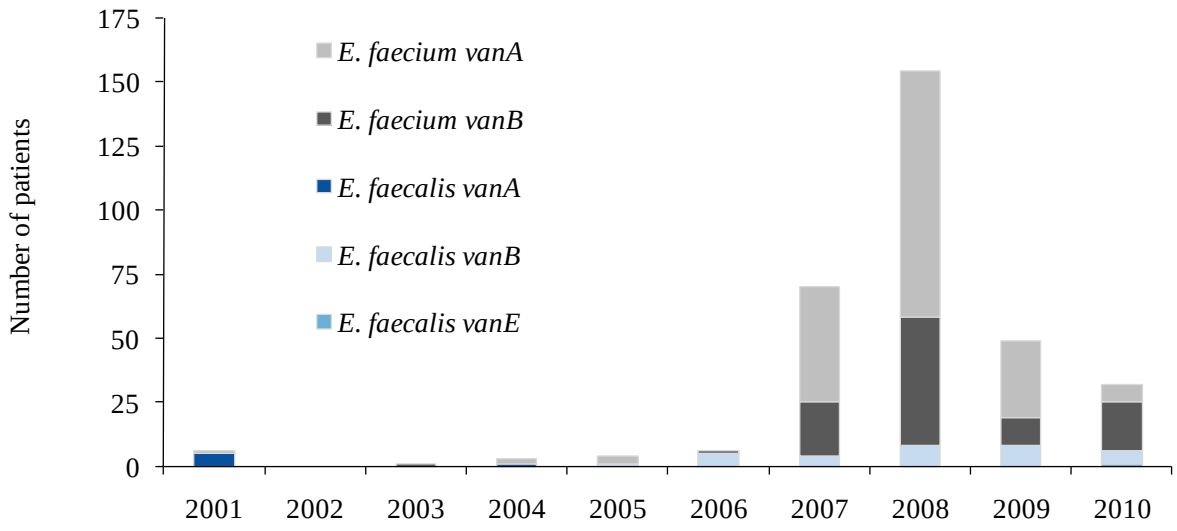
Vancomycin-resistant enterococci, 2010

Hospital and community diagnostic laboratories are requested to refer all vancomycin-resistant *Enterococcus faecium* and *E. faecalis* (VRE) isolates to ESR for the national surveillance of these resistant organisms. At ESR, the isolates are confirmed as vancomycin resistant, the *van* gene is identified by PCR, the isolates' susceptibility to a range of antibiotics is determined, and the isolates are typed by pulsed-field gel electrophoresis (PFGE).

VRE from 31 patients were confirmed in 2010. The species and van genotype distribution of the VRE from these 31 patients is shown in Figure 1. Nineteen patients had vanB *E. faecium*, 6 had vanA *E. faecium*, 5 had vanB *E. faecalis* and 1 had vanE *E. faecalis*. There were no isolates of vanA *E. faecalis*. One patient had two strains (as determined by PFGE typing) of vanA *E. faecium*.

Figure 1. Species and van genotype of VRE isolated in New Zealand, 2001-2010



The number of VRE referred to ESR decreased in 2010 compared with the previous year (Figure 1). The relatively large numbers of VRE in 2007 and 2008 were due to outbreaks of vancomycin-resistant *E. faecium* in Auckland hospitals, and also to a small outbreak in Waikato Hospital in 2008.

In 2010, the majority (69.7%) of the VRE were isolated from patients in Auckland hospitals: 27.3% Auckland City Hospital, 24.2% North Shore Hospital and 18.2% Middlemore Hospital. A more detailed breakdown of the sources of the VRE referred in 2010 is shown in Table 1.

The majority (25, 78.1%) of the VRE were isolated from rectal swabs or faecal specimens as the result of screening for the organism. The remaining VRE were isolated from urine (5, 15.6%) or other miscellaneous diagnostic specimens (2, 6.3%).

Table 1 shows the various VRE strains identified by PFGE typing in 2010. No strain predominated among the vanA *E. faecium* isolates, with the majority being distinct strains sharing <90% homology by PFGE with any other VRE. Among the vanB *E. faecium* isolates, strain EfV was predominant among VRE isolated from North Shore Hospital patients and was also isolated from one patient in each of Middlemore and Christchurch Hospitals. Notably there were no isolates of the vanA or vanB *E. faecium* strains prevalent during the 2007-2008 VRE outbreaks in Auckland hospitals and Waikato Hospital.

Strain EfJ was prevalent among the vanB *E. faecalis* isolates. This strain has been predominant among vanB *E. faecalis* isolates since 2005, and all isolates of this strain have come from the Northland or Auckland area. Most cases appear to be sporadic.

Table 1. VRE referred to ESR, 2010

Species	*van* gene	Referred from	PFGE profile/'strain'[1]	Number of patients[2]
E. faecium	A	Middlemore Hospital	**EfAK**	1
			distinct[3]	2
		Auckland City Hospital	distinct	2
		Christchurch Hospital	distinct	2
	B	North Shore Hospital	**EfV**	6
			distinct	1
		Auckland City Hospital	**EfAE**	2
			EfAC	1
			distinct	2
		Middlemore Hospital	**EfAE**	1
			EfV	1
		Wellington Hospital	distinct	2
		Whangarei Hospital	**EfAE**	1
		Waikato Hospital	distinct	1
		Christchurch Hospital	**EfV**	1
		Christchurch community	distinct	1
E. faecalis	B	North Shore Hospital	**EfJ**	1
		Auckland City Hospital	**EfJ**	1
		Middlemore Hospital	**EfJ**	1
		Wellington Hospital	**EfZ**	1
		Whangarei community	distinct	1
	E	Auckland City Hospital	distinct	1

1 In-house pulsed-field gel electrophoresis (PFGE) profile designations. PFGE profiles were analysed with BioNumerics software version 5.1 (Applied Maths, St-Martens-Latem, Belgium) using the Dice coefficient and unweighted-pair group method with arithmetic averages, at settings of 0.5% optimisation and 1.5% position tolerance. The PFGE profiles of isolates designated as the same strain share ≥90% similarity. PFGE profile designations in boldface are profiles of strains that were identified prior to 2010.

2 Two distinct vanA *E. faecium* strains were isolated from one patient in two different hospitals. This patient is included in the counts for each hospital. VanB *E. faecium*, strain EfAE, was isolated from the same patient in two different hospitals. This patient is also included in the counts for each hospital.

3 Distinct isolates that share <90% PFGE profile similarity with any other VRE isolate.

The antimicrobial susceptibility among the 2010 VRE isolates is shown in Table 2. Almost all VRE were multiresistant to ≥3 antibiotic classes in addition to glycopeptides.

Table 2. Resistance among VRE, 2010[1]

Antimicrobial agent[2]	Percent resistance			
	E. faecium			*E. faecalis*
	vanA n=7[3]	vanB n=19	All n=26	vanB n=5
ampicillin	85.7	100.0	96.2	0.0
ciprofloxacin	100.0	100.0	100.0	80.0
gentamicin high-level	71.4	79.0	76.9	100.0
nitrofurantoin	0.0	5.3	3.9	0.0
quinupristin/dalfopristin	28.6	0.0	7.7	100.0[4]
streptomycin high-level	85.7	52.6	61.5	20.0
teicoplanin	85.7[5]	0.0	23.1	0.0
tetracycline	57.1	15.8	26.9	80.0
multiresistant[6]	100.0	89.5	92.3	80.0

1 Data not included for the one vanE *E. faecalis* isolate which was only resistant to quinupristin/dalfopristin.

2 Ampicillin, ciprofloxacin, gentamicin, linezolid and teicoplanin susceptibilities were determined by Etest minimum inhibitory concentrations (MICs). Nitrofurantoin, quinupristin/dalfopristin, streptomycin and tetracycline susceptibilities were determined by disc testing. MICs and zones of inhibition were interpreted according to the Clinical and Laboratory Standards Institute's criteria.[1] No isolate was resistant to linezolid, although one vanA *E. faecium* isolate had intermediate resistance (MIC 4 mg/L).

3 Includes isolates of two different strains from the same patient.

4 *E. faecalis* are intrinsically resistant to quinupristin/dalfopristin.

5 The remaining vanA *E. faecium* isolate had intermediate teicoplanin resistance (MIC 16 mg/L).

6 Resistant ≥3 classes of antibiotics in addition to glycopeptides (quinupristin/dalfopristin resistance not included for *E. faecalis*).

[1] Clinical and Laboratory Standards Institute. Performance standards for antimicrobial susceptibility testing; twentieth informational supplement. Wayne, PA, USA: CLSI, 2010. CLSI document M100-S20.