Table S1: PCR primers for all detected genes in carbapenem-resistant *Escherichia coli* surrogates.

Target gene	Target protein	Primer name	Sequence (5' to 3')	Amplicon size (bp)	Reference
uidA	β-glucuronidase	*uidA*-F	ATCACCGTGGTGACGCATGTCGC	486	(Heininger et al., 1999)
		uidA-R	CACCACGATGCCATGTTCATCTGC		
bla$_{KPC}$	Class A carbapenemase	KPC-Fm	CGTCTAGTTCTGCTGTCTTG	798	(Poirel et al., 2011)
		KPC-Rm	CTTGTCATCCTTGTTAGGCG		
bla$_{IMP}$	Class B carbapenemase	IMP-F	GGAATAGAGTGGCTTAAYTCTC	232	(Poirel et al., 2011)
		IMP-R	GGTTTAAYAAAACAACCACC		
bla$_{VIM}$	Class B carbapenemase	VIM-F	GATGGTGTTTGGTCGCATA	390	(Poirel et al., 2011)
		VIM-R	CGAATGCGCAGCACCAG		
bla$_{NDM}$	Class B carbapenemase	NDM-F	GGTTTGGCGATCTGGTTTTC	621	(Poirel et al., 2011)
		NDM-R	CGGAATGGCTCATCACGATC		
bla$_{OXA-48}$	Class D carbapenemase	OXA-F	GCGTGGTTAAGGATGAACAC	438	(Poirel et al., 2011)
		OXA-R	CATCAAGTTCAACCCAACCG		
eae	Intimin	AE-19	CAGGTCGTCGTGTCTGCTAAA	1,087	(Gannon et al., 1993)
		AE-20	TCAGCGTGGTTGGATCAACCT		
stx$_1$	Shiga toxin 1	EVT-1	CAACACTGGATGATCTCAG	350	(Sukhumungoon et al., 2011)
		EVT-2	CCCCCTCAACTGCTAATA		
stx$_2$	Shiga toxin 2	EVS-1	ATCAGTCGTCACTCACTGGT	404	(Sukhumungoon et al., 2011)
		EVS-2	CCAGTTATCTGACATTCTG		
bfpA	Bundle forming pili	EP-1	AATGGTGCTTGCGCTTGCTGC	326	(Gunzburg et al., 1995)
		EP-2	GCCGCTTTATCCAACCTGGTA		

est	Heat-stable enterotoxin	JW14	ATTTTTMTTTCTGTATTRTCTT	190	(Stacy-Phipps et al., 1995)
		JW7	CACCCGGTACARGCAGGATT		
elt	Heat-labile	TW20	GGCGACAGATTATACCGTGC	450	(Stacy-Phipps et al., 1995)
	enterotoxin	JW11	CGGTCTCTATATTCCCTGTT		
aggR	Transcriptional	AggR-1	CAGAATACATCAGTACACTG	433	(Tsukamoto, 1996)
	activator of AAF/I	AggR-2	GAAGCTTACAGCCGATATAT		
ipaH	Enteroinvasive	ipaIII	GTTCCTTGACCGCCTTTCCGATACCGTC	603, 619	(Sethabutr et al., 1993)
	mechanism	ipaIV	GCCGGTCAGCCACCCTCTGAGAGTAC		
daaE	F1845 fimbriae	daaF-F	GAACGTTGGTTAATGTGGGGTAA	542	(Vidal et al., 2005)
		daaF-R	TATTCACCGGTCGGTTATCAGT		
papA	P fimbriae subunit	PapA f	ATGGCAGTGGTGTCTTTTGGTG	720	(Vidal et al., 2005)
		PapA r	CGTCCCACCATACGTGCTCTTC		
papC	Outer membrane	PapC f	GTGGCAGTATGAGTAATGACCGTTA	200	(Vidal et al., 2005)
	usher protein	PapC r	ATATCCTTTCTGCAGGGATGCAATA		
sfaDE	S fimbriae	sfa1-F	CTCCGGAGAACTGGGTGCATCTTAC	408	(Le Bouguenec et al.,
		sfa2-R	CGGAGGAGTAATTACAAACCTGGCA		1992)
afa	Afa adhesion	afa1	GCTGGGCAGCAAACTGATAACTCTC	750	(Le Bouguenec et al.,
		afa2	CATCAAGCTGTlTTGTTCGTCCGCCG		1992)
kpsMT II	Capsular antigen	kpsII f	GCGCATTTGCTGATACTGTTG	272	(Johnson and Stell, 2000)
		kpsII r	CATCCAGACGATAAGCATGAGCA		
iutA	Aerobactin	AerJ f	GGCTGGACATCATGGGAACTGG	300	(Johnson et al., 2006)
		AerJ r	CGTCGGGAACGGGTAGAATCG		
astA	EAST1	EAST11a	CCATCAACACAGTATATCCGA	111	

		EAST11b	GGTCGCGAGTGACGGCTTTGT		(de Sousa and Dubreuil, 2001)
agn43	Antigen 43	1-Kpn	GAACCTGTCGGTACCGATGCCCTCCC		(Danese et al., 2000)
		2-Bam	CGGGATCCGTTGCCACTGTACCGGGCTTGACGACC		
cnf1	Cytotoxic necro-	cnf1-F	AAGATGGAGTTTCCTATGCAGGAG	498	(Yamamoto et al., 1995)
	tizing factor-1	cnf2-R	CATTCAGAGTCCTGCCCTCATTATT		
hlyA	α-hemolysin	hly1	AACAAGGATAAGCACTGTTCTGGCT	1,177	(Yamamoto et al., 1995)
		hly2	ACCATATAAGCGGTCATTCCCGTCA		
fimH	Type 1 fimbriae	Fim*H*-F	TGCAGAACGGATAAGCCGTGG	508	(Johnson and Stell, 2000)
		Fim*H*-R	GCAGTCACCTGCCCTCCGGTA		
lpf	Long polar	*lpf* A1-F	GGTCGTTTTTGCCTTAACCGC	500	(Torres et al., 2004)
	fimbriae	*lpf* A1-R	AGGTTGAAATCGACCTGCGC		
chuA	Heme transport	chuA1	ATGGTACCGGACGAACCAAC	288	(Clermont et al., 2000)
		chuA2	TGCCGCCAGTACCAAAGACA		
yjaA	Unknown	yjaA1	CAAACGTGAAGTGTCAGGAG	211	(Clermont et al., 2000)
		yjaA2	AATGCGTTCCTCAACCTGTG		
TSPE4.C2	Unknown	TspE4.C2-1	CACTATTCGTAAGGTCATCC	152	(Clermont et al., 2000)
		TspE4.C2-2	AGTTTATCGCTGCGGGTCGC		

Table S2: PCR conditions for all detected genes in carbapenem-resistant *Escherichia coli* surrogates.

Target gene	Category	PCR condition			No. of cycles
		Denaturation	Annealing	Extension	
uidA	*E. coli*	94 ˚C, 30 min	59 ˚C, 50 sec	72 ˚C, 50 sec	33
bla_{KPC}	Class A carbapenemase	94 ˚C, 30 sec	52 ˚C, 40 sec	72 ˚C, 50 sec	36
bla_{IMP}	Class B carbapenemase	94 ˚C, 30 sec	52 ˚C, 40 sec	72 ˚C, 50 sec	36
bla_{VIM}	Class B carbapenemase	94 ˚C, 30 sec	57 ˚C, 40 sec	72 ˚C, 50 sec	36
bla_{NDM}	Class B carbapenemase	94 ˚C, 30 sec	56 ˚C, 40 sec	72 ˚C, 50 sec	36
bla_{OXA-48}	Class D carbapenemase	94 ˚C, 30 sec	52 ˚C, 40 sec	72 ˚C, 50 sec	36
stx1	EHEC	94 ˚C, 1 min	55 ˚C, 1 min	72 ˚C, 50 sec	35
stx2	EHEC	94 ˚C, 1 min	50 ˚C, 1 min	72 ˚C, 1 min	35
eae	EHEC, tEPEC, aEPEC	94 ˚C, 1 min	55 ˚C, 1 min	72 ˚C, 1.15 min	35
bfp	tEPEC	94 ˚C, 1 min	55 ˚C, 1 min	72 ˚C, 1 min	35
est	ETEC	94 ˚C, 1 min	40 ˚C, 1 min	72 ˚C, 30 sec	35
elt	ETEC	94 ˚C, 1 min	50 ˚C, 1 min	72 ˚C, 50 sec	35
aggR	EAEC	94 ˚C, 1 min	50 ˚C, 50 sec	72 ˚C, 1 min	32
ipaH	EIEC	94 ˚C, 1 min	65 ˚C, 50 sec	72 ˚C, 1 min	33
daaE	DAEC	94 ˚C, 1 min	55 ˚C, 1 min	72 ˚C, 1 min	35
papA, papC	ExPEC group 1	94 ˚C, 1 min	55 ˚C, 1 min	72 ˚C, 1 min	35
sfaDE	ExPEC group 2	94 ˚C, 1 min	58 ˚C, 1 min	72 ˚C, 1 min	35
afa	ExPEC group 3	94 ˚C, 1 min	58 ˚C, 1 min	72 ˚C, 1 min	33
kpsMT II	ExPEC group 4	94 ˚C, 1 min	50 ˚C, 1 min	72 ˚C, 50 sec	36
iutA	ExPEC group 5	94 ˚C, 1 min	58 ˚C, 1 min	72 ˚C, 50 sec	35
astA	Virulence gene	94 ˚C, 1 min	50 ˚C, 1 min	72 ˚C, 1 min	35
agn43	Virulence gene	94 ˚C, 1 min	67 ˚C, 1 min	72 ˚C, 1.30 min	32
cnf1	Virulence gene	94 ˚C, 1 min	58 ˚C, 1 min	72 ˚C, 50 sec	35
hlyA	Virulence gene	94 ˚C, 1 min	55 ˚C, 40 sec	72 ˚C, 1 min	35
fimH	Virulence gene	94 ˚C, 1 min	55 ˚C, 1 min	72 ˚C, 1 min	35
lpf	Virulence gene	94 ˚C, 1 min	55 ˚C, 1 min	72 ˚C, 1.50 min	35
chuA	Phylogenetic group	94 ˚C, 50 sec	54 ˚C, 50 sec	72 ˚C, 30 sec	35
yjaA	Phylogenetic group	94 ˚C, 50 sec	54 ˚C, 50 sec	72 ˚C, 30 sec	35
TSPE4.C2	Phylogenetic group	94 ˚C, 50 sec	54 ˚C, 50 sec	72 ˚C, 30 sec	35

Table S3: Antimicrobial susceptibility patterns in carbapenem-non-susceptible *Escherichia coli* surrogates.

Sample source	Isolate code	Antimicrobial agents				Classification
		CTX	CAZ	IPM	MEM	
Beef	B1.3	S	S	R	I	CNSEC/CREC
Beef	B1.4	S	S	R	R	CNSEC/CREC
Beef	B1.7	R	R	S	S	ESBL-PEC
Beef	B1.9	S	S	S	S	CSEC
Beef	B1.13	S	S	S	S	CSEC
Beef	B1.14	S	S	S	S	CSEC
Beef	B1.15	S	S	S	S	CSEC
Beef	B2.9	S	S	S	S	CSEC
Beef	B2.14	S	S	S	S	CSEC
Beef	B2.15	S	S	S	S	CSEC
Beef	B2.16	S	S	S	S	CSEC
Beef	B3.15	S	S	S	S	CSEC
Beef	B3.18	S	S	S	S	CSEC
Beef	B3.19	S	S	S	S	CSEC
Beef	B3.2	S	S	S	S	CSEC
Beef	B3.17	S	S	S	S	CSEC
Beef	B4.3	S	S	S	S	CSEC
Beef	B4.4	S	S	S	S	CSEC
Beef	B1.4	S	S	S	S	CSEC
Beef	B1.8	S	S	S	S	CSEC
Beef	B1.11	S	S	S	S	CSEC
Beef	B1.19	S	S	S	S	CSEC
Beef	B1.2	S	S	R	R	CNSEC/CREC
Beef	B2.1	R	S	R	I	CNSEC & ESBL-PEC
Beef	B2.2	S	S	R	I	CNSEC/CREC
Beef	B2.5	I	S	I	S	CNSEC
Beef	B2.6	R	S	R	I	CNSEC & ESBL-PEC
Beef	B2.7	I	S	R	I	CNSEC/CREC
Beef	B2.8	I	S	I	S	CNSEC
Beef	B2.9	S	S	S	S	CSEC
Beef	B2.1	S	S	S	S	CSEC
Beef	B2.14	R	S	R	R	CNSEC & ESBL-PEC
Beef	B2.18	S	S	S	S	CSEC
Beef	B2.2	S	S	R	I	CNSEC/CREC
Beef	B3.2	I	S	R	S	CNSEC/CREC
Beef	B3.3	S	S	S	S	CSEC
Beef	B3.4	S	S	R	I	CNSEC/CREC
Beef	B3.5	S	S	S	S	CSEC
Beef	B3.6	I	S	R	R	CNSEC/CREC
Beef	B3.7	S	S	S	S	CSEC

Beef	B3.9	S	S	S	S	CSEC
Beef	B3.11	S	S	S	S	CSEC
Beef	B3.13	S	S	R	I	CNSEC/CREC
Beef	B3.15	S	S	S	S	CSEC
Beef	B3.18	S	S	S	S	CSEC
Beef	B4.3	S	S	S	S	CSEC
Beef	B4.5	S	S	S	S	CSEC
Beef	B4.7	S	S	S	S	CSEC
Beef	B4.8	S	S	S	S	CSEC
Beef	B4.1	S	S	S	S	CSEC
Beef	B4.15	S	S	S	S	CSEC
Beef	B4.16	S	S	S	S	CSEC
Beef	B4.19	S	S	S	S	CSEC
Beef	B4.2	I	S	S	S	CSEC
Beef	B5.2	S	S	S	S	CSEC
Beef	B5.4	S	S	I	S	CNSEC
Beef	B5.5	S	S	S	S	CSEC
Beef	B5.6	S	S	S	S	CSEC
Beef	B5.7	S	S	S	S	CSEC
Beef	B5.13	I	S	S	S	CSEC
Beef	B5.17	I	S	S	S	CSEC
Beef	B5.18	S	S	R	I	CNSEC/CREC
Beef	B6.3	S	S	S	S	CSEC
Beef	B6.6	S	S	S	S	CSEC
Beef	B6.7	S	S	S	S	CSEC
Beef	B6.9	S	S	S	S	CSEC
Beef	B6.1	S	S	S	S	CSEC
Beef	B6.15	S	S	S	S	CSEC
Beef	B6.16	S	S	S	S	CSEC
Beef	B6.2	S	S	S	S	CSEC
Beef	B7.1	S	S	R	S	CNSEC/CREC
Beef	B7.2	I	S	R	S	CNSEC/CREC
Beef	B7.3	S	S	R	S	CNSEC/CREC
Beef	B7.1	S	S	R	S	CNSEC/CREC
Beef	B7.12	S	S	S	S	CSEC
Beef	B7.14	S	S	S	S	CSEC
Beef	B7.18	S	S	R	S	CNSEC/CREC
Beef	B14.1	R	R	R	R	CNSEC & ESBL-PEC
Beef	B14.2	R	R	R	R	CNSEC & ESBL-PEC
Beef	B14.3	R	R	R	R	CNSEC & ESBL-PEC
Beef	B14.4	R	R	R	R	CNSEC & ESBL-PEC
Beef	B14.5	R	R	R	R	CNSEC & ESBL-PEC
Beef	B14.6	R	R	R	R	CNSEC & ESBL-PEC
Beef	B14.7	R	R	R	R	CNSEC & ESBL-PEC

Beef	B14.8	R	R	R	R	CNSEC & ESBL-PEC
Beef	B14.9	R	R	R	R	CNSEC & ESBL-PEC
Beef	B14.1	R	R	R	R	CNSEC & ESBL-PEC
Beef	B14.11	R	R	R	R	CNSEC & ESBL-PEC
Beef	B14.12	R	R	R	R	CNSEC & ESBL-PEC
Beef	B14.13	R	R	R	R	CNSEC & ESBL-PEC
Beef	B14.14	R	R	R	R	CNSEC & ESBL-PEC
Beef	B14.15	R	R	R	R	CNSEC & ESBL-PEC
Beef	B22.1	S	I	R	R	CNSEC/CREC
Beef	B23.1	S	S	R	R	CNSEC/CREC
Beef	B23.3	S	S	R	R	CNSEC/CREC
Beef	B23.4	S	S	I	S	CNSEC
Beef	B24.1	S	S	R	R	CNSEC/CREC
Beef	B24.2	I	S	R	R	CNSEC/CREC
Beef	B24.4	S	S	R	I	CNSEC/CREC
Beef	B24.5	I	S	R	I	CNSEC/CREC
Beef	B24.6	S	S	R	I	CNSEC/CREC
Beef	B24.9	S	I	R	R	CNSEC/CREC
Beef	B24.1	S	S	R	R	CNSEC/CREC
Beef	B24.11	S	I	R	R	CNSEC/CREC
Beef	B24.12	S	S	R	R	CNSEC/CREC
Beef	B24.14	S	I	R	R	CNSEC/CREC
Beef	B24.15	S	S	R	R	CNSEC/CREC
Beef	B25.1	S	S	R	R	CNSEC/CREC
Beef	B25.2	S	S	R	I	CNSEC/CREC
Beef	B25.3	S	S	R	I	CNSEC/CREC
Beef	B26.2	S	S	R	I	CNSEC/CREC
Beef	B26.6	S	S	R	S	CNSEC/CREC
Beef	B26.9	I	S	R	R	CNSEC/CREC
Beef	B26.1	S	S	I	S	CNSEC
Beef	B27.1	S	S	R	R	CNSEC/CREC
Beef	B27.2	S	S	R	I	CNSEC/CREC
Beef	B27.3	S	S	R	I	CNSEC/CREC
Beef	B27.4	S	S	R	I	CNSEC/CREC
Beef	B27.5	S	S	R	I	CNSEC/CREC
Beef	B27.6	S	S	R	R	CNSEC/CREC
Beef	B27.7	S	S	R	I	CNSEC/CREC
Beef	B27.8	S	S	R	I	CNSEC/CREC
Beef	B29.1	S	S	R	I	CNSEC/CREC
Beef	B29.4	S	S	R	S	CNSEC/CREC
Beef	B30.1	S	S	R	S	CNSEC/CREC
Beef	B30.2	S	S	R	R	CNSEC/CREC
Beef	B30.3	S	S	R	R	CNSEC/CREC
Beef	B30.4	S	S	R	R	CNSEC/CREC

Beef	B30.6	S	S	R	S	CNSEC/CREC
Beef	B30.7	R	R	R	R	CNSEC & ESBL-PEC
Beef	B30.8	S	S	I	S	CNSEC
Beef	B30.9	S	S	R	I	CNSEC/CREC
Beef	B30.1	S	S	R	I	CNSEC/CREC
Beef	B30.11	S	S	R	R	CNSEC/CREC
Beef	B30.12	S	S	R	I	CNSEC/CREC
Beef	B30.13	S	I	R	R	CNSEC/CREC
Beef	B31.1	S	S	R	I	CNSEC/CREC
Beef	B31.2	S	S	I	S	CNSEC
Beef	B31.3	S	S	R	I	CNSEC/CREC
Beef	B31.5	S	S	R	S	CNSEC/CREC
Beef	B32.1	S	S	R	I	CNSEC/CREC
Beef	B32.3	S	S	R	S	CNSEC/CREC
Beef	B32.4	S	S	R	R	CNSEC/CREC
Beef	B32.5	S	S	R	R	CNSEC/CREC
Beef	B32.6	S	S	R	R	CNSEC/CREC
Beef	B32.7	S	S	R	S	CNSEC/CREC
Beef	B32.8	S	S	R	S	CNSEC/CREC
Beef	B32.9	S	S	R	S	CNSEC/CREC
Beef	B32.1	S	S	R	R	CNSEC/CREC
Beef	B32.11	S	S	R	R	CNSEC/CREC
Beef	B32.12	S	S	I	S	CNSEC
Beef	B32.13	S	I	R	R	CNSEC/CREC
Beef	B32.15	S	S	R	R	CNSEC/CREC
Beef	B33.1	S	S	R	R	CNSEC/CREC
Beef	B33.2	S	S	R	I	CNSEC/CREC
Beef	B33.3	S	S	R	I	CNSEC/CREC
Beef	B33.5	S	S	R	I	CNSEC/CREC
Beef	B33.6	S	S	R	I	CNSEC/CREC
Beef	B33.7	S	S	R	I	CNSEC/CREC
Beef	B33.8	S	S	R	I	CNSEC/CREC
Beef	B33.11	I	I	I	S	CNSEC
Beef	B33.12	S	S	I	S	CNSEC
Beef	B34.1	S	S	R	R	CNSEC/CREC
Beef	B34.2	S	S	R	S	CNSEC/CREC
Beef	B34.3	S	S	R	R	CNSEC/CREC
Beef	B34.4	S	I	R	R	CNSEC/CREC
Beef	B34.5	S	S	R	I	CNSEC/CREC
Beef	B34.6	S	S	R	I	CNSEC/CREC
Beef	B34.7	S	I	I	S	CNSEC
Beef	B34.8	S	I	R	R	CNSEC/CREC
Beef	B34.9	R	S	I	I	CNSEC & ESBL-PEC
Beef	B34.1	S	S	R	R	CNSEC/CREC

Beef	B34.11	S	S	R	S	CNSEC/CREC
Beef	B34.12	S	S	R	I	CNSEC/CREC
Beef	B34.13	S	S	R	I	CNSEC/CREC
Beef	B34.14	S	S	R	R	CNSEC/CREC
Beef	B34.15	S	S	R	R	CNSEC/CREC
Beef	B38.1	S	S	R	R	CNSEC/CREC
Beef	B39.1	S	S	R	I	CNSEC/CREC
Beef	B39.2	S	S	R	I	CNSEC/CREC
Beef	B44.1	S	S	I	S	CNSEC
Beef	B44.2	I	I	R	I	CNSEC/CREC
Beef	B46.1	S	I	R	I	CNSEC/CREC
Beef	B48.1	I	I	R	R	CNSEC/CREC
Beef	B49.1	S	S	R	I	CNSEC/CREC
Pork	P58.1	I	S	R	S	CNSEC/CREC
Pork	P58.3	S	S	R	S	CNSEC/CREC
Pork	P58.4	I	S	R	S	CNSEC/CREC
Pork	P58.5	I	R	R	I	CNSEC & ESBL-PEC
Pork	P58.6	S	S	R	I	CNSEC/CREC
Pork	P58.7	S	S	R	I	CNSEC/CREC
Pork	P58.8	S	I	R	I	CNSEC/CREC
Pork	P58.9	S	S	R	R	CNSEC/CREC
Pork	P58.11	S	S	R	I	CNSEC/CREC
Pork	P58.12	S	S	R	I	CNSEC/CREC
Pork	P58.13	S	S	R	R	CNSEC/CREC
Pork	P58.14	S	S	R	I	CNSEC/CREC
Pork	P58.15	I	S	I	R	CNSEC/CREC
Pork	P63.4	S	S	R	I	CNSEC/CREC
Pork	P63.5	R	R	S	R	CNSEC & ESBL-PEC
Pork	P64.3	S	S	R	R	CNSEC/CREC
Pork	P64.4	I	S	R	R	CNSEC/CREC
Pork	P64.6	I	I	R	S	CNSEC/CREC
Pork	P65.5	S	S	R	I	CNSEC/CREC
Pork	P65.1	S	S	R	S	CNSEC/CREC
Pork	P65.2	S	S	R	I	CNSEC/CREC
Pork	P65.3	I	S	R	S	CNSEC/CREC
Pork	P65.9	I	I	R	I	CNSEC/CREC
Pork	P65.11	S	S	R	I	CNSEC/CREC
Pork	P65.13	S	S	R	I	CNSEC/CREC
Pork	P65.14	S	S	R	I	CNSEC/CREC
Pork	P65.15	S	I	R	I	CNSEC/CREC
Pork	P66.2	S	S	R	I	CNSEC/CREC
Pork	P66.3	R	I	S	R	CNSEC & ESBL-PEC
Pork	P66.4	S	I	R	R	CNSEC/CREC
Pork	P66.5	S	I	R	I	CNSEC/CREC

Pork	P66.8	I	I	R	R	CNSEC/CREC
Pork	P66.9	S	S	R	R	CNSEC/CREC
Pork	P66.1	S	S	R	R	CNSEC/CREC
Pork	P66.11	S	S	R	R	CNSEC/CREC
Pork	P66.12	S	S	R	I	CNSEC/CREC
Pork	P66.13	S	S	R	R	CNSEC/CREC
Pork	P71.1	S	S	R	I	CNSEC/CREC
Pork	P71.2	S	S	R	I	CNSEC/CREC
Pork	P71.5	S	I	R	R	CNSEC/CREC
Pork	P71.6	S	S	R	I	CNSEC/CREC
Pork	P72.2	S	I	R	R	CNSEC/CREC
Pork	P72.3	S	I	R	R	CNSEC/CREC
Pork	P73.1	S	S	R	R	CNSEC/CREC
Pork	P73.2	S	S	R	I	CNSEC/CREC
Pork	P77.1	S	S	R	I	CNSEC/CREC
Pork	P77.2	S	S	R	R	CNSEC/CREC
Pork	P77.4	S	S	R	I	CNSEC/CREC
Pork	P77.5	S	S	R	R	CNSEC/CREC
Pork	P77.6	S	S	I	S	CNSEC
Pork	P77.7	S	S	R	R	CNSEC/CREC
Pork	P77.8	S	S	R	R	CNSEC/CREC
Pork	P77.11	S	S	I	S	CNSEC
Pork	P78.3	S	S	I	S	CNSEC
Pork	P78.5	S	S	R	I	CNSEC/CREC
Pork	P78.6	S	S	R	R	CNSEC/CREC
Pork	P78.7	S	S	R	I	CNSEC/CREC
Pork	P78.8	S	S	R	I	CNSEC/CREC
Pork	P78.9	S	S	R	I	CNSEC/CREC
Pork	P79.3	S	S	R	I	CNSEC/CREC
Pork	P79.4	S	I	R	R	CNSEC/CREC
Pork	P80.1	S	S	R	R	CNSEC/CREC
Pork	P80.2	S	S	R	R	CNSEC/CREC
Pork	P80.4	S	S	R	I	CNSEC/CREC
Pork	P80.8	S	S	I	S	CNSEC
Pork	P80.9	S	S	I	S	CNSEC
Pork	P80.1	S	S	I	S	CNSEC
Pork	P85.2	S	S	R	R	CNSEC/CREC
Pork	P85.3	S	S	R	R	CNSEC/CREC
Pork	P85.4	S	S	R	R	CNSEC/CREC
Pork	P85.7	S	S	R	R	CNSEC/CREC
Pork	P85.8	S	S	R	R	CNSEC/CREC
Pork	P85.9	S	I	R	R	CNSEC/CREC
Pork	P85.1	S	R	R	R	CNSEC & ESBL-PEC
Pork	P85.12	S	S	R	S	CNSEC/CREC

Pork	P86.1	S	S	R	I	CNSEC/CREC
Pork	P86.1	S	S	R	I	CNSEC/CREC
Pork	P86.12	S	I	R	R	CNSEC/CREC
Pork	P86.13	S	I	R	R	CNSEC/CREC
Pork	P86.15	S	S	R	I	CNSEC/CREC
Pork	P87.1	S	S	R	R	CNSEC/CREC
Pork	P87.2	S	S	R	R	CNSEC/CREC
Pork	P87.4	S	I	R	R	CNSEC/CREC
Pork	P87.5	S	S	R	R	CNSEC/CREC
Pork	P87.6	S	I	R	R	CNSEC/CREC
Pork	P87.7	S	S	R	R	CNSEC/CREC
Pork	P87.8	S	S	R	R	CNSEC/CREC
Pork	P87.12	R	R	R	I	CNSEC & ESBL-PEC
Pork	P91.1	S	S	R	S	CNSEC/CREC
Pork	P91.2	S	S	S	S	CSEC
Pork	P91.3	I	I	R	R	CNSEC/CREC
Pork	P92.1	I	I	R	R	CNSEC/CREC
Pork	P93.1	S	S	I	S	CNSEC
Pork	P93.2	I	S	I	S	CNSEC
Pork	P94.1	I	I	R	R	CNSEC/CREC
Pork	P94.2	I	I	R	R	CNSEC/CREC
Pork	P94.3	I	I	R	R	CNSEC/CREC
Pork	P95.2	S	S	I	S	CNSEC
Pork	P95.3	S	S	R	I	CNSEC/CREC
Pork	P95.6	S	S	R	S	CNSEC/CREC
Pork	P95.7	I	I	R	I	CNSEC/CREC
Pork	P95.8	I	S	R	I	CNSEC/CREC
Pork	P95.9	S	S	R	S	CNSEC/CREC
Pork	P95.14	S	S	R	I	CNSEC/CREC
Pork	P96.1	S	S	I	S	CNSEC
Pork	P96.4	S	S	I	S	CNSEC
Pork	P96.5	I	I	I	S	CNSEC
Pork	P96.6	I	S	R	S	CNSEC/CREC
Pork	P96.7	S	S	I	S	CNSEC
Pork	P96.8	I	I	R	I	CNSEC/CREC
Pork	P97.2	I	S	I	S	CNSEC
Pork	P97.4	S	S	R	R	CNSEC/CREC
Pork	P97.5	I	I	R	R	CNSEC/CREC
Pork	P97.6	I	I	R	I	CNSEC/CREC
Pork	P97.8	I	S	I	S	CNSEC
Pork	P105.1	S	S	R	S	CNSEC/CREC
Pork	P105.2	R	S	R	I	CNSEC & ESBL-PEC
Pork	P105.4	I	S	R	I	CNSEC/CREC
Pork	P105.7	I	S	R	I	CNSEC/CREC

Pork	P105.1	S	S	R	S	CNSEC/CREC
Pork	P106.13	S	S	R	I	CNSEC/CREC
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Pork	P106.15	S	S	R	I	CNSEC/CREC
Pork	P107.1	S	S	R	I	CNSEC/CREC
Pork	P108.2	S	S	R	I	CNSEC/CREC
Pork	P108.3	S	S	R	R	CNSEC/CREC
Pork	P108.4	S	S	R	I	CNSEC/CREC
Pork	P108.5	S	S	R	I	CNSEC/CREC
Pork	P108.6	S	S	R	I	CNSEC/CREC
Pork	P108.7	S	S	R	S	CNSEC/CREC
Pork	P109.5	I	S	R	I	CNSEC/CREC
Pork	P109.6	S	S	R	I	CNSEC/CREC
Pork	P109.7	S	S	R	I	CNSEC/CREC
Pork	P109.8	S	S	R	I	CNSEC/CREC
Pork	P122.1	S	S	R	S	CNSEC/CREC
Pork	P122.2	I	I	R	R	CNSEC/CREC
Pork	P123.1	I	S	R	I	CNSEC/CREC
Pork	P123.2	S	S	R	I	CNSEC/CREC
Pork	P124.1	S	I	R	R	CNSEC/CREC
Chicken	C54.1	S	S	R	I	CNSEC/CREC
Chicken	C54.2	S	S	R	S	CNSEC/CREC
Chicken	C54.3	S	S	I	S	CNSEC
Chicken	C54.4	S	S	I	S	CNSEC
Chicken	C54.7	S	S	I	S	CNSEC
Chicken	C54.9	S	S	I	S	CNSEC
Chicken	C54.13	S	S	I	I	CNSEC
Chicken	C67.1	S	S	R	I	CNSEC/CREC
Chicken	C67.2	S	S	R	I	CNSEC/CREC
Chicken	C67.3	S	S	R	I	CNSEC/CREC
Chicken	C70.1	S	S	R	I	CNSEC/CREC
Chicken	C70.2	I	S	R	R	CNSEC/CREC
Chicken	C70.3	S	S	R	I	CNSEC/CREC
Chicken	C70.4	S	S	R	I	CNSEC/CREC
Chicken	C70.5	S	S	R	I	CNSEC/CREC
Chicken	C70.6	S	S	R	I	CNSEC/CREC
Chicken	C70.8	S	S	R	S	CNSEC/CREC
Chicken	C70.9	S	S	R	I	CNSEC/CREC
Chicken	C70.11	S	S	R	I	CNSEC/CREC
Chicken	C70.12	S	S	R	I	CNSEC/CREC
Chicken	C70.13	S	S	R	R	CNSEC/CREC
Chicken	C74.2	S	S	R	R	CNSEC/CREC
Chicken	C74.3	S	S	R	R	CNSEC/CREC
Chicken	C75.1	S	S	R	R	CNSEC/CREC

Chicken	C75.2	S	S	R	R	CNSEC/CREC
Chicken	C75.3	S	S	R	R	CNSEC/CREC
Chicken	C75.4	S	S	R	R	CNSEC/CREC
Chicken	C75.5	S	S	R	R	CNSEC/CREC
Chicken	C75.6	S	S	R	R	CNSEC/CREC
Chicken	C75.8	S	S	R	R	CNSEC/CREC
Chicken	C75.9	S	S	R	I	CNSEC/CREC
Chicken	C81.4	S	S	R	R	CNSEC/CREC
Chicken	C81.5	S	S	R	R	CNSEC/CREC
Chicken	C81.6	S	S	R	I	CNSEC/CREC
Chicken	C81.7	S	S	R	I	CNSEC/CREC
Chicken	C82.1	S	S	R	R	CNSEC/CREC
Chicken	C82.2	S	S	R	R	CNSEC/CREC
Chicken	C82.4	S	S	R	R	CNSEC/CREC
Chicken	C82.5	S	S	R	R	CNSEC/CREC
Chicken	C82.6	S	S	R	R	CNSEC/CREC
Chicken	C82.7	S	S	R	R	CNSEC/CREC
Chicken	C82.9	S	S	R	R	CNSEC/CREC
Chicken	C82.13	S	S	R	R	CNSEC/CREC
Chicken	C82.15	S	S	R	R	CNSEC/CREC
Chicken	C83.2	S	S	R	R	CNSEC/CREC
Chicken	C83.3	S	S	R	I	CNSEC/CREC
Chicken	C84.1	S	S	R	R	CNSEC/CREC
Chicken	C84.4	S	S	R	R	CNSEC/CREC
Chicken	C84.5	S	S	R	R	CNSEC/CREC
Chicken	C84.6	S	S	R	R	CNSEC/CREC
Chicken	C84.8	S	I	R	R	CNSEC/CREC
Chicken	C84.1	S	S	R	I	CNSEC/CREC
Chicken	C84.12	S	S	R	I	CNSEC/CREC
Chicken	C84.14	S	S	R	R	CNSEC/CREC
Chicken	C84.15	S	S	R	I	CNSEC/CREC
Chicken	C88.1	S	S	R	S	CNSEC/CREC
Chicken	C88.2	R	S	R	I	CNSEC & ESBL-PEC
Chicken	C88.3	S	S	I	I	CNSEC
Chicken	C90.1	R	I	R	R	CNSEC & ESBL-PEC
Chicken	C90.2	S	I	R	R	CNSEC/CREC
Chicken	C98.4	S	S	I	S	CNSEC
Chicken	C98.11	I	I	R	S	CNSEC/CREC
Chicken	C98.14	I	S	I	S	CNSEC
Chicken	C99.1	I	I	R	I	CNSEC/CREC
Chicken	C99.2	I	I	R	S	CNSEC/CREC
Chicken	C99.6	I	I	S	S	CSEC
Chicken	C99.7	S	S	S	S	CSEC
Chicken	C100.1	S	S	S	S	CSEC

Chicken	C100.2	R	S	R	I	CNSEC & ESBL-PEC
Chicken	C100.4	S	S	R	S	CNSEC/CREC
Chicken	C100.5	S	S	S	S	CSEC
Chicken	C100.6	S	S	R	I	CNSEC/CREC
Chicken	C100.8	S	S	R	I	CNSEC/CREC
Chicken	C100.1	R	S	I	S	CNSEC & ESBL-PEC
Chicken	C101.1	S	S	I	S	CNSEC
Chicken	C101.2	S	S	I	S	CNSEC
Chicken	C102.8	S	S	R	I	CNSEC/CREC
Chicken	C102.9	S	S	R	I	CNSEC/CREC
Chicken	C103.4	S	S	R	I	CNSEC/CREC
Chicken	C103.5	S	S	R	S	CNSEC/CREC
Chicken	C103.6	I	S	R	I	CNSEC/CREC
Chicken	C103.8	I	S	R	R	CNSEC/CREC
Chicken	C103.9	S	S	R	I	CNSEC/CREC
Chicken	C104.1	S	S	R	I	CNSEC/CREC
Chicken	C112.1	I	S	R	I	CNSEC/CREC
Chicken	C112.2	I	S	R	R	CNSEC/CREC
Chicken	C112.3	R	S	R	I	CNSEC & ESBL-PEC
Chicken	C118.1	I	I	R	R	CNSEC/CREC

S, susceptible; I, intermediate-resistant; R, resistant; CNSEC, carbapenem-non-susceptible *Escherichia coli*; CNSEC/CREC, carbapenem-non-susceptible *Escherichia coli* with subclassification of carbapenem-resistant *Escherichia coli*; CSEC, carbapenem-non-susceptible *Escherichia coli*; ESBL-PEC, extended-spectrum β-lactamase-producing *Escherichia coli*

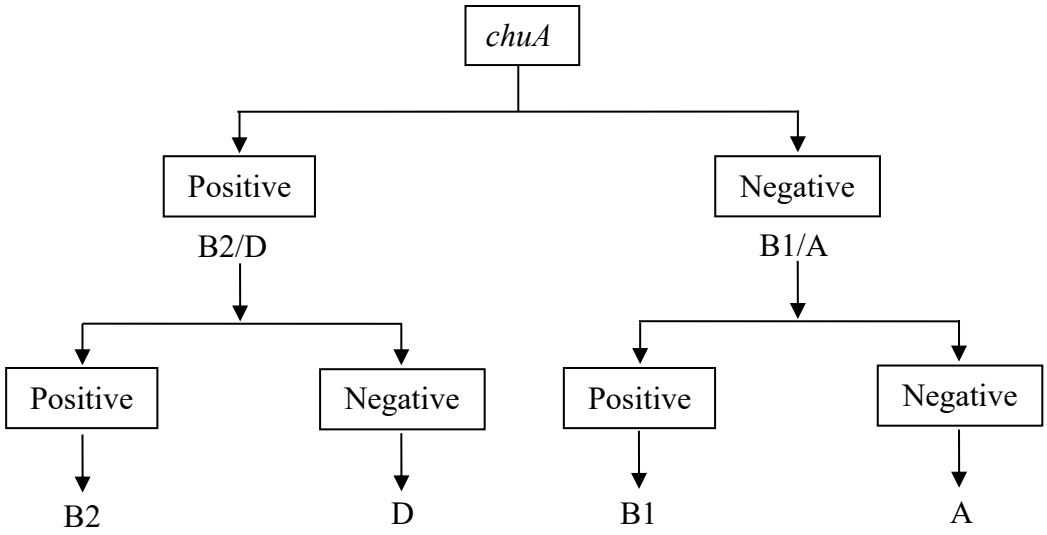

Figure S1: Dichotomous decision tree to determine the phylogenetic group of *Escherichia coli* strains (Clermont *et al.*, 2000).

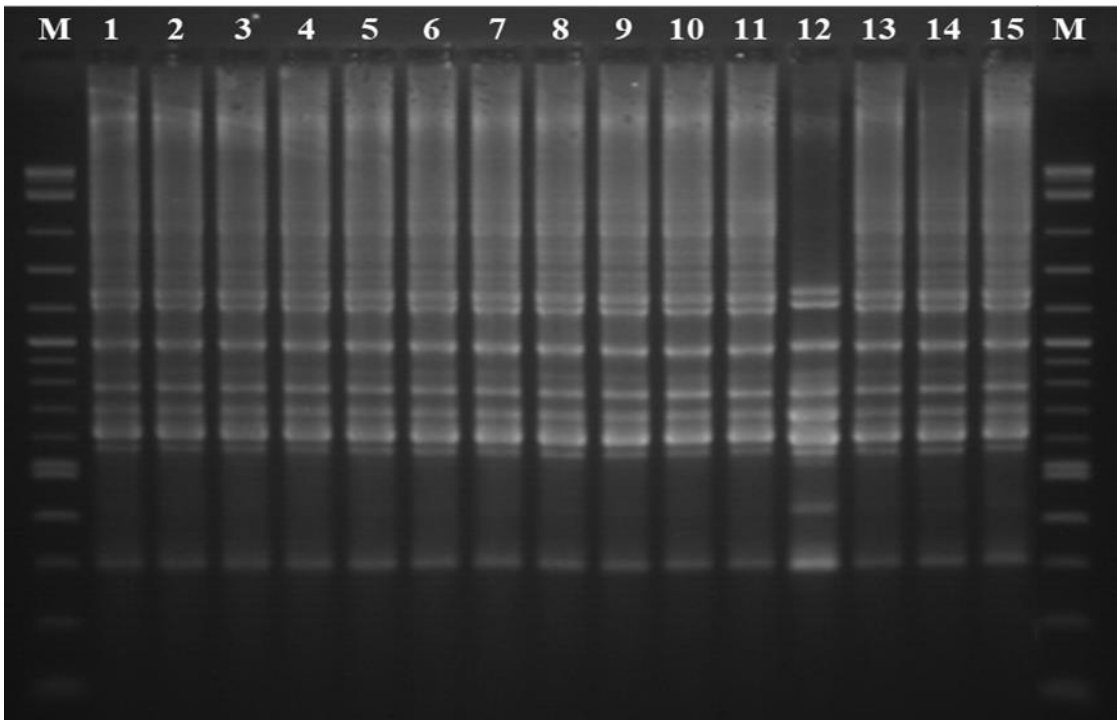

Figure S2: Genetic relatedness among 16 carbapenem-resistant *Escherichia coli* isolates, with at least one carbapenemase gene carriage. Lane M, 2-log DNA markers; lane P, positive control; lane 1, B14.1; lane 2, B14.2; lane 3, B14.3; lane 4, B14.4; lane 5, B14.5; lane 6, B14.6; lane 7, B14.7; lane 8, B14.8; lane 9, B14.9; lane 10, B14.10; lane 11, B14.11; lane 12, B14.12; lane 13, B14.13; lane 14, B14.14; lane 15, B14.15

References

Clermont, O., Bonacorsi, S., and Bingen, E., Rapid and simple determination of the *Escherichia coli* phylogenetic group, *Appl. Environ. Microbiol.*, 2000, vol. 66, no. 10, pp. 4555-58. https://doi.org/10.1128/AEM.66.10.4555-4558.2000

Danese, P.N., Pratt, L.A., Dove, S.L., and Kolter, R., The outer membrane protein, antigen 43, mediates cell-to-cell interactions within *Escherichia coli* biofilms, *Mol. Microbiol.*, 2000, vol. 37, no. 2, pp. 424-32. https://doi.org/10.1046/j.1365-2958.2000.02008.x

de Sousa, C.P. and Dubreuil, J.D., Distribution and expression of the *astA* gene (EAST1 toxin) in *Escherichia coli* and *Salmonella*, *Int. J. Med. Microbiol.*, 2001, vol. 291, no. 1, pp. 15-20. https://doi.org/10.1078/1438-4221-00097

Gannon, V., Rashed, M., King, R.K., and Thomas, E., Detection and characterization of the *eae* gene of Shiga-like toxin-producing *Escherichia coli* using polymerase chain reaction, *J. Clin. Microbiol.*, 1993, vol. 31, no. 5, pp. 1268-74. https://doi.org/10.1128/jcm.31.5.1268-1274.1993

Gunzburg, S.T., Tornieporth, N.G., and Riley, L.W., Identification of enteropathogenic *Escherichia coli* by PCR-based detection of the bundle-forming pilus gene, *J. Clin. Microbiol.*, 1995, vol. 33, no. 5, pp. 1375-77. https://doi.org/10.1128/jcm.33.5.1375-1377.1995

Heininger, A., Binder, M., Schmidt, S., Unertl, K., Botzenhart, K., and Döring, G., PCR and blood culture for detection of Escherichia coli bacteremia in rats, *J. Clin. Microbiol.*, 1999, vol. 37, no. 8, pp. 2479-82. https://doi.org/10.1128/jcm.37.8.2479-2482.1999

Johnson, J.R. and Stell, A.L., Extended virulence genotypes of Escherichia coli strains from patients with urosepsis in relation to phylogeny and host compromise, *J. Infect. Dis*., 2000, vol. 181, no. 1, pp. 261-72. https://doi.org/10.1086/315217

Johnson, T.J., Siek, K.E., Johnson, S.J., and Nolan, L.K., DNA sequence of a ColV plasmid and prevalence of selected plasmid-encoded virulence genes among avian *Escherichia coli* strains, *J. Bacteriol.*, 2006, vol. 188, no. 2, pp. 745-58. https://doi.org/10.1128/jb.188.2.745-758.2006

Le Bouguenec, C., Archambaud, M., and Labigne, A., Rapid and specific detection of the *pap*, *afa*, and *sfa* adhesin-encoding operons in uropathogenic *Escherichia coli* strains by polymerase chain reaction, *J. Clin. Microbiol.*, 1992, vol. 30, no. 5, pp. 1189-93. https://doi.org/10.1128/jcm.30.5.1189-1193.1992

Poirel, L., Walsh, T.R., Cuvillier, V., and Nordmann, P., Multiplex PCR for detection of acquired carbapenemase genes, *Diagn. Microbiol. Infect. Dis.*, 2011, vol. 70, no. 1, pp. 119-23. https://doi.org/10.1016/j.diagmicrobio.2010.12.002

Sethabutr, O., Venkatesan, M., Murphy, G.S., Eampokalap, B., Hoge, C.W., and Echeverria, P., Detection of Shigellae and enteroinvasive *Escherichia* coli by amplification of the invasion plasmid antigen H DNA sequence in patients with dysentery, *J. Infect. Dis.*, 1993, vol. 167, no. 2, pp. 458-61. https://doi.org/10.1093/infdis/167.2.458

Stacy-Phipps, S., Mecca, J.J., and Weiss, J.B., Multiplex PCR assay and simple preparation method for stool specimens detect enterotoxigenic *Escherichia coli* DNA during course of infection, *J. Clin. Microbiol.*, 1995, vol. 33, no. 5, pp. 1054-59. https://doi.org/10.1128/jcm.33.5.1054-1059.1995

Sukhumungoon, P., Nakaguchi, Y., Ingviya, N., Pradutkanchana, J., Iwade, Y., Seto, K., Son, R., Nishibuchi, M., and Vuddhakul, V., Investigation of *stx 2+ eae+ Escherichia coli* O157: H7 in beef imported from Malaysia to Thailand, *Int. Food Res. J.*, 2011, vol. 18, no. 1, pp. 381

Torres, A.G., Kanack, K.J., Tutt, C.B., Popov, V., and Kaper, J.B., Characterization of the second long polar (LP) fimbriae of *Escherichia coli* O157: H7 and distribution of LP fimbriae in other pathogenic *E. coli* strains, *FEMS Microbiol. Lett.*, 2004, vol. 238, no. 2, pp. 333-44. https://doi.org/10.1111/j.1574-6968.2004.tb09774.x

Tsukamoto, T., PCR methods for detection of enteropathogenic *Escherichia coli* (localized adherence) and enteroaggregative *Escherichia coli*, *Kansenshogaku zasshi. The Journal of the Japanese Association for Infectious Diseases*, 1996, vol. 70, pp. 569-73. https://doi.org/10.11150/kansenshogakuzasshi1970.70.569

Vidal, M., Kruger, E., Durán, C., Lagos, R., Levine, M., Prado, V., Toro, C., and Vidal, R., Single multiplex PCR assay to identify simultaneously the six categories of diarrheagenic *Escherichia coli* associated with enteric infections, *J. Clin. Microbiol.*, 2005, vol. 43, no. 10, pp. 5362-65. https://doi.org/10.1128/jcm.43.10.5362-5365.2005

Yamamoto, S., Terai, A., Yuri, K., Kurazono, H., Takeda, Y., and Yoshida, O., Detection of urovirulence factors in *Escherichia coli* by multiplex polymerase chain reaction, *FEMS Immunology & Medical Microbiology*, 1995, vol. 12, no. 2, pp. 85-90. https://doi.org/10.1111/j.1574-695X.1995.tb00179.x