Inivos

Fremantle Hospital and Health Services

Clusters of vancomycin resistant enterococcus (VRE) carriage identified through a surveillance program in a tertiary teaching hospital

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ABSTRACT

Background: VRE infections in Australian hospitals have been increasing and hospital-acquired bacteraemia is becoming more common. Following emerging resistance in Perth hospitals in 2001 a state screening policy was developed.

Aim: To describe recent experience from screening of high risk units (HRU) in a 350 bed tertiary teaching hospital with isolation of carriers and screening of patient contacts.

Methods: Haematology, Renal and intensive care unit (ICU) patients were screened on admission and regularly thereafter using VRE chromogenic agar. Presence of vanB or vanA gene was confirmed by polymerase chain reaction (PCR) and typing was performed by pulsed field gel electrophoresis.

Results: Between October 2011 and June 2014 VRE was isolated from 204 patients: 10 clinical isolates, 117 screening isolates and 77 isolates from room contacts. No bloodstream infections were recorded in this time. Seventeen pulsotypes were identified throughout the hospital but three types accounted for 74% of cases in three consecutive clusters on the Haematology, Renal and Surgery wards. All three types were found in ten wards across the hospital including ICU.

Environmental swabbing on the surgical ward revealed VRE contamination throughout the ward including offices and equipment outside of isolation rooms. Enhanced cleaning of toilets and bathrooms including use of vaporised hydrogen peroxide (ProXcide) was associated with reduction in the number of cases.

Conclusion: Focused screening for VRE carriage and isolation of positive patients has resulted in low levels of carriage in HRU. The number of infections remains low.

BACKGROUND

In recent years, VRE have emerged as important nosocomial pathogens, causing significant morbidity and mortality(1). Carriers of Enterococcus faecium with vanB vancomycin resistance have become common in Perth tertiary teaching hospitals in the last decade.

Currently clinical infections are unusual although there has been a dramatic increase in VRE hospital acquired bacteraemia in other parts of Australia(2). A surveillance, screening and isolation program appears to have maintained control in Perth. Repeated introductions of VRE to our hospital have resulted in spread on the wards due to contamination of shared toilet facilities and other equipment via the hands of patients and staff.

AIMS

To describe:

1. Recent experience of VRE screening and isolation of patients of high risk units (HRU) in a 350 bed tertiary teaching hospital.
2. The efficacy of the ProXcide™ decontamination system in preventing the environmental transmission of VRE in HRU.

METHOD

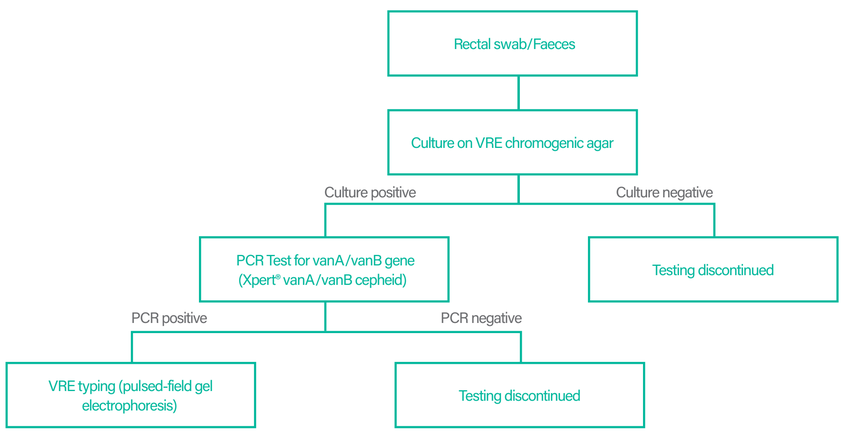
Haematology, Renal and Intensive Care Unit (ICU) patients were screened on admission and regularly thereafter using VRE chromogenic agar. Presence of vanB or vanA gene was confirmed by polymerase chain reaction (PCR) and typing was performed by pulsed-field gel electrophoresis and multilocus sequence typing.

Screening Policies:

RDF* patients and HCF* patients transferred from outside Western Australia	ICU* Renal Haematology/Oncology inpatients	Haemodialysis patients	Room contact
Screening on admission	Screening on admission	Screening on admission	Medical records electronically tagged
	Weekly screening if long stay	Routine three monthly screening	Three negative swabs on three consecutive days
			Cleared

*
* RCF: Residence care facility
* HCF: Health care facility
ICU: Intensive care unit

Laboratory testing:



RESULTS

ProXcide™ decontamination

In recent years hydrogen peroxide vapour (HPV) has been shown to be efficient in ridding the hospital environment of VRE where routine cleaning has failed(3). We used the ProXcide™ decontamination system in toilet areas on ward B7N where there had been increased spread and widespread environmental contamination. In conjunction with enhanced cleaning this terminated spread in the ward and there have been no new cases of the VRE since the decontamination process. These results are in concordance with the findings of Passaretti et al. where patients admitted to rooms decontaminated with HPV were 80% less likely to acquire VRE(4).

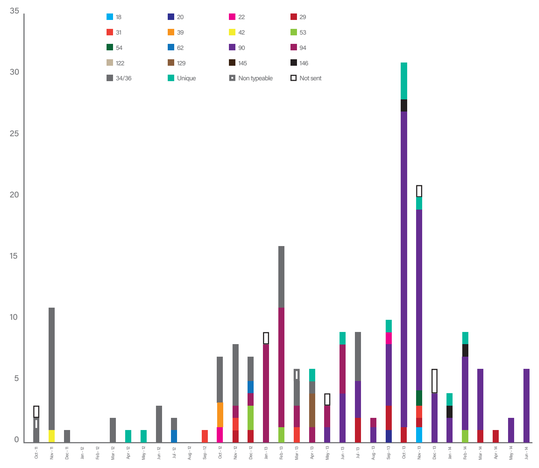
Molecular epidemiology

The multilocus sequence types of the three predominant VRE PFGE were ST203 (PFGE 34/36); ST78 (PFGE 94) and ST555 (PFGE 90). All three sequence types belong to the hospital associated clonal complex 17 (Figure 2).

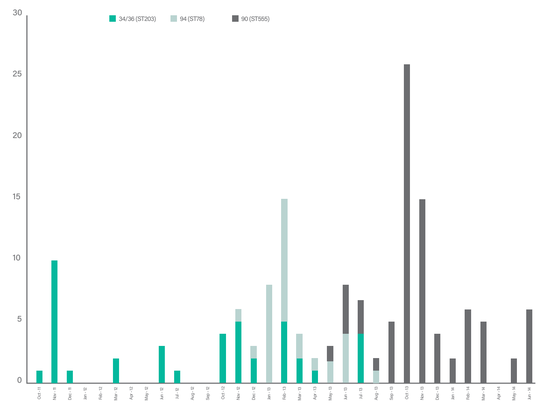
CONCLUSION

Surveillance of carriage in high risk units with isolation of carriers and room contacts together with enhanced cleaning have maintained clinical infections at a low level.

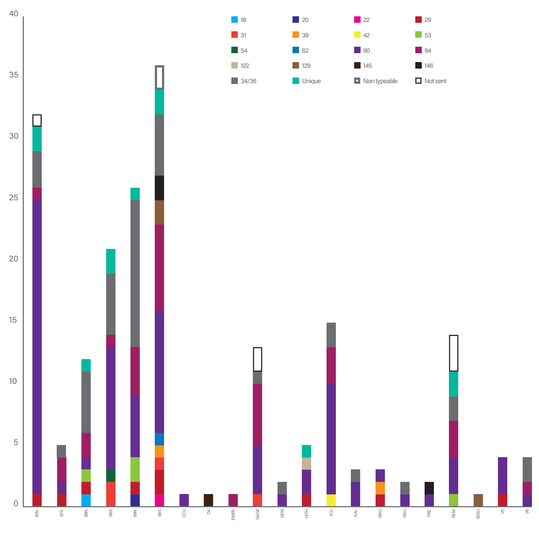
Newly acquired VRE PFGE Pulsotypes
October 2011 - June 2014



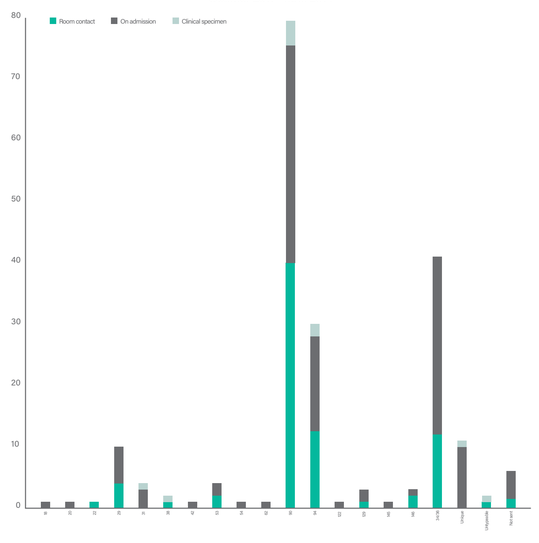
Predominant VRE PFGE Pulsotypes
October 2011 - June 2014



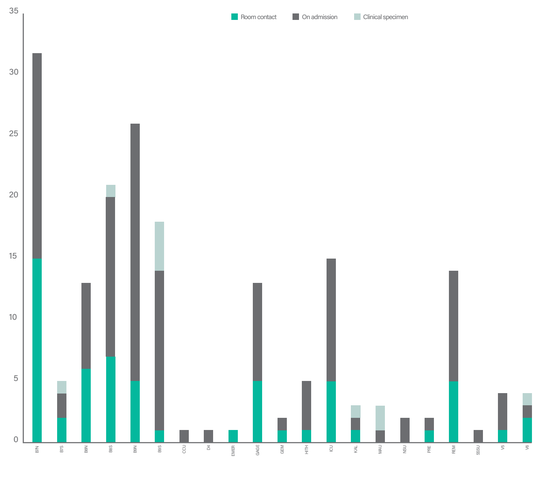
VRE PFGE Pulsotypes per source wards
October 2011 - June 2014



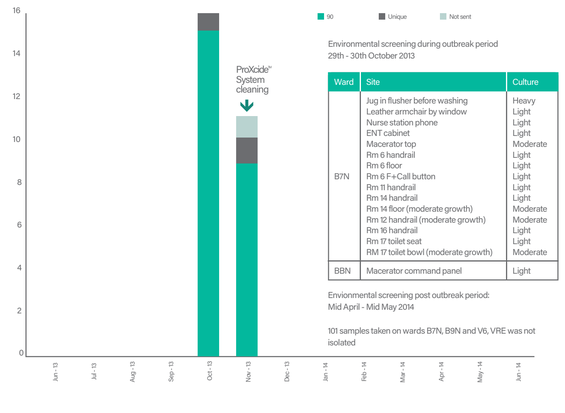
VRE PFGE Pulsotypes per acquisition mode
October 2011 - June 2014



VRE PFGE Pulsotypes per acquisition mode per source ward
October 2011 - June 2014



VRE PFGE Pulsotypes for Ward B7N
June 2013 - June 2014



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