



THE EVOLUTION OF CARBAPENEMASES IN ENTEROBACTERIACEAE IN AUSTRALIA

The Table below documents the number and type of carbapenemases detected in Enterobacteriaceae in AGAR surveys since 2004

Year	Source of isolates	Population sampled	Organism set ^a	Total Isolates	Carbapenemases detected	%	Comments
2014	Blood	All patients	All Enterobacteriaceae	5796	14 = 7 <i>bla</i> _{IMP-4} , 3 <i>bla</i> _{KPC-2} , 2 <i>bla</i> _{VIM-1} , 1 <i>bla</i> _{NDM-4} , 1 <i>bla</i> _{OXA-181}	0.24	0 in non-EKE species
2013	Blood	All patients	All Enterobacteriaceae	4958	14 = 9 <i>bla</i> _{IMP-4} , 3 <i>bla</i> _{KPC-2} ^b , 2 <i>bla</i> _{NDM-7} ^c	0.28	3 in non-EKE species
2012	Urine	Non-inpatients	EKE	2802	1 = 1 <i>bla</i> _{IMP-4}	0.04	0.17% for 2011-12
2011	Multiple	Inpatients	EKE	2633	8 = 8 <i>bla</i> _{IMP-4}	0.30	combined
2010	Urine	Non-inpatients	EKE	2938	3 = 3 <i>bla</i> _{IMP-4}	0.10	0.16% for 2009-10
2009	Multiple	Inpatients	EKE	2574	6 = 6 <i>bla</i> _{IMP-4}	0.23	combined
2008	Urine	Non-inpatients	EKE	3010	None	0	
2006	Multiple	All patients	EKE	2285	1 = 1 <i>bla</i> _{IMP-4}	0.04	
2004	Multiple	All patients	EKE	2390	1 = 1 <i>bla</i> _{IMP-4}	0.04	

^a *E. coli*, *Klebsiella* spp., and *Enterobacter* spp. only

^b Two KPC from same with repeat episode of bacteraemia

^c NDM from same patient with repeat episode of bacteraemia

Notes:

- All strains with a meropenem MIC > 0.25 mg/L were requested for molecular screening for IMP, VIM, KPC, NDM and OXA-48-like genes. Not all isolates were available for testing.
- Many strains of Enterobacteriaceae with elevated MICs to meropenem do NOT harbour a carbapenemase, but possess other non-transmissible mechanisms (e.g a combination of ESBL or AmpC enzymes with porin changes)
- The years 2009 and 2010, and 2011 and 2012 were combined to determine an overall rate of outpatients + inpatients over those two years
- The IMP-4 metallo-β-lactamase (a type of carbapenemase) appears to be endemic in Australia at a very low level.