RESISTANCE SURVEILLANCE PROGRAMME

BRITISH SOCIETY FOR ANTIMICROBIAL CHEMOTHERAPY

Public Health England

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.[1]

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 dilution[2] with EUCAST breakpoints (v9.0, 2019).[3]

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.1 A-E).
- A decrease in the rate of resistance to ciprofloxacin among *E. coli*, *Enterobacter* and *Serratia* (Fig.1 A, 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 ceftobiprole 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* (6.1% 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.1 A-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 Enterobacterales 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

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[#]BSAC Standing Committee on Resistance Surveillance: Alasdair MacGowan (Chair), Derek Brown (formerly EUCAST), David Livermore (UEA), Chris Longshaw (BSAC Treasurer), Alan Johnson (PHE), Neil Woodford (PHE).

Sponsor representatives: Nowel Redder (Correvio), Adela Alvárez Buylla (MSD), Mike Allen (MSD), James Campling (Pfizer Vaccines), and Jan Chesham (Pfizer Anti-Infectives).

TO REQUEST ISOLATES FROM THE BSAC COLLECTION

Contact Dr Carolyne Horner. Email: rs@bsac.org.uk

RESULTS

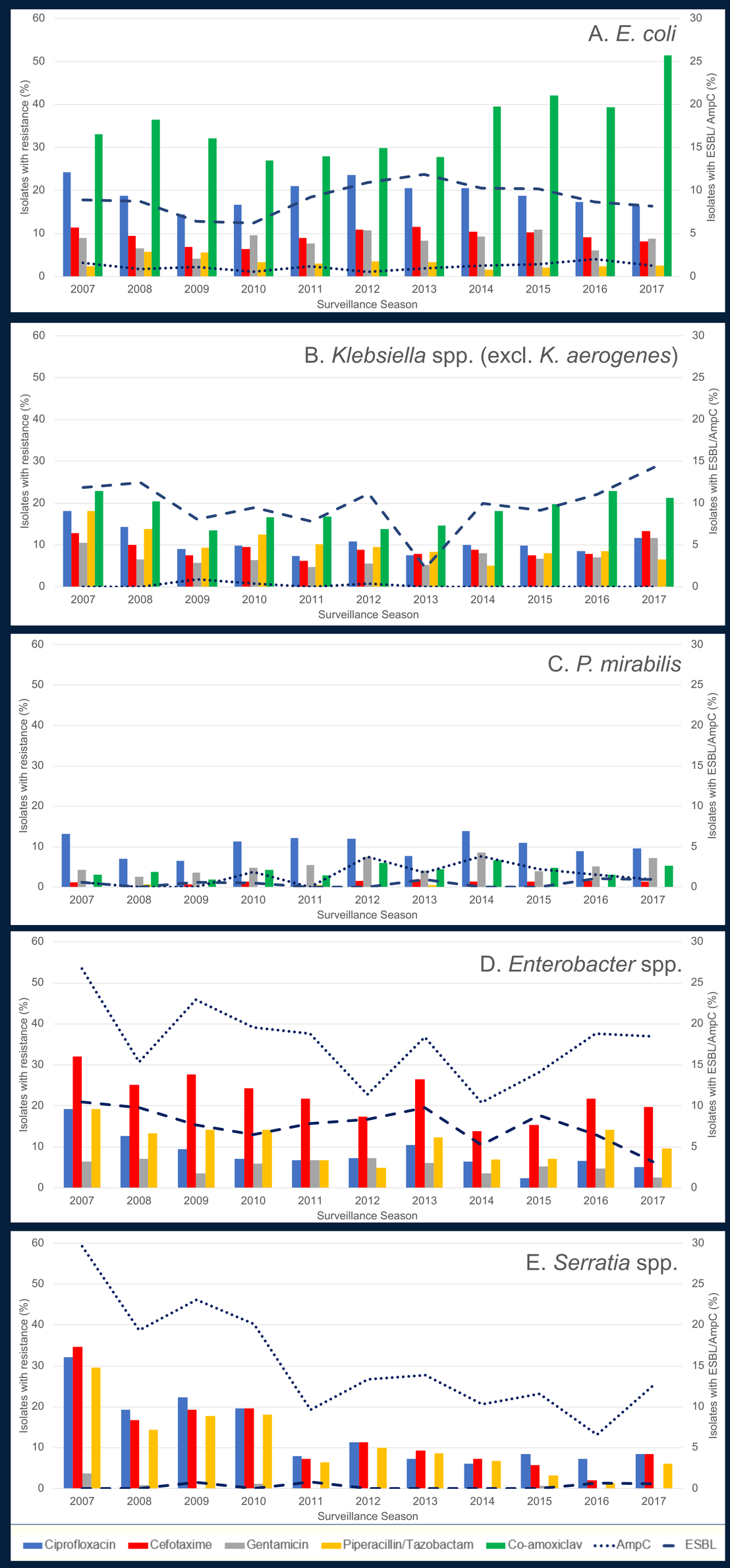

FIGURE 2. Antimicrobial resistance trends and rates of ESBL and high-level AmpC for the main species of Enterobacterales collected.

REFERENCES

1) www.bsacsurv.org.
2) Reynolds, *et al. J Antimicrob Chemother* 2008. 62, suppl 2 ii15-1128.
3) http://www.eucast.org/clinical_breakpoints/
4) Munson & Carroll, *JCM* 2019. 57(2): e0118-18.