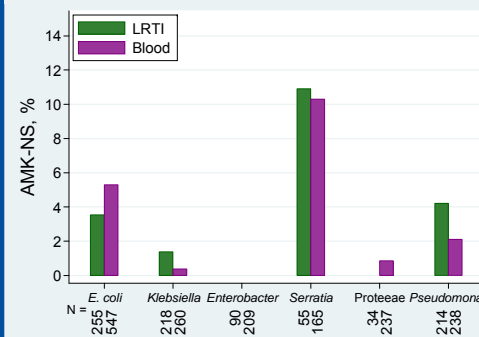
### *Pseudomonas* isolates

- For *Pseudomonas* isolates, non-susceptibility rates were similar for all three agents.
- 23/24 GEN-non-susceptible *Pseudomonas* isolates were non-susceptible to  $\geq 1$  other aminoglycoside and 3 were non-susceptible to all 3 compounds.

Aminoglycoside non-susceptibility in blood and hospital LRTIs



Amikacin non-susceptibility using EUCAST expert rules



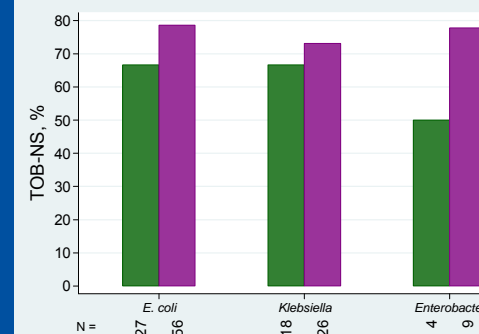
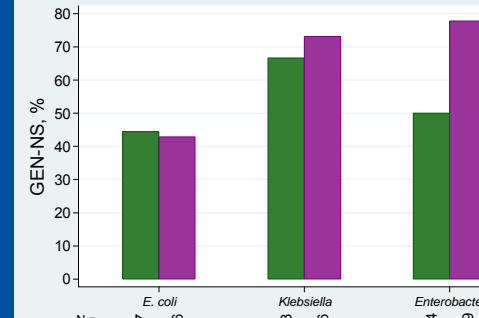
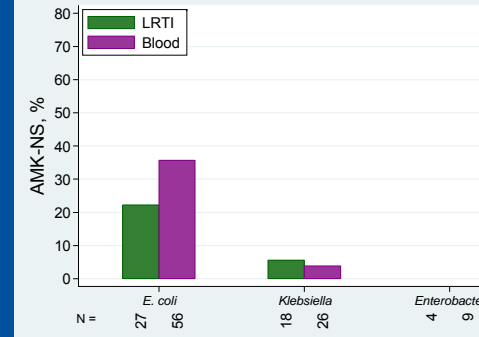
### Enterobacteriaceae isolates

- For genera besides *Serratia*, susceptibility rates for Enterobacteriaceae isolates were AMK >96%, GEN >88% and TOB >85%.
- Only among *Serratia* spp. (which have a chromosomal 6' N-acetyltransferase) was non-susceptibility to AMK more frequent than to GEN and/or TOB.
- Non-susceptibility rates were higher among ESBL producers than non-ESBL for all three agents; ESBL plasmids often encode resistance to other antimicrobials.
- One meropenem-resistant LRTI isolate (a *K. pneumoniae* with a *KPC* carbapenemase and a meropenem MIC of 8 mg/L) was collected; it was susceptible to AMK but not to GEN or TOB.

## CONCLUSIONS

- For *Pseudomonas* isolates, non-susceptibility rates were similar for the three agents.
- For Enterobacteriaceae (except *Serratia* spp.) AMK retained wider activity than GEN or TOB.

Aminoglycoside non-susceptibility among ESBL producers



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**Organism ID and Susceptibility Testing:** S. Mushtaq<sup>5</sup> and staff at Public Health England, Colindale.

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

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\*Expert rule 12.7: If non-susceptible to TOB and susceptible to GEN and AMK, then report AMK MIC as intermediate for Enterobacteriaceae or resistant for *Pseudomonas* spp. and *Acinetobacter* spp.

AMK: amikacin; GEN: gentamicin; I: intermediate; NS: non susceptible; S:susceptible; TOB: tobramycin.

**Central Laboratory: Public Health England, London.**

**Sponsors 2001-2015:** Astellas, AstraZeneca, Basilea, Bayer, Cempra, Cerexa, Cubist, J&J/Janssen-Cilag, Melinta (associate), MSD, Novartis, Pfizer, Theravance, Wyeth (2015 in bold)  
**Support:** BSAC.