Antibiogram of Carbapenemase Producing Organisms - March, 2023

Table 1: Aggregate antibiogram of carbapenemase producing Enterobacterales and Pseudomonas isolates by number and percantage susceptible to each antimicrobial, received by MDU PHL 01/01/2021 - 31/12/2022

				Count of susceptible isolates and susceptibility proportion (%)																	
				Aminoglycosides (See note 1)			Monobactams	Cephalosporins						Fluoroquinolones	Carbapenems			Tetracyclines	Miscellaneous agents	
Beta-lactamase class	CPO Gene	Organism	N	Amikacin	Gentamicin	Tobramycin	Aztreonam	Ceftazidime/ Avibactam	Ceftazidime	Cefiderocol/ Tazobactam	Ceftriaxone	Cefepime	Cefiderocol	Ciprofloxacin	Meropenem	Imipenem-Relebactam	Meropenem-Vaborbactam	Tigecycline	Colistin	Fosfomycin (IV)
Class A	KPC-2	*Klebsiella pneumoniae*	8	5/6 (83.3%)	5/6 (83.3%)	2/6 (33.3%)	0/6 (0.0%)	7/8 (87.5%)	0/6 (0.0%)	*	0/6 (0.0%)	0/6 (0.0%)	-	1/6 (16.7%)	0/8 (0.0%)	4/5 (80.0%)	5/5 (100.0%)	3/6 (50.0%)	5/8 (62.5%)	6/8 (75.0%)
Class B	IMP-4	*Enterobacter cloacae*	56	51/55 (92.7%)	1/54 (1.9%)	0/55 (0.0%)	14/55 (25.5%)	*	0/54 (0.0%)	*	0/52 (0.0%)	1/53 (1.9%)	-	12/52 (23.1%)	40/55 (72.7%)	31/42 (73.8%)	41/42 (97.6%)	34/55 (61.8%)	52/53 (98.1%)	46/55 (83.6%)
		Escherichia coli	5	2/4 (50.0%)	0/4 (0.0%)	0/4 (0.0%)	3/4 (75.0%)	*	0/4 (0.0%)	*	0/4 (0.0%)	1/4 (25.0%)	-	2/4 (50.0%)	2/4 (50.0%)	-	-	3/4 (75.0%)	4/4 (100.0%)	3/4 (75.0%)
		Klebsiella oxytoca	8	8/8 (100.0%)	1/8 (12.5%)	0/8 (0.0%)	7/8 (87.5%)	*	0/8 (0.0%)	*	0/8 (0.0%)	2/8 (25.0%)	-	7/8 (87.5%)	5/8 (62.5%)	5/6 (83.3%)	6/6 (100.0%)	6/8 (75.0%)	8/8 (100.0%)	6/8 (75.0%)
		Klebsiella pneumoniae	6	4/6 (66.7%)	1/6 (16.7%)	1/6 (16.7%)	4/6 (66.7%)	*	0/6 (0.0%)	*	0/6 (0.0%)	1/6 (16.7%)	-	3/6 (50.0%)	3/6 (50.0%)	-	-	1/6 (16.7%)	6/6 (100.0%)	5/6 (83.3%)
		Serratia marcescens	12	9/11 (81.8%)	5/11 (45.5%)	0/11 (0.0%)	10/11 (90.9%)	*	0/11 (0.0%)	*	0/10 (0.0%)	0/10 (0.0%)	-	1/11 (9.1%)	1/12 (8.3%)	0/10 (0.0%)	6/10 (60.0%)	0/10 (0.0%)	*	2/12 (16.7%)
	NDM-1	*Citrobacter freundii complex*	8	8/8 (100.0%)	7/8 (87.5%)	6/8 (75.0%)	6/8 (75.0%)	*	0/8 (0.0%)	*	0/6 (0.0%)	0/6 (0.0%)	-	6/8 (75.0%)	0/8 (0.0%)	-	-	3/8 (37.5%)	8/8 (100.0%)	8/8 (100.0%)
		Enterobacter cloacae	7	6/7 (85.7%)	4/7 (57.1%)	3/7 (42.9%)	4/7 (57.1%)	*	0/7 (0.0%)	*	0/6 (0.0%)	0/6 (0.0%)	-	2/7 (28.6%)	1/7 (14.3%)	-	-	3/7 (42.9%)	5/5 (100.0%)	7/7 (100.0%)
		Escherichia coli	20	20/20 (100.0%)	19/20 (95.0%)	16/20 (80.0%)	17/20 (85.0%)	*	0/20 (0.0%)	*	0/16 (0.0%)	0/16 (0.0%)	-	6/19 (31.6%)	1/20 (5.0%)	0/13 (0.0%)	2/13 (15.4%)	16/19 (84.2%)	20/20 (100.0%)	18/20 (90.0%)
		Klebsiella oxytoca	6	5/5 (100.0%)	3/5 (60.0%)	3/5 (60.0%)	5/5 (100.0%)	*	0/5 (0.0%)	*	0/5 (0.0%)	0/5 (0.0%)	-	2/4 (50.0%)	1/6 (16.7%)	-	-	2/5 (40.0%)	6/6 (100.0%)	6/6 (100.0%)
		Klebsiella pneumoniae	7	4/7 (57.1%)	5/7 (71.4%)	4/7 (57.1%)	4/7 (57.1%)	*	0/7 (0.0%)	*	0/7 (0.0%)	0/7 (0.0%)	-	0/6 (0.0%)	1/7 (14.3%)	0/6 (0.0%)	2/6 (33.3%)	6/7 (85.7%)	6/6 (100.0%)	6/7 (85.7%)
		Pseudomonas aeruginosa	7	0/7 (0.0%)	0/7 (0.0%)	0/7 (0.0%)	3/7 (42.9%)	*	0/7 (0.0%)	*	*	0/7 (0.0%)	-	1/7 (14.3%)	0/7 (0.0%)	0/4 (0.0%)	0/4 (0.0%)	*	5/6 (83.3%)	^
	NDM-5	*Escherichia coli*	35	22/33 (66.7%)	25/33 (75.8%)	19/33 (57.6%)	3/33 (9.1%)	*	0/33 (0.0%)	*	0/28 (0.0%)	0/28 (0.0%)	0/4 (0.0%)	0/31 (0.0%)	2/33 (6.1%)	0/25 (0.0%)	4/25 (16.0%)	25/33 (75.8%)	31/31 (100.0%)	34/34 (100.0%)
	NDM-7	*Enterobacter cloacae*	5	4/5 (80.0%)	0/5 (0.0%)	0/5 (0.0%)	0/5 (0.0%)	*	0/5 (0.0%)	*	0/5 (0.0%)	0/5 (0.0%)	-	1/5 (20.0%)	0/5 (0.0%)	0/5 (0.0%)	1/5 (20.0%)	4/4 (100.0%)	5/5 (100.0%)	5/5 (100.0%)
		Klebsiella pneumoniae	8	8/8 (100.0%)	8/8 (100.0%)	8/8 (100.0%)	8/8 (100.0%)	*	0/8 (0.0%)	*	0/8 (0.0%)	0/8 (0.0%)	-	8/8 (100.0%)	0/8 (0.0%)	0/7 (0.0%)	0/7 (0.0%)	7/8 (87.5%)	8/8 (100.0%)	8/8 (100.0%)
	VIM-2	*Pseudomonas aeruginosa*	7	0/7 (0.0%)	0/7 (0.0%)	0/7 (0.0%)	5/7 (71.4%)	*	0/7 (0.0%)	*	*	0/7 (0.0%)	-	0/7 (0.0%)	1/7 (14.3%)	0/6 (0.0%)	1/6 (16.7%)	*	7/7 (100.0%)	^
Class D	OXA-23	*Proteus mirabilis*	5	4/5 (80.0%)	4/5 (80.0%)	4/5 (80.0%)	5/5 (100.0%)	*	5/5 (100.0%)	5/5 (100.0%)	5/5 (100.0%)	-	-	5/5 (100.0%)	5/5 (100.0%)	-	-	*	*	5/5 (100.0%)
Total			210	160/202 (79.2%)	88/201 (43.8%)	66/202 (32.7%)	98/202 (48.5%)	7/8 (87.5%)	5/201 (2.5%)	5/5 (100.0%)	5/172 (2.9%)	5/182 (2.7%)	0/4 (0.0%)	57/194 (29.4%)	63/206 (30.6%)	40/129 (31.0%)	68/129 (52.7%)	113/180 (62.8%)	176/181 (97.2%)	165/193 (85.5%)

Legend	
*	Intrinsic Resistance Reported
-	Less than 4 isolates tested
^	No interpretive criteria

Percentage susceptible (%)				
0-20%	21-40%	41-60%	61-80%	81-100%

** No isolates tested reported susceptibility to Ampicilin or Ampicilin/Sulbactam

Note 1 Aminoglycoside susceptible/resistance differentiates between organisms with and without acquired resistance mechanisms only. For systemic infections aminoglycosides must be used in combination with other active therapy.

Note 2 Colistin susceptible/resistance differentiates between organisms with and without acquired resistance mechanisms only. For systemic infections colistin must be used in combination with other active therapy.

Carbapenemase producing Enterobacterales isolates identified or submitted to the Microbiological Diagnostic Unit Public Health Laboratory (MDU PHL) between 01/01/2021 and 31/12/2022 with available susceptibility data are included in the analysis above. Antimicrobial susceptibility testing was performed by broth microdilution, except for fosfomycin (agar dilution). Aggregate antibiograms exclude antimicrobials for an organism and carbapenemase gene combinations where fewer than five valid results were available. Aggregate antibiograms are categorised by carbapenemase gene sub-type(s) and isolates may contain other antimicrobial resistance (AMR) mechanisms not indicated. Carbapenemase gene subtypes have been determined by whole genome sequence analysis. EUCAST 2023 clinical breakpoints have been used for all susceptibility interpretations (1). Intermediate susceptibility included as susceptible in aggregate antibiograms.

(1) The European Committee on Antimicrobial Susceptibility Testing. Breakpoint Tables for Interpretation of MICs and Zone Diameters. Version 13.0, 2023. http://www.eucast.org.