RESISTANCE TRENDS AMONG ENTEROBACTERALES FROM BACTERAEMIAS IN THE UK AND IRELAND, 2007 - 2017
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INTRODUCTION
The BSAC Resistance Surveillance Programme has monitored antimicrobial susceptibility in the organisms causing bacteraemia in the UK and Ireland since 2001. We review data for Escherichia coli, Klebsiella, Enterobacter, P. mirabilis, and Serratia collected between 2007-2017.

METHODS
Consecutive isolates causing clinically significant bacteraemia were tested, participating laboratories across the UK and Ireland (n=24-40) collected 7-20 isolates/species group per year.
MICs were determined centrally by BSAC agar dilution2 with EUCAST breakpoints (v9.0, 2019).2

Due to changes in taxonomy,4 Enterobacter aerogenes were classified as Klebsiella aerogenes and were excluded from further analysis.

RESULTS
Isolates tested (n = 13,608)
• E. coli (n=5364), Klebsiella (n=2686), P. mirabilis (n=2155), Enterobacter (n=1819), and Serratia (n=1584).

Notable resistance trends
• A decrease in the rate of resistance to piperacillin/tazobactam among most species (Fig.1A-E).
• A decrease in the rate of resistance to ciprofloxacin among E. coli, Enterobacter and Serratia (Fig.1A, D, E).
• Average annual rates of resistance to ceftolozane/tazobactam ranged from 0.2% (E. coli) to 9.2% (E. cloacae); rates of resistance to cefotibprol were higher [10% (E. coli) and 20% (E. cloacae)].
• Rates of colistin resistance were low among E. coli (0.5%), and Klebsiella (1.2%); rates were higher and increasing among E. cloacae (6% in 2011 to 13.4% in 2017).

Mechanisms of resistance
• Rates of ESBL production were stable; higher among E. coli (9.6%), Enterobacter (10.4%), and Klebsiella (14.7%), compared with <1% among P. mirabilis and Serratia (Fig.1A-E).
• Carbapenemase producers remained rare (n=20, without trend): most frequently among Klebsiella (n=13), with OXA-48-like being the most common enzyme (n=8).

CONCLUSIONS
• Rates of resistance in the UK and Ireland remained largely stable over the 11-year period.
• Carbapenemase-producing Enterobacteriales were not commonly associated with bacteraemia despite rising reference laboratory submissions (n=20 in 2008 compared with >3000 in 2017).
• These trends are reassuring and may reflect interventions to reduce inappropriate use of antimicrobials implemented across the countries surveyed.
• Comparison with equivalent data from Public Health England is required to determine if the trends identified are generalisable across England.

ACKNOWLEDGEMENTS
These data have been presented at the Federation of Infection Societies (FIS) meeting, November 12th 2019, Edinburgh.

BSAC is grateful to Correvio, MSD, and Pfizer for currently sponsoring the Programme, sentinel laboratories submitting isolates, and Shazad Mushtaq and staff at the Central Testing Laboratory, PHE, London.

1BSAC Standing Committee on Resistance Surveillance: Alaisdair MacGowan (Chair), Derek Brown (formerly EUCAST), David Livermore (UEA), Chris Longshaw (BSAC Treasurer), Alan Johnson (PHE), Neil Woodford (PHE).
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REFERENCES
2) http://www.eucast.org/clinical_breakpoints/