

Supplemental Table 1 Antimicrobial activity of carbapenem agents tested against *E. coli*, including challenge organisms, stratified by molecular characteristics

Organism (no. of isolates)	No. and cumulative % of isolates inhibited at MIC (mg/L) of:											MIC ₅₀	MIC ₉₀	
	Antimicrobial agent	≤0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8			>8
Wild type (90)														
Tebipenem	70 (77.8)	18 (97.8)	1 (98.9)	1 (100.0)									≤0.015	0.03
Meropenem	82 (91.1)	7 (98.9)	1 (100.0)										≤0.015	≤0.015
Doripenem ^a			88 (97.8)	2 (100.0)									≤0.06	≤0.06
Imipenem ^a			18 (20.0)	64 (91.1)	6 (97.8)	2 (100.0)							0.12	0.12
Ertapenem	84 (93.3)	2 (95.6)	1 (96.7)	3 (100.0)									≤0.015	≤0.015
pAmpC and/or ESBL (47)														
Tebipenem	7 (14.9)	29 (76.6)	8 (93.6)	3 (100.0)									0.03	0.06
Meropenem	7 (14.9)	31 (80.9)	7 (95.7)	2 (100.0)									0.03	0.06
Doripenem ^a			23 (48.9)	22 (95.7)	2 (100.0)								0.12	0.12
Imipenem ^a			2 (4.3)	35 (78.7)	4 (87.2)	6 (100.0)							0.12	0.5
Ertapenem	9 (19.1)	18 (57.4)	5 (68.1)	6 (80.9)	2 (85.1)	6 (97.9)	1 (100.0)						0.03	0.5
Carbapenemase (10)														
Tebipenem							1 (10.0)	0 (10.0)	3 (40.0)	3 (70.0)	3 (100.0)		8	>8
Meropenem							1 (10.0)	0 (10.0)	3 (40.0)	3 (70.0)	3 (100.0)		8	>8
Doripenem ^a							2 (20.0)	3 (50.0)	2 (70.0)	1 (80.0)	2 (100.0)		2	>8
Imipenem ^a							1 (10.0)	1 (20.0)	5 (70.0)	1 (80.0)	2 (100.0)		4	>8
Ertapenem									2 (20.0)	2 (40.0)	6 (100.0)		>8	>8

Shading represents susceptible MIC values per CLSI 2018

Abbreviations: pAmpC, plasmid AmpC; ESBL, extended-spectrum β-lactamase.

^a The lowest concentration tested for doripenem and imipenem was 0.06 mg/L.

Supplemental Table 2 Antimicrobial activity of tested agents against *K. pneumoniae*, including challenge organisms, stratified by genotype

Organism (no. of isolates)	No. and cumulative % of isolates inhibited at MIC (mg/L) of:											MIC ₅₀	MIC ₉₀	
	Antimicrobial agent	≤0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8			>8
Wild type (169)														
Tebipenem	17 (10.1)	132 (88.2)	17 (98.2)	1 (98.8)	2 (100.0)								0.03	0.06
Meropenem	47 (27.8)	119 (98.2)	3 (100.0)										0.03	0.03
Doripenem ^a			161 (95.3)	7 (99.4)	1 (100.0)								≤0.06	≤0.06
Imipenem ^a			13 (7.7)	114 (75.1)	33 (94.7)	7 (98.8)	1 (99.4)	1 (100.0)					0.12	0.25
Ertapenem	150 (88.8)	9 (94.1)	6 (97.6)	2 (98.8)	1 (99.4)	0 (99.4)	0 (99.4)	1 (100.0)					≤0.015	0.03
pAmpC and/or ESBL (39)														
Tebipenem		24 (61.5)	6 (76.9)	3 (84.6)	3 (92.3)	0 (92.3)	0 (92.3)	1 (94.9)	1 (97.4)	1 (100.0)			0.03	0.25
Meropenem	2 (5.1)	22 (61.5)	9 (84.6)	1 (87.2)	2 (92.3)	0 (92.3)	0 (92.3)	1 (94.9)	2 (100.0)				0.03	0.25
Doripenem ^a			28 (71.8)	5 (84.6)	3 (92.3)	0 (92.3)	0 (92.3)	1 (94.9)	1 (97.4)	1 (100.0)			≤0.06	0.25
Imipenem ^a			1 (2.6)	25 (66.7)	6 (82.1)	1 (84.6)	5 (97.4)	0 (97.4)	0 (97.4)	1 (100.0)			0.12	1
Ertapenem	4 (10.3)	6 (25.6)	8 (46.2)	8 (66.7)	5 (79.5)	0 (79.5)	3 (87.2)	1 (89.7)	1 (92.3)	0 (92.3)	3 (100.0)		0.12	4
Carbapenemase (38)														
Tebipenem							1 (2.6)	1 (5.3)	5 (18.4)	3 (26.3)	28 (100.0)		>8	>8
Meropenem								3 (7.9)	5 (21.1)	3 (28.9)	27 (100.0)		>8	>8
Doripenem ^a							1 (2.6)	3 (10.5)	8 (31.6)	9 (55.3)	17 (100.0)		8	>8
Imipenem ^a								2 (5.3)	10 (31.6)	12 (63.2)	14 (100.0)		8	>8
Ertapenem								1 (2.6)	1 (5.3)	7 (23.7)	29 (100.0)		>8	>8

Shading represents susceptible MIC values per CLSI 2018

Abbreviations: pAmpC, plasmid AmpC; ESBL, extended-spectrum β-lactamase.

^a The lowest concentration tested for doripenem and imipenem was 0.06 mg/L.

Supplemental Table 3 Antimicrobial activity of tested agents against *P. mirabilis*, including challenge organisms, stratified by genotype

Organism (no. of isolates)	No. and cumulative % of isolates inhibited at MIC (mg/L) of:											MIC ₅₀	MIC ₉₀	
	Antimicrobial agent	≤0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8			>8
Wild type (102)														
Tebipenem		15 (14.7)	48 (61.8)	34 (95.1)	4 (99.0)	1 (100.0)							0.06	0.12
Meropenem	1 (1.0)	17 (17.6)	62 (78.4)	17 (95.1)	5 (100.0)								0.06	0.12
Doripenem ^a			3 (2.9)	15 (17.6)	43 (59.8)	30 (89.2)	8 (97.1)	3 (100.0)					0.25	1
Imipenem ^a			1 (1.0)	6 (6.9)	14 (20.6)	17 (37.3)	51 (87.3)	11 (98.0)	2 (100.0)				1	2
Ertapenem	99 (97.1)	1 (98.0)	2 (100.0)										≤0.015	≤0.015
pAmpC and/or ESBL (32)														
Tebipenem		1 (3.1)	9 (31.3)	9 (59.4)	6 (78.1)	6 (96.9)	0 (96.9)	0 (96.9)	1 (100.0)				0.12	0.5
Meropenem		1 (3.1)	10 (34.4)	8 (59.4)	6 (78.1)	6 (96.9)	0 (96.9)	0 (96.9)	1 (100.0)				0.12	0.5
Doripenem ^a			5 (15.6)	7 (37.5)	7 (59.4)	7 (81.3)	5 (96.9)	1 (100.0)					0.25	1
Imipenem ^a				1 (3.1)	0 (3.1)	4 (15.6)	8 (40.6)	14 (84.4)	5 (100.0)				2	4
Ertapenem	12 (37.5)	9 (65.6)	7 (87.5)	2 (93.8)	1 (96.9)	0 (96.9)	0 (96.9)	0 (96.9)	1 (100.0)				0.03	0.12
Carbapenemase (2)														
Tebipenem								1 (50.0)	0 (50.0)	1 (100.0)			-	-
Meropenem								1 (50.0)	0 (50.0)	1 (100.0)			-	-
Doripenem ^a							1 (50.0)	0 (50.0)	0 (50.0)	0 (50.0)	1 (100.0)		-	-
Imipenem ^a										0 (0.0)	2 (100.0)		-	-
Ertapenem								2 (100.0)					-	-

Shading represents susceptible MIC values per CLSI 2018

Abbreviations: pAmpC, plasmid AmpC; ESBL, extended-spectrum β-lactamase.

^a The lowest concentration tested for doripenem and imipenem was 0.06 mg/L.

Supplemental Table 4 Genotype/phenotype of study isolates

Organism Genotype/phenotype	Random uropathogen set		Challenge set
	No. of isolates	% within species	No. of isolates
<i>E. coli</i>	101	-	46
Wild-type	90	89.1	-
pAmpC and/or ESBL	11	10.9	36
Carbapenemase	0	0.0	10
<i>K. pneumoniae</i>	208	-	38
Wild-type	169	81.3	-
pAmpC and/or ESBL	31	14.9	8
Carbapenemase	8	3.8	30
<i>P. mirabilis</i>	103	-	33
Wild-type	102	99.0	-
pAmpC and/or ESBL	1	1.0	31
Carbapenemase	0	0.0	2

Abbreviations: pAmpC, plasmid AmpC; ESBL, extended-spectrum β -lactamase.

Supplemental Table 5 Carbapenem MIC results and genotype of study isolates

Number	Category	Organism	MIC (mg/L) ^a					Genotype ^b
			TBP	DOR	ERT	IMI	MER	
840011	Challenge	<i>E. coli</i>	≤0.015	0.12	0.03	0.12	≤0.015	CP_CTX-M_Group1
840540	Challenge	<i>E. coli</i>	≤0.015	0.12	≤0.015	0.12	≤0.015	CP_CTX-M_Group1
861989	Challenge	<i>E. coli</i>	≤0.015	0.12	≤0.015	0.12	≤0.015	CP_CTX-M_Group9
765116	Challenge	<i>E. coli</i>	0.03	≤0.06	0.06	0.12	0.03	CP_CMYII
780060	Challenge	<i>E. coli</i>	0.03	≤0.06	0.03	0.25	0.03	CP_CMYII
836753	Challenge	<i>E. coli</i>	0.03	0.12	0.12	0.12	0.03	CP_CMYII
846824	Challenge	<i>E. coli</i>	0.03	0.12	0.12	0.25	0.03	CP_CMYII
738439	Challenge	<i>E. coli</i>	0.03	≤0.06	0.03	0.12	0.03	CP_CTX-M_Group1
742996	Challenge	<i>E. coli</i>	0.03	≤0.06	0.03	0.12	0.03	CP_CTX-M_Group1
750347	Challenge	<i>E. coli</i>	0.03	≤0.06	0.5	0.12	0.03	CP_CTX-M_Group1
753146	Challenge	<i>E. coli</i>	0.03	≤0.06	0.25	0.12	0.03	CP_CTX-M_Group1
761046	Challenge	<i>E. coli</i>	0.03	≤0.06	0.03	0.12	0.03	CP_CTX-M_Group1
813359	Challenge	<i>E. coli</i>	0.03	0.12	0.03	0.12	0.03	CP_CTX-M_Group1
835674	Challenge	<i>E. coli</i>	0.03	0.12	0.03	0.12	0.03	CP_CTX-M_Group1
837614	Challenge	<i>E. coli</i>	0.03	0.12	0.12	0.12	0.03	CP_CTX-M_Group1
838943	Challenge	<i>E. coli</i>	0.03	0.12	≤0.015	0.12	0.03	CP_CTX-M_Group1
840329	Challenge	<i>E. coli</i>	0.03	0.12	0.03	0.12	0.03	CP_CTX-M_Group1
846549	Challenge	<i>E. coli</i>	0.03	0.12	0.03	0.12	0.03	CP_CTX-M_Group1
848585	Challenge	<i>E. coli</i>	0.03	0.12	0.03	0.12	0.03	CP_CTX-M_Group1
850243	Challenge	<i>E. coli</i>	0.03	0.12	0.03	0.12	0.03	CP_CTX-M_Group1
859760	Challenge	<i>E. coli</i>	0.03	0.12	0.06	0.12	0.03	CP_CTX-M_Group1
865551	Challenge	<i>E. coli</i>	0.03	0.12	0.03	0.12	0.03	CP_CTX-M_Group1
744071	Challenge	<i>E. coli</i>	0.03	≤0.06	≤0.015	0.12	0.03	CP_CTX-M_Group9
780073	Challenge	<i>E. coli</i>	0.03	≤0.06	0.03	0.12	0.03	CP_CTX-M_Group9
824511	Challenge	<i>E. coli</i>	0.03	0.12	0.03	0.12	0.03	CP_CTX-M_Group9
828779	Challenge	<i>E. coli</i>	0.03	0.12	0.03	0.12	0.03	CP_CTX-M_Group9
846531	Challenge	<i>E. coli</i>	0.03	0.12	≤0.015	0.12	0.03	CP_CTX-M_Group9
924068	Challenge	<i>E. coli</i>	0.03	≤0.06	≤0.015	0.12	0.03	CP_CTX-M_Group9
751432	Challenge	<i>E. coli</i>	0.03	≤0.06	≤0.015	0.12	0.03	CP_SHV_ESBL
845741	Challenge	<i>E. coli</i>	0.03	0.12	0.06	0.12	0.03	CTX-M-15, OXA-1
844466	Challenge	<i>E. coli</i>	0.06	0.12	0.5	0.25	0.06	CMY-133
872217	Challenge	<i>E. coli</i>	0.06	0.12	1	0.5	0.06	CMY-2

750904	Challenge	<i>E. coli</i>	0.06	≤0.06	0.5	0.12	0.06	CP_CTX-M_Group1
742654	Challenge	<i>E. coli</i>	0.06	≤0.06	0.06	0.5	0.06	SHV-12
850505	Challenge	<i>E. coli</i>	0.12	0.25	0.12	0.5	0.12	CMY-2, OXA-1
764048	Challenge	<i>E. coli</i>	1	1	4	4	1	KPC-3
636486	Challenge	<i>E. coli</i>	4	1	8	2	4	KPC-2
785701	Challenge	<i>E. coli</i>	4	2	8	4	4	KPC-2
749610	Challenge	<i>E. coli</i>	4	2	4	4	4	KPC-3
805039	Challenge	<i>E. coli</i>	8	4	>8	4	8	KPC-2
805027	Challenge	<i>E. coli</i>	8	2	>8	4	8	KPC-2, OXA-9
637562	Challenge	<i>E. coli</i>	8	4	>8	1	8	KPC-3
712375	Challenge	<i>E. coli</i>	>8	8	>8	8	>8	KPC-2
813671	Challenge	<i>E. coli</i>	>8	>8	>8	>8	>8	NDM-5
814512	Challenge	<i>E. coli</i>	>8	>8	>8	>8	>8	NDM-7
713837	Challenge	<i>K. pneumoniae</i>	0.03	≤0.06	0.03	0.12	0.03	CP_CTX-M_Group9
744595	Challenge	<i>K. pneumoniae</i>	0.03	≤0.06	≤0.015	0.12	0.03	CP_FOX
761985	Challenge	<i>K. pneumoniae</i>	0.03	≤0.06	0.03	0.12	0.03	CP_SHV_ESBL
761147	Challenge	<i>K. pneumoniae</i>	0.03	≤0.06	0.12	0.12	0.03	CTX-M-55/57
776273	Challenge	<i>K. pneumoniae</i>	0.03	≤0.06	0.12	0.12	0.03	SHV-1, SHV-12
753218	Challenge	<i>K. pneumoniae</i>	0.06	≤0.06	0.06	0.25	0.06	CP_CMYII
707714	Challenge	<i>K. pneumoniae</i>	0.06	≤0.06	0.12	0.12	0.06	CTX-M-15
642277	Challenge	<i>K. pneumoniae</i>	0.06	0.12	0.25	0.25	0.06	DHA-1, OXA-1, SHV-61, TEM-1
673456	Challenge	<i>K. pneumoniae</i>	2	>8	8	8	2	CTX-M-15-like, CTX-M-3-like, OXA-48
774940	Challenge	<i>K. pneumoniae</i>	4	2	8	4	4	KPC-2
747216	Challenge	<i>K. pneumoniae</i>	4	1	8	2	4	KPC-3
765668	Challenge	<i>K. pneumoniae</i>	4	4	>8	2	4	OXA-48
681322	Challenge	<i>K. pneumoniae</i>	4	>8	2	8	4	VIM-1
416095	Challenge	<i>K. pneumoniae</i>	4	4	4	4	4	VIM-like
748004	Challenge	<i>K. pneumoniae</i>	8	4	>8	4	8	KPC-2
760595	Challenge	<i>K. pneumoniae</i>	8	4	>8	4	8	KPC-2
803291	Challenge	<i>K. pneumoniae</i>	8	2	8	4	8	KPC-2
602754	Challenge	<i>K. pneumoniae</i>	>8	8	>8	>8	>8	CMY-6, NDM-1, OXA-1
779303	Challenge	<i>K. pneumoniae</i>	>8	>8	>8	>8	>8	CP_CMYII, CP_CTX-M_Group1, KPC-2
405507	Challenge	<i>K. pneumoniae</i>	>8	>8	>8	>8	>8	CTX-M-15, OXA-181, OXA-1
407150	Challenge	<i>K. pneumoniae</i>	>8	>8	>8	>8	>8	CTX-M-15, OXA-181, OXA-1
694901	Challenge	<i>K. pneumoniae</i>	>8	>8	8	4	>8	IMP-1
761989	Challenge	<i>K. pneumoniae</i>	>8	4	>8	8	>8	KPC-2

762632	Challenge	<i>K. pneumoniae</i>	>8	>8	>8	>8	>8	KPC-2
767089	Challenge	<i>K. pneumoniae</i>	>8	4	>8	8	>8	KPC-2
783079	Challenge	<i>K. pneumoniae</i>	>8	8	>8	8	>8	KPC-2
744519	Challenge	<i>K. pneumoniae</i>	>8	8	>8	8	>8	KPC-3
745411	Challenge	<i>K. pneumoniae</i>	>8	8	>8	8	>8	KPC-3
802901	Challenge	<i>K. pneumoniae</i>	>8	8	>8	8	>8	KPC-3
807702	Challenge	<i>K. pneumoniae</i>	>8	8	>8	8	>8	KPC-3, VIM-1
811951	Challenge	<i>K. pneumoniae</i>	>8	>8	>8	>8	>8	NDM-1, OXA-10, OXA-244, SHV-11, VIM-1
813641	Challenge	<i>K. pneumoniae</i>	>8	>8	>8	>8	>8	NDM-1, OXA-232
782429	Challenge	<i>K. pneumoniae</i>	>8	>8	>8	>8	>8	NDM-7
674232	Challenge	<i>K. pneumoniae</i>	>8	4	>8	4	>8	OXA-48
759711	Challenge	<i>K. pneumoniae</i>	>8	8	>8	4	>8	OXA-48
763287	Challenge	<i>K. pneumoniae</i>	>8	>8	>8	4	>8	OXA-48
699665	Challenge	<i>K. pneumoniae</i>	>8	>8	>8	>8	>8	VIM-26
418007	Challenge	<i>K. pneumoniae</i>	>8	4	8	8	>8	VIM-like
824918	Challenge	<i>P. mirabilis</i>	0.03	0.12	≤0.015	2	0.03	CP_CTX-M_Group9
898022	Challenge	<i>P. mirabilis</i>	0.06	≤0.06	≤0.015	0.5	0.06	CP_CMYII
909077	Challenge	<i>P. mirabilis</i>	0.06	0.25	0.03	4	0.06	CP_CMYII
929419	Challenge	<i>P. mirabilis</i>	0.06	0.12	≤0.015	1	0.06	CP_CMYII
913743	Challenge	<i>P. mirabilis</i>	0.06	0.25	≤0.015	2	0.06	CP_CTX-M_Group1
932239	Challenge	<i>P. mirabilis</i>	0.06	≤0.06	≤0.015	0.12	0.06	CP_CTX-M_Group1
875413	Challenge	<i>P. mirabilis</i>	0.06	0.25	≤0.015	1	0.06	CP_SHV_ESBL
883965	Challenge	<i>P. mirabilis</i>	0.06	0.5	≤0.015	2	0.06	CP_TEM_ESBL
924975	Challenge	<i>P. mirabilis</i>	0.06	≤0.06	≤0.015	1	0.06	CP_TEM_ESBL
872295	Challenge	<i>P. mirabilis</i>	0.06	0.25	0.03	2	0.06	CTX-M-2-like, OXA-2-like
877960	Challenge	<i>P. mirabilis</i>	0.12	≤0.06	0.03	0.5	0.12	CP_CMYII
895338	Challenge	<i>P. mirabilis</i>	0.12	0.25	≤0.015	2	0.12	CP_CMYII
898771	Challenge	<i>P. mirabilis</i>	0.12	0.25	≤0.015	2	0.12	CP_CMYII
916763	Challenge	<i>P. mirabilis</i>	0.12	0.25	0.06	2	0.12	CP_CMYII
879714	Challenge	<i>P. mirabilis</i>	0.12	≤0.06	0.03	0.5	0.12	CP_CTX-M_Group1
889129	Challenge	<i>P. mirabilis</i>	0.12	0.5	≤0.015	4	0.12	CP_CTX-M_Group1
824917	Challenge	<i>P. mirabilis</i>	0.12	0.12	0.03	2	0.12	CP_CTX-M_Group9
922683	Challenge	<i>P. mirabilis</i>	0.12	0.12	0.03	0.5	0.12	CP_SHV_ESBL
829140	Challenge	<i>P. mirabilis</i>	0.25	0.12	0.06	2	0.25	CP_CMYII
900230	Challenge	<i>P. mirabilis</i>	0.25	1	0.12	2	0.25	CP_CMYII
892631	Challenge	<i>P. mirabilis</i>	0.25	0.5	0.06	2	0.25	CP_CMYII, CP_FOX

918129	Challenge	<i>P. mirabilis</i>	0.25	1	0.03	1	0.25	CP_CTX-M_Group1
891173	Challenge	<i>P. mirabilis</i>	0.25	0.5	0.03	1	0.25	CP_CTX-M_Group9
555493	Challenge	<i>P. mirabilis</i>	0.25	0.12	0.03	1	0.25	FOX-5
890924	Challenge	<i>P. mirabilis</i>	0.5	0.12	0.06	2	0.5	CP_CMYII
929732	Challenge	<i>P. mirabilis</i>	0.5	0.5	0.25	1	0.5	CP_CMYII
876039	Challenge	<i>P. mirabilis</i>	0.5	1	0.06	2	0.5	CP_CTX-M_Group1
882604	Challenge	<i>P. mirabilis</i>	0.5	1	0.06	4	0.5	CP_TEM_ESBL
899923	Challenge	<i>P. mirabilis</i>	0.5	1	0.06	4	0.5	CP_TEM_ESBL
880588	Challenge	<i>P. mirabilis</i>	0.5	0.5	0.12	2	0.5	CTX-M-8-like
877308	Challenge	<i>P. mirabilis</i>	2	1	2	>8	2	CP_KPC
892550	Challenge	<i>P. mirabilis</i>	4	2	4	4	4	CTX-M-2-like
299431	Challenge	<i>P. mirabilis</i>	8	>8	2	>8	8	VIM-1
983883	Uropathogen	<i>E. coli</i>	≤0.015	≤0.06	≤0.015	0.12	0.03	CTX-M-14
942430	Uropathogen	<i>E. coli</i>	≤0.015	≤0.06	0.03	0.12	≤0.015	CTX-M-14, OXA-1
934570	Uropathogen	<i>E. coli</i>	≤0.015	≤0.06	0.03	0.12	≤0.015	CTX-M-27
939034	Uropathogen	<i>E. coli</i>	≤0.015	≤0.06	≤0.015	0.06	≤0.015	CTX-M-55
971948	Uropathogen	<i>E. coli</i>	≤0.015	≤0.06	≤0.015	0.12	≤0.015	SHV-12
968732	Uropathogen	<i>E. coli</i>	0.03	≤0.06	0.03	0.12	≤0.015	CTX-M-15, OXA-1
955472	Uropathogen	<i>E. coli</i>	0.06	≤0.06	0.12	0.5	0.03	CMY-2
956695	Uropathogen	<i>E. coli</i>	0.06	≤0.06	0.25	0.5	0.03	CMY-2
953360	Uropathogen	<i>E. coli</i>	0.06	≤0.06	0.5	0.06	0.12	CTX-M-15
964287	Uropathogen	<i>E. coli</i>	0.06	≤0.06	0.5	0.12	0.06	CTX-M-15, OXA-1
984150	Uropathogen	<i>E. coli</i>	0.12	≤0.06	0.5	0.25	0.06	CMY-2
937209	Uropathogen	<i>E. coli</i>	0.12	0.25	0.12	0.5	0.06	CTX-M-15
968284	Uropathogen	<i>K. pneumoniae</i>	0.03	0.12	0.12	0.12	0.03	PSE-1, CTX-M-15, SHV-11
935254	Uropathogen	<i>K. pneumoniae</i>	0.03	≤0.06	≤0.015	0.12	0.03	CTX-M-14, SHV-11
964933	Uropathogen	<i>K. pneumoniae</i>	0.03	≤0.06	0.03	0.25	0.03	CTX-M-15
964932	Uropathogen	<i>K. pneumoniae</i>	0.03	≤0.06	0.06	0.12	0.03	CTX-M-15, OXA-1
950070	Uropathogen	<i>K. pneumoniae</i>	0.03	≤0.06	≤0.015	0.25	0.03	CTX-M-15, OXA-1, SHV-1
935511	Uropathogen	<i>K. pneumoniae</i>	0.03	≤0.06	0.06	0.12	0.03	CTX-M-15, OXA-1, SHV-11
942575	Uropathogen	<i>K. pneumoniae</i>	0.03	≤0.06	0.06	0.12	0.03	CTX-M-15, OXA-1, SHV-11
968307	Uropathogen	<i>K. pneumoniae</i>	0.03	≤0.06	0.25	0.12	0.06	CTX-M-15, OXA-1, SHV-11
983840	Uropathogen	<i>K. pneumoniae</i>	0.03	≤0.06	0.12	0.12	0.03	CTX-M-15, OXA-1, SHV-11
988596	Uropathogen	<i>K. pneumoniae</i>	0.03	≤0.06	0.06	0.12	0.06	CTX-M-15, OXA-1, SHV-27
939045	Uropathogen	<i>K. pneumoniae</i>	0.03	≤0.06	0.12	0.12	0.03	CTX-M-15, OXA-1, SHV-28
972879	Uropathogen	<i>K. pneumoniae</i>	0.03	0.12	0.12	0.12	0.06	CTX-M-15, OXA-1, SHV-28

964902	Uropathogen	<i>K. pneumoniae</i>	0.03	≤0.06	0.03	0.12	≤0.015	CTX-M-15, OXA-1, SHV-76
977786	Uropathogen	<i>K. pneumoniae</i>	0.03	≤0.06	0.06	0.12	0.06	CTX-M-15, SHV-11
984380	Uropathogen	<i>K. pneumoniae</i>	0.03	≤0.06	0.03	0.12	≤0.015	CTX-M-15, SHV-11
937177	Uropathogen	<i>K. pneumoniae</i>	0.03	≤0.06	0.25	0.12	0.03	CTX-M-15, SHV-28
942812	Uropathogen	<i>K. pneumoniae</i>	0.03	≤0.06	0.25	0.12	0.03	CTX-M-15, SHV-28
959949	Uropathogen	<i>K. pneumoniae</i>	0.03	≤0.06	0.03	0.12	0.03	CTX-M-15, SHV-28
978304	Uropathogen	<i>K. pneumoniae</i>	0.03	≤0.06	≤0.015	0.12	0.03	SHV-27
950110	Uropathogen	<i>K. pneumoniae</i>	0.06	≤0.06	0.25	0.12	0.03	CTX-M-15, OXA-1, SHV-1
961709	Uropathogen	<i>K. pneumoniae</i>	0.06	≤0.06	0.06	0.25	0.03	CTX-M-15, OXA-1, SHV-1
970702	Uropathogen	<i>K. pneumoniae</i>	0.06	≤0.06	0.06	0.25	0.03	CTX-M-15, OXA-1, SHV-11
953367	Uropathogen	<i>K. pneumoniae</i>	0.12	0.25	1	0.5	0.12	CTX-M-15, DHA-1, OXA-1, OXA-9
965646	Uropathogen	<i>K. pneumoniae</i>	0.12	0.12	2	1	0.06	CTX-M-15, DHA-1, OXA-1, OXA-9, SHV-11
960673	Uropathogen	<i>K. pneumoniae</i>	0.12	≤0.06	0.12	0.06	0.03	CTX-M-15, OXA-1
953371	Uropathogen	<i>K. pneumoniae</i>	0.25	0.12	1	1	0.06	CTX-M-15, DHA-1, OXA-1, OXA-9, SHV-11
965661	Uropathogen	<i>K. pneumoniae</i>	0.25	0.25	4	1	0.25	CTX-M-15, DHA-1, OXA-1, OXA-9, SHV-11
934954	Uropathogen	<i>K. pneumoniae</i>	0.25	0.25	1	0.12	0.25	CTX-M-15, OXA-1, SHV-28
960660	Uropathogen	<i>K. pneumoniae</i>	1	8	8	4	2	OXA-48, CTX-M-15, OXA-1, SHV-76
965666	Uropathogen	<i>K. pneumoniae</i>	2	2	>8	1	2	CTX-M-15, OXA-1, SHV-11
953369	Uropathogen	<i>K. pneumoniae</i>	4	4	>8	1	4	CTX-M-15, OXA-1, SHV-11
965657	Uropathogen	<i>K. pneumoniae</i>	8	8	>8	8	4	CTX-M-15, DHA-1, OXA-1, SHV-11
942447	Uropathogen	<i>K. pneumoniae</i>	>8	>8	>8	>8	>8	KPC-2
942544	Uropathogen	<i>K. pneumoniae</i>	>8	8	>8	8	>8	KPC-2, CTX-M-15, OXA-1, SHV-28
961751	Uropathogen	<i>K. pneumoniae</i>	>8	2	>8	8	2	KPC-2, CTX-M-15, OXA-1, SHV-76
985275	Uropathogen	<i>K. pneumoniae</i>	>8	>8	>8	>8	>8	KPC-2, SHV-12
985277	Uropathogen	<i>K. pneumoniae</i>	>8	>8	>8	>8	>8	KPC-2, SHV-12
942556	Uropathogen	<i>K. pneumoniae</i>	>8	>8	>8	>8	>8	KPC-3
942555	Uropathogen	<i>K. pneumoniae</i>	>8	>8	>8	>8	>8	KPC-3, OXA-9
960663	Uropathogen	<i>Proteus mirabilis</i>	0.12	0.5	≤0.015	1	0.06	CTX-M-2, TEM-1

^a TBP, tebipenem; DOR, doripenem; ERT, ertapenem; IMI, imipenem; MER, meropenem.

^b The challenge set of isolates were characterized using a microarray based assay Check-MDR CT101 kit (Check-points, Wageningen, Netherlands). The assay was performed according to the manufacturer's instructions. This kit has the capability to detect CTX-M Groups 1, 2, 8+25 and 9, TEM wild-type (WT) and ESBL, SHV WT and ESBL, ACC, ACT/MIR, CMYII, DHA, FOX, KPC and NDM-1. The most common mutations that expand the spectrum of TEM and SHV enzymes are detected by this assay and these mutations include 104K, 164S/C/H or 123S for TEM and 138S, 238A and 240K for SHV. The uropathogen set were recovered during 2016 and characterized using genome sequencing and *in silico* analysis.