

# Vancomycin resistant enterococci in Australia: results of the AGAR surveys 1995 to 2010

J. Pearson<sup>1</sup>, K. Christiansen<sup>1</sup>, J. Turnidge<sup>2</sup>, J. Bell<sup>2</sup>, T. Gottlieb<sup>3</sup> and N. George<sup>4</sup> on behalf of the Australian Group for Antimicrobial Resistance (AGAR).

<sup>1</sup>Pathwest Laboratory Medicine-WA, Royal Perth Hospital, Western Australia, <sup>2</sup>SA Pathology, Women's and Children's Hospital, South Australia, <sup>3</sup>Concord Hospital, New South Wales, <sup>4</sup>Pathology Queensland, Central Laboratory, Queensland.



## Background

The Australian Group on Antimicrobial Resistance (AGAR) performs period-prevalence surveys to monitor changes in antimicrobial resistance in a range of pathogens. From 1995 to 2010, seven *Enterococcus* species surveys were performed.

## Introduction

Vancomycin resistant enterococci (VRE) carry transferable resistance genes (*van*) that encode for resistance against vancomycin. As vancomycin is the drug of choice for serious infections caused by *E. faecium*, increasing rates of VRE present a challenge for both clinical care and hospital infection control.

## Methods

Surveys were conducted in 1995 (16 participating laboratories), 1999 (18), 2003 (18), 2005 (22), 2007 (17), 2009 (14) and 2010 (15). Laboratories collected up to 100 enterococci from clinical samples. All isolates were identified to species level using the laboratories' own protocols (minimum tests were specified). Vancomycin susceptibility testing was performed by the laboratories' routine methods (Vitek or Vitek2, agar dilution, Phoenix, Etest, CLSI/CDS/BSAC disc diffusion). PCR for *van* gene detection was performed on vancomycin resistant isolates.

## Results

- In 1995, all *E. faecalis* and *E. faecium* were vancomycin susceptible.
- From 1999 to 2010, less than 1% of *E. faecalis* were vancomycin resistant (Figure 1).
- For *E. faecium*, levels of vancomycin resistance remained at less than 5% until 2005 (Figure 2).
- From 2005 to 2010 vancomycin resistance in *E. faecium* increased from 7.2% to 36.3% ( $p < 0.0001$ ). The increase for invasive isolates (blood and CSF) was 9.3% to 30.4% ( $p < 0.0001$ ).
- In total 205 VRE were detected during the surveys. *vanB E. faecium* was the most common VRE isolated in Australia (182, 89%) followed by *vanB E. faecalis* (18, 9%) and *vanA E. faecium* (5, 2%). *vanA E. faecalis* was not detected.
- The proportion of *E. faecium* that are VRE varied by region (Figure 3): Victoria (25%), South Australia (25%), the Australian Capital Territory (23%), New South Wales (17%), Queensland (10%) and Western Australia (3%). No VRE were detected in Tasmania. The Northern Territory did not participate.
- In the 2010 survey, one in three *E. faecium* were VRE.

## Conclusions

VRE in Australia are predominantly *vanB E. faecium*. The proportion of vancomycin resistant *E. faecalis* has remained low whereas the proportion of vancomycin resistant *E. faecium* has increased markedly particularly in the last five years. Regional differences are evident with the highest proportions of VRE seen in the Australian Capital Territory, New South Wales, South Australia and Victoria.

## Limitations

There have been changes in participating laboratories from 1995 to 2010 and this may have influenced trend data. However, trends were analysed for a subset of laboratories that participated in all surveys with similar results (an overall increase in vancomycin resistant *E. faecium* from 12% in 2007 to 35% in 2010).

## Results

Figure 1: Vancomycin resistance in *E. faecalis*

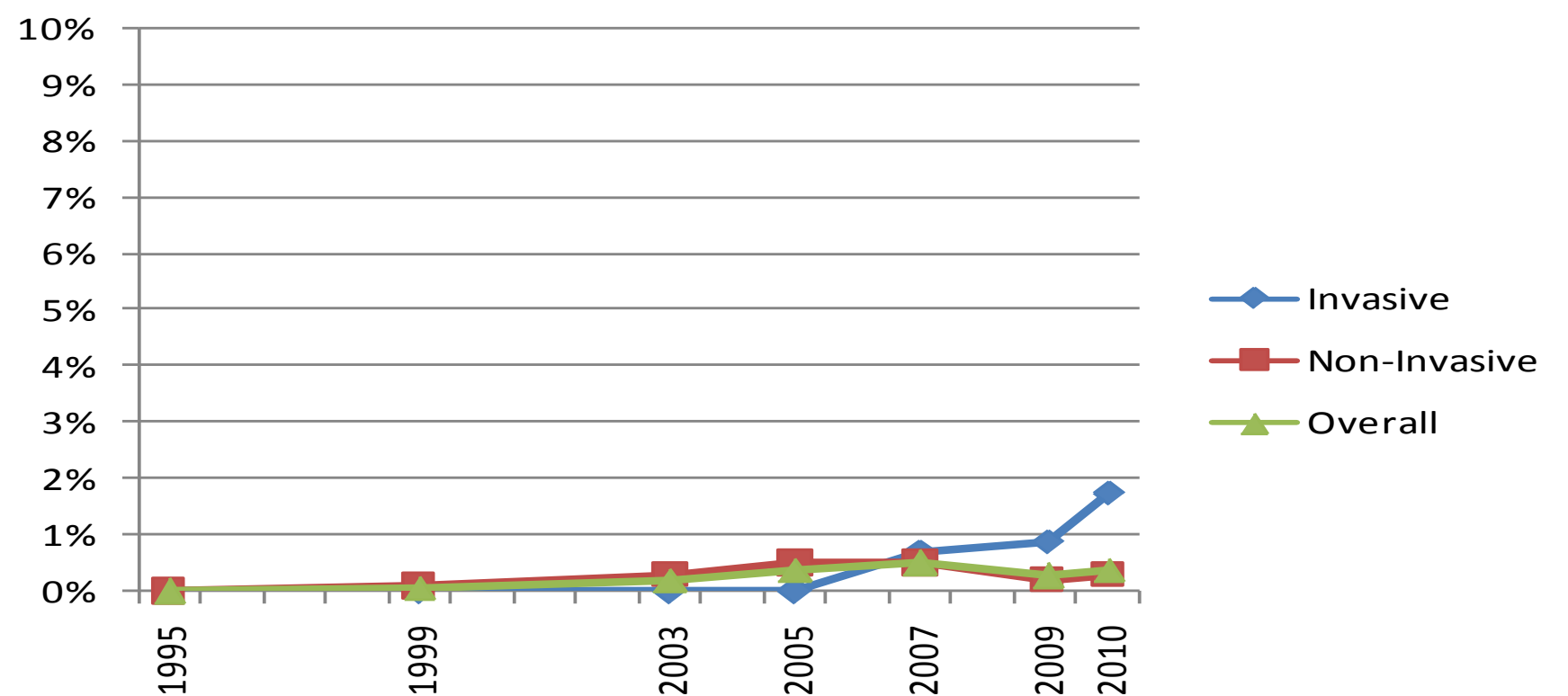


Figure 2: Vancomycin resistance in *E. faecium*

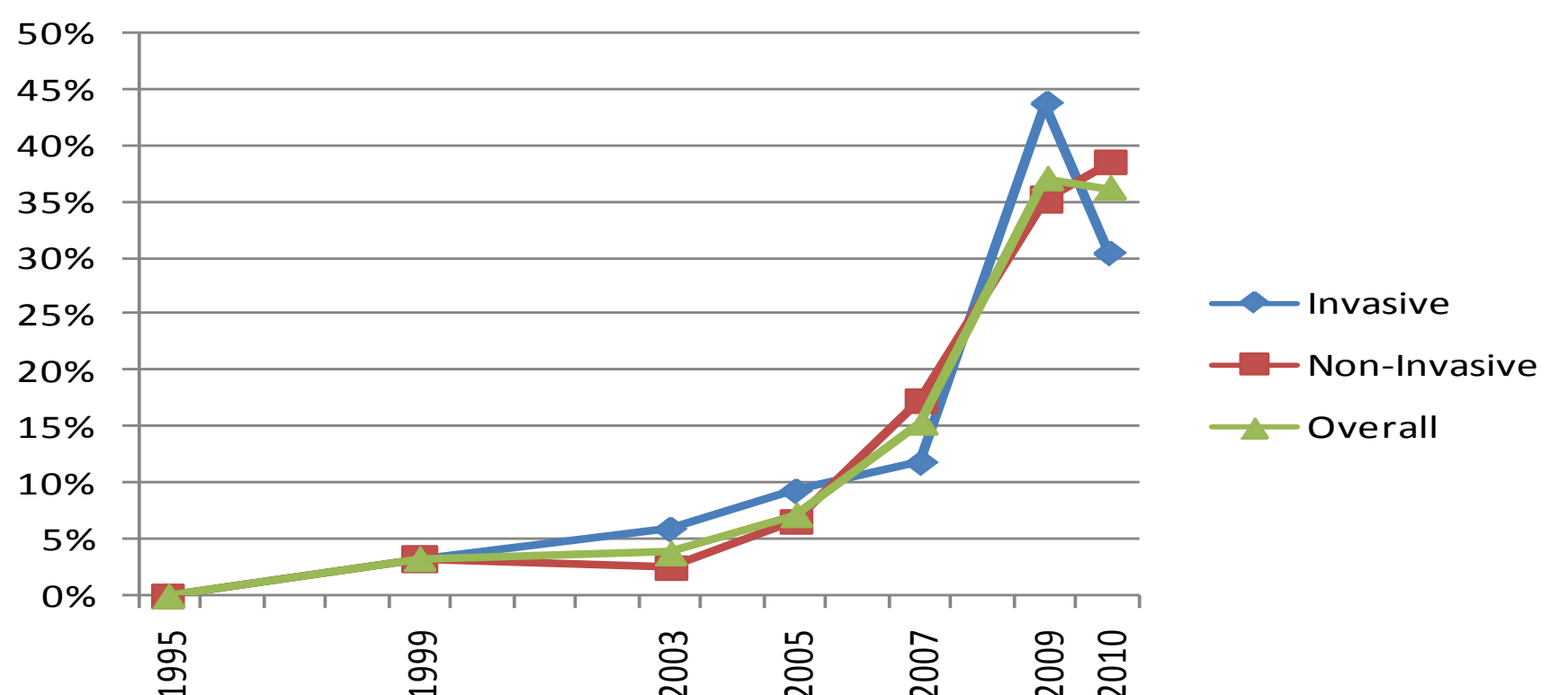
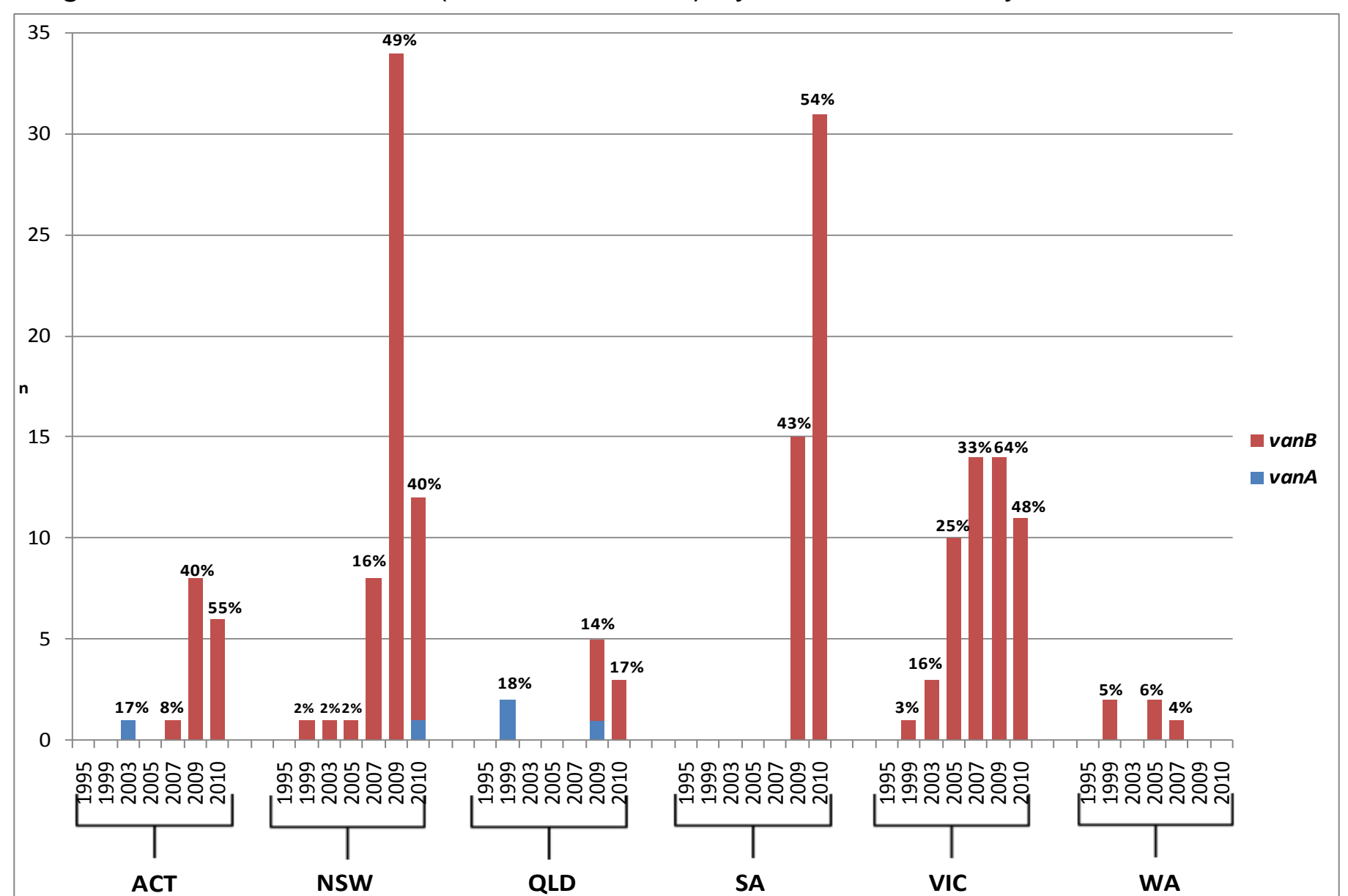


Figure 3: Number of VRE (% of *E. faecium*) by State or Territory



NB: Tasmania contributed enterococci in 1995, 2005 and 2007. No VRE were detected