GROWING PROPORTION OF BLOODSTREAM INFECTION DUE TO *E. FAECIUM* VS. *E. FAECALIS* IN THE UK: A LONG TEMPORAL SHIFT

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RESISTANCE SURVEILLANCE PROGRAMME
Public Health England

INTRODUCTION

- Enterococci are among the top 10 pathogens causing bloodstream infection in England (BSI).[1]
- *Enterococcus faecalis* was the prevalent species, but *E. faecium* the more resistant.[2]
- Mortality is higher in patients infected with *E. faecium* compared with *E. faecalis*.[3]
- The BSAC Resistance Surveillance Programme monitors antimicrobial resistance of bacteria causing BSI within the UK & Ireland.[4]
- Public Health England (PHE) captures most routine NHS laboratory data from its SGSS (Second Generation Surveillance System).[5]

Objective:

- To review temporal changes in the proportion of *E. faecium* vs. *E. faecalis* from the two surveillance schemes.

METHODS

BSAC Bacteraemia Surveillance Data

- Between 2001 and 2016, 7-10 consecutive bloodstream enterococci were sent p.a. from laboratories (n=24-38) across the UK & Ireland. (Fig. 1).
- Isolates were re-identified centrally by PCR (2001-2012) or MALDI-ToF (2013-2016).
- MICs were determined by agar dilution;[6] current EUCAST breakpoints were used.[7]

PHE Bacteraemia Surveillance Data

- NHS microbiology laboratories in England, Wales and Northern Ireland electronically report results of local susceptibility testing to PHE.
- Data from 2000-2016 were analysed.
- Not all reports indicated species identification, so isolates were also categorised according to ampicillin/amoxicillin susceptibility.

FIGURE 1
Distribution of BSAC participating laboratories throughout the UK and Ireland (n=24-38).

RESULTS

BSAC Surveillance

- Between 205-248 *E. faecium/E. faecalis* isolates were received annually, 2001-2016 (n=3578).
- The proportion of *E. faecium* rose:
  - 31.1-36.5% in 2001-4
  - 47.3-54.7% in 2012-16 (Fig. 2)
- The proportion of *E. faecalis* fell:
  - 68.9-63.5% in 2001-4
  - 52.7-45.3% in 2012-15 (Fig. 2)
- In 2016, *E. faecium* (54.7%) exceeded *E. faecalis* (45.3%) (Fig. 2).

PHE Surveillance

- Provided a larger dataset (2840 reports of enterococcal BSI in 2000 and 5000-7000 p.a. from 2003-2016).
- The proportion of *E. faecium* increased over time, based either on reported identification or amoxicillin resistance (Fig 3).
- Unlike in the BSAC surveillance, the proportion of *E. faecalis* still narrowly outnumbered *E. faecium* in 2016 (Fig. 3).

Antibiotic Susceptibilities

- Rates of non-susceptibility to ampicillin, vancomycin and high-level gentamicin are shown in Figures 4 & 5 (BSAC data).
- A gradual decline in high-level gentamicin resistance was identified in *E. faecalis* (Fig. 5).

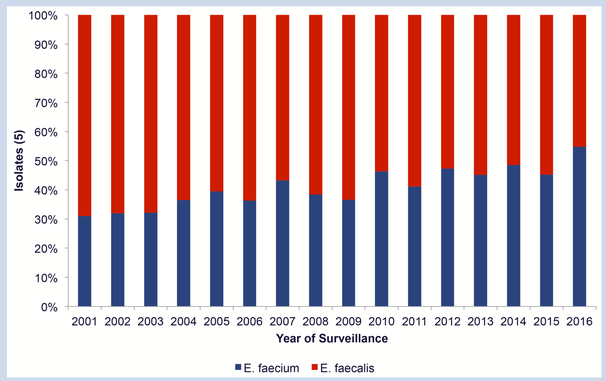

FIGURE 2 Proportion of *E. faecium* and *E. faecalis* causing BSI, 2001-2016 (BSAC data).

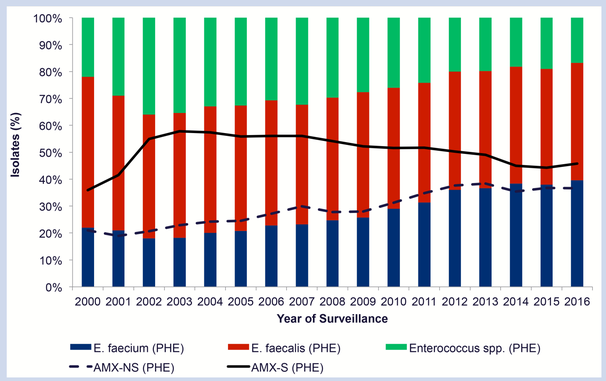

FIGURE 3 Proportion of enterococci causing BSI, 2000-2016, based on reported identification or amoxicillin (AMX) resistance (PHE data).

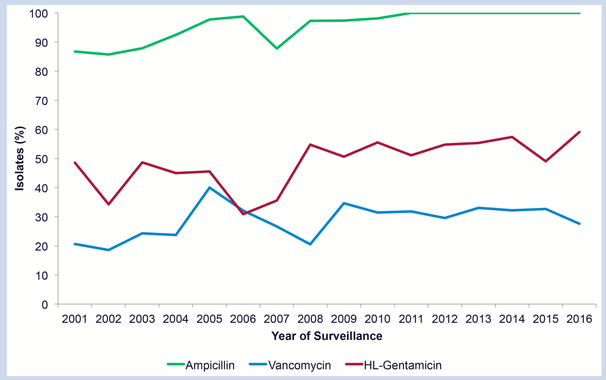

FIGURE 4 Non-susceptibility of *E. faecium* causing BSI, 2001-2016 (BSAC data).

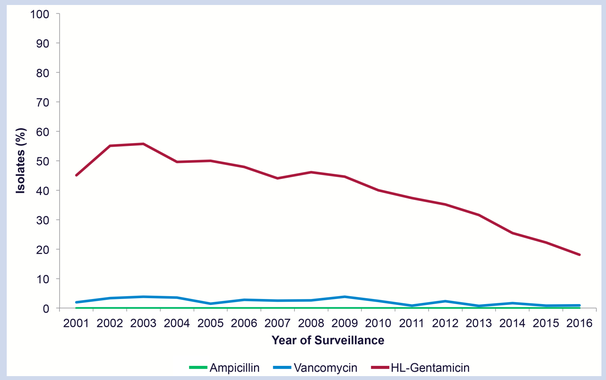

FIGURE 5 Non-susceptibility of *E. faecalis* causing BSI, 2001-2016 (BSAC data).

CONCLUSIONS

- Both BSAC and PHE surveillance data indicated an increase in proportion of *E. faecium* among enterococcal BSI.
- The increased proportion of *E. faecium* is reflected in increased antibiotic resistance (to ampicillin and vancomycin).
- There are fewer therapeutic options available for multi-resistant *E. faecium*, which may result in higher mortality.[3]
- The reason behind the decrease in high-level gentamicin resistance in *E. faecalis* is unknown and will be subject to further investigation.

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