Supportive documents for molecular characterization of ESBL and carbapenemase genes

S1 Table 1: Biochemical test results of *Enterobacteriaceae* isolates from blood samples of BSI patients at TASH

Patient id	Organism isolated	LF	Indole	Urea	Mannitol	TSI(H2S)	Gas (Glu)	Citrate	Motility	LDC
7606	*P.retigari*	_	+	+	+	_	+	+	+	_
7131	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
7800	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
7708	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
250	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
380	*E.coli*	+	+	_	+	_	+	_	+	+
546	*Enterobacter spp*	+	_	+	+	_	+	+	+	_
626	*K.rihansclris*	+	+	+	+	_	+	+	_	+
662	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
666	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
693	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
691	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
508	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
728	*E.coli*	+	+	_	+	_	+	_	+	+
643	*K.oxytoca*	+	+	+	+	_	+	+	_	+
744	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
750	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
780	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
894	*K.oxytoca*	+	+	+	+	_	+	+	_	+
961	*E.coli*	+	+	_	+	_	+	_	+	+
851	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
974	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
1080	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
1065	*S.marcescens*	+	_	_	+	_	+	+	+	+
25	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
140	*M.morgani*	_	+	+	_	_	+	_	+	_
141	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
105	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
122	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
90	*M.morgani*	_	+	+	_	_	+	_	+	_
106	*K.oxytoca*	+	+	+	+	_	+	+	_	+
157	*E.coli*	+	+	_	+	_	+	_	+	+
181	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
311	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
151	*K.oxytoca*	+	+	+	+	_	+	+	_	+
291	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
314	*P.mirabilus*	_	_	+	_	+	+	+	+	_
523	*K.oxytoca*	+	+	+	+	_	+	+	_	+
467	*K.oxytoca*	+	+	+	+	_	+	+	_	+
652	*E.coli*	+	+	_	+	_	+	_	+	+
629	*E.coli*	+	+	_	+	_	+	_	+	+

719	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
704	*E.coli*	+	+	_	+	_	+	_	+	+
824	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
861	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
968	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
1028	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
1091	*K.oxytoca*	+	+	+	+	_	+	+	_	+
1100	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
1066	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
1132	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
1194	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
1115	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
1261	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
1248	*P.mirabilus*	_	_	+	_	+	+	+	+	_
1291	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
1340	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
1412	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
1409	*E.coli*	+	+	_	+	_	+	_	+	+
1396	*E.coli*	+	+	_	+	_	+	_	+	+
1424	*E.coli*	+	+	_	+	_	+	_	+	+
1478	*E.coli*	+	+	_	+	_	+	_	+	+
1482	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
1485	*K.oxytoca*	+	+	+	+	_	+	+	_	+
1647	*K.oxytoca*	+	+	+	+	_	+	+	_	+
1681	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
1684	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
1682	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
1716	*M.morgani*	_	+	+	_	_	+	_	+	_
1762	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
1683	*P.retigari*	_	+	+	+	_	+	+	+	_
1686	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
1743	*K.oxytoca*	+	+	+	+	_	+	+	_	+
1829	*E.coli*	+	+	_	+	_	+	_	+	+
1869	*K.oxytoca*	+	+	+	+	_	+	+	_	+
1872	*K.oxytoca*	+	+	+	+	_	+	+	_	+
1961	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
1997	*Salmonella spp*	_	_	_	+	+	+	+	+	+
1971	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
1984	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
2199	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
2270	*E.coli*	+	+	_	+	_	+	_	+	+
2336	*E.coli*	+	+	_	+	_	+	_	+	+
2438	*Serratia spp*	+	_	_	+	_	_	+	+	+
2386	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
2400	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
2979	*K.pneumoniae*	+	_	+	+	_	+	+	_	+

2840	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
2668	*K.oxytoca*	+	+	+	+	_	+	+	_	+
2686	*K.oxytoca*	+	+	+	+	_	+	+	_	+
2592	*K.oxytoca*	+	+	+	+	_	+	+	_	+
2556	*E.coli*	+	+	_	+	_	+	_	+	+
3326	*E.coli*	+	+	_	+	_	+	_	+	+
3278	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
3272	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
3464	*K.oxytoca*	+	+	+	+	_	+	+	_	+
3416	*E.coli*	+	+	_	+	_	+	_	+	+
3524	*K.pneumoniae*	+	_	+	+	_	+	+	_	+
201	*E.coli*	+	+	_	+	_	+	_	+	+
3346	*E.coli*	+	+	_	+	_	+	_	+	+
194	*K.oxytoca*	+	+	+	+	_	+	+	_	+
438	*K. Pneumoniae*	+	_	+	+	_	+	+	_	+
37	*E.coli*	+	+	_	+	_	+	_	+	+
85	*K.pneumoniae*	+	_	+	+	_	+	+	_	+

Keys: LF-lactose fermenter, TSI-Triple sugar iron, Glu-glucose, LCD-Lysine decarboxylase, H_2S-hydrogen sulfide.

S2 Table 2: Antimicrobial susceptibility patterns of ESBL producing Enterobacteriaceae from BSI patients at TASH

Patient id	AMP	GEN	AMK	CTX	CRO	CAZ	CIP	TOB	FEP	CXT	CRX	MEM	SXT	PTZ	AMC	IMI
7131	R	R	S	R	R	R	S	R	R	R	R	S	R	S	R	S
7708	R	R	S	R	R	R	R	R	R	R	S	S	R	S	R	S
250	R	R	S	R	R	S	S	R	S	S	R	S	R	S	R	S
662	R	S	S	R	R	R	R	S	R	R	R	S	R	S	R	S
666	R	S	S	R	R	R	R	S	R	R	R	S	R	S	R	S
693	R	R	S	R	R	R	R	R	R	R	R	R	R	R	R	R
508	R	R	S	R	R	R	S	S	R	R	R	S	R	S	S	S
728	R	S	S	R	R	R	S	R	R	R	R	S	R	R	R	S
643	R	S	S	R	R	R	S	R	S	R	R	S	S	S	R	S
744	R	R	S	R	R	R	S	R	R	S	R	S	R	R	R	S
780	R	R	S	R	R	R	S	R	R	R	R	S	R	R	R	S
894	R	R	R	R	R	R	R	R	R	R	R	S	R	R	R	S

961	R	S	R	R	R	R	R	S	R	R	R	S	R	R	R	S
851	R	R	S	R	R	R	S	S	R	R	R	S	R	S	R	S
974	R	R	S	R	R	R	S	R	R	R	R	S	R	R	R	S
1080	R	R	R	R	R	R	R	R	R	R	R	S	R	R	R	S
25	R	R	S	R	R	R	S	S	S	R	R	S	R	R	R	S
140	R	R	S	R	R	R	R	R	R	R	R	S	R	S	R	S
141	R	S	S	R	R	R	R	S	R	R	R	S	R	S	R	S
157	R	S	S	R	R	R	R	S	S	R	R	S	R	S	R	S
181	R	S	S	R	R	R	S	S	S	S	R	S	R	S	R	S
311	R	S	S	R	R	R	S	S	R	R	R	S	R	S	R	S
151	R	S	S	R	R	R	S	S	R	R	R	S	R	S	R	S
291	R	R	S	R	R	R	R	R	R	R	R	R	S	R	R	R
314	R	R	S	R	R	R	R	S	R	R	R	S	R	S	R	S
652	R	R	S	R	R	R	R	S	R	R	R	S	R	R	R	S
629	R	S	S	R	R	R	S	S	R	S	R	S	R	S	R	S
719	R	R	S	R	R	R	R	R	R	R	R	S	R	S	R	S
861	R	R	S	R	R	R	S	R	R	S	R	S	R	S	R	S
968	R	R	S	R	R	R	R	R	R	R	R	S	R	R	R	S
1066	R	S	S	R	R	S	S	S	R	R	R	S	R	S	R	S
1132	R	R	S	R	R	R	R	R	R	R	R	S	R	R	R	S
1115	R	R	S	R	R	R	R	R	R	S	R	S	R	R	R	S
1261	R	R	S	R	R	R	R	R	R	R	R	S	R	R	R	S
1291	R	R	S	R	R	R	R	S	R	S	R	S	R	R	R	S
1340	R	R	S	R	R	R	R	R	R	R	R	S	R	R	R	S
1412	R	R	S	R	R	R	R	R	R	R	R	S	R	R	R	S
1409	R	R	S	R	R	R	R	S	R	R	R	S	R	R	R	S
1396	R	R	S	R	R	R	R	S	R	R	R	S	R	R	R	S
1424	R	R	S	R	R	R	R	R	R	R	R	S	R	S	R	S
1478	R	R	S	R	R	R	R	S	R	R	R	S	R	R	R	S
1482	R	R	S	R	R	R	R	R	R	R	R	S	R	S	R	S
1647	R	S	S	R	R	R	S	S	R	S	R	S	R	S	R	S
1681	R	R	S	R	R	R	R	R	R	R	R	S	R	R	R	S
1682	R	R	S	R	R	R	R	R	R	R	R	S	R	R	R	S
1762	R	R	S	R	R	R	S	R	R	S	R	R	R	R	R	R
1683	R	S	S	R	S	S	S	S	R	R	R	S	R	S	R	S
1686	R	R	S	R	R	R	R	S	R	R	R	S	R	S	R	S
1743	R	R	S	R	R	R	R	R	R	S	R	S	R	R	R	S
1829	R	S	S	R	R	R	R	S	R	S	R	S	R	R	R	S
1869	R	R	S	R	R	R	S	R	R	R	R	S	R	R	R	S
1872	R	R	S	R	S	S	S	S	R	S	R	S	R	S	R	S
1961	R	S	S	R	R	R	R	S	R	R	R	S	R	S	R	S
1971	R	S	S	R	R	R	R	S	R	R	R	S	R	S	R	S
1984	R	R	S	R	R	R	R	R	R	S	R	S	R	S	R	S
2199	R	R	S	R	R	R	S	S	R	R	R	S	R	S	R	S
2270	R	S	S	R	R	R	R	S	R	R	R	S	R	R	R	S
2336	R	S	S	R	R	R	R	S	R	S	R	S	R	S	R	S

2386	R	R	S	R	R	R	R	S	S	R	R	S	R	S	R	S
2400	R	R	S	R	R	R	R	S	R	S	R	S	R	R	R	S
2840	R	S	S	R	R	R	R	S	R	S	R	S	R	S	R	S
2668	R	R	S	R	R	S	S	S	R	S	R	S	R	S	R	S
2686	R	S	S	R	R	S	S	S	R	S	R	S	R	S	R	S
2592	R	R	S	R	R	R	S	S	R	R	R	S	R	S	R	S
3326	R	R	S	R	R	R	R	S	R	S	R	S	R	S	R	S
3278	R	R	S	R	R	R	R	R	R	R	R	S	R	S	R	S
3272	R	S	S	R	R	R	R	R	R	S	R	S	R	S	R	S
3464	R	R	S	R	R	R	R	S	R	S	R	S	R	S	R	S
3524	R	R	S	R	R	R	R	R	R	S	R	S	R	R	R	S
85	R	R	R	R	R	R	S	R	R	R	R	S	R	S	R	S

Keys: AMP, Ampicillin; Gen, Gentamicin; AMK, Amikacin; CTX, Cefotaxime; CRO, Ceftriaxone; CAZ, Ceftazidime; CIP, Ciprofloxacin, TOB, Tobramycin; FEP, Cefipeme; CXT, Cefoxitin; MEM, Meropenem; IMI, Imipenem; SXT, Trimethoprim/sulphamethoxazol; PTZ, Piperacillin/tazobactam; AMC, Amoxacillin/clavulanic acid; CRX, Cefuroxime; R, resistant and S, susceptible

S3 Table 3: Distribution of ESBL genes among ward type and their MDR patterns

Patient id	Ward type	CDT ESBL	CTXM gene	SHV gene	TEM gene	MDR pattern
7131	Pediatrics	Pos	Pos	Pos	Pos	AM,GM,FEP,FOX,SXT,AUG
7708	Pediatrics	Pos	Pos	Neg	Neg	AM,GM,CIP,FEP,FOX,SXT,AUG
250	Pediatrics	Pos	Pos	Pos	Pos	AM,GM,FEP,SXT,AUG
662	Medical ward	Pos	Pos	Pos	Pos	AM,CIP,FEP,FOX,SXT,AUG
666	Pediatrics	Pos	Pos	Pos	Pos	AM,CIP,FEP,FOX,SXT,AUG
693	Pediatrics	Pos	Pos	Neg	Pos	AM,GM,CIP,FEP,FOX,MEM,SXT,AUG
508	ICU	Pos	Pos	Pos	Pos	AM,GM,FEP,FOX,SXT
728	Medical ward	Pos	Pos	Pos	Pos	AM,FEP,FOX,SXT,AUG
643	Pediatrics	Pos	Pos	Neg	Neg	AM,FEP,FOX,AUG
744	ICU	Pos	Pos	Pos	Pos	AM,GM,FEP,SXT,AUG
780	Pediatrics	Pos	Pos	Pos	Pos	AM,GM,FEP,SXT,AUG
894	Pediatrics	Pos	Pos	Pos	Pos	AM,GM,CIP,FEP,FOX,SXT,AUG
961	Medical ward	Pos	Pos	Pos	Neg	AM,CIP,FEP,FOX,SXT,AUG
851	Pediatrics	Pos	Pos	Pos	Pos	AM,GM,FEP,FOX,SXT,AUG
974	Pediatrics	Pos	Pos	Pos	Pos	AM,GM,FEP,SXT,AUG
1080	Medical ward	Pos	Pos	Pos	Pos	AM,GM,CIP,FEP,FOX,SXT,AUG
25	Pediatrics	Pos	Pos	Pos	Pos	AM,GM,FEP,FOX,SXT,AUG

140	Pediatrics	Pos	Pos	Pos	Pos	AM,GM,CIP,FEP,FOX,SXT,AUG
141	Medical ward	Pos	Pos	Pos	Pos	AM,CIP,FEP,FOX,SXT,AUG
157	Medical ward	Pos	Pos	Neg	Neg	AM,CIP,FOX,SXT,AUG
181	Pediatrics	Pos	Pos	Pos	Pos	AM,FEP,SXT,AUG
311	Pediatrics	Pos	Pos	Neg	Neg	AM,FEP,FOX,SXT,AUG
151	Pediatrics	Pos	Pos	Pos	Pos	AM,FEP,FOX,SXT,AUG
291	Medical ward	Pos	Pos	Pos	Pos	AM,GM,CIP,FEP,FOX,MEM,AUG
314	Medical ward	Pos	Pos	Pos	Neg	AM,GM,CIP,FEP,FOX,SXT,AUG
652	ICU	Pos	Pos	Pos	Pos	AM,CIP,FEP,FOX,SXT,AUG
629	Pediatrics	Pos	Pos	Pos	Pos	AM,FEP,SXT,AUG
719	ICU	Pos	Pos	Neg	Pos	AM,GM,CIP,FEP,FOX,SXT,AUG
861	ICU	Pos	Pos	Pos	Pos	AM,GM,FEP,SXT,AUG
968	ICU	Pos	Pos	Pos	Pos	AM,GM,CIP,FEP,FOX,SXT,AUG
1066	ICU	Pos	Pos	Neg	Pos	AM,FEP,SXT,AUG
1132	Medical ward	Pos	Pos	Neg	Pos	AM,GM,CIP,FEP,FOX,SXT,AUG
1115	Pediatrics	Pos	Pos	Pos	Pos	AM,GM,CIP,FEP,SXT,AUG
1261	Pediatrics	Pos	Pos	Pos	Pos	AM,GM,CIP,FEP,SXT,AUG
1291	ICU	Pos	Pos	Pos	Pos	AM,GM,CIP,FEP,SXT,AUG
1340	Medical ward	Pos	Pos	Pos	Pos	AM,GM,CIP,FEP,FOX,SXT,AUG
1412	ICU	Pos	Pos	Neg	Neg	AM,CIP,FEP,FOX,SXT,AUG
1409	Pediatrics	Pos	Pos	Neg	Pos	AM,CIP,FEP,FOX,SXT,AUG
1396	Pediatrics	Pos	Pos	Pos	Pos	AM,CIP,FEP,FOX,SXT,AUG
1424	Medical ward	Pos	Pos	Neg	Pos	AM,GM,CIP,FEP,SXT,AUG
1478	Pediatrics	Pos	Pos	Neg	Pos	AM,GM,CIP,FEP,FOX,SXT,AUG
1482	Pediatrics	Pos	Pos	Pos	Pos	AM,CIP,FEP,FOX,SXT,AUG
1647	Pediatrics	Pos	Pos	Neg	Neg	AM,FEP,SXT,AUG
1681	ICU	Pos	Pos	Neg	Neg	AM,GM,CIP,FEP,SXT,AUG
1682	ICU	Pos	Pos	Pos	Pos	AM,GM,CIP,FEP,FOX,SXT,AUG
1762	ICU	Pos	Pos	Pos	Pos	AM,GM,FEP,SXT,AUG
1683	ICU	Pos	Pos	Neg	Neg	AM,FEP,FOX,SXT,AUG
1686	Pediatrics	Pos	Pos	Pos	Pos	AM,GM,FEP,FOX,SXT,AUG
1743	ICU	Pos	Pos	Pos	Pos	AM,GM,CIP,FEP,SXT,AUG
1829	ICU	Pos	Pos	Neg	Neg	AM,CIP,FEP,SXT,AUG
1869	ICU	Pos	Pos	Pos	Pos	AM,GM,FEP,SXT,AUG
1872	ICU	Pos	Pos	Neg	Neg	AM,GM,FEP,SXT
1961	Pediatrics	Pos	Pos	Pos	Neg	AM,CIP,FEP,SXT,AUG
1971	ICU	Pos	Pos	Pos	Pos	AM,CIP,FEP,SXT,AUG
1984	ICU	Pos	Pos	Pos	Pos	AM,GM,FEP,SXT,AUG
2199	ICU	Pos	Pos	Neg	Pos	AM,GM,FEP,SXT,AUG
2270	Pediatrics	Pos	Pos	Neg	Pos	AM,CIP,FEP,FOX,SXT,AUG
2336	Medical ward	Pos	Pos	Pos	Pos	AM,CIP,FEP,SXT
2386	Pediatrics	Pos	Pos	Pos	Pos	AM,FEP,FOX,SXT,AUG
2400	ICU	Pos	Pos	Pos	Pos	AM,GM,FEP,SXT,AUG
2840	ICU	Pos	Pos	Pos	Pos	AM,FEP,SXT
2668	Medical ward	Pos	Pos	Pos	Pos	AM,GM,FEP,SXT
2686	ICU	Pos	Pos	Pos	Pos	AM,FEP,SXT

2592	ICU	Pos	Pos	Pos	Pos	AM,FEP,FOX,SXT,AUG
3326	Pediatrics	Pos	Pos	Neg	Neg	AM,GM,CIP,FEP,SXT
3278	ICU	Pos	Pos	Pos	Pos	AM,GM,FEP,FOX,SXT,AUG
3272	Pediatrics	Pos	Pos	Pos	Pos	AM,CIP,FEP,SXT,AUG
3464	ICU	Pos	Pos	Neg	Neg	AM,FEP,SXT
3524	Medical ward	Pos	Pos	Neg	Neg	AM,GM,CIP,FEP,FOX,SXT,AUG
85	Medical ward	Pos	Pos	Pos	Pos	AM,FEP,FOX,SXT,AUG

Keys: AMP, Ampicillin; Gen, Gentamicin; AMK, Amikacin; CTX, Cefotaxime; CRO, Ceftriaxone; CAZ, Ceftazidime; CIP, Ciprofloxacin, TOB, Tobramycin; FEP, Cefipeme; CXT, Cefoxitin; MEM, Meropenem; IMI, Imipenem; SXT, Trimethoprim/sulphamethoxazol; PTZ, Piperacillin/tazobactam; AMC, Amoxacillin/clavulanic acid; CRX, Cefuroxime; CDT,combined disk test; ICU, intensive care unit

S4 Table 4: Distribution of carbapenemase genes among ward type and their MDR patterns

Patient id	Ward type	CDT ESBL	mCIM	KPC	NDM	MDR pattern
7800	Pediatrics	Neg	Pos	Neg	Pos	AM,GM,CIP,FEP,FOX,MEM,AUG
693	Pediatrics	Pos	Pos	Neg	Pos	AM,GM,CIP,FEP,FOX,MEM,SXT,AUG
691	Medical	Neg	Pos	Neg	Pos	AM,GM,CIP,FEP,FOX,MEM,SXT,AUG
1065	Pediatrics	Neg	Pos	Neg	Pos	AM,GM,FEP,FOX,MEM,AUG
90	Pediatrics	Neg	Pos	Neg	Pos	AM,GM,CIP,FEP,FOX,MEM,SXT,AUG
291	Medical	Pos	Pos	Neg	Pos	AM,GM,CIP,FEP,FOX,MEM,AUG
704/11	ICU	Neg	Pos	Neg	Pos	AM,FEP,FOX,MEM,SXT,AUG
1091/11	Pediatrics	Neg	Pos	Neg	Pos	AM,GM,FEP,FOX,MEM,SXT,AUG

Keys: ICU, intensive care unit; CDT, combined disk test; mCIM, modified carbapenem inactivation method; MDR, Multi-drug resistance.