

# Enterococcal bacteraemia

A longitudinal analysis

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# Background

- Enterococcus is an important human pathogen
- Intrinsic resistance to several classes of antibiotics
- One of the leading causes of sepsis
- 30-day mortality is 20% - 30%

# What is the Australian data telling us?

- All enterococcal bacteraemia
  - Community onset – 54%
  - Hospital onset – 46%
- *E. faecalis* bacteraemia
  - Community onset – 71%
  - Hospital onset – 29%
- Hospital onset bacteraemia
  - *E. faecalis* 33%
  - *E. faecium* 64%

# Aim

- To review the epidemiology of enterococcal bacteremia over 10 years to inform possible infection control strategies
  - To compare and contrast the epidemiologic differences between *E. faecalis* and *E. faecium* bacteraemia
  - To compare and contrast the epidemiological differences between VSEfm and VREfm bacteraemia
  - To investigate whether the community onset healthcare associated definitions are useful for enterococcal bacteraemia

# Method

- Retrospective observational study
- Data source : Prospectively collected bacteraemia surveillance database of CHHS
- Source population: All enterococcal bacteraemia identified at Canberra Hospital and Health Services over a 10-year period (2008-2017)
- Institutions:
  - TCH, Rehab

# Method - definitions

- Enterococcal bacteraemia
  - Isolation of one or more enterococcal species from one or more blood cultures
  - Bacteraemia with same organism(s) that recurs within 14days of the original event is disregarded
- Place of onset
  - **Community onset:** onset  $\leq$  48h of hospital admission

# Method - definitions

- Place of onset

**Inpatient healthcare – associated** : If more than 48 hours after admission or within 48 hours of discharge

Acquired during hospitalisation

Complication of presence of an indwelling medical device

Occurs within 30days of surgical procedure and bacteraemia related to surgical site infection

Invasive instrumentation/incision performed within 48hours before onset of infection

Associated with neutropaenia contributed to by cytotoxic therapy

**Non-inpatient healthcare – associated** : If within 48 hours of admission or 48 hours after discharge

# Statistical analysis

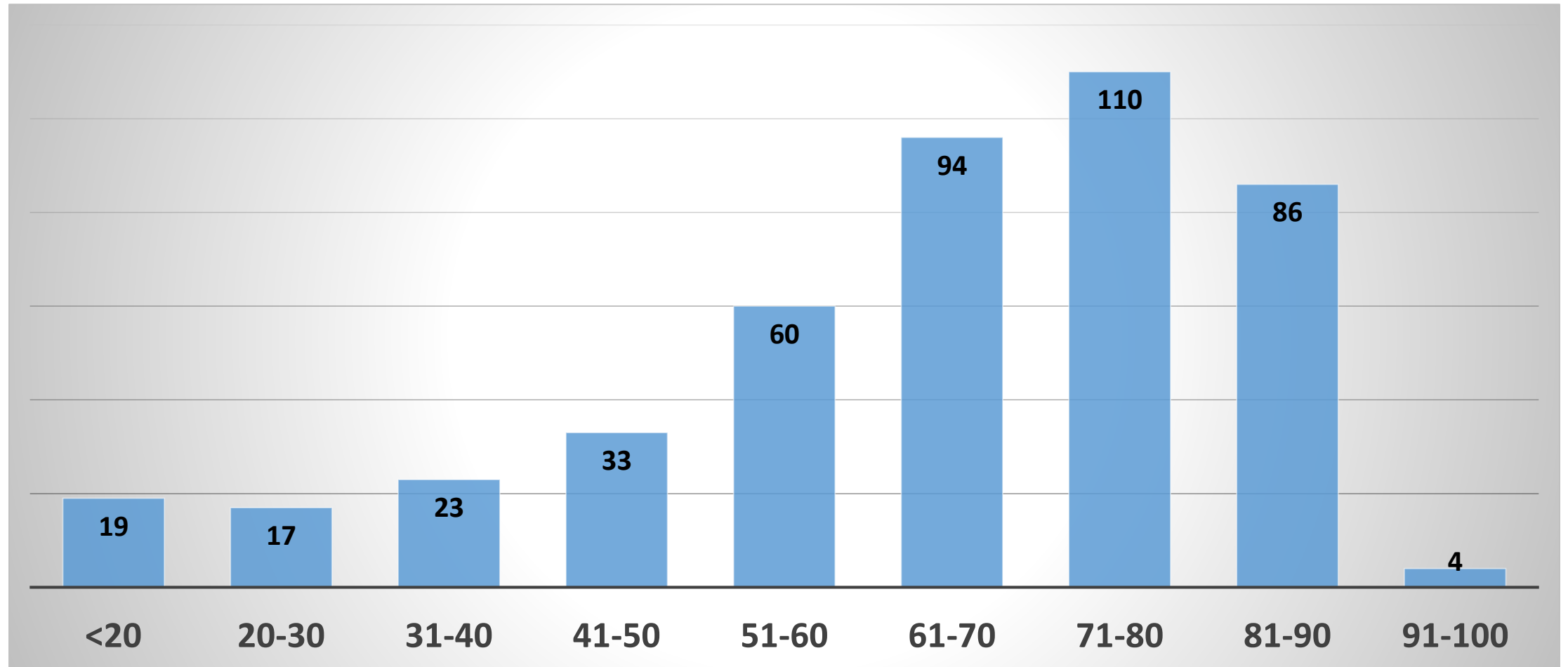
- Categorical variables compared using Chi-squared or Fisher's exact test
- Logistic regression analysis performed to identify predictors of 7-day mortality
- $P$ -values  $< 0.05$  considered statistically significant
- SPSS for Windows (version 11.5; SPSS Inc. Chicago, IL, USA) was used for this analysis.



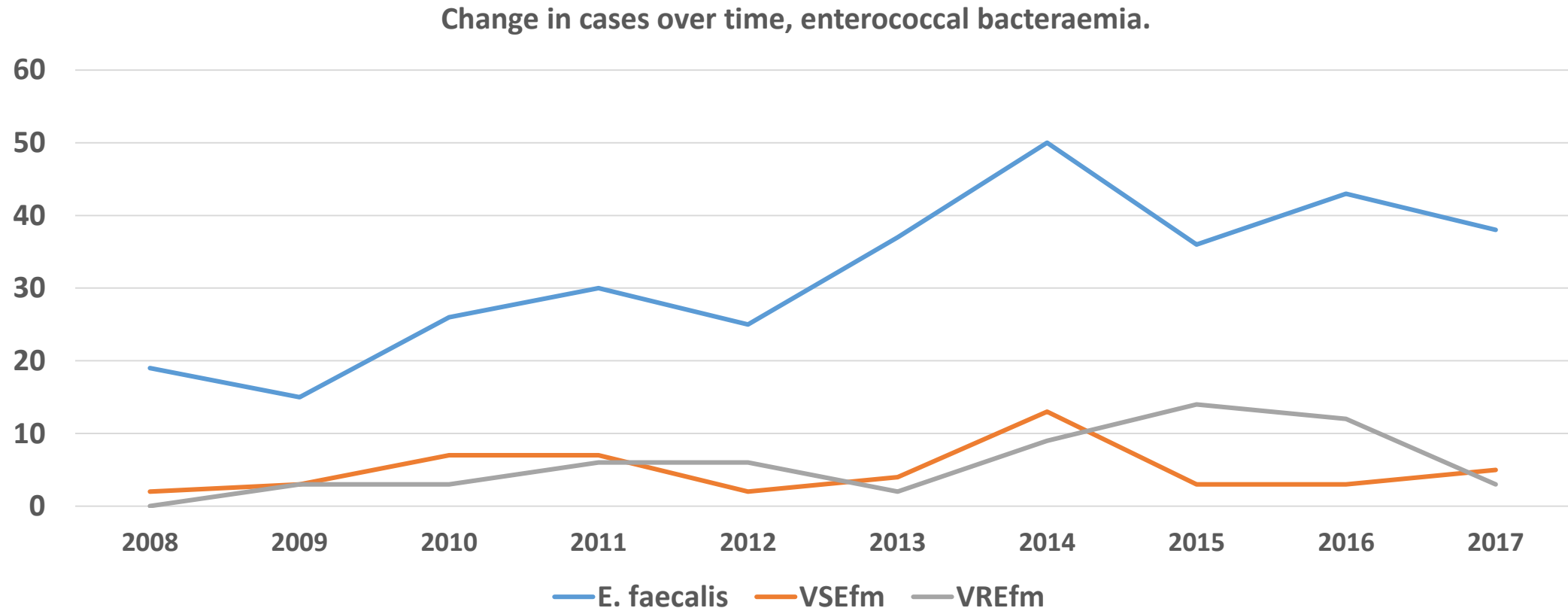
# Results – General Demographics

- 446 episodes of enterococcal bacteraemia identified from 2008-2017
- By species:
  - *E. faecalis* 318 (71%)
  - *E. faecium* 107 (24%)
  - *E. other* 21 (5%)
- By gender:
  - Males 287 (64%)
  - Females 159 (36%)

# Enterococcal bacteraemia by age groups



# Enterococcal bacteraemia over ten years

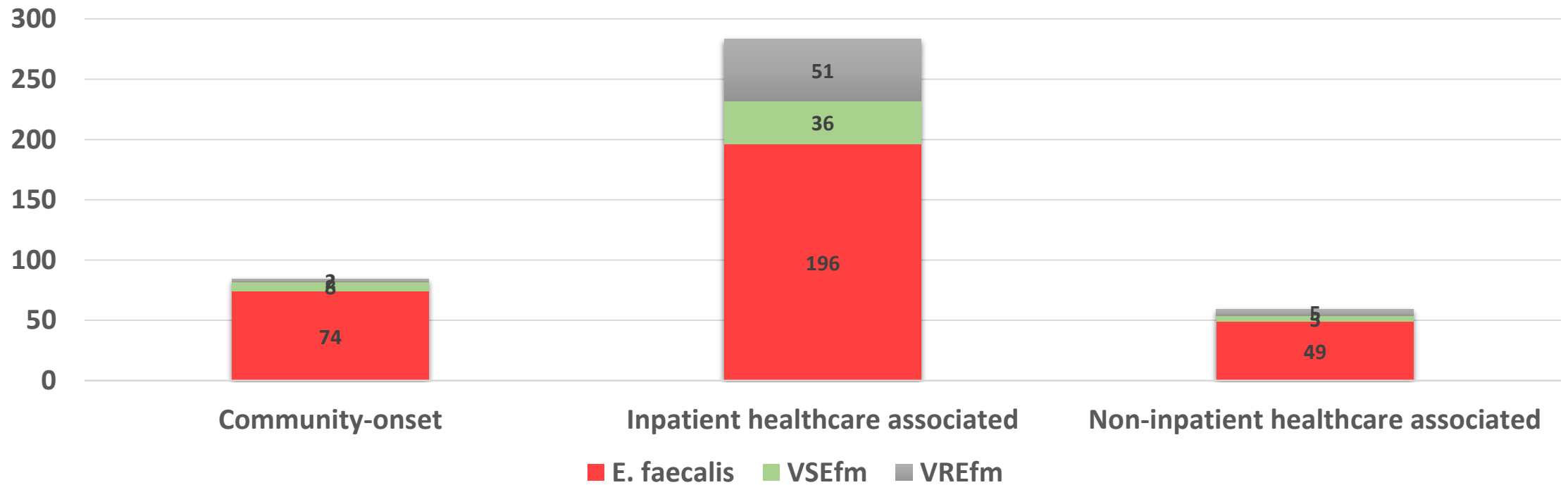


# Results – microbiological features

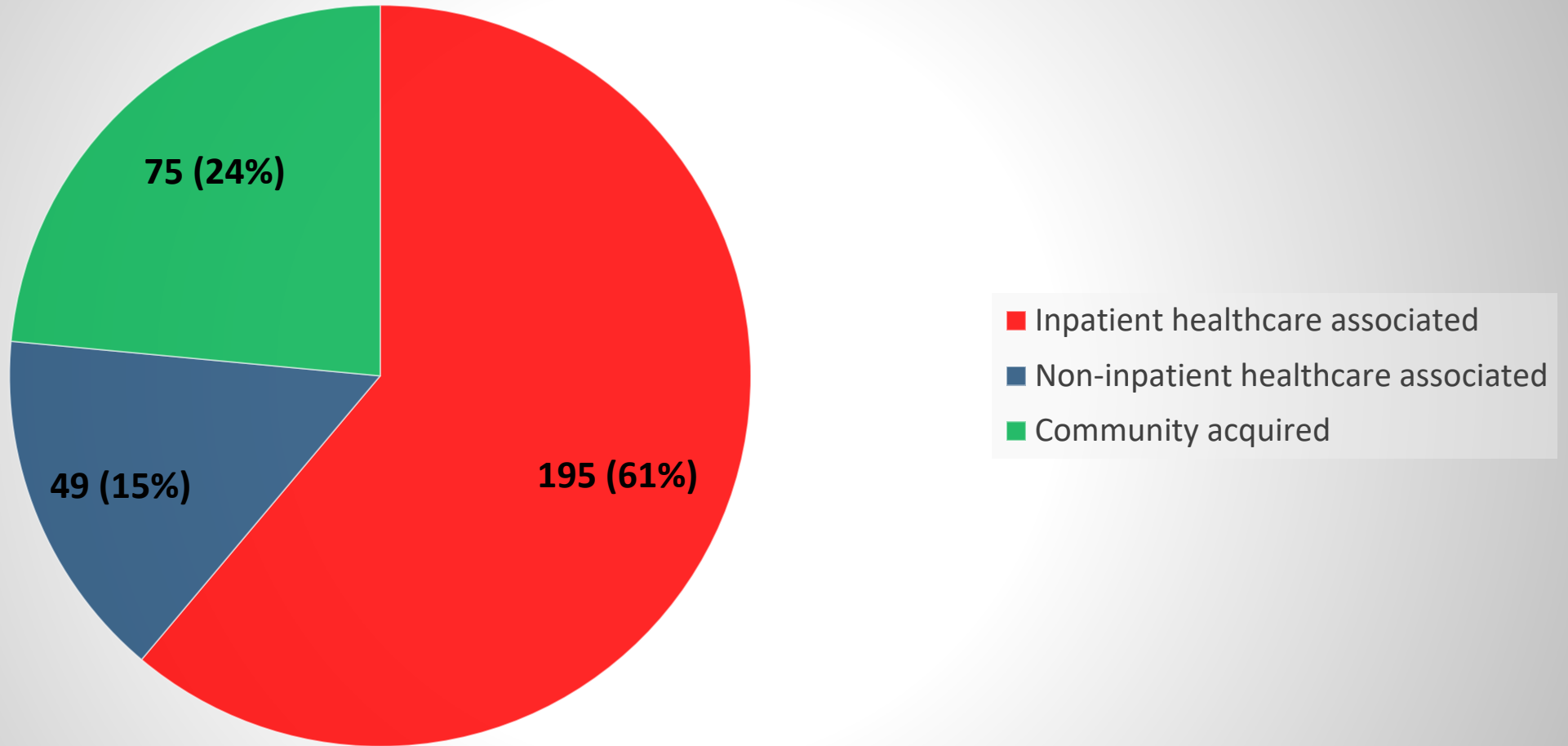
- Enterococcal bacteraemia
  - Monomicrobial: 294 (66%)
  - Polymicrobial: 152 (34%)
  - *E. faecium* more likely to be polymicrobial (38% vs 31%, *P* value<0.05)
- By jurisdiction (based on postcode)
  - ACT 283 (63%)
  - NSW 163 (37%)
  - NSW patients more likely to have *E. faecium* bacteraemia (32% vs 19%, *P* value <0.01)

# Place of onset vs enterococcal species

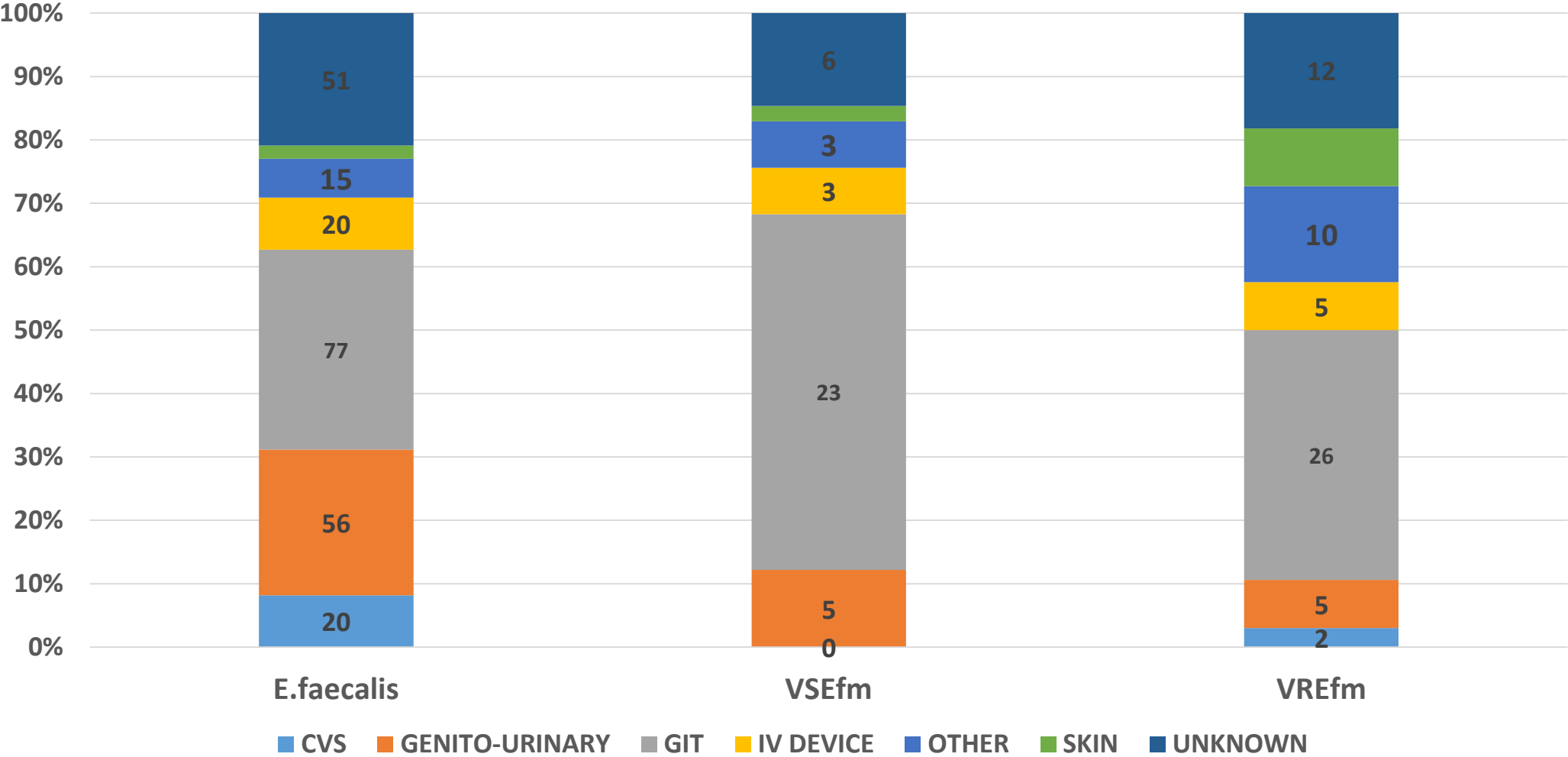
Percentage proportions of *E. faecalis* and *E. faecium* by place of onset of bacteraemia



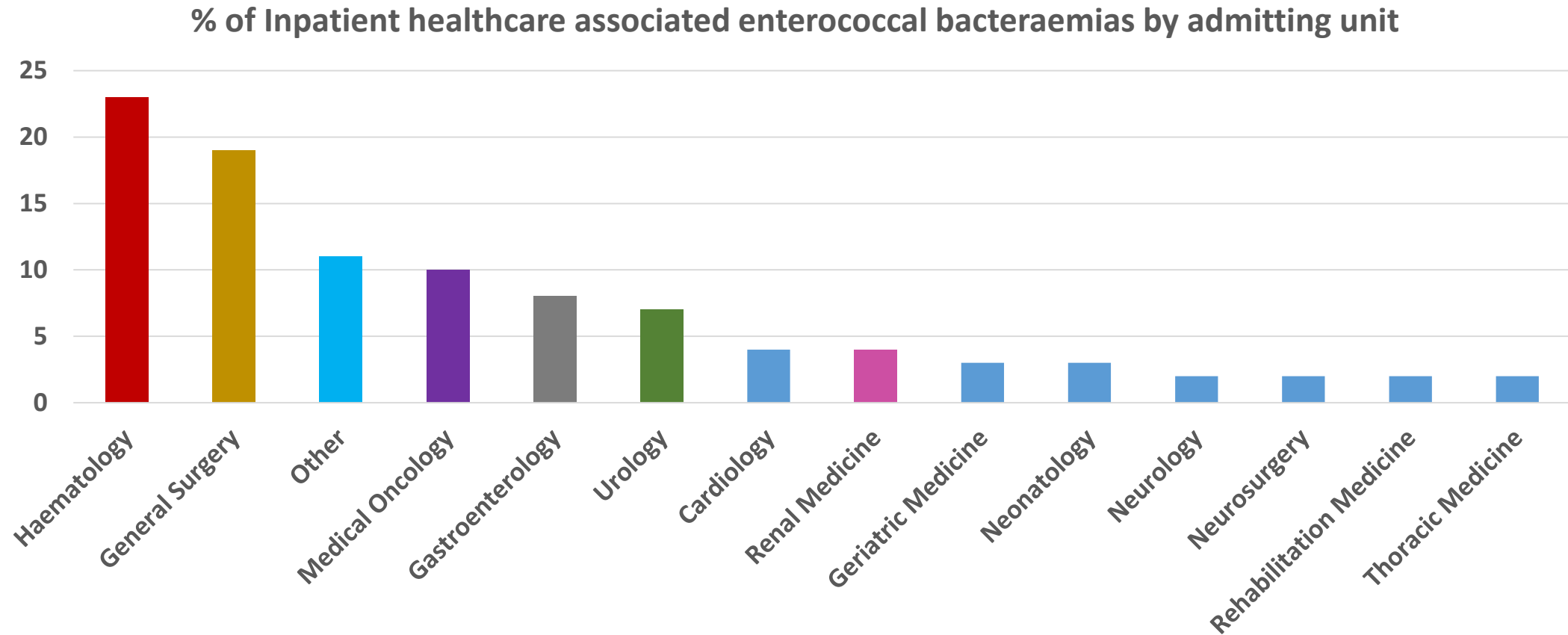
# *E. faecalis* bacteraemia by place of onset



# Healthcare associated bacteraemia by source

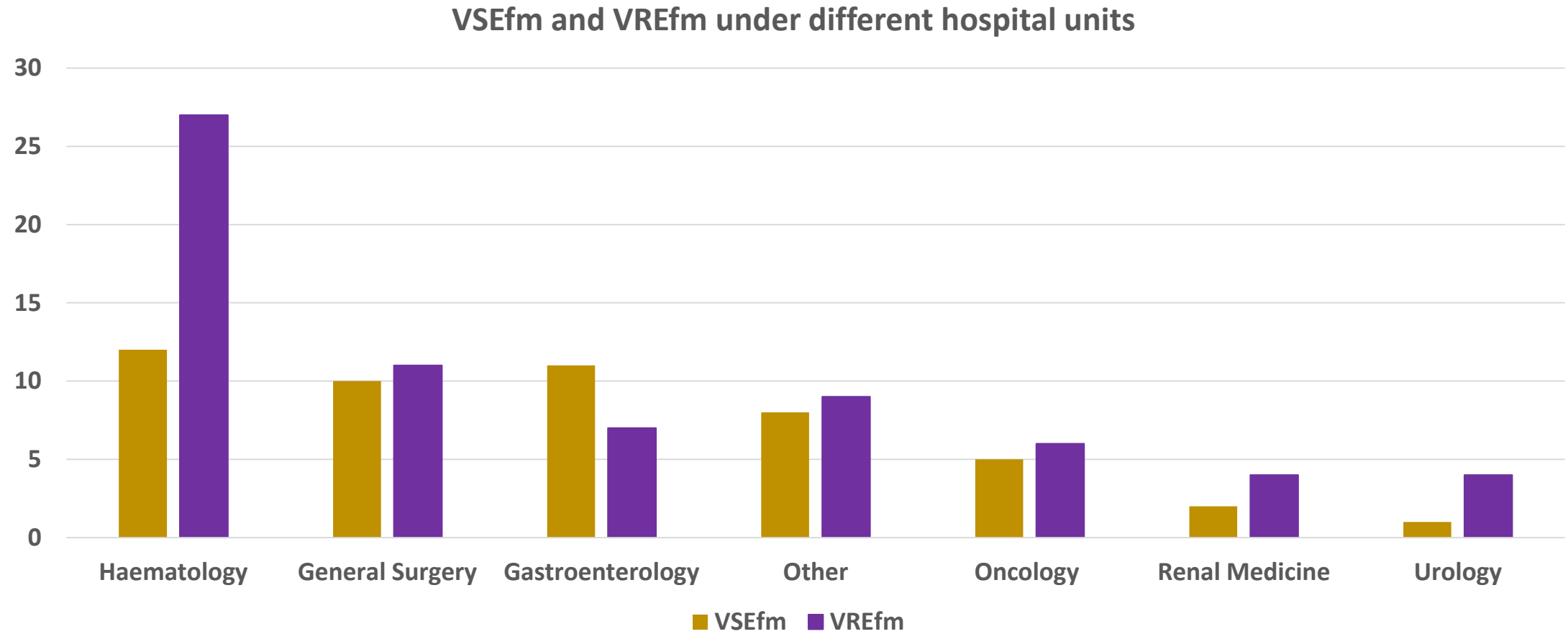


# Inpatient healthcare associated – by unit

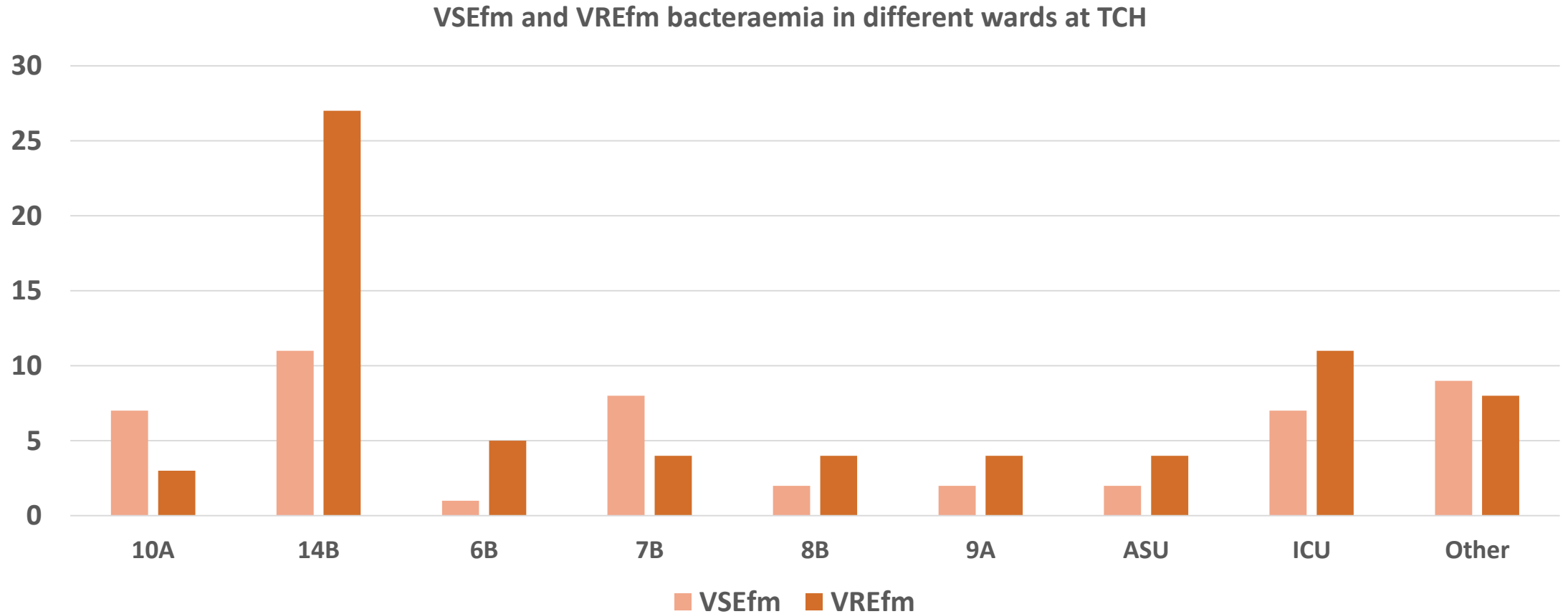




# Inpatient healthcare associated – VSEfm:VREfm



# Spread of VSEfm and VREfm – by ward



# Clinical significance

- *E. faecalis* AND *E. faecium* are predominantly healthcare associated
- *E. faecalis* major contributor to inpatient acquired bacteraemia
- SAB surveillance definitions add more clarity to analysis of enterococcal bacteraemia
- The majority of *E. faecium* (and VRE) bacteraemia come from surgical and haem-onc patients

# Clinical significance (2)

- Gastrointestinal source most commonly implicated
- A substantial proportion of ALL enterococcal bacteraemia are cryptogenic
- Concerted efforts
  - Environmental control
  - Hand-hygiene
  - More prudent antimicrobial stewardship