

Rapid Diagnosis of Infection in the Critically Ill (RADICAL), a multicenter study of molecular detection in bloodstream infections, pneumonia and sterile site infections

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Supplemental Digital Content

Table S1: Blood-stream infection organisms reported using microbiology and the PCR/ESI-MS result in the same patient

Subject Identifier	Microbiology	PCR/ESI-MS	Q Score	Level (GE/mL)	Matched results
1001	<i>Klebsiella pneumoniae</i>	<i>Klebsiella pneumoniae</i>	0.99	173	Yes
1016	<i>Candida albicans</i>	<i>Escherichia coli</i>	0.85	4	No
1028	<i>Klebsiella pneumoniae</i>	<i>Klebsiella pneumoniae</i>	0.99	222	Yes
1032	<i>Staphylococcus aureus</i>	<i>Staphylococcus aureus</i>	0.99	12	Yes
1033	<i>Escherichia coli</i>	<i>Escherichia coli</i>	0.97	16	Yes
2005	<i>Enterobacter cloacae</i>	<i>Enterobacter cloacae complex</i>	0.97	15	Yes
2006	<i>Pseudomonas aeruginosa</i>	<i>Pseudomonas aeruginosa</i>	0.99	215	Yes
2028	<i>Staphylococcus aureus</i>	<i>Staphylococcus aureus</i>	0.99	74	Yes
2032	<i>Enterococcus faecium</i>	<i>Enterococcus faecium</i>	0.99	337	Yes
2034	<i>Citrobacter freundii</i>	<i>Citrobacter freundii</i>	0.99	142	Yes
2037	<i>Staphylococcus aureus</i>	Negative	.	.	Negative by PCR
2043	<i>Candida albicans</i>	<i>Candida albicans</i>	0.94	6	Yes
2045	<i>Escherichia coli</i>	<i>Escherichia coli</i>	0.99	176	Yes
2049	<i>Staphylococcus aureus</i>	<i>Escherichia coli</i>	0.99	173	No
2052	<i>Streptococcus oralis</i>	<i>Fingoldia magna</i>	0.96	52	No
2055	<i>Hafnia alvei</i>	<i>Hafnia alvei</i>	0.97	68	Yes
2057	<i>Escherichia coli</i>	<i>Escherichia coli</i>	0.99	142	Yes
2067	<i>Escherichia coli</i>	<i>Escherichia coli</i>	0.96	2	Yes
3011	<i>Acinetobacter baumannii</i>	<i>Escherichia coli</i>	0.89	3	No
3047	Gram- cocci	<i>Klebsiella pneumoniae</i>	0.99	82	Yes
4001	<i>Candida parapsilosis</i>	<i>Candida parapsilosis</i>	0.99	178	Yes
4011	<i>Escherichia coli</i>	<i>Escherichia coli</i>	0.99	85	Yes
4012	<i>Staphylococcus aureus</i>	<i>Staphylococcus aureus</i>	0.99	191	Yes
4012	<i>Staphylococcus aureus</i>	<i>Staphylococcus aureus</i>	0.99	206	Yes
4016	<i>Bacteroides fragilis</i>	<i>Bacteroides fragilis/thetaiotaomicron</i>	0.96	55	Yes
4018	<i>Escherichia coli</i>	<i>Escherichia coli</i>	0.99	48	Yes
4026	<i>Enterobacter cloacae</i>	<i>Klebsiella pneumoniae</i>	0.99	171	No
4029	<i>Enterobacter cloacae</i>	<i>Enterobacter cloacae complex</i>	0.99	158	Yes
4029	<i>Enterobacter cloacae</i>	<i>Enterobacter cloacae complex</i>	0.99	156	Yes
4033	<i>Staphylococcus aureus</i>	<i>Staphylococcus aureus</i>	0.99	210	Yes
4037	<i>Escherichia coli</i>	<i>Escherichia coli</i>	0.97	151	Yes
4037	<i>Escherichia coli</i>	<i>Escherichia coli</i>	0.98	247	Yes
4061	<i>Streptococcus pneumoniae</i>	<i>Streptococcus mitis/pneumoniae;</i> <i>Streptococcus pneumoniae</i>	0.98	54	Yes
5009	<i>Escherichia coli</i>	<i>Escherichia coli</i>	0.98	13	Yes
5009	<i>Escherichia coli</i>	<i>Escherichia coli</i>	0.98	8	Yes
5040	<i>Escherichia coli</i>	Negative	.	.	Negative by PCR
5047	<i>Escherichia coli</i>	<i>Escherichia coli</i>	0.99	197	Yes
5048	<i>Staphylococcus aureus</i>	<i>Staphylococcus aureus</i>	0.99	258	Yes

5048	<i>Staphylococcus aureus</i>	<i>Staphylococcus aureus</i>	0.99	169	Yes
5050	<i>Enterococcus faecalis</i>	Negative	.	.	Negative by PCR
5057	<i>Escherichia coli</i>	<i>Escherichia coli</i>	0.99	140	Yes
5063	<i>Clostridium paraputrificium</i>	Negative	.	.	Negative by PCR
6006	<i>Pseudomonas sp.</i>	<i>Pseudomonas aeruginosa</i>	0.98	301	Yes
6006	<i>Pseudomonas aeruginosa</i>	<i>Pseudomonas aeruginosa</i>	0.98	200	Yes
6010	<i>Escherichia coli</i>	<i>Escherichia coli</i>	0.99	244	Yes
6010	<i>Escherichia coli</i>	<i>Escherichia coli</i>	0.99	264	Yes
6014	<i>Stenotrophomonas maltophilia</i>	<i>Stenotrophomonas maltophilia</i>	0.98	221	Yes
6046	<i>Escherichia coli</i>	<i>Escherichia coli</i>	0.99	112	Yes
6051	<i>Escherichia coli</i>	<i>Escherichia coli</i>	0.99	242	Yes
6051	<i>Escherichia coli</i>	<i>Escherichia coli</i>	0.99	246	Yes
6054	<i>Staphylococcus aureus</i>	<i>Staphylococcus aureus</i>	0.99	187	Yes
6054	<i>Staphylococcus aureus</i>	<i>Staphylococcus aureus</i>	0.99	165	Yes
6068	<i>Pseudomonas aeruginosa</i>	<i>Pseudomonas aeruginosa</i>	0.99	646	Yes
6068	<i>Pseudomonas aeruginosa</i>	<i>Pseudomonas aeruginosa</i>	0.99	446	Yes
6070	<i>Enterococcus faecium</i>	Negative	.	.	Negative by PCR
7002	<i>Staphylococcus aureus</i>	<i>Staphylococcus aureus</i>	0.98	145	Yes
7010	<i>Streptococcus pyogenes</i>	Negative	.	.	Negative by PCR
8001	<i>Listeria monocytogenes</i>	Negative	.	.	Negative by PCR
8002	<i>Morganella morganii</i>	<i>Morganella morganii</i>	0.96	9	Yes
8008	<i>Klebsiella pneumoniae</i>	<i>Klebsiella pneumoniae</i>	0.97	4	Yes
8038	<i>Pseudomonas aeruginosa</i>	<i>Candida albicans</i>	0.99	103	No
9005	<i>Escherichia coli</i>	<i>Escherichia coli</i>	0.99	214	Yes
9005	<i>Escherichia coli</i>	<i>Escherichia coli</i>	0.99	159	Yes
9010	<i>Escherichia coli</i>	<i>Escherichia coli</i>	0.98	83	Yes
9030	<i>Staphylococcus aureus</i>	<i>Staphylococcus aureus</i>	0.99	175	Yes
9030	<i>Staphylococcus aureus</i>	<i>Staphylococcus aureus</i>	0.99	192	Yes
9033	<i>Pseudomonas aeruginosa</i>	<i>Pseudomonas aeruginosa</i>	0.98	45	Yes

Table S2: Summary of organisms reported by PCR/ESI-MS that were negative by culture in blood-stream infection samples

PCR/ESI-MS reported microbes negative by culture	Total
<i>Acinetobacter baumannii</i>	1
<i>Bacteroides fragilis/thetaiotaomicron</i>	2
<i>Candida albicans</i>	11
<i>Candida glabrata</i>	2
<i>Candida tropicalis</i>	2
<i>Citrobacter koseri</i>	5
<i>Enterobacter cloacae complex</i>	3
<i>Enterococcus faecalis</i>	7
<i>Enterococcus faecium</i>	23
<i>Escherichia coli</i>	64
<i>Escherichia vulneris</i>	1
<i>Fingoldia magna</i>	1
<i>Fusobacterium nucleatum</i>	3
<i>Granulicatella adiacens</i>	1
<i>Haemophilus influenzae</i>	5
<i>Hafnia alvei</i>	1
<i>Helicobacter cetorum;Helicobacter pylori</i>	1
<i>Klebsiella oxytoca</i>	5
<i>Klebsiella pneumoniae</i>	8
<i>Klebsiella variicola</i>	1
<i>Lactobacillus acidophilus/amylovorus/crispatus</i>	1
<i>Lactobacillus fermentum</i>	1
<i>Lactobacillus gasseri</i>	1
<i>Lactococcus lactis</i>	1
<i>Micrococcus luteus</i>	1
<i>Morganella morganii</i>	2
<i>Mycobacterium africanum/bovis/canettii/tuberculosis</i>	2
<i>Neisseria meningitidis</i>	2
<i>Prevotella denticola</i>	1
<i>Pseudomonas aeruginosa</i>	2
<i>Raoultella ornithinolytica/planticola</i>	2
<i>Roseomonas gilardii</i>	1
<i>Rothia mucilaginosa</i>	2
<i>Shigella boydii</i>	1
<i>Staphylococcus aureus</i>	17
<i>Staphylococcus lugdunensis</i>	1
<i>Stenotrophomonas maltophilia</i>	1
<i>Streptococcus agalactiae</i>	1
<i>Streptococcus mitis/pneumoniae;Streptococcus pneumoniae</i>	4
<i>Streptococcus oralis/pneumoniae</i>	1
<i>Streptococcus pneumoniae</i>	2

<i>Streptococcus pseudopneumoniae</i>	1
<i>Streptococcus pyogenes</i>	6

Table S3: Summary of replicate testing results

168 samples for which there were two replicates of PCR/ESI-MS results			
		Replicate 2	
Replicate 1		Positive	Negative
	Positive	52	12
	Negative	13	91
158 samples for which there were two replicates of culture results			
		Replicate 2	
Replicate 1		Positive	Negative
	Positive	12	6
	Negative	3	137

Table S4: Replicate sample test results from the 80 cases where either method was positive in one or both BSI replicates. In 77 instances, PCR/ESI-MS was positive in one or both replicates while in 3 only culture was positive. Levels of detection (GE/mL) for matched replicate PCR/ESI-MS results were comparable

Subject Identifier	Standard of care organism detection		PCR/ESI-MS organism identification		PCR/ESI-MS level (GE/mL)	
	Primary result	Replicate result	Primary result	Replicate result	Primary result	Replicate result
2039	Negative	Negative	<i>Mycobacterium africanum/bovis/canettii/tuberculosis</i>	<i>Mycobacterium africanum/bovis/canettii/tuberculosis</i>	752	667
2043	<i>Candida albicans</i>	Negative	<i>Candida albicans</i>	<i>Candida albicans</i>	6	190
2047	Negative	Negative	<i>Enterococcus faecium</i>	<i>Enterococcus faecium</i>	11	67
2049	Negative	<i>Staphylococcus aureus</i>	Negative	<i>Escherichia coli</i>	.	.
2053	Negative	Negative	<i>Escherichia coli</i>	Negative	74	.
2055	<i>Hafnia alvei</i>	Negative	<i>Hafnia alvei</i>	<i>Hafnia alvei</i>	68	4
2067	Negative	<i>Escherichia coli</i>	Negative	<i>Escherichia coli</i>	.	2
2103	Negative	Negative	Negative	<i>Enterococcus faecium</i>	.	13
2104	Negative	Negative	<i>Candida tropicalis</i>	<i>Candida tropicalis</i>	7	10
2106	Negative	Negative	<i>Escherichia coli</i>	Negative	17	.
4012	<i>Staphylococcus aureus</i>	<i>Staphylococcus aureus</i>	<i>Staphylococcus aureus</i>	<i>Staphylococcus aureus</i>	191	206
4029	<i>Enterobacter cloacae</i>	<i>Enterobacter cloacae</i>	<i>Enterobacter cloacae</i> complex	<i>Enterobacter cloacae</i> complex	158	156
4037	<i>Escherichia coli</i>	<i>Escherichia coli</i>	<i>Escherichia coli</i>	<i>Escherichia coli</i>	151	247
4040	Negative	Negative	Negative	<i>Klebsiella pneumoniae</i>	.	138
4081	Negative	Negative	<i>Escherichia coli</i>	<i>Escherichia coli</i>	322	280
5009	<i>Escherichia coli</i>	<i>Escherichia coli</i>	<i>Escherichia coli</i>	<i>Escherichia coli</i>	13	8
5013	Negative	Not Tested	<i>Haemophilus influenzae</i>	Negative	382	.
5014	Negative	Negative	<i>Escherichia coli</i>	<i>Escherichia coli</i>	7	17
5018	Negative	Not Tested	Negative	<i>Fingoldia magna</i>	.	15
5019	Negative	Negative	<i>Escherichia coli</i>	<i>Escherichia coli</i>	13	59
5023	Not Tested	Negative	<i>Streptococcus oralis/pneumoniae</i>	<i>Streptococcus oralis/pneumoniae</i>	181	164
5026	Negative	Negative	<i>Escherichia coli</i>	Negative	5	.
5027	Negative	Negative	<i>Escherichia coli</i>	<i>Escherichia coli</i>	234	171
5028	Negative	Negative	<i>Escherichia coli</i>	<i>Escherichia coli</i>	181	92
5030	Negative	Not Tested	Negative	<i>Citrobacter koseri</i>	.	142
5031	Negative	Negative	<i>Enterococcus faecium</i>	<i>Enterococcus faecium</i>	57	116
5032	Negative	Negative	<i>Citrobacter koseri</i>	<i>Citrobacter koseri</i>	146	134
5038	Negative	Not tested	<i>Escherichia coli</i>	<i>Escherichia coli</i>	5	15
5039	Negative	Negative	Negative	<i>Candida albicans</i>	.	5

5040	<i>Escherichia coli</i>	Not tested	Negative	<i>Escherichia coli</i>	.	7
5041	Negative	Not tested	<i>Lactobacillus acidophilus/amylovorus/crispatus</i>	Negative	153	.
5045	Negative	Negative	<i>Escherichia coli</i>	<i>Escherichia coli</i>	532	200
5048	<i>Staphylococcus aureus</i>	<i>Staphylococcus aureus</i>	<i>Staphylococcus aureus</i>	<i>Staphylococcus aureus</i>	258	169
5049	Negative	Not Tested	Negative	<i>Staphylococcus aureus</i>	.	3
5053	Negative	Not Tested	<i>Staphylococcus aureus</i>	Negative	248	.
5054	Negative	Negative	<i>Escherichia coli</i>	<i>Escherichia coli</i>	25	57
5058	Negative	Negative	<i>Staphylococcus aureus</i>	<i>Staphylococcus aureus</i>	348	6
5062	Negative	Negative	<i>Escherichia coli</i>	<i>Escherichia coli</i>	14	24
5063	<i>Clostridium paraprutificum</i>	Negative	Negative	Negative	.	.
5071	Negative	Negative	<i>Neisseria meningitidis</i>	<i>Neisseria meningitidis</i>	199	210
6001	Negative	Negative	<i>Klebsiella oxytoca</i>	<i>Klebsiella oxytoca</i>	39	49
6004	Negative	Negative	<i>Escherichia coli</i>	<i>Escherichia coli</i>	35	41
6005	Negative	Negative	<i>Enterococcus faecium</i>	<i>Enterococcus faecium</i>	22	23
6006	<i>Pseudomonas sp.</i>	<i>Pseudomonas aeruginosa</i>	<i>Pseudomonas aeruginosa</i>	<i>Pseudomonas aeruginosa</i>	301	200
6010	<i>Escherichia coli</i>	<i>Escherichia coli</i>	<i>Escherichia coli</i>	<i>Escherichia coli</i>	244	264
6012	Negative	Negative	<i>Enterococcus faecium</i>	<i>Enterococcus faecium</i>	61	39
6014	<i>Stenotrophomonas maltophilia</i>	Negative	<i>Stenotrophomonas maltophilia</i>	<i>Stenotrophomonas maltophilia</i>	221	5
6016	Negative	Negative	<i>Citrobacter koseri</i>	<i>Citrobacter koseri</i>	142	100
6018	Negative	Negative	<i>Enterococcus faecium</i>	<i>Enterococcus faecium</i>	27	37
6022	Negative	Negative	Negative	<i>Escherichia coli</i>	.	4
6030	Negative	Negative	Negative	<i>Bacteroides fragilis/thetaiotaomicron</i>	.	19
6031	Negative	Negative	<i>Enterococcus faecalis</i>	<i>Enterococcus faecalis</i>	6	15
6032	Negative	Negative	<i>Escherichia coli</i>	<i>Escherichia coli</i>	6	4
6039	Negative	Negative	<i>Candida albicans</i>	Negative	5	.
6044	Negative	Negative	<i>Klebsiella pneumoniae</i>	<i>Klebsiella pneumoniae</i>	214	191
6046	Negative	<i>Escherichia coli</i>	<i>Escherichia coli</i>	<i>Escherichia coli</i>	181	112
6050	Negative	Negative	<i>Escherichia coli</i>	<i>Escherichia coli</i>	23	26
6051	<i>Escherichia coli</i>	<i>Escherichia coli</i>	<i>Escherichia coli</i>	<i>Escherichia coli</i>	242	246
6054	<i>Staphylococcus aureus</i>	<i>Staphylococcus aureus</i>	<i>Staphylococcus aureus</i>	<i>Staphylococcus aureus</i>	187	165
6055	Negative	Negative	<i>Enterococcus faecalis</i>	Negative	9	.
6061	Negative	Negative	<i>Klebsiella oxytoca</i>	<i>Klebsiella oxytoca</i>	90	114
6067	Negative	Negative	<i>Streptococcus pyogenes</i>	<i>Streptococcus pyogenes</i>	17	4
6068	<i>Pseudomonas aeruginosa</i>	<i>Pseudomonas aeruginosa</i>	<i>Pseudomonas aeruginosa</i>	<i>Pseudomonas aeruginosa</i>	646	446
6070	<i>Enterococcus faecium</i>	Negative	Negative	Negative	.	.
6072	Negative	Negative	<i>Escherichia coli</i>	<i>Escherichia coli</i>	207	202

6082	Negative	Negative	Negative	<i>Morganella morganii</i>	.	3
6083	Negative	Negative	<i>Morganella morganii</i>	Negative	3	.
6088	Negative	Negative	<i>Escherichia coli</i>	<i>Escherichia coli</i>	71	171
6091	Negative	Negative	<i>Escherichia coli</i>	<i>Escherichia coli</i>	3	7
6092	Negative	Negative	<i>Streptococcus pyogenes</i>	<i>Streptococcus pyogenes</i>	130	106
6094	Negative	Negative	<i>Streptococcus mitis/pneumoniae</i> ; <i>Streptococcus pneumoniae</i>	<i>Streptococcus mitis/pneumoniae</i> ; <i>Streptococcus pneumoniae</i>	20	17
7008	Negative	Negative	<i>Shigella boydii</i>	Negative	136	.
7010	<i>Streptococcus pyogenes</i>	Negative	Negative	Negative	.	.
8026	Not Tested	Negative	Negative	<i>Streptococcus pseudopneumoniae</i>	.	115
9002	Negative	Negative	<i>Enterococcus faecium</i>	Negative	3	.
9005	<i>Escherichia coli</i>	<i>Escherichia coli</i>	<i>Escherichia coli</i>	<i>Escherichia coli</i>	214	159
9021	Negative	Negative	<i>Escherichia coli</i>	<i>Escherichia coli</i>	234	495
9030	<i>Staphylococcus aureus</i>	<i>Staphylococcus aureus</i>	<i>Staphylococcus aureus</i>	<i>Staphylococcus aureus</i>	175	192
9031	Negative	Negative	<i>Staphylococcus aureus</i>	<i>Staphylococcus aureus</i>	48	44
9034	Negative	Negative	<i>Escherichia coli</i>	Negative	3	.

