

Predicting Antibiotic Resistance in Gram-Negative Bacilli by Rapid Detection of Resistance Genes

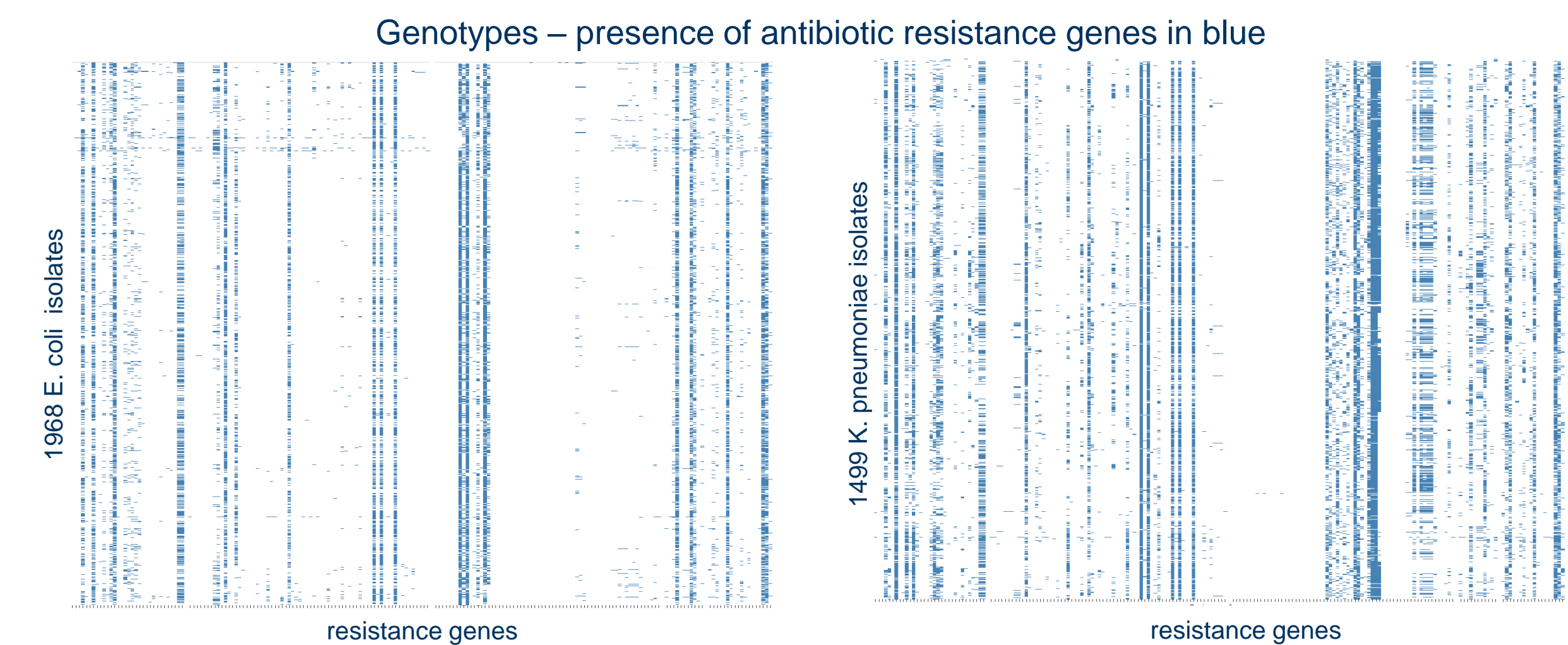
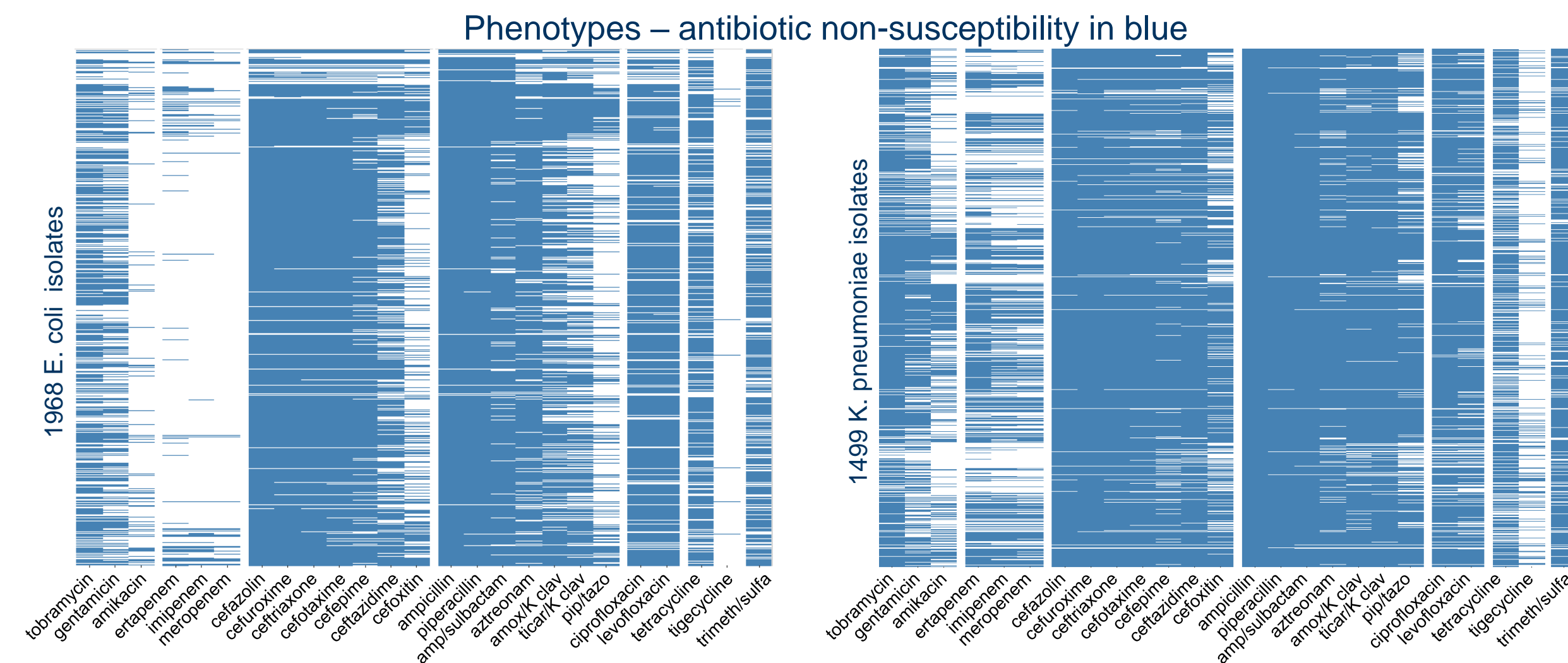
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1968 *E. coli* isolates

1499 *K. pneumoniae* isolates

Antibiotics	1968 <i>E. coli</i> isolates					1499 <i>K. pneumoniae</i> isolates				
	Agreement %	Kappa %	Sensitivity %	Specificity %	AUC %	Agreement %	Kappa %	Sensitivity %	Specificity %	AUC %
Tetracycline	92	81	94	88	93	70	42	58	88	74
Levofloxacin	93	81	95	87	91	88	70	90	83	89
Gentamicin	91	80	86	94	94	83	66	81	87	88
Ciprofloxacin	93	79	95	85	91	92	70	95	76	90
Tobramycin	90	79	91	88	91	88	68	90	82	90
Trimeth.Sulfa	89	76	92	83	92	88	60	93	66	89
Cefepime	87	63	92	72	83	87	57	89	76	85
Ceftriaxone	90	62	92	80	89	88	47	89	79	84
Cefotaxime	89	62	91	79	88	89	53	90	78	87
Cefuroxime	90	56	91	76	86	80	23	80	80	78
Piperacillin	94	55	95	76	87	71	6	70	95	88
Ceftazidime	77	53	81	72	79	87	52	91	67	83
Amp.Sulbactam	84	52	85	82	85	81	15	81	81	83
Amox.K.Clav	76	52	66	90	84	82	40	82	76	85
Meropenem	96	51	55	98	78	86	69	73	93	88
Ampicillin	94	50	96	70	85	NA	NA	NA	NA	NA
Cefazolin	88	49	90	73	84	90	30	92	57	86
Aztreonam	83	49	91	56	78	89	57	91	73	84
Imipenem	93	47	55	96	84	85	68	80	88	86
Ertapenem	90	45	53	94	76	81	62	68	93	81
Pip.Tazo	75	38	66	78	77	75	44	80	66	80
Ticar.K.Clav	68	37	83	54	75	75	28	75	76	80
Cefoxitin	72	36	65	74	75	71	44	62	87	76
Amikacin	81	26	65	82	81	84	58	52	99	85
Tigecycline	75	3	72	75	79	67	14	60	68	65



Background. Conventional microbiology methods such as phenotypic antibiotic susceptibility testing (AST) are too slow for guiding antibiotic therapy. Molecular tests are rapid but haven't comprehensively predicted antibiotic resistance in Gram-negative infections.

Methods. We compared PCR results for 126 families of resistance genes with phenotypic AST (MicroScan) across 1968 *E. coli* and 1499 *K. pneumoniae* clinical isolates.

Results. Statistical models predicted phenotypic antibiotic resistance from resistance genes with excellent agreement to phenotypic AST results with the ability to identify ESBLs and other MDROs.

Conclusions. Rapid detection of resistance genes can improve antibiotic use and outcomes for Gram-negative infections.