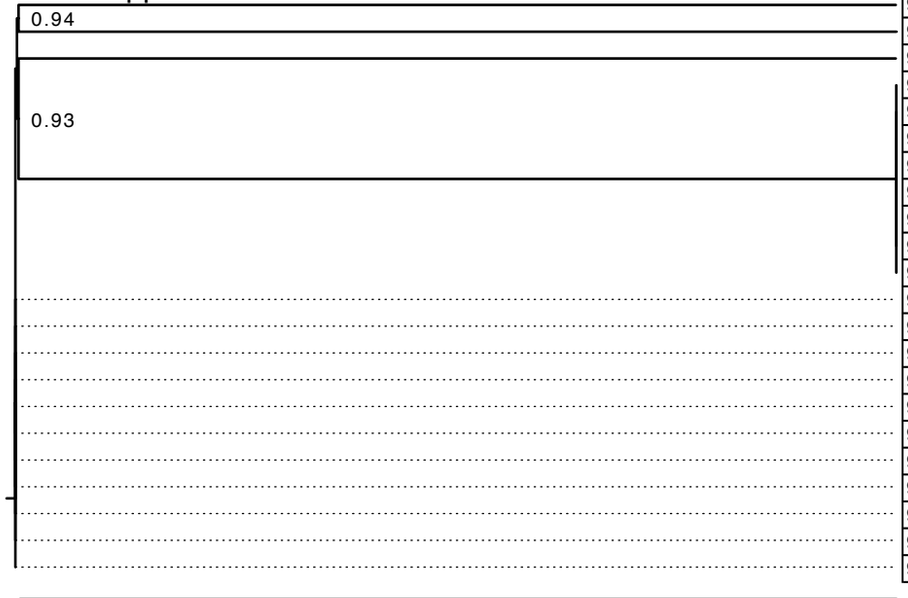
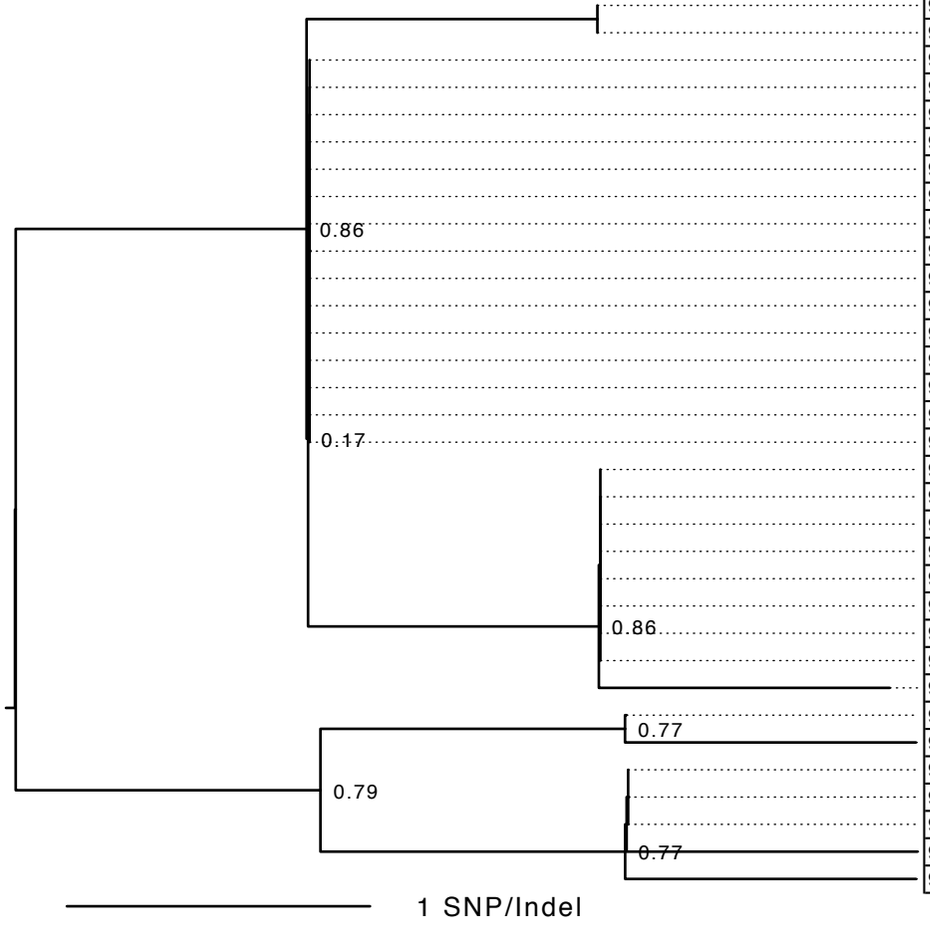
Online appendix 1



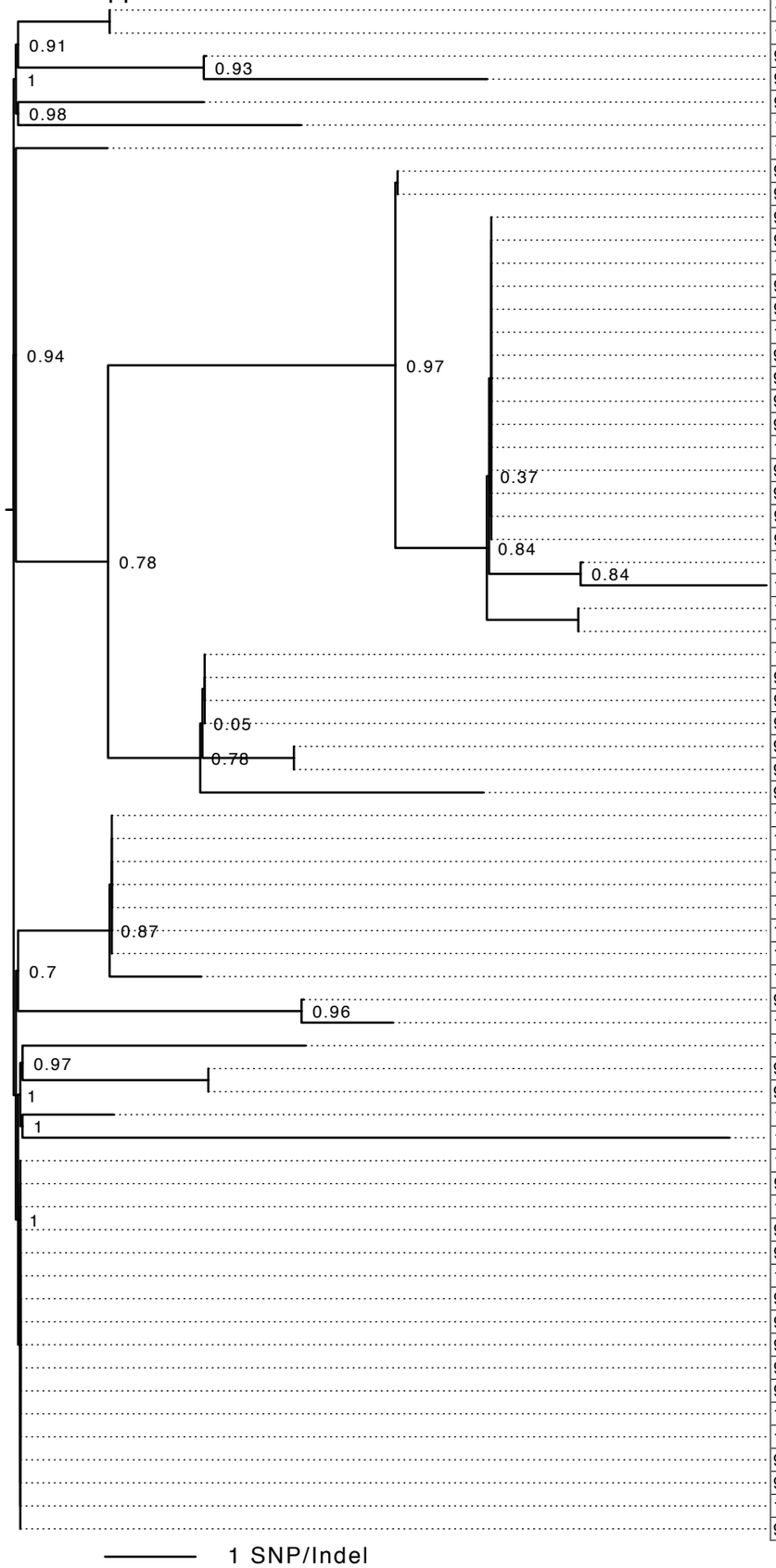
Sample Number	Patient	Ward	Bed	Type of Specimen	Site	Days	TIM	PIP	TAZ	CAZ	AZT	IMI	MER	AMI	GEN	TOB	CIP	COL
922	P02	BCU	8	Wound swab	Upper back	40	R	I	I	S	I	S	S	S	S	S	S	S
921	P02	BCU	8	Wound swab	Upper back	40												
913	P02	BCU	8	Environmental	Shower trolley	40	R	S	S	S	I	S	S	S	S	S	S	S
919	P02	BCU	8	Wound swab	Chest	40	R	I	I	S	I	I	S	S	S	S	R	S
926	P02	BCU	8	Wound swab	Right palm	44	R	I	I	S	I	I	S	S	S	S	R	S
909	P02	BCU	8	Wound swab	Anterior left upper-arm	37	R	I	I	S	I	R	S	S	S	S	R	S
908	P02	BCU	8	Wound swab	Anterior left upper-arm	37	R	I	I	S	I	S	S	S	S	S	S	S
925	P02	BCU	8	Wound swab	Anterior left upper-arm	44	R	I	I	S	I	I	S	S	S	S	R	S
932	P02	BCU	8	Wound swab	Back of head	49	R	I	I	S	I	R	S	S	S	S	R	S
928	P02	BCU	8	Wound swab	Upper back	44	R	I	I	S	I	I	I	S	S	S	R	S
927	P02	BCU	8	Wound swab	Upper back	44	R	I	I	S	I	I	I	S	S	S	R	S
915	P02	BCU	8	Environmental	Chair	40	R	I	I	S	I	S	S	S	S	S	S	S
914	P02	BCU	8	Environmental	Chair	40	R	S	S	S	I	S	S	S	S	S	S	S
904	P02	BCU	8	Tissue	Anterior right upper-arm	33	R	S	S	S	I	S	S	S	S	S	S	S
905	P02	BCU	8	Wound swab	Chest	37	R	I	I	S	I	I	S	S	S	S	S	S
906	P02	BCU	8	Wound swab	Chest	37	R	I	I	S	I	I	S	S	S	S	S	S
920	P02	BCU	8	Wound swab	Chest	40	R	I	I	S	I	R	I	S	S	S	R	S
918	P02	BCU	8	Wound swab	Chest	40	R	I	I	S	I	S	S	S	S	S	S	S
907	P02	BCU	8	Wound swab	Abdomen	37	R	I	I	S	I	S	S	S	S	S	S	S
911	P02	BCU	8	Wound swab	Anterior left forearm	37	R	I	I	S	I	I	S	S	S	S	S	S
912	P02	BCU	8	Wound swab	Anterior left forearm	37	R	I	I	S	I	I	S	S	S	S	S	S
923	P02	BCU	8	Wound swab	Posterior left upper-arm	40	R	I	I	S	I	S	S	S	S	S	S	S

Online appendix 2



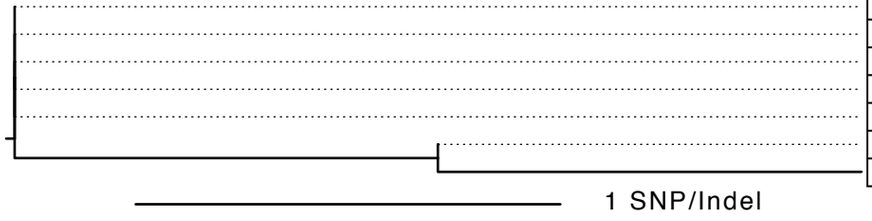
Study Number	Patient	Ward	Bed	Type of Specimen	Site	Days	TIM	PIP	TAZ	CAZ	AZT	IMI	MER	AMI	GEN	TOB	CIP	COL
937	P03	BCU	11	Wound swab	Anterior left thigh	50												
936	P03	BCU	11	Wound swab	Anterior left thigh	50												
929	P03	BCU	11	Wound swab	Posterior left thigh	48	R	S	S	S	I	R	I	S	S	S	S	S
951	P03	BCU	15	Environmental	Bedside table	56	R	I	I	S	I	R	I	S	S	S	S	S
960	P03	BCU	15	Environmental	Bedside table	62	R	S	S	S	I	R	I	S	S	S	S	S
961	P03	BCU	15	Environmental	Door handle	62	R	I	I	S	I	R	I	S	S	S	S	S
958	P03	BCU	15	Environmental	Shower chair	62	R	I	I	S	I	R	I	S	S	S	S	S
957	P03	BCU	15	Environmental	Shower chair	62	R	S	S	S	I	R	I	S	S	S	S	S
940	P03	BCU	15	Wound swab	Anterior right thigh	55	S	S	S	S	I	I	I	S	S	S	S	S
970	P03	BCU	15	Wound swab	Anterior right thigh	64	R	I	I	S	I	R	I	S	S	S	S	S
944	P03	BCU	15	Wound swab	Anterior right shin	55	R	I	I	S	I	R	I	S	S	S	S	S
945	P03	BCU	15	Wound swab	Anterior right shin	55	R	S	S	S	I	R	I	S	S	S	S	S
946	P03	BCU	15	Wound swab	Anterior left thigh	55	R	S	S	S	I	R	I	S	S	S	S	S
954	P03	BCU	15	Wound swab	Anterior left thigh	57	R	I	I	S	I	R	I	S	S	S	S	S
947	P03	BCU	15	Wound swab	Anterior left shin	55	R	S	S	S	I	R	I	S	S	S	S	S
972	P03	BCU	15	Wound swab	Posterior left shin	64	S	S	S	S	I	R	I	S	S	S	S	S
949	P03	BCU	15	Wound swab	Posterior right thigh	55	R	I	I	S	I	R	I	S	S	S	S	S
950	P03	BCU	15	Environmental	Bedside table	56	R	S	S	S	I	R	I	S	S	S	S	S
959	P03	BCU	15	Environmental	Bedside table	62	R	I	I	S	I	R	I	S	S	S	S	S
953	P03	BCU	15	Environmental	Toilet flush	56	R	S	S	S	I	I	I	S	S	S	S	S
938	P03	BCU	15	Urine	Urine	55	R	S	S	S	I	R	I	S	S	S	S	S
939	P03	BCU	15	Urine	Urine	55	R	S	S	S	I	R	I	S	S	S	S	S
956	P03	BCU	15	Urine	Urine	58	R	S	S	S	I	R	I	S	S	S	S	S
969	P03	BCU	15	Wound swab	Anterior right thigh	64	R	S	S	S	I	R	I	S	S	S	S	S
971	P03	BCU	15	Wound swab	Anterior left thigh	64	R	I	I	S	I	R	I	S	S	S	S	S
973	P03	BCU	15	Wound swab	Posterior right thigh	64	R	S	S	S	I	R	I	S	S	S	S	S
955	P03	BCU	15	Wound swab	Anterior left thigh	57	S	S	S	S	I	R	I	S	S	S	S	S
975	P03	BCU	15	Wound swab	Posterior right shin	64	S	S	S	S	I	R	I	S	S	S	S	S
962	P03	BCU	15	Environmental	Shower chair	62	S	S	S	S	I	R	I	S	S	S	S	S
948	P03	BCU	15	Wound swab	Posterior right thigh	55	S	S	S	S	I	R	I	S	S	S	S	S
974	P03	BCU	15	Wound swab	Posterior right thigh	64	S	S	S	S	I	I	I	S	S	S	S	S
963	P03	BCU	15	Environmental	Bedside table	62	S	S	S	S	I	I	I	S	S	S	S	S
964	P03	BCU	15	Environmental	Bedside table	62	S	S	S	S	I	R	I	S	S	S	S	S

Online appendix 3



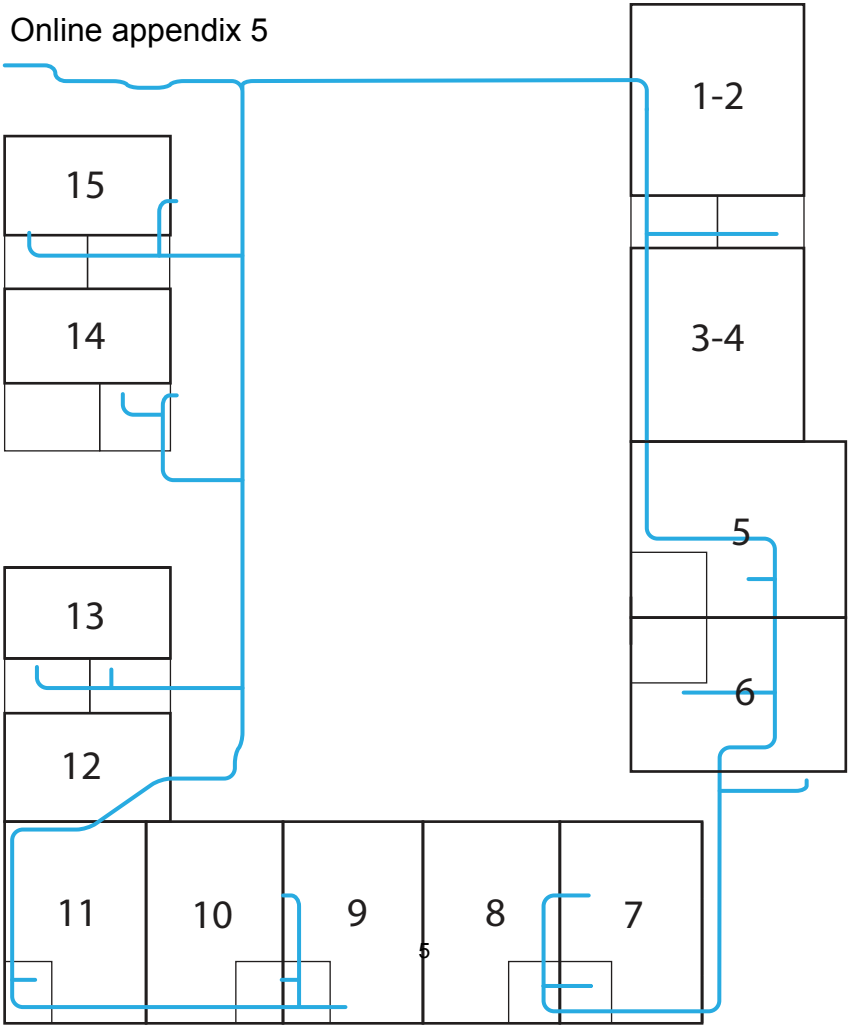
Sample Number	Patient	Ward	Bed	Type of Specimen	Site	Days	TIM	PIP	TAZ	CAZ	AZT	IMI	MER	AMI	GEN	TOB	CIP	COL	pBURNS1	pBURNS2
1067	SP30	BCU	12	Water	Shower (Pre-flush)	292														
1068	SP30	BCU	12	Water	Shower (Pre-flush)	292														
991	Water sampling	BCU	10	Water	Shower (Pre-flush)	90														
966	SP08	BCU	10	Water	Shower (Unknown)	65	R	S	S	S	I	S	S	S	S	S	S	S		
931	P02	BCU	8	Environmental	Shower (Rose)	49	R	S	S	S	I	S	S	S	S	S	S	S		
1065	SP30	BCU	12	Environmental	Shower (Rose)	292														
1034	SP15	BCU	8	Environmental	Shower (Rose)	176	R	S	S	S	R	S	S	S	S	S	S	S	Yes	
902	P01	BCU	11	Environmental	Drain	27														
903	P01	BCU	11	Water	Shower (Post-flush)	27	R	S	S	S	I	S	S	S	S	S	S	S		
981	P04	BCU	11	Environmental	Drain	89	R	S	S	S	I	S	S	S	S	S	S	S		
980	P04	BCU	11	Environmental	Shower (Rose)	89	R	S	S	S	I	S	S	S	S	S	S	S		
1048	SP20	BCU	11	Environmental	Shower (Rose)	216	R	S	S	S	I	S	S	S	S	S	S	S		
901	P01	BCU	11	Environmental	Trolley	27	R	S	S	S	I	S	S	S	S	S	S	S		
987	P04	BCU	11	Water	Shower (Hose)	89	R	S	S	S	I	S	S	S	S	S	S	S		
1050	SP21	BCU	11	Water	Shower (Post-flush)	216														
988	P04	BCU	11	Water	Shower (Pre-flush)	89	R	S	S	S	I	S	S	S	S	S	S	S		
968	SP10	BCU	11	Water	Shower (Unknown)	65	R	S	S	S	I	S	S	S	S	S	S	S		
900	P01	BCU	11	Wound swab	Groin	14	R	S	S	S	I	S	S	S	S	S	S	S		
979	P04	BCU	11	Wound swab	Anterior right thigh	82	R	S	S	S	I	S	S	S	S	S	S	S		
1008	P04	BCU	11	Wound swab	Anterior right thigh	103	R	S	S	S	I	S	S	S	S	S	S	S		
976	P04	BCU	11	Wound swab	Anterior right shin	72	R	S	S	S	I	S	S	S	S	S	S	S		
984	P04	BCU	11	Wound swab	Dorsum of left foot	85	R	S	S	S	I	R	I	S	S	S	S	S		
983	P04	BCU	11	Wound swab	Dorsum of left foot	85	R	S	S	S	I	R	I	S	S	S	S	S		
982	P04	BCU	11	Wound swab	Dorsum of left foot	85	R	S	S	S	I	S	S	S	S	S	S	S		
1007	P04	BCU	11	Wound swab	Anterior right thigh	93	R	S	S	S	I	R	I	S	S	S	S	S		
1009	P04	BCU	11	Wound swab	Anterior right thigh	103	R	S	S	S	I	S	S	S	S	S	S	S		
1005	P04	BCU	11	Wound swab	Anterior right thigh	91	R	S	S	S	I	R	I	S	S	S	S	S		
1006	P04	BCU	11	Wound swab	Anterior right thigh	91	R	S	S	S	I	R	I	S	S	S	S	S		
1052	SP22	BCU	9	Water	Shower (Hose)	226														Yes
993	Water sampling	BCU	9	Water	Shower (Hose)	90	R	S	S	S	I	S	S	S	S	S	S	S		
994	Water sampling	BCU	9	Water	Shower (Pre-flush)	90	R	S	S	S	I	S	S	S	S	S	S	S		
992	Water sampling	BCU	9	Water	Tap	90	R	S	S	S	I	S	S	S	S	S	S	S		
985	P04	BCU	11	Water	Tap	89	R	S	S	S	I	S	S	S	S	S	S	S		
986	P04	BCU	11	Water	Tap	89														
967	SP09	BCU	9	Water	Shower (Unknown)	65	R	S	S	S	I	S	S	S	S	S	S	S		Yes
1062	SP29	BCU	6	Environmental	Shower (Rose)	292														
1058	SP25	BCU	6	Environmental	Shower (Rose)	278														
1003	Water sampling	BCU	6	Water	Shower (Hose)	91														
1064	SP29	BCU	6	Water	Shower (Pre-flush)	292														
1036	SP15	BCU	6	Water	Shower (Pre-flush)	177														
1004	Water sampling	BCU	6	Water	Shower (Pre-flush)	91														
1057	SP25	BCU	6	Water	Shower (Pre-flush)	278	R	S	S	S	I	S	S	S	S	S	S	S		
1041	SP16	BCU	6	Water	Shower (Pre-flush)	190														
999	Water sampling	BCU	1	Water	Shower (Hose)	91														
1000	Water sampling	BCU	1	Water	Shower (Pre-flush)	91														
1010	SP11	BCU	8	Environmental	Sink	113	S	S	S	S	I	S	S	S	S	S	S	S	Yes	
989	Water sampling	BCU	12	Water	Shower (Hose)	89	R	S	S	S	I	S	S	S	S	S	S	S		
990	Water sampling	BCU	12	Water	Shower (Pre-flush)	89	R	S	S	S	I	S	S	S	S	S	S	S		
1040	SP16	BCU	6	Environmental	Shower (Rose)	190	R	S	S	S	I	S	S	S	S	S	S	S		
1031	SP13	BCU	8	Water	Shower (Hose)	155													Yes	
1001	Water sampling	BCU	5	Water	Tap	91														
996	Water sampling	BCU	7	Water	Shower (Pre-flush)	90	R	S	S	S	I	S	S	S	S	S	S	S		
1029	SP12	BCU	8	Environmental	Drain	146													Yes	
933	P02	BCU	8	Environmental	EGC	49	R	S	S	S	I	S	S	S	S	S	S	S		
930	P02	BCU	8	Environmental	Shower (Rose)	49	R	S	S	S	I	R	S	S	S	S	S	S		
1028	SP12	BCU	8	Environmental	Shower (Rose)	146													Yes	
942	P02	BCU	8	Environmental	Shower (Rose)	55	R	S	S	S	I	S	S	S	S	S	S	S		
941	P02	BCU	8	Environmental	Shower (Rose)	55	R	S	S	S	I	S	S	S	S	S	S	S		
917	P02	BCU	8	Environmental	Shower (Rose)	40	S	S	S	S	I	S	S	S	S	S	S	S	Yes	
916	P02	BCU	8	Environmental	Shower (Rose)	40	S	S	S	S	I	S	S	S	S	S	S	S	Yes	
934	P02	BCU	8	Water	Shower (Post-flush)	49	S	S	S	S	I	S	S	S	S	S	S	S	Yes	
1030	SP12	BCU	8	Water	Shower (post-flush)	146													Yes	
1035	SP14	BCU	8	Water	Shower (Post-flush)	176													Yes	
910	P02	BCU	8	Water	Shower (Post-flush)	40	S	S	S	S	I	S	S	S	S	S	S	S	Yes	
935	P02	BCU	8	Water	Shower (Pre-flush)	49	R	S	S	S	I	S	S	S	S	S	S	S	Yes	
1046	SP19	BCU	8	Water	Shower (Pre-flush)	203														
943	P02	BCU	8	Water	Shower (Pre-flush)	55	S	S	S	S	I	S	S	S	S	S	S	S	Yes	

Online appendix 4

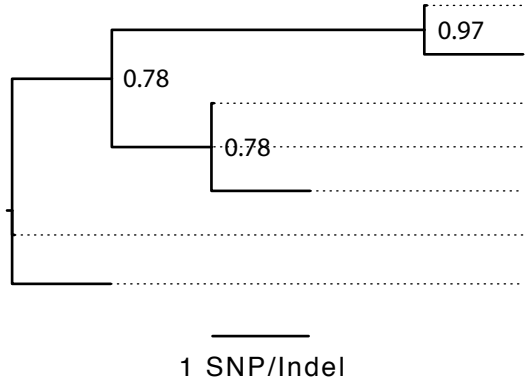


Sample Number	Patient	Ward	Bed	Type of Specimen	Site	Days	TIM	PIP	TAZ	CAZ	AZT	IMI	MER	AMI	GEN	TOB	CIP	COL
1069	Water sampling	WCCB	11	Water	Tap	301	R	S	S	S	I	R	I	S	S	S	S	S
1045	SP20	WCCB	11	Environmental	Tap handle	204												
1047	SP20	WCCB	11	Water	Tap	204	R	S	S	S	I	R	I	I	R	S	S	S
1049	P05	WCCB	11	Sputum	Sputum	221		I	I	S	I	I	I	I	R	S	S	S
1053	P05	WCCB	11	Water	Tap	231	R	I	I	S	I	R	S	S	S	S	S	S
1054	P05	WCCB	11	Sputum	Sputum	229	R	R	R	R	R	R	R	I	R	S	I	S
1056	P05	WCCB	11	Sputum	Sputum	242		R	R	R	S	R	R		S	S	R	S

Online appendix 5



Online appendix 6



Bed	Type of Specimen	Alignment
11	Shower	TCCTACTCC-CACAGACCTAACCT-----G--ACCGAAATCCTTTTCCG-CGAGGCG
11	Shower	TCCTACTCC-TACAGACCTAACCT-----G--ACCGAAATCCTTTTCCG-CGAGGCG
9	Tap	TGCAACTCC-CACAGACCTAACGT-----G--ACCGAAATCCTTTTCCG-CGCGGCG
9	TMV	TGCA-CT-C-CACAGA---AACGT-----G--ACCG--A-CCTTTTC-G-C--GGCG
11	Tap	TGTAACTCC-CACAGACCTAACGT-----G--ACCGAAATCCTTTTCCG-CGCGGCG
8	Shower	TCCAACTCC-CACAGACCTAACGT-----G--ACCGAAATCCTTTTCCG-CTCGGCG
6	Shower	TCCAACTCC-CACAGCCCTAACGT-----G--ACCGAAATCCTTTTCCG-CTCGGCG

6

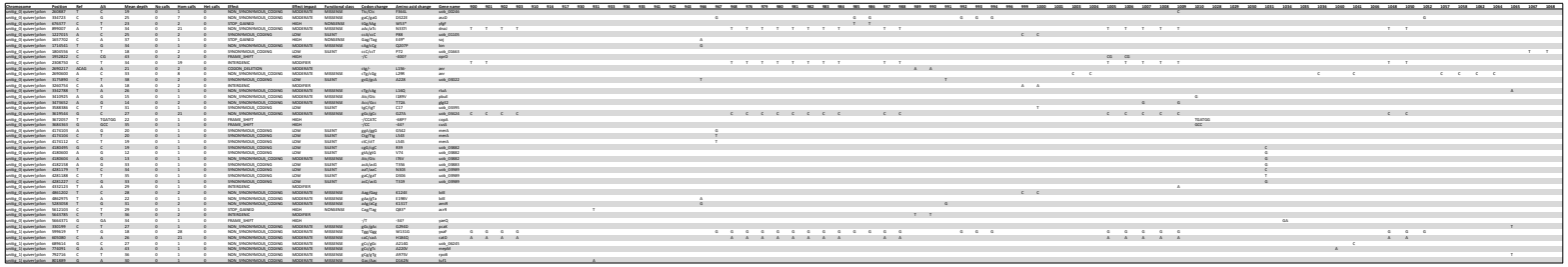
Online appendix 7

Chromosome	Position	Ref	Alt	Mean depth	No calls	Hom calls	Het calls	Effect	Effect impact	Functional class	Codon change	Amino acid change	Gene name	904	905	906	907	908	909	911	912	913	914	915	918	919	920	921	922	923	925	926	927	928	932
NC_002516	1558800	CCATATG	C	40	0	1	0	CODON_DELETION	MODERATE		catatg/-	HM211-	lasR																C						
NC_002516	2806409	G	A	23	0	8	0	NON_SYNONYMOUS_CODING	MODERATE	MISSENSE	Cac/Tac	H321Y	PA2491					A	A							A					A	A	A	A	A
NC_002516	3804666	GCTTGC	G	19	0	1	0	FRAME_SHIFT	HIGH		-	-72	PA3399															G							
NC_002516	4148397	A	T	21	0	1	0	NON_SYNONYMOUS_CODING	MODERATE	MISSENSE	aTt/aAt	I181N	wspD									T													

Online appendix 8

Chromosome	Position	Ref	Alt	Mean depth	No calls	Hom calls	Het calls	Effect	Effect impact	Functional class	Codon change	Amino acid change	Gene name	929	936	937	938	939	940	944	945	946	947	948	949	950	951	953	954	955	956	957	958	959	960	961	962	963	964	969	970	971	972	973	974	975
NC_002516	574989	CCGCAGTTG	C	20	0	9	0	FRAME_SHIFT	HIGH			-37	PA0512				C	C								C		C			C			C				C				C				
NC_002516	856001	TGGCCTGG	T	31	0	1	0	FRAME_SHIFT	HIGH		-	-242	putP																									T			C		C		C			
NC_002516	1558520	C	T	41	0	5	0	NON_SYNONYMOUS_CODING	MODERATE	MISSENSE	cCg/cTg	P117L	lasR											T															T	T	T						T		
NC_002516	1558668	C	CTT	36	0	2	0	FRAME_SHIFT	HIGH		-/TT	-167?	lasR																	CTT																CTT
NC_002516	2844173	A	C	19	0	26	0	NON_SYNONYMOUS_CODING	MODERATE	MISSENSE	gAc/gCc	D119A	PA2523	C	C	C	C	C	C	C	C	C	C			C	C	C	C	C		C	C	C	C	C	C			C	C	C	C	C			
NC_002516	2926290	G	A	25	0	7	0	NON_SYNONYMOUS_CODING	MODERATE	MISSENSE	cCg/cTg	P48L	gacA											A							A							A	A	A						A	A	
NC_002516	3486673	A	T	25	0	1	0	NON_SYNONYMOUS_CODING	MODERATE	MISSENSE	cTg/cAg	L171Q	PA3106																																			T
NC_002516	3584085	G	A	23	0	2	0	NON_SYNONYMOUS_CODING	MODERATE	MISSENSE	gCc/gTc	A87V	gltR		A	A																															
NC_002516	5796903	C	T	14	0	1	0	NON_SYNONYMOUS_CODING	MODERATE	MISSENSE	gCc/gTc	A317V	mutY																																T			
NC_002516	5853846	A	C	26	0	1	0	NON_SYNONYMOUS_CODING	MODERATE	MISSENSE	Acc/Ccc	T88P	PA5201																												C							

Online appendix 9



Online appendix 10

Chromosome	Position	Ref	Alt	Mean depth	No calls	Hom calls	Het calls	Effect	Effect impact	Functional class	Codon change	Amino acid change	Gene name	1045	1047	1049	1053	1054	1056	1069
NC_002516	3558951	G	A	35	0	1	0	NON_SYNONYMOUS_CODING	MODERATE	MISSENSE	aCc/aTc	T83I	gyrA						A	
NC_002516	4166773	A	G	22	0	2	0	NON_SYNONYMOUS_CODING	MODERATE	MISSENSE	Acg/Gcg	T86A	nalC					G	G	

Online appendix 11

Patient	Antibiotic/antifungal	Start	End	Start	End
2	Ciprofloxacin	16/10/2012	06/11/2012		
	Nitrofurantoin	16/10/2012	11/11/2012		
	Vancomycin	29/10/2012	03/11/2012		
4	Flucloxacillin	23/11/2012	30/11/2012		
	Piperacillin/tazobactam	30/11/2012	03/12/2012		
	Meropenem	03/12/2012	08/12/2012		
	Colistin	15/12/2012	21/12/2012		
5	Gentamycin	12/04/2013	12/04/2013		
	Co-amoxiclav	13/04/2013	14/04/2013		
	Erthromycin	14/04/2013	21/04/2013	11/05/2013	19/05/2013
	Piperacillin/tazobactam	14/04/2013	18/04/2013		
	Meropenem	20/04/2013	08/05/2013	19/05/2013	20/05/2013
	Caspofungin	26/04/2013	14/05/2013	20/05/2013	21/05/2013
	Linezolid	01/05/2013	12/05/2013		
	Ciprofloxacin	06/05/2013	16/05/2013	20/05/2013	21/05/2013
	Colistin	20/05/2013	23/05/2013		

Gene	Mutation type	Effect	AA substitution	Resistance phenotype	Samples
gyrA	SNP	non-synonymous	T83I	Ciprofloxacin	1056
nalC	indel	-	-	Meropenem	1054, 1056
mexS	SNP	non-synonymous	H321Y	Ciprofloxacin	908, 909, 919, 925-928, 932
oprD	indel	frame shift	-400?	Imipenem/meropenem	1005, 1006