

Machine learning based prediction of antibiotic sensitivity in patients with critical illness

Supplementary Material

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Figure S1. Correlation matrices of prediction errors for different baseline models corresponding to sputum, urine and pus swab sample data respectively.

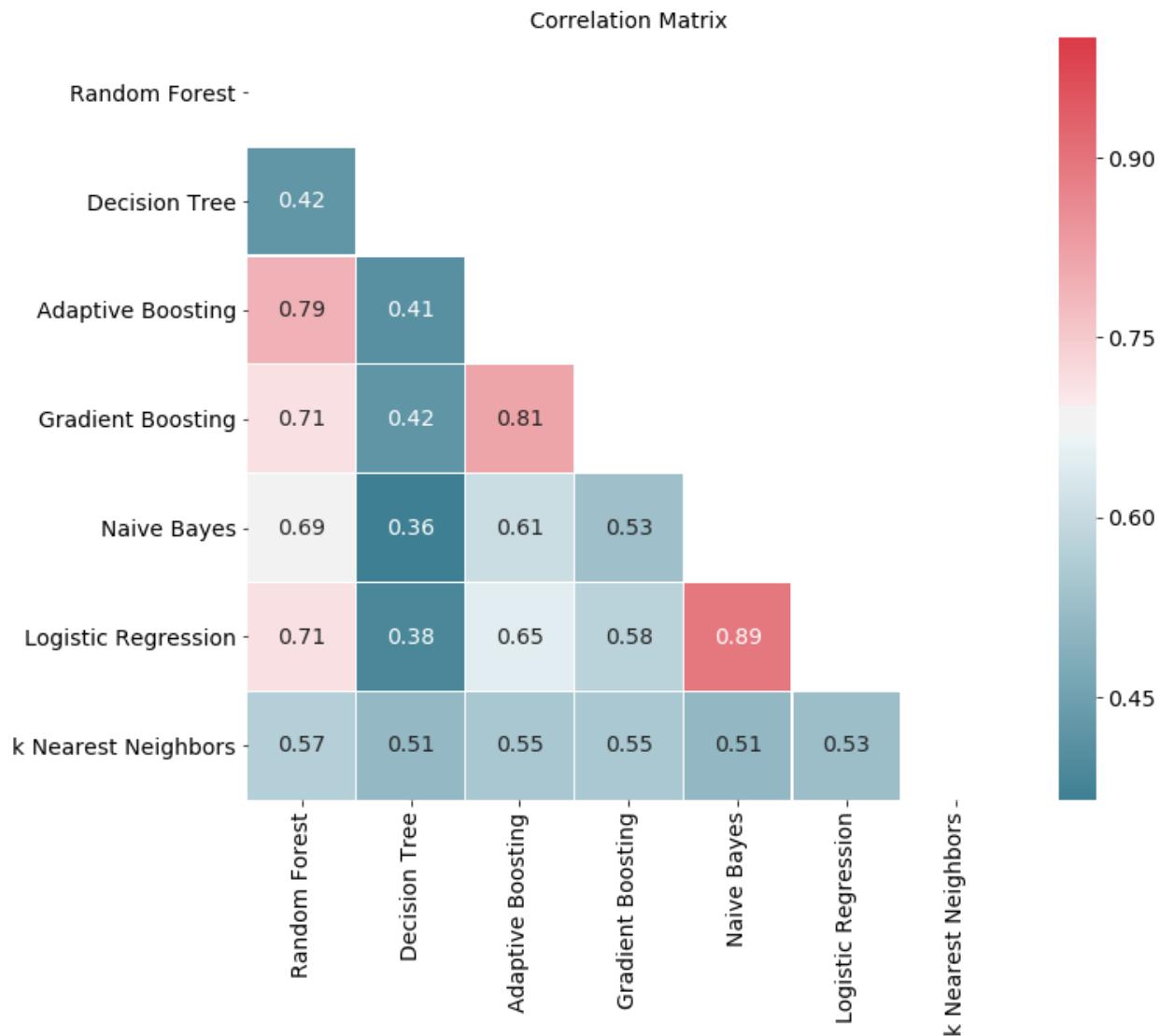


Figure S1a. Correlation matrix of prediction errors for different baseline models corresponding to sputum sample data.

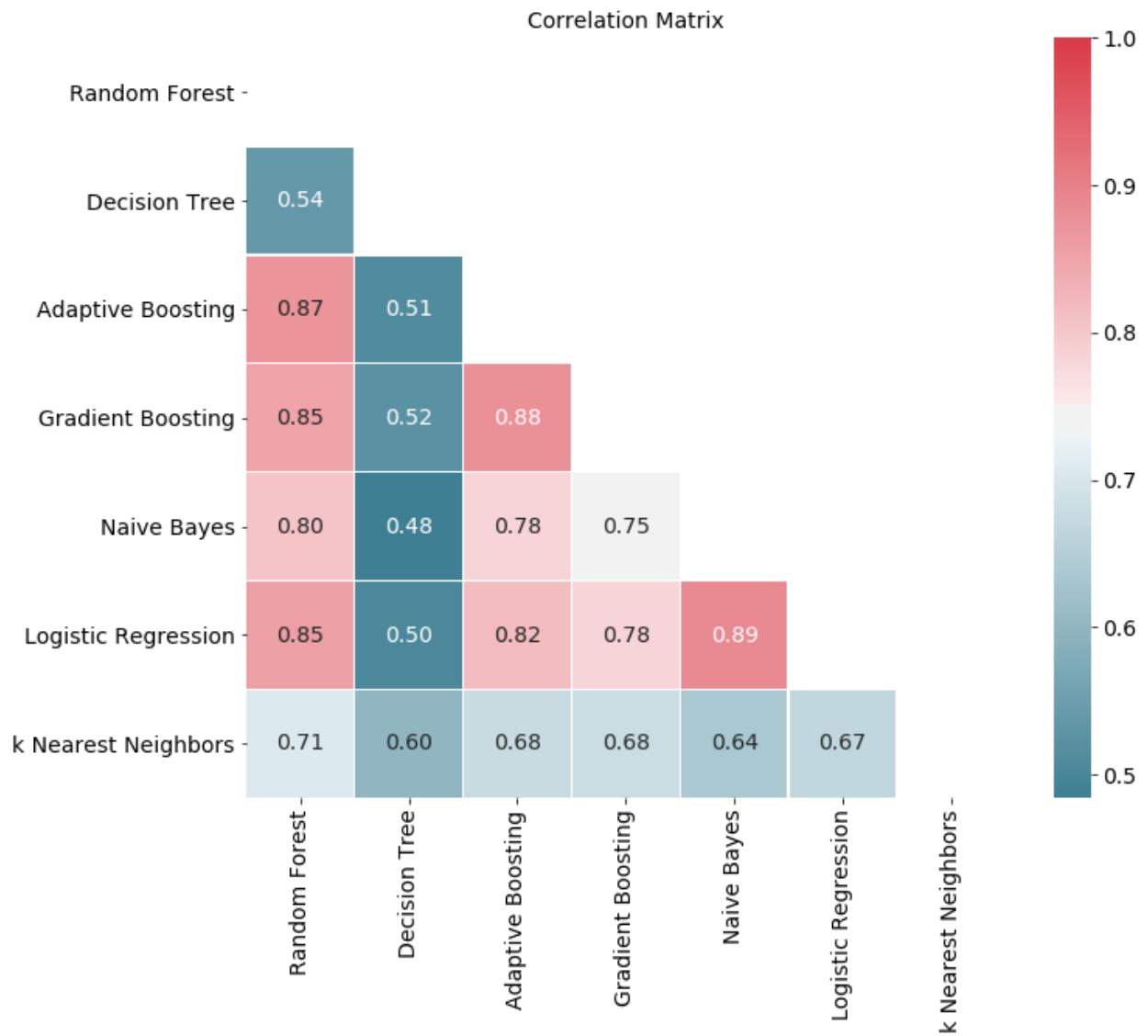


Figure S1b. Correlation matrix of prediction errors for different baseline models corresponding to urine sample data.

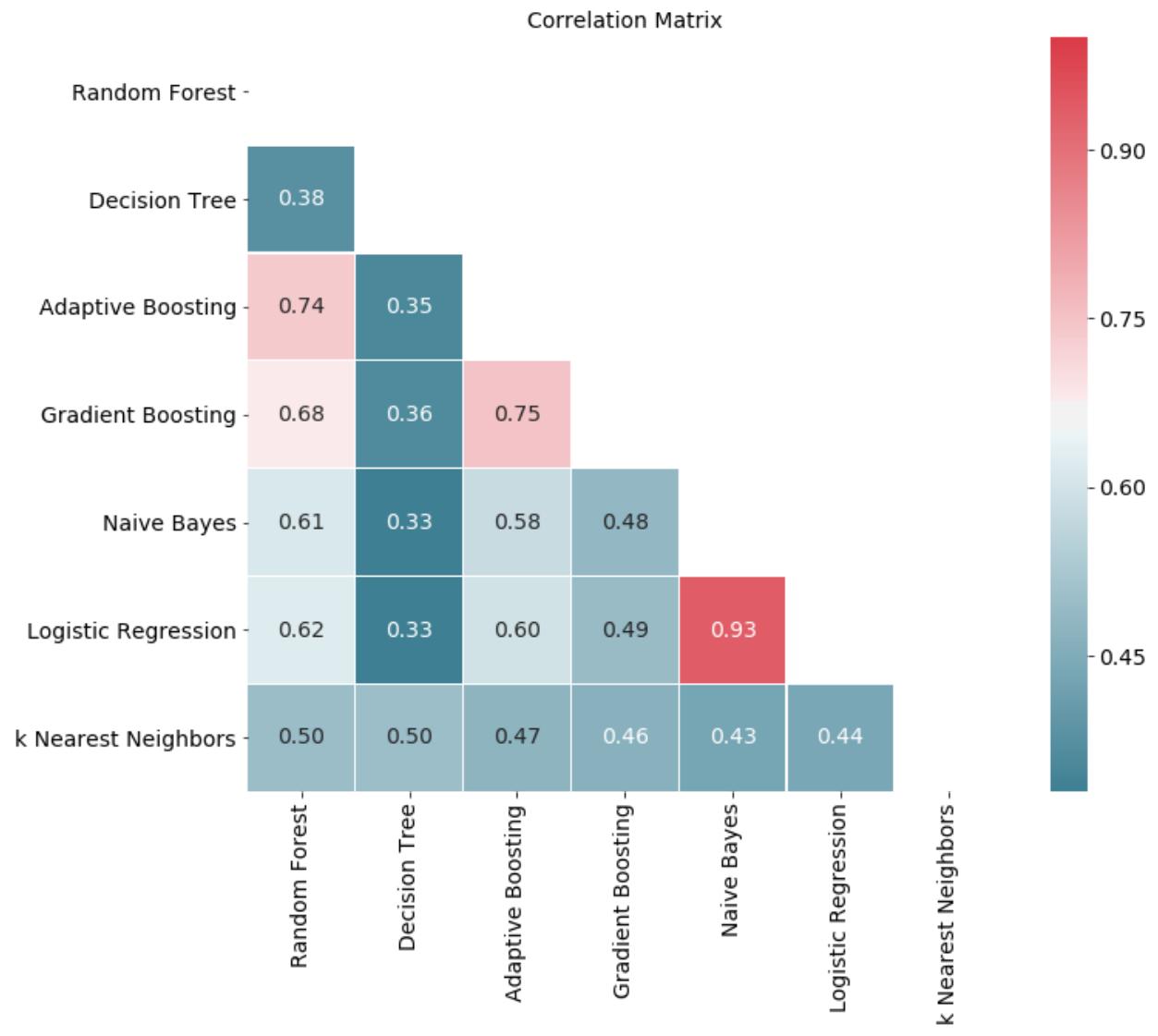
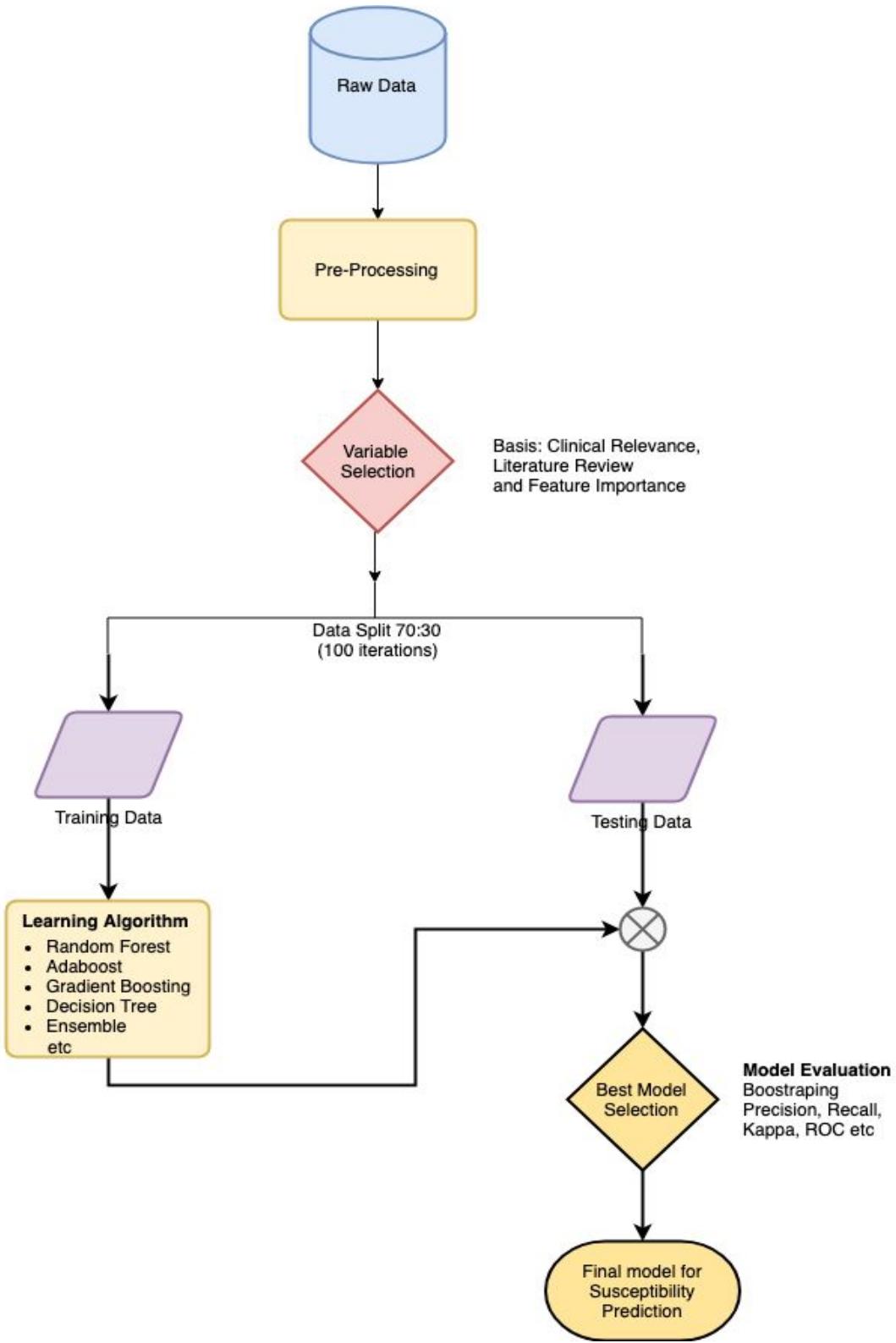


Figure S1c. Correlation matrix of prediction errors for different baseline models corresponding to pus swab sample data.

Figure S2. Step by step procedure followed to select and build the classifier for empiric sensitivity prediction.



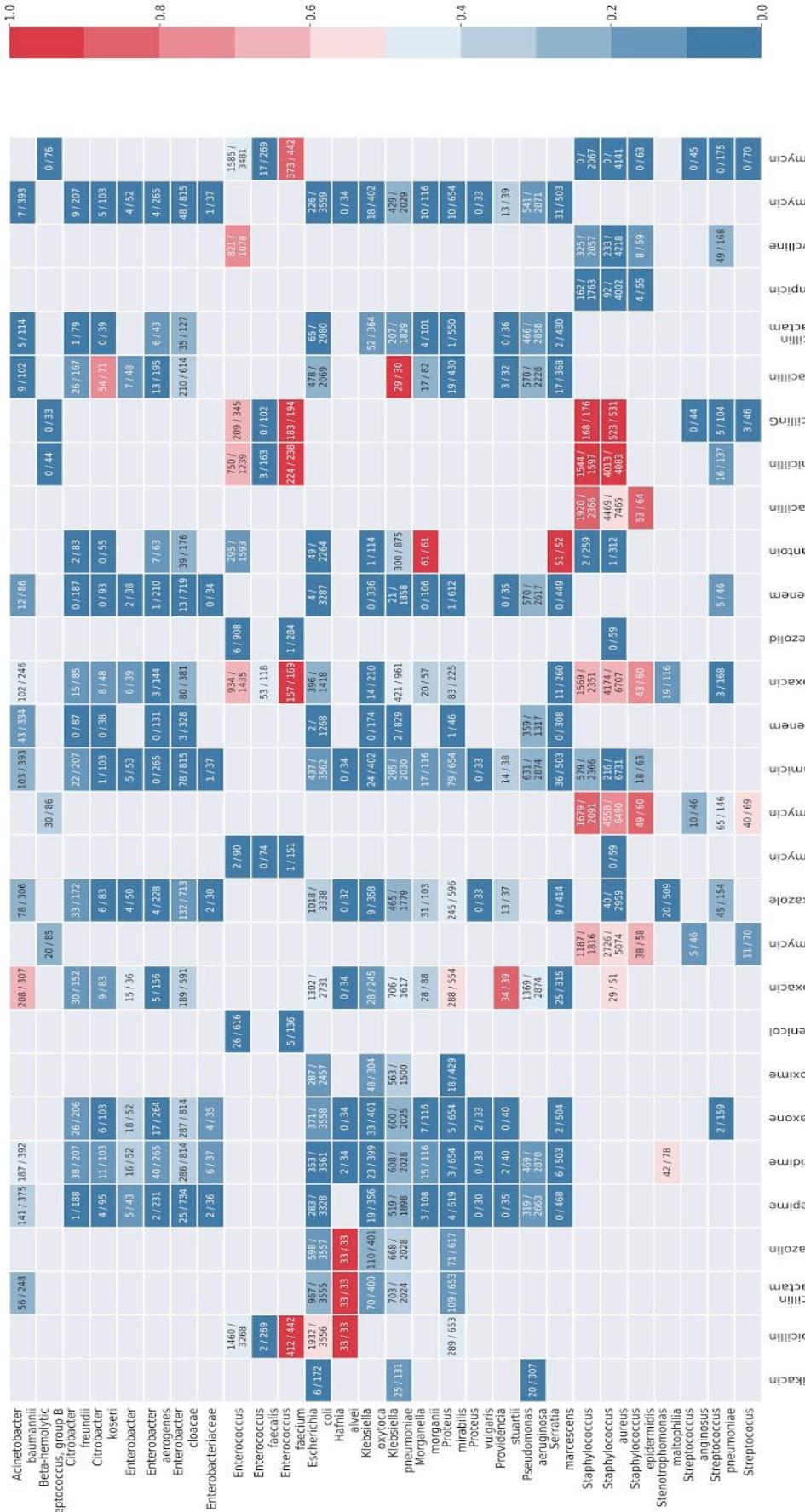


Figure S3. Antibiotic vs bacteria pairwise resistance rate in MIMIC-III data for all positive cultures.

Figure S4. Antibiotic vs bacteria pairwise resistance rate in MIMIC-III positive culture data for sputum, urine and pus swab samples respectively.

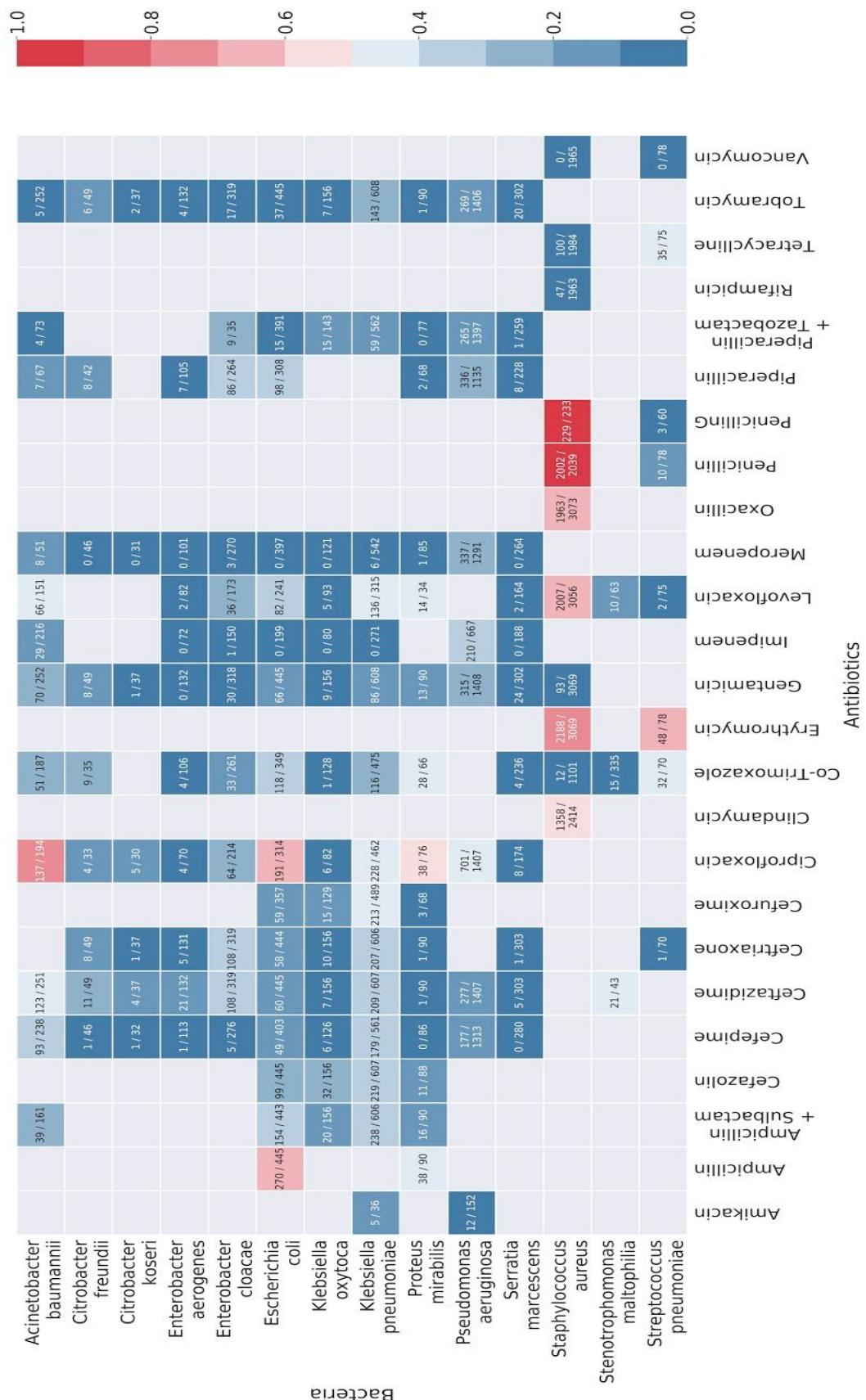


Figure S4a. Antibiotic vs bacteria pairwise resistance rate in MIMIC-III data for positive cultures of sputum sample.

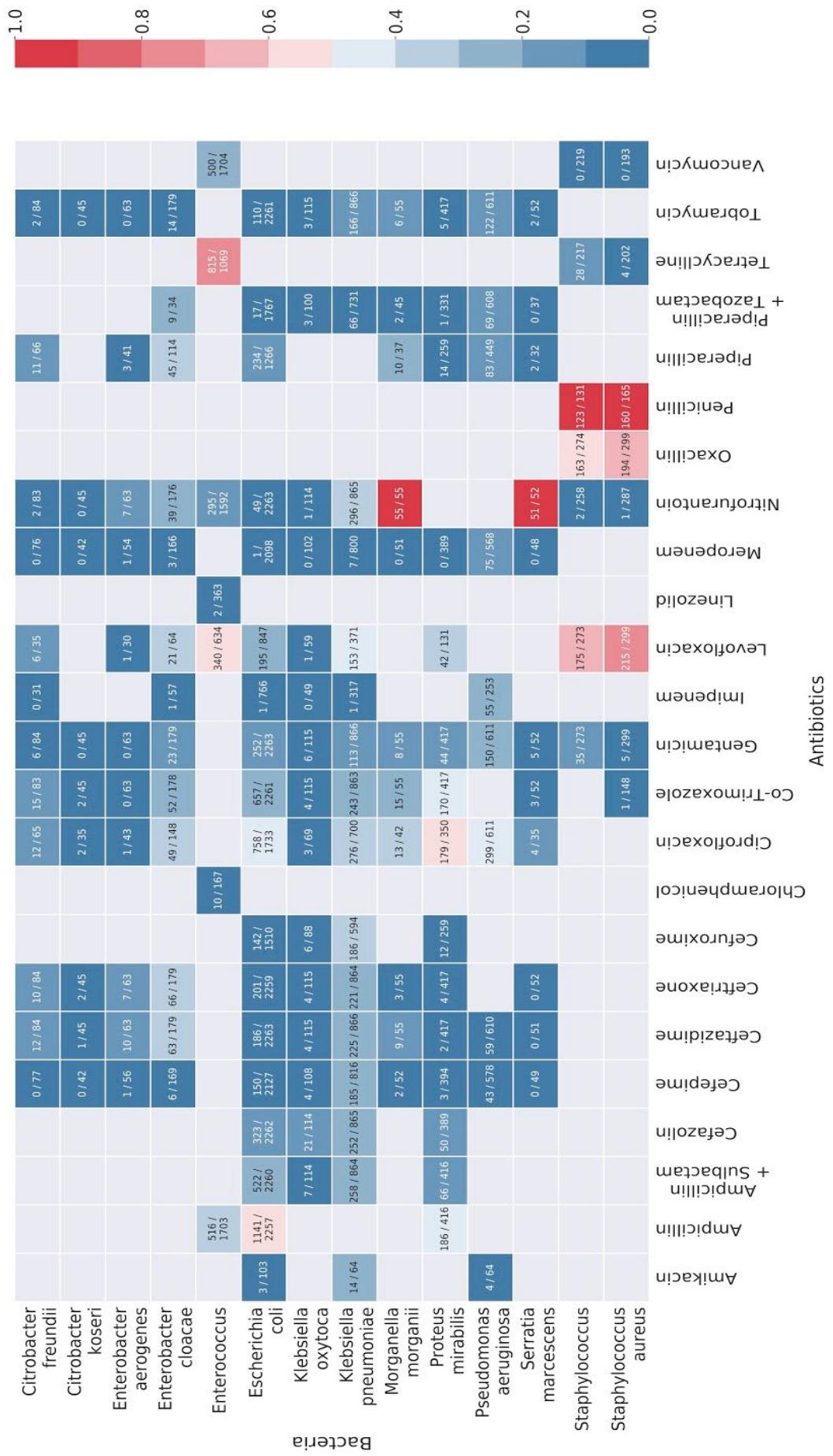


Figure S4b. Antibiotic vs bacteria pairwise resistance rate in MiMIC-III data for positive cultures of urine sample.

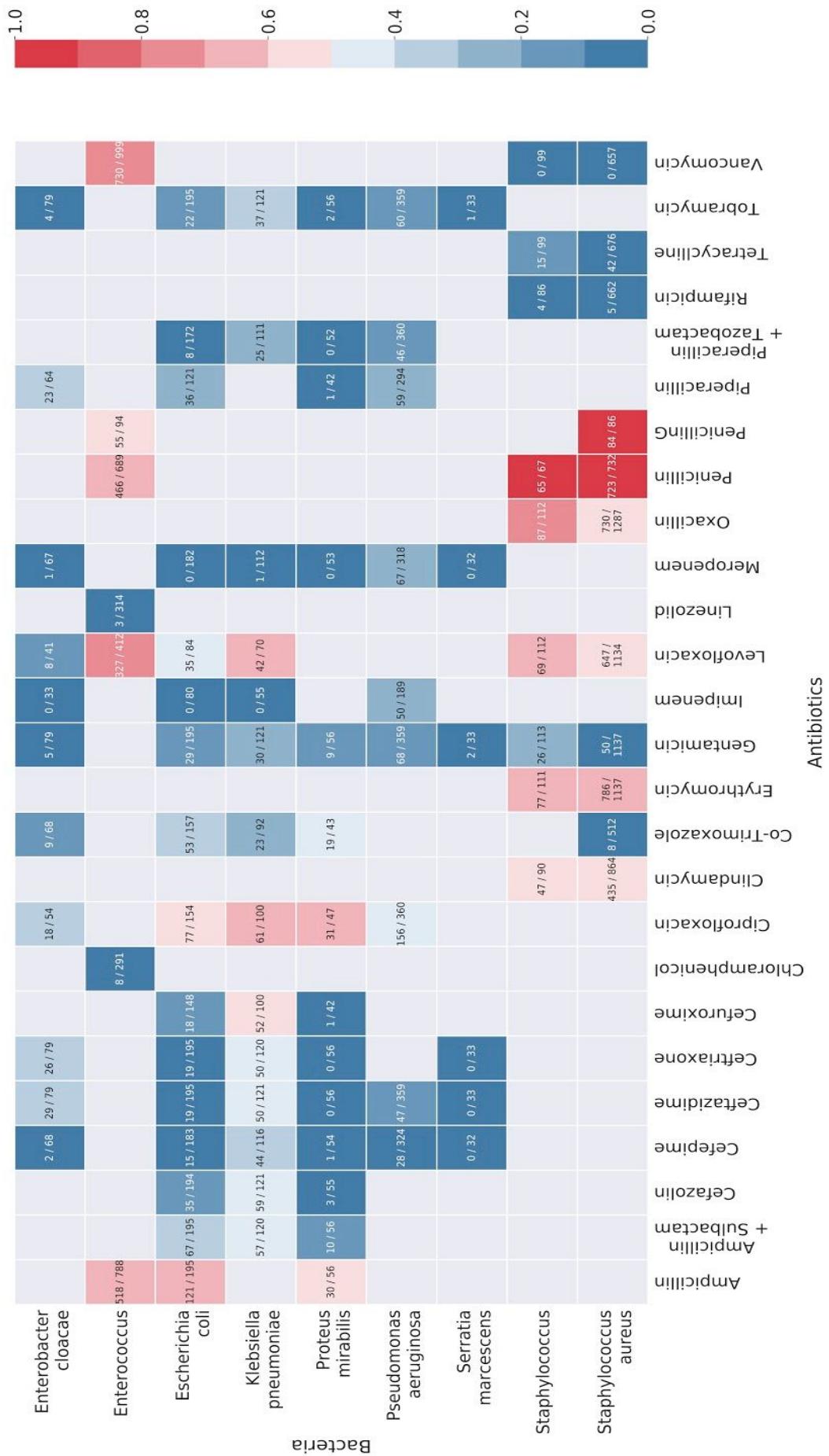


Figure S4c. Antibiotic vs bacteria pairwise resistance rate in MIMIC-III data for positive cultures of pus swab sample.

Figure S5. Coefficient plots of multinomial logistic regression on bacteria over several patient factors corresponding to sputum, urine and pus swab sample data respectively.

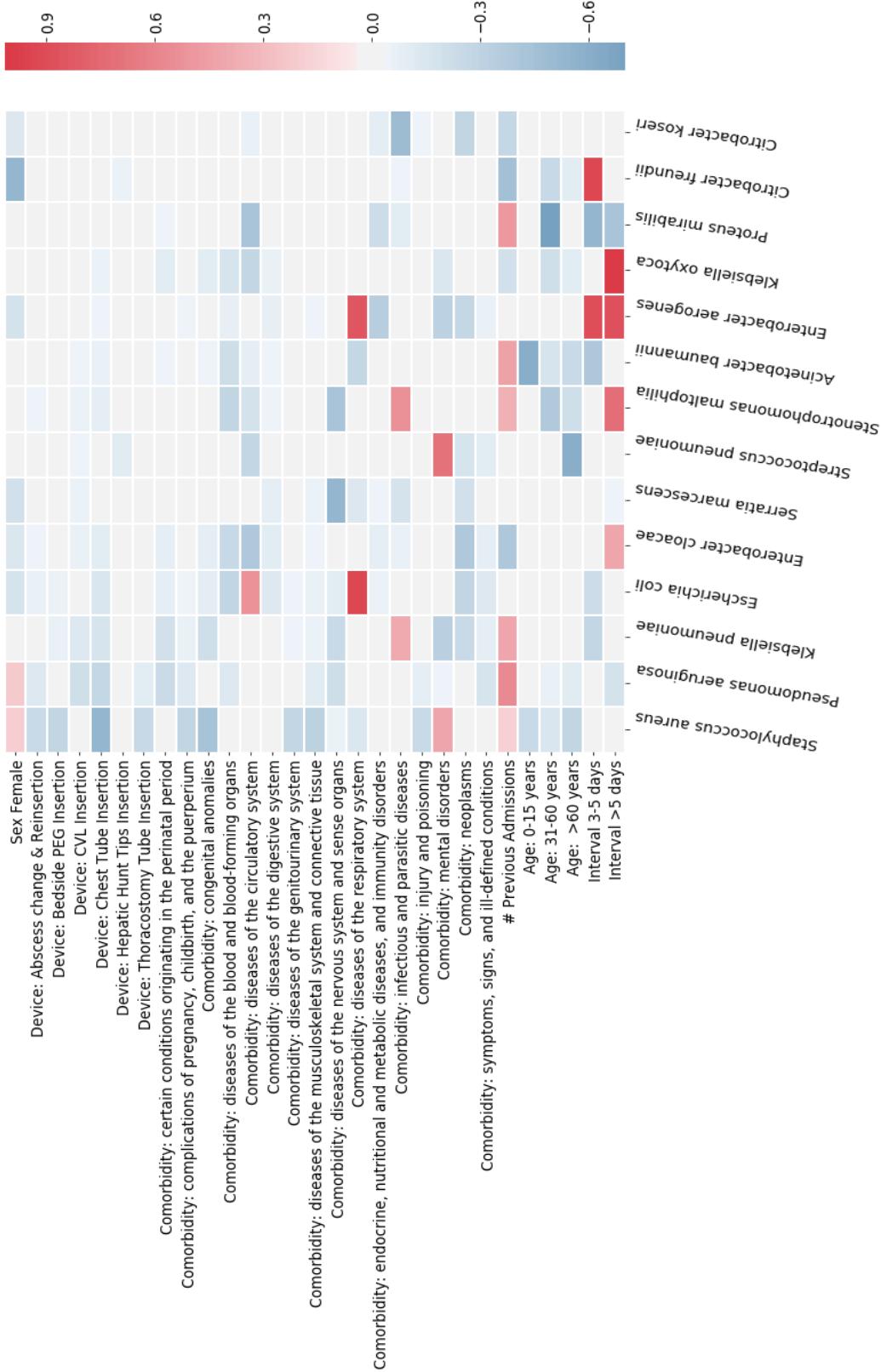


Figure S5a. Coefficient plot of multinomial logistic regression on bacteria over several patient factors corresponding to sputum sample data.

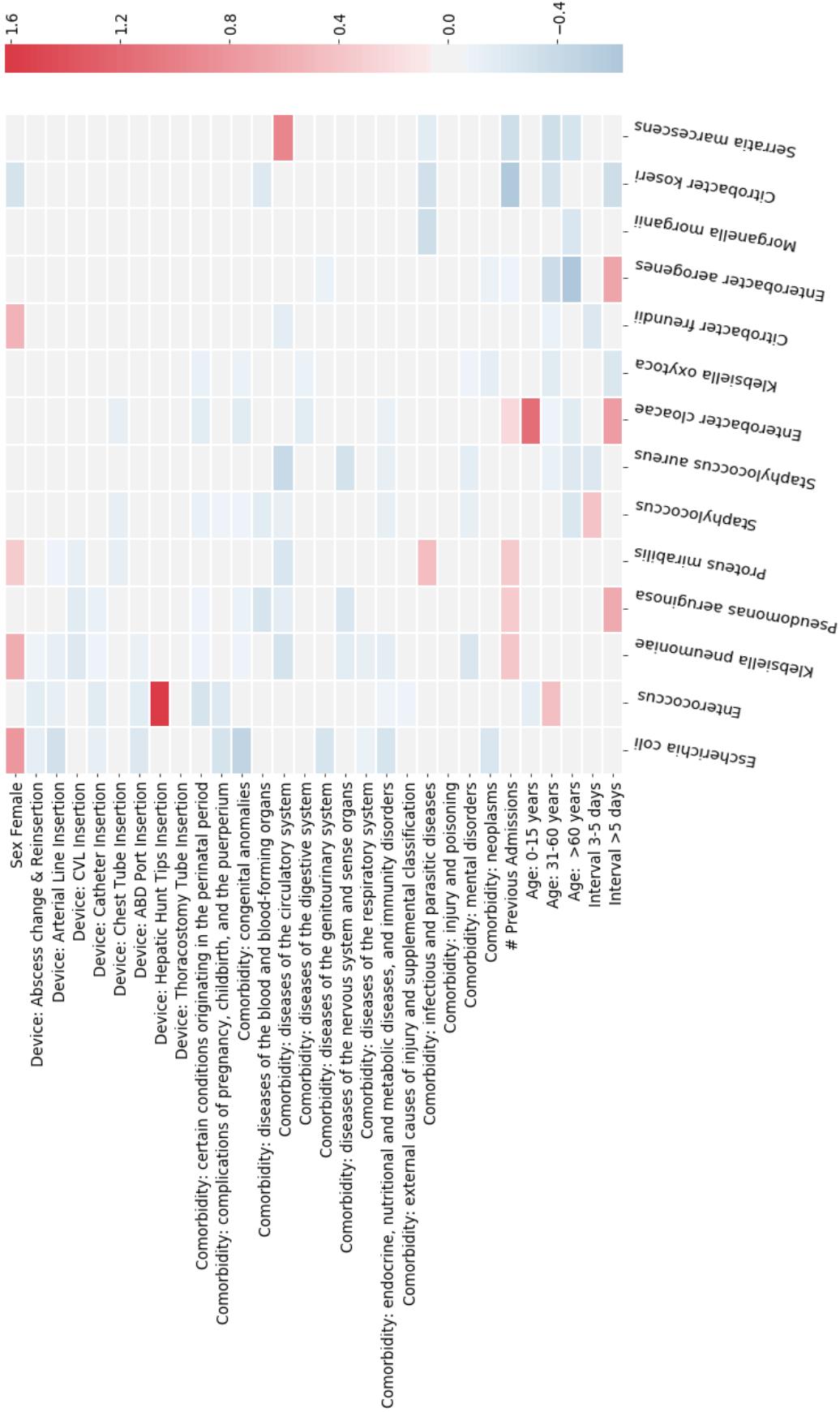


Figure S5b. Coefficient plot of multinomial logistic regression on bacteria over several patient factors corresponding to urine sample data.

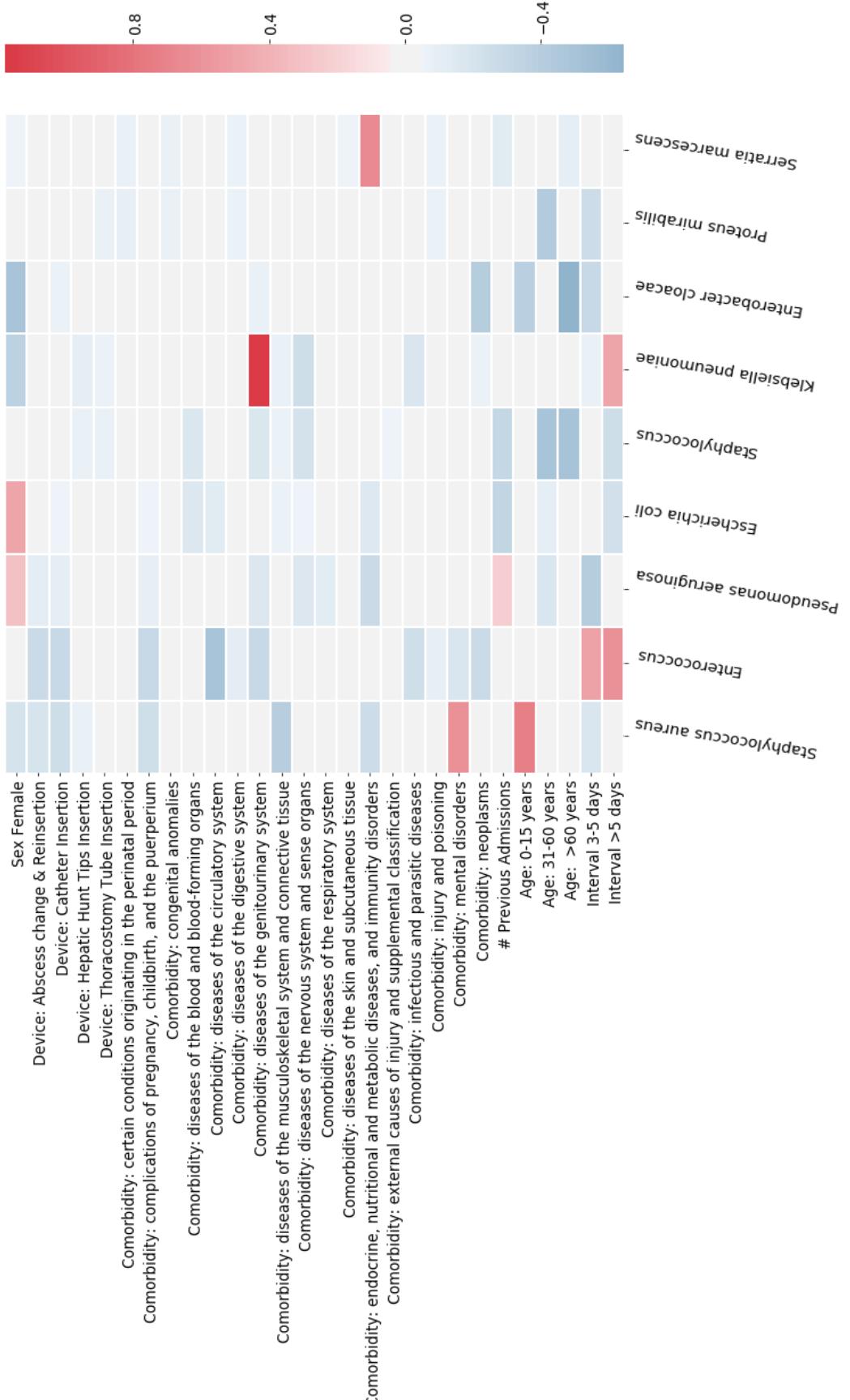


Figure S5c. Coefficient plot of multinomial logistic regression on bacteria over several patient factors corresponding to pus swab sample data.

Table S1. Coefficient values of multinomial logistic regression on bacteria over several patient factors in blood sample data.

Organism name	Patient factor	Mean regression coefficient	Multiplying factor
<i>Enterococcus faecium</i>	Interval >5 days	1·8390286185779800	6·290424890424900
<i>Beta-hemolytic Streptococcus, group B</i>	Age: 0-15 years	1·7535760888872100	5·775218486701170
<i>Escherichia coli</i>	Age: 0-15 years	1·7406708073371800	5·7011665245814100
<i>Enterococcus faecalis</i>	Comorbidity: diseases of the respiratory system	1·1683747876016900	3·2167604689901400
<i>Serratia marcescens</i>	Interval 3-5 days	1·0362948672486200	2·818753785526770
<i>Pseudomonas aeruginosa</i>	Interval >5 days	1·019469189544030	2·771723113805340
<i>Pseudomonas aeruginosa</i>	Comorbidity: endocrine, nutritional and metabolic diseases, and immunity disorders	0·9291949397394890	2·5324695661143000
<i>Staphylococcus</i>	Interval >5 days	0·921077642684052	2·511995965927430
<i>Streptococcus</i>	Age: 0-15 years	0·899100466566055	2·457391610732640
<i>Staphylococcus</i>	Age: 0-15 years	0·8895016422064140	2·433916387794530
<i>Staphylococcus</i>	Comorbidity: external causes of injury and supplemental classification	0·8377901589826430	2·311253825730800
<i>Enterobacter cloacae</i>	Interval >5 days	0·7884904490060790	2·2000727962163400
<i>Pseudomonas aeruginosa</i>	Comorbidity: infectious and parasitic diseases	0·7779302985175650	2·1769619382419700
<i>Proteus mirabilis</i>	Age: >60 years	0·7166474698463010	2·047557193823530
<i>Escherichia coli</i>	Comorbidity: infectious and parasitic diseases	0·6916528536089640	1·9970135779992000
<i>Escherichia coli</i>	Age: >60 years	0·6885450150234890	1·9908168164008800
<i>Enterococcus faecium</i>	Interval 3-5 days	0·68364080766841	1·9810773396545600
<i>Staphylococcus</i>	Interval 3-5 days	0·6214786507990540	1·861678780470550
<i>Pseudomonas aeruginosa</i>	Interval 3-5 days	0·6187340225852570	1·8565761699521900
<i>Staphylococcus aureus</i>	Comorbidity: diseases of the blood and blood-forming organs	0·6152719075668360	1·8501596035659900
<i>Enterobacter cloacae</i>	Comorbidity: infectious and parasitic diseases	0·5651270653473920	1·7596713617698200
<i>Staphylococcus epidermidis</i>	Age: 31-60 years	0·5412748419955560	1·718195894836340
<i>Staphylococcus epidermidis</i>	Age: >60 years	0·5037443080730140	1·654906162909140
<i>Escherichia coli</i>	Sex Female	0·295153470943277	1·3433325053738400
<i>Staphylococcus aureus</i>	Interval 3-5 days	0·2950982547784400	1·3432583337525500
<i>Stenotrophomonas maltophilia</i>	# Previous Admissions	0·28004975947141400	1·3231956522155800
<i>Proteus mirabilis</i>	# Previous Admissions	0·25612388623083700	1·2919127682295300

<i>Enterococcus faecium</i>	# Previous Admissions	0·24022190814076100	1·271531282159320
<i>Klebsiella pneumoniae</i>	# Previous Admissions	0·19949063238850600	1·2207807735774200
<i>Pseudomonas aeruginosa</i>	# Previous Admissions	0·19481275687181000	1·2150834491619600
<i>Streptococcus pneumoniae</i>	Age: 0-15 years	0·0	1·0
<i>Streptococcus pneumoniae</i>	Comorbidity: neoplasms	0·0	1·0
<i>Streptococcus pneumoniae</i>	Comorbidity: diseases of the respiratory system	0·0	1·0
<i>Streptococcus pneumoniae</i>	Comorbidity: infectious and parasitic diseases	0·0	1·0
<i>Streptococcus pneumoniae</i>	Comorbidity: diseases of the nervous system and sense organs	0·0	1·0
<i>Streptococcus pneumoniae</i>	Comorbidity: diseases of the circulatory system	0·0	1·0
<i>Streptococcus pneumoniae</i>	Comorbidity: mental disorders	0·0	1·0
<i>Streptococcus pneumoniae</i>	# Previous Admissions	0·0	1·0
<i>Stenotrophomonas maltophilia</i>	Interval >5 days	0·0	1·0
<i>Streptococcus pneumoniae</i>	Comorbidity: diseases of the blood and blood-forming organs	0·0	1·0
<i>Pseudomonas aeruginosa</i>	Comorbidity: diseases of the nervous system and sense organs	0·0	1·0
<i>Enterococcus faecalis</i>	# Previous Admissions	0·0	1·0
<i>Enterococcus faecalis</i>	Age: >60 years	0·0	1·0
<i>Enterococcus faecalis</i>	Interval 3-5 days	0·0	1·0
<i>Enterococcus faecalis</i>	Interval >5 days	0·0	1·0
<i>Pseudomonas aeruginosa</i>	Device: Hepatic Hunt Tips Insertion	0·0	1·0
<i>Pseudomonas aeruginosa</i>	Comorbidity: diseases of the blood and blood-forming organs	0·0	1·0
<i>Pseudomonas aeruginosa</i>	Comorbidity: diseases of the respiratory system	0·0	1·0
<i>Streptococcus pneumoniae</i>	Comorbidity: certain conditions originating in the perinatal period	0·0	1·0
<i>Pseudomonas aeruginosa</i>	Comorbidity: mental disorders	0·0	1·0
<i>Pseudomonas aeruginosa</i>	Age: 31-60 years	0·0	1·0
<i>Pseudomonas aeruginosa</i>	Age: >60 years	0·0	1·0
<i>Streptococcus pneumoniae</i>	Sex Female	0·0	1·0

<i>Streptococcus pneumoniae</i>	Age: >60 years	0·0	1·0
<i>Streptococcus pneumoniae</i>	Device: Hepatic Hunt Tips Insertion	0·0	1·0
<i>Streptococcus pneumoniae</i>	Age: 31-60 years	0·0	1·0
<i>Enterobacter cloacae</i>	Comorbidity: diseases of the blood and blood-forming organs	0·0	1·0
<i>Streptococcus pneumoniae</i>	Interval 3-5 days	0·0	1·0
<i>Beta-hemolytic Streptococcus, group B</i>	Age: >60 years	0·0	1·0
<i>Beta-hemolytic Streptococcus, group B</i>	Comorbidity: diseases of the blood and blood-forming organs	0·0	1·0
<i>Beta-hemolytic Streptococcus, group B</i>	Comorbidity: diseases of the circulatory system	0·0	1·0
<i>Beta-hemolytic Streptococcus, group B</i>	Comorbidity: diseases of the nervous system and sense organs	0·0	1·0
<i>Beta-hemolytic Streptococcus, group B</i>	Comorbidity: diseases of the respiratory system	0·0	1·0
<i>Beta-hemolytic Streptococcus, group B</i>	Comorbidity: endocrine, nutritional and metabolic diseases, and immunity disorders	0·0	1·0
<i>Beta-hemolytic Streptococcus, group B</i>	Comorbidity: external causes of injury and supplemental classification	0·0	1·0
<i>Beta-hemolytic Streptococcus, group B</i>	Comorbidity: mental disorders	0·0	1·0
<i>Beta-hemolytic Streptococcus, group B</i>	Interval 3-5 days	0·0	1·0
<i>Beta-hemolytic Streptococcus, group B</i>	Comorbidity: certain conditions originating in the perinatal period	0·0	1·0
<i>Beta-hemolytic Streptococcus, group B</i>	Interval >5 days	0·0	1·0
<i>Proteus mirabilis</i>	Sex Female	0·0	1·0
<i>Proteus mirabilis</i>	Comorbidity: diseases of the blood and blood-forming organs	0·0	1·0
<i>Proteus mirabilis</i>	Comorbidity: diseases of the circulatory system	0·0	1·0
<i>Proteus mirabilis</i>	Comorbidity: diseases of the nervous system and sense organs	0·0	1·0
<i>Proteus mirabilis</i>	Comorbidity: infectious and parasitic diseases	0·0	1·0
<i>Proteus mirabilis</i>	Comorbidity: mental disorders	0·0	1·0
<i>Beta-hemolytic Streptococcus, group B</i>	Comorbidity: congenital anomalies	0·0	1·0

<i>Beta-hemolytic Streptococcus, group B</i>	Device: Hepatic Hunt Tips Insertion	0·0	1·0
<i>Streptococcus pneumoniae</i>	Interval >5 days	0·0	1·0
<i>Enterobacter cloacae</i>	Comorbidity: endocrine, nutritional and metabolic diseases, and immunity disorders	0·0	1·0
<i>Enterobacter cloacae</i>	Sex Female	0·0	1·0
<i>Enterobacter cloacae</i>	Device: Hepatic Hunt Tips Insertion	0·0	1·0
<i>Enterobacter cloacae</i>	Device: Thoracostomy Tube Insertion	0·0	1·0
<i>Enterococcus faecalis</i>	Comorbidity: infectious and parasitic diseases	0·0	1·0
<i>Enterobacter cloacae</i>	Comorbidity: diseases of the circulatory system	0·0	1·0
<i>Enterobacter cloacae</i>	Comorbidity: diseases of the nervous system and sense organs	0·0	1·0
<i>Stenotrophomonas maltophilia</i>	Interval 3-5 days	0·0	1·0
<i>Enterobacter cloacae</i>	Comorbidity: mental disorders	0·0	1·0
<i>Beta-hemolytic Streptococcus, group B</i>	Device: Catheter Insertion	0·0	1·0
<i>Enterobacter cloacae</i>	Comorbidity: neoplasms	0·0	1·0
<i>Enterobacter cloacae</i>	# Previous Admissions	0·0	1·0
<i>Enterobacter cloacae</i>	Age: 0-15 years	0·0	1·0
<i>Enterobacter cloacae</i>	Age: 31-60 years	0·0	1·0
<i>Enterobacter cloacae</i>	Age: >60 years	0·0	1·0
<i>Enterobacter cloacae</i>	Interval 3-5 days	0·0	1·0
<i>Beta-hemolytic Streptococcus, group B</i>	Sex Female	0·0	1·0
<i>Enterococcus faecalis</i>	Comorbidity: mental disorders	0·0	1·0
<i>Klebsiella pneumoniae</i>	Interval 3-5 days	0·0	1·0
<i>Enterococcus faecalis</i>	Comorbidity: endocrine, nutritional and metabolic diseases, and immunity disorders	0·0	1·0
<i>Staphylococcus</i>	Comorbidity: symptoms, signs, and ill-defined conditions	0·0	1·0
<i>Staphylococcus</i>	Comorbidity: certain conditions originating in the perinatal period	0·0	1·0
<i>Staphylococcus</i>	Comorbidity: congenital anomalies	0·0	1·0
<i>Staphylococcus</i>	Comorbidity: diseases of the blood and blood-forming organs	0·0	1·0
<i>Staphylococcus</i>	Comorbidity: diseases of the skin and subcutaneous tissue	0·0	1·0

<i>Staphylococcus</i>	Comorbidity: infectious and parasitic diseases	0·0	1·0
<i>Staphylococcus</i>	Comorbidity: injury and poisoning	0·0	1·0
<i>Staphylococcus</i>	Comorbidity: neoplasms	0·0	1·0
<i>Staphylococcus</i>	# Previous Admissions	0·0	1·0
<i>Enterococcus faecalis</i>	Comorbidity: diseases of the nervous system and sense organs	0·0	1·0
<i>Staphylococcus</i>	Age: >60 years	0·0	1·0
<i>Escherichia coli</i>	Device: Hepatic Hunt Tips Insertion	0·0	1·0
<i>Escherichia coli</i>	Device: Thoracostomy Tube Insertion	0·0	1·0
<i>Escherichia coli</i>	Comorbidity: congenital anomalies	0·0	1·0
<i>Escherichia coli</i>	Comorbidity: diseases of the digestive system	0·0	1·0
<i>Escherichia coli</i>	Comorbidity: diseases of the nervous system and sense organs	0·0	1·0
<i>Escherichia coli</i>	Comorbidity: diseases of the respiratory system	0·0	1·0
<i>Staphylococcus</i>	Device: Thoracostomy Tube Insertion	0·0	1·0
<i>Staphylococcus</i>	Device: Hepatic Hunt Tips Insertion	0·0	1·0
<i>Staphylococcus</i>	Sex Female	0·0	1·0
<i>Staphylococcus aureus</i>	Interval >5 days	0·0	1·0
<i>Staphylococcus aureus</i>	Device: Chest Tube Insertion	0·0	1·0
<i>Staphylococcus aureus</i>	Device: Hepatic Hunt Tips Insertion	0·0	1·0
<i>Staphylococcus aureus</i>	Device: Thoracostomy Tube Insertion	0·0	1·0
<i>Staphylococcus aureus</i>	Comorbidity: certain conditions originating in the perinatal period	0·0	1·0
<i>Staphylococcus aureus</i>	Comorbidity: congenital anomalies	0·0	1·0
<i>Staphylococcus aureus</i>	Comorbidity: diseases of the circulatory system	0·0	1·0
<i>Staphylococcus aureus</i>	Comorbidity: diseases of the digestive system	0·0	1·0
<i>Staphylococcus aureus</i>	Comorbidity: diseases of the musculoskeletal system and connective tissue	0·0	1·0
<i>Staphylococcus aureus</i>	Comorbidity: diseases of the skin and subcutaneous tissue	0·0	1·0
<i>Staphylococcus aureus</i>	Comorbidity: external causes of injury and supplemental classification	0·0	1·0
<i>Staphylococcus aureus</i>	Comorbidity: mental disorders	0·0	1·0
<i>Staphylococcus aureus</i>	# Previous Admissions	0·0	1·0
<i>Staphylococcus aureus</i>	Age: 0-15 years	0·0	1·0
<i>Staphylococcus aureus</i>	Age: 31-60 years	0·0	1·0
<i>Staphylococcus aureus</i>	Age: >60 years	0·0	1·0

<i>Escherichia coli</i>	Comorbidity: external causes of injury and supplemental classification	0·0	1·0
<i>Escherichia coli</i>	Comorbidity: mental disorders	0·0	1·0
<i>Escherichia coli</i>	Comorbidity: neoplasms	0·0	1·0
<i>Klebsiella pneumoniae</i>	Comorbidity: diseases of the circulatory system	0·0	1·0
<i>Klebsiella pneumoniae</i>	Comorbidity: diseases of the nervous system and sense organs	0·0	1·0
<i>Klebsiella pneumoniae</i>	Comorbidity: diseases of the respiratory system	0·0	1·0
<i>Klebsiella pneumoniae</i>	Comorbidity: external causes of injury and supplemental classification	0·0	1·0
<i>Klebsiella pneumoniae</i>	Comorbidity: infectious and parasitic diseases	0·0	1·0
<i>Klebsiella pneumoniae</i>	Comorbidity: mental disorders	0·0	1·0
<i>Klebsiella pneumoniae</i>	Comorbidity: neoplasms	0·0	1·0
<i>Klebsiella pneumoniae</i>	Age: 0-15 years	0·0	1·0
<i>Klebsiella pneumoniae</i>	Age: 31-60 years	0·0	1·0
<i>Klebsiella pneumoniae</i>	Age: >60 years	0·0	1·0
<i>Enterococcus faecalis</i>	Device: Chest Tube Insertion	0·0	1·0
<i>Enterococcus faecalis</i>	Device: Hepatic Hunt Tips Insertion	0·0	1·0
<i>Enterococcus faecalis</i>	Comorbidity: certain conditions originating in the perinatal period	0·0	1·0
<i>Enterococcus faecalis</i>	Comorbidity: congenital anomalies	0·0	1·0
<i>Enterococcus faecalis</i>	Comorbidity: diseases of the blood and blood-forming organs	0·0	1·0
<i>Enterococcus faecalis</i>	Comorbidity: diseases of the circulatory system	0·0	1·0
<i>Klebsiella pneumoniae</i>	Comorbidity: diseases of the digestive system	0·0	1·0
<i>Klebsiella pneumoniae</i>	Comorbidity: congenital anomalies	0·0	1·0
<i>Escherichia coli</i>	Age: 31-60 years	0·0	1·0
<i>Klebsiella pneumoniae</i>	Comorbidity: certain conditions originating in the perinatal period	0·0	1·0
<i>Escherichia coli</i>	Interval 3-5 days	0·0	1·0
<i>Escherichia coli</i>	Interval >5 days	0·0	1·0
<i>Enterococcus faecium</i>	Sex Female	0·0	1·0
<i>Enterococcus faecium</i>	Device: Abscess change & Reinsertion	0·0	1·0
<i>Enterococcus faecium</i>	Comorbidity: certain conditions originating in the perinatal period	0·0	1·0
<i>Enterococcus faecium</i>	Comorbidity: congenital anomalies	0·0	1·0
<i>Enterococcus faecium</i>	Comorbidity: diseases of the blood and blood-forming organs	0·0	1·0

<i>Enterococcus faecium</i>	Comorbidity: diseases of the digestive system	0·0	1·0
<i>Enterococcus faecium</i>	Comorbidity: diseases of the nervous system and sense organs	0·0	1·0
<i>Enterococcus faecium</i>	Comorbidity: external causes of injury and supplemental classification	0·0	1·0
<i>Enterococcus faecium</i>	Comorbidity: neoplasms	0·0	1·0
<i>Enterococcus faecium</i>	Age: 0-15 years	0·0	1·0
<i>Enterococcus faecium</i>	Age: 31-60 years	0·0	1·0
<i>Enterococcus faecium</i>	Age: >60 years	0·0	1·0
<i>Klebsiella pneumoniae</i>	Device: Hepatic Hunt Tips Insertion	0·0	1·0
<i>Proteus mirabilis</i>	Comorbidity: neoplasms	0·0	1·0
<i>Enterobacter cloacae</i>	Comorbidity: diseases of the respiratory system	0·0	1·0
<i>Staphylococcus aureus</i>	Sex Female	0·0	1·0
<i>Serratia marcescens</i>	Comorbidity: diseases of the circulatory system	0·0	1·0
<i>Klebsiella oxytoca</i>	Age: 0-15 years	0·0	1·0
<i>Staphylococcus epidermidis</i>	# Previous Admissions	0·0	1·0
<i>Serratia marcescens</i>	Comorbidity: congenital anomalies	0·0	1·0
<i>Serratia marcescens</i>	Comorbidity: certain conditions originating in the perinatal period	0·0	1·0
<i>Staphylococcus epidermidis</i>	Age: 0-15 years	0·0	1·0
<i>Staphylococcus epidermidis</i>	Interval >5 days	0·0	1·0
<i>Enterococcus</i>	Sex Female	0·0	1·0
<i>Serratia marcescens</i>	Device: Hepatic Hunt Tips Insertion	0·0	1·0
<i>Enterococcus</i>	Device: Hepatic Hunt Tips Insertion	0·0	1·0
<i>Enterococcus</i>	Comorbidity: certain conditions originating in the perinatal period	0·0	1·0
<i>Enterococcus</i>	Comorbidity: congenital anomalies	0·0	1·0
<i>Enterococcus</i>	Comorbidity: diseases of the blood and blood-forming organs	0·0	1·0
<i>Klebsiella oxytoca</i>	Comorbidity: certain conditions originating in the perinatal period	0·0	1·0
<i>Enterococcus</i>	Comorbidity: diseases of the circulatory system	0·0	1·0
<i>Streptococcus</i>	Interval >5 days	0·0	1·0
<i>Enterococcus</i>	Comorbidity: diseases of the nervous system and sense organs	0·0	1·0
<i>Klebsiella oxytoca</i>	Comorbidity: congenital anomalies	0·0	1·0

<i>Staphylococcus epidermidis</i>	Device: Hepatic Hunt Tips Insertion	0·0	1·0
<i>Streptococcus</i>	Age: 31-60 years	0·0	1·0
<i>Streptococcus</i>	# Previous Admissions	0·0	1·0
<i>Enterococcus</i>	Comorbidity: diseases of the respiratory system	0·0	1·0
<i>Serratia marcescens</i>	Comorbidity: diseases of the blood and blood-forming organs	0·0	1·0
<i>Staphylococcus epidermidis</i>	Comorbidity: neoplasms	0·0	1·0
<i>Streptococcus</i>	Comorbidity: mental disorders	0·0	1·0
<i>Serratia marcescens</i>	Comorbidity: diseases of the nervous system and sense organs	0·0	1·0
<i>Staphylococcus epidermidis</i>	Device: Catheter Insertion	0·0	1·0
<i>Staphylococcus epidermidis</i>	Comorbidity: congenital anomalies	0·0	1·0
<i>Serratia marcescens</i>	Interval >5 days	0·0	1·0
<i>Serratia marcescens</i>	Age: >60 years	0·0	1·0
<i>Klebsiella oxytoca</i>	Interval >5 days	0·0	1·0
<i>Klebsiella oxytoca</i>	Interval 3-5 days	0·0	1·0
<i>Staphylococcus epidermidis</i>	Comorbidity: diseases of the blood and blood-forming organs	0·0	1·0
<i>Staphylococcus epidermidis</i>	Comorbidity: diseases of the circulatory system	0·0	1·0
<i>Serratia marcescens</i>	Age: 0-15 years	0·0	1·0
<i>Serratia marcescens</i>	# Previous Admissions	0·0	1·0
<i>Staphylococcus epidermidis</i>	Comorbidity: diseases of the nervous system and sense organs	0·0	1·0
<i>Staphylococcus epidermidis</i>	Comorbidity: diseases of the respiratory system	0·0	1·0
<i>Serratia marcescens</i>	Comorbidity: neoplasms	0·0	1·0
<i>Klebsiella oxytoca</i>	Device: Hepatic Hunt Tips Insertion	0·0	1·0
<i>Serratia marcescens</i>	Comorbidity: mental disorders	0·0	1·0
<i>Staphylococcus epidermidis</i>	Comorbidity: endocrine, nutritional and metabolic diseases, and immunity disorders	0·0	1·0
<i>Serratia marcescens</i>	Comorbidity: infectious and parasitic diseases	0·0	1·0
<i>Klebsiella oxytoca</i>	Device: Thoracostomy Tube Insertion	0·0	1·0
<i>Serratia marcescens</i>	Comorbidity: endocrine, nutritional and metabolic diseases, and immunity disorders	0·0	1·0

<i>Staphylococcus epidermidis</i>	Comorbidity: mental disorders	0·0	1·0
<i>Serratia marcescens</i>	Comorbidity: diseases of the respiratory system	0·0	1·0
<i>Streptococcus</i>	Comorbidity: neoplasms	0·0	1·0
<i>Streptococcus</i>	Age: >60 years	0·0	1·0
<i>Staphylococcus epidermidis</i>	Comorbidity: certain conditions originating in the perinatal period	0·0	1·0
<i>Streptococcus</i>	Device: Hepatic Hunt Tips Insertion	0·0	1·0
<i>Enterococcus</i>	Interval >5 days	0·0	1·0
<i>Stenotrophomonas maltophilia</i>	Sex Female	0·0	1·0
<i>Klebsiella oxytoca</i>	Comorbidity: mental disorders	0·0	1·0
<i>Streptococcus</i>	Comorbidity: certain conditions originating in the perinatal period	0·0	1·0
<i>Proteus mirabilis</i>	Age: 0-15 years	0·0	1·0
<i>Stenotrophomonas maltophilia</i>	Device: Hepatic Hunt Tips Insertion	0·0	1·0
<i>Klebsiella oxytoca</i>	# Previous Admissions	0·0	1·0
<i>Stenotrophomonas maltophilia</i>	Comorbidity: diseases of the blood and blood-forming organs	0·0	1·0
<i>Enterococcus</i>	Interval 3-5 days	0·0	1·0
<i>Stenotrophomonas maltophilia</i>	Comorbidity: diseases of the circulatory system	0·0	1·0
<i>Proteus mirabilis</i>	Interval >5 days	0·0	1·0
<i>Stenotrophomonas maltophilia</i>	Comorbidity: diseases of the nervous system and sense organs	0·0	1·0
<i>Klebsiella oxytoca</i>	Comorbidity: diseases of the respiratory system	0·0	1·0
<i>Stenotrophomonas maltophilia</i>	Comorbidity: neoplasms	0·0	1·0
<i>Klebsiella oxytoca</i>	Comorbidity: diseases of the circulatory system	0·0	1·0
<i>Stenotrophomonas maltophilia</i>	Comorbidity: mental disorders	0·0	1·0
<i>Stenotrophomonas maltophilia</i>	Age: 0-15 years	0·0	1·0
<i>Streptococcus</i>	Comorbidity: congenital anomalies	0·0	1·0
<i>Streptococcus</i>	Comorbidity: diseases of the blood and blood-forming organs	0·0	1·0
<i>Stenotrophomonas maltophilia</i>	Age: 31-60 years	0·0	1·0

<i>Streptococcus</i>	Comorbidity: external causes of injury and supplemental classification	0·0	1·0
<i>Enterococcus</i>	Comorbidity: endocrine, nutritional and metabolic diseases, and immunity disorders	0·0	1·0
<i>Enterococcus</i>	Comorbidity: mental disorders	0·0	1·0
<i>Streptococcus</i>	Comorbidity: diseases of the respiratory system	0·0	1·0
<i>Streptococcus</i>	Comorbidity: diseases of the circulatory system	0·0	1·0
<i>Streptococcus</i>	Comorbidity: diseases of the nervous system and sense organs	0·0	1·0
<i>Enterococcus</i>	Comorbidity: neoplasms	0·0	1·0
<i>Klebsiella oxytoca</i>	Comorbidity: diseases of the blood and blood-forming organs	0·0	1·0
<i>Enterococcus</i>	# Previous Admissions	0·0	1·0
<i>Enterococcus</i>	Age: 0-15 years	0·0	1·0
<i>Enterococcus</i>	Age: >60 years	0·0	1·0
<i>Proteus mirabilis</i>	Interval 3-5 days	0·0	1·0
<i>Klebsiella oxytoca</i>	Comorbidity: neoplasms	0·0	1·0
<i>Klebsiella oxytoca</i>	Comorbidity: diseases of the nervous system and sense organs	0·0	1·0
<i>Proteus mirabilis</i>	Comorbidity: diseases of the musculoskeletal system and connective tissue	-0·0006215962419423070	0·999378596908979
<i>Streptococcus pneumoniae</i>	Comorbidity: diseases of the musculoskeletal system and connective tissue	-0·0008829924255590210	0·9991173972975370
<i>Proteus mirabilis</i>	Comorbidity: injury and poisoning	-0·0009932090856692440	0·999007283983221
<i>Enterococcus</i>	Comorbidity: diseases of the musculoskeletal system and connective tissue	-0·0013887382079825800	0·9986122256426920
<i>Stenotrophomonas maltophilia</i>	Comorbidity: diseases of the musculoskeletal system and connective tissue	-0·0016404204093848500	0·9983609243447540
<i>Proteus mirabilis</i>	Comorbidity: diseases of the skin and subcutaneous tissue	-0·0021532563101494700	0·9978490602831810
<i>Staphylococcus epidermidis</i>	Comorbidity: diseases of the musculoskeletal system and connective tissue	-0·002353083510377190	0·9976496828203980
<i>Stenotrophomonas maltophilia</i>	Comorbidity: external causes of injury and supplemental classification	-0·0025965357052381400	0·9974068323778490
<i>Serratia marcescens</i>	Comorbidity: diseases of the musculoskeletal system and connective tissue	-0·002615457515037840	0·9973879598140260
<i>Enterococcus faecium</i>	Comorbidity: diseases of the circulatory system	-0·0026321211693696200	0·9973713398243050
<i>Staphylococcus epidermidis</i>	Comorbidity: external causes of injury and supplemental classification	-0·002904176794945720	0·9971000362470230
<i>Streptococcus pneumoniae</i>	Comorbidity: injury and poisoning	-0·002968239190509770	0·9970361616760850

<i>Proteus mirabilis</i>	Device: Abscess change & Reinsertion	-0-0029903371225700900	0-997014129482156
<i>Klebsiella oxytoca</i>	Comorbidity: diseases of the musculoskeletal system and connective tissue	-0-0030380014774792800	0-9969666085793750
<i>Enterococcus</i>	Comorbidity: injury and poisoning	-0-003087450445727240	0-9969173108280740
<i>Stenotrophomonas maltophilia</i>	Comorbidity: symptoms, signs, and ill-defined conditions	-0-0033027053219151100	0-9967027426100180
<i>Beta-hemolytic Streptococcus, group B</i>	Comorbidity: injury and poisoning	-0-003559813073448040	0-9964465155493120
<i>Streptococcus</i>	Comorbidity: injury and poisoning	-0-0037827495318834000	0-9962243960523030
<i>Staphylococcus epidermidis</i>	Comorbidity: injury and poisoning	-0-003873100911087980	0-9961343898702750
<i>Serratia marcescens</i>	Comorbidity: injury and poisoning	-0-0040605366976678600	0-9959476961344600
<i>Stenotrophomonas maltophilia</i>	Comorbidity: injury and poisoning	-0-00419537548552718	0-995813412807846
<i>Enterobacter cloacae</i>	Comorbidity: diseases of the musculoskeletal system and connective tissue	-0-004373834382173950	0-9956357169011100
<i>Enterococcus</i>	Comorbidity: external causes of injury and supplemental classification	-0-004451799987372830	0-9955580945858580
<i>Streptococcus pneumoniae</i>	Comorbidity: diseases of the skin and subcutaneous tissue	-0-004488860595270970	0-9955211992813610
<i>Klebsiella oxytoca</i>	Comorbidity: injury and poisoning	-0-0046281074259110400	0-9953825857604960
<i>Enterococcus</i>	Device: Abscess change & Reinsertion	-0-005068770665218540	0-9949440538754420
<i>Enterococcus</i>	Comorbidity: diseases of the skin and subcutaneous tissue	-0-005105573726089360	0-9949074375626640
<i>Proteus mirabilis</i>	Comorbidity: diseases of the digestive system	-0-005298581971017090	0-9947154307543190
<i>Proteus mirabilis</i>	Comorbidity: external causes of injury and supplemental classification	-0-0054741366437495	0-9945408191398020
<i>Beta-hemolytic Streptococcus, group B</i>	Device: Abscess change & Reinsertion	-0-005603135009802830	0-9944125332736710
<i>Pseudomonas aeruginosa</i>	Sex Female	-0-005716616943609710	0-9942996918192480
<i>Pseudomonas aeruginosa</i>	Comorbidity: diseases of the musculoskeletal system and connective tissue	-0-005839872288169910	0-9941771466204670
<i>Enterococcus</i>	Comorbidity: symptoms, signs, and ill-defined conditions	-0-0058701302319453200	0-9941470653193630
<i>Enterobacter cloacae</i>	Comorbidity: symptoms, signs, and ill-defined conditions	-0-005940441960119720	0-9940771675784860
<i>Klebsiella pneumoniae</i>	Comorbidity: diseases of the musculoskeletal system and connective tissue	-0-005942716845667800	0-9940749061692760
<i>Streptococcus</i>	Device: Abscess change & Reinsertion	-0-006012662719680490	0-9940053771627910
<i>Enterobacter cloacae</i>	Comorbidity: external causes of injury and supplemental classification	-0-006386188826656420	0-9936341595380000

<i>Serratia marcescens</i>	Comorbidity: external causes of injury and supplemental classification	-0-006459113176457380	0-993561702054965
<i>Pseudomonas aeruginosa</i>	Comorbidity: external causes of injury and supplemental classification	-0-00652911890711278	0-9934921494766290
<i>Staphylococcus epidermidis</i>	Comorbidity: symptoms, signs, and ill-defined conditions	-0-006593874854485140	0-9934278170342600
<i>Stenotrophomonas maltophilia</i>	Device: Abscess change & Reinsertion	-0-006723440726948630	0-9932991110305490
<i>Streptococcus pneumoniae</i>	Comorbidity: diseases of the digestive system	-0-006831530997139200	0-9931917508636570
<i>Staphylococcus epidermidis</i>	Device: Abscess change & Reinsertion	-0-006919989719297620	0-9931038982762380
<i>Streptococcus pneumoniae</i>	Device: Abscess change & Reinsertion	-0-007039100123233820	0-99298561631421
<i>Stenotrophomonas maltophilia</i>	Comorbidity: diseases of the skin and subcutaneous tissue	-0-0070970051044644200	0-9929281191654370
<i>Klebsiella oxytoca</i>	Device: Abscess change & Reinsertion	-0-007317124645063290	0-992709580337214
<i>Stenotrophomonas maltophilia</i>	Device: Chest Tube Insertion	-0-007336771160200200	0-9926900772450020
<i>Klebsiella oxytoca</i>	Comorbidity: external causes of injury and supplemental classification	-0-008107894628700780	0-9919248856959890
<i>Proteus mirabilis</i>	Comorbidity: symptoms, signs, and ill-defined conditions	-0-008424292407535600	0-9916110925097350
<i>Serratia marcescens</i>	Comorbidity: diseases of the skin and subcutaneous tissue	-0-008641479389104900	0-9913957508752080
<i>Pseudomonas aeruginosa</i>	Comorbidity: symptoms, signs, and ill-defined conditions	-0-008707577977151360	0-9913302231815480
<i>Serratia marcescens</i>	Device: Abscess change & Reinsertion	-0-00890945843368194	0-991130113183348
<i>Staphylococcus epidermidis</i>	Comorbidity: diseases of the skin and subcutaneous tissue	-0-009507877512856430	0-9905371794428010
<i>Beta-hemolytic Streptococcus, group B</i>	Device: Chest Tube Insertion	-0-009841257651794920	0-9902070090594760
<i>Enterobacter cloacae</i>	Comorbidity: injury and poisoning	-0-009933087745491250	0-9901160824320200
<i>Klebsiella oxytoca</i>	Comorbidity: diseases of the skin and subcutaneous tissue	-0-010009739881309800	0-990040190828257
<i>Serratia marcescens</i>	Comorbidity: symptoms, signs, and ill-defined conditions	-0-010142998285003900	0-9899082684429130
<i>Proteus mirabilis</i>	Comorbidity: congenital anomalies	-0-010865006281935700	0-9891938047121690
<i>Pseudomonas aeruginosa</i>	Comorbidity: injury and poisoning	-0-010878350639201200	0-9891806046447070
<i>Stenotrophomonas maltophilia</i>	Device: Thoracostomy Tube Insertion	-0-011136347959083400	0-9889254316182230

<i>Streptococcus pneumoniae</i>	Device: Chest Tube Insertion	-0-011322800474615200	0-9887410611725260
<i>Enterococcus</i>	Comorbidity: diseases of the digestive system	-0-011349093846874700	0-9887150641775120
<i>Enterococcus faecium</i>	Comorbidity: diseases of the musculoskeletal system and connective tissue	-0-01147507319044370	0-9885905143482680
<i>Streptococcus</i>	Device: Chest Tube Insertion	-0-011907613443837100	0-988163001621586
<i>Stenotrophomonas maltophilia</i>	Device: Catheter Insertion	-0-012332449601117200	0-9877432834112590
<i>Staphylococcus epidermidis</i>	Comorbidity: diseases of the digestive system	-0-012679932612873700	0-9874001190256470
<i>Streptococcus pneumoniae</i>	Comorbidity: external causes of injury and supplemental classification	-0-013191474865175900	0-9868951513120100
<i>Proteus mirabilis</i>	Device: Chest Tube Insertion	-0-01390497367695550	0-9861912539390290
<i>Stenotrophomonas maltophilia</i>	Comorbidity: diseases of the digestive system	-0-014850989050549200	0-9852587430058840
<i>Enterococcus faecium</i>	Device: Hepatic Hunt Tips Insertion	-0-015053739530781400	0-9850590015721070
<i>Enterococcus</i>	Device: Catheter Insertion	-0-01568078926691620	0-984441514202972
<i>Streptococcus</i>	Device: Catheter Insertion	-0-0159911643405543	0-9841360155075510
<i>Enterococcus</i>	Device: Chest Tube Insertion	-0-015995624230003700	0-9841316263795070
<i>Streptococcus</i>	Comorbidity: diseases of the musculoskeletal system and connective tissue	-0-016912722504334500	0-9832294946981730
<i>Klebsiella oxytoca</i>	Comorbidity: symptoms, signs, and ill-defined conditions	-0-017149976082772200	0-9829962476525730
<i>Enterobacter cloacae</i>	Comorbidity: diseases of the skin and subcutaneous tissue	-0-017398759369819900	0-9827517250327580
<i>Enterococcus faecalis</i>	Comorbidity: diseases of the musculoskeletal system and connective tissue	-0-017490476480493400	0-9826615940173700
<i>Serratia marcescens</i>	Comorbidity: diseases of the digestive system	-0-01774792325295070	0-9824086435236140
<i>Staphylococcus epidermidis</i>	Device: Chest Tube Insertion	-0-018013619682316800	0-982147655728149
<i>Streptococcus pneumoniae</i>	Comorbidity: congenital anomalies	-0-018292987090713000	0-9818733140057580
<i>Escherichia coli</i>	Comorbidity: injury and poisoning	-0-0185135671585548	0-9816567562085880
<i>Stenotrophomonas maltophilia</i>	Comorbidity: certain conditions originating in the perinatal period	-0-018710391934745700	0-9814635608506910
<i>Proteus mirabilis</i>	Comorbidity: certain conditions originating in the perinatal period	-0-018800408732463700	0-981375216620158
<i>Klebsiella oxytoca</i>	Device: Chest Tube Insertion	-0-018918225076069800	0-9812596013912460
<i>Klebsiella oxytoca</i>	Comorbidity: diseases of the digestive system	-0-019697328057555900	0-9804953968458660
<i>Serratia marcescens</i>	Device: Catheter Insertion	-0-020247262143365000	0-9799563372433720

<i>Pseudomonas aeruginosa</i>	Comorbidity: diseases of the skin and subcutaneous tissue	-0-02064032293340220	0-9795712305213870
<i>Klebsiella pneumoniae</i>	Comorbidity: injury and poisoning	-0-020709510192199700	0-97950345901764
<i>Streptococcus pneumoniae</i>	Device: Catheter Insertion	-0-021463604187599300	0-978765099771848
<i>Enterococcus faecalis</i>	Comorbidity: injury and poisoning	-0-023015575977942800	0-9772472620729320
<i>Enterococcus</i>	Device: Thoracostomy Tube Insertion	-0-023105575406837300	0-9771593143351400
<i>Stenotrophomonas maltophilia</i>	Comorbidity: congenital anomalies	-0-02313374489444470	0-9771317886456380
<i>Beta-hemolytic Streptococcus, group B</i>	Comorbidity: diseases of the musculoskeletal system and connective tissue	-0-02382307793360120	0-9764584515235400
<i>Streptococcus pneumoniae</i>	Comorbidity: symptoms, signs, and ill-defined conditions	-0-025056978577723400	0-9752543418398760
<i>Klebsiella oxytoca</i>	Device: Catheter Insertion	-0-027837315388185500	0-9725465722936840
<i>Enterococcus faecium</i>	Comorbidity: symptoms, signs, and ill-defined conditions	-0-028932480656262000	0-9714820560831080
<i>Staphylococcus epidermidis</i>	Device: Thoracostomy Tube Insertion	-0-0293568221533185	0-9710699033859970
<i>Streptococcus</i>	Comorbidity: diseases of the skin and subcutaneous tissue	-0-02944368952580550	0-9709855527587010
<i>Enterococcus faecalis</i>	Device: Abscess change & Reinsertion	-0-030472748657214700	0-9699868651516000
<i>Klebsiella pneumoniae</i>	Comorbidity: diseases of the skin and subcutaneous tissue	-0-03297061175912290	0-9675669942631000
<i>Enterobacter cloacae</i>	Device: Abscess change & Reinsertion	-0-03361367340146800	0-966944989057969
<i>Enterococcus</i>	Comorbidity: infectious and parasitic diseases	-0-03441303634816020	0-9661723579097230
<i>Enterococcus faecalis</i>	Comorbidity: external causes of injury and supplemental classification	-0-03451439048113090	0-9660744373105000
<i>Enterobacter cloacae</i>	Comorbidity: diseases of the digestive system	-0-03665298716341470	0-9640106013669750
<i>Klebsiella pneumoniae</i>	Device: Abscess change & Reinsertion	-0-040029938495607100	0-9607606749925000
<i>Pseudomonas aeruginosa</i>	Comorbidity: diseases of the digestive system	-0-04034299003534440	0-9604599544568440
<i>Enterobacter cloacae</i>	Device: Chest Tube Insertion	-0-04034368344815170	0-9604592884618410
<i>Escherichia coli</i>	Comorbidity: diseases of the musculoskeletal system and connective tissue	-0-04133684064767470	0-9595058749277820
<i>Beta-hemolytic Streptococcus, group B</i>	Comorbidity: diseases of the skin and subcutaneous tissue	-0-04395367953509910	0-9569982850518750
<i>Pseudomonas aeruginosa</i>	Device: Abscess change & Reinsertion	-0-044214375830406000	0-9567488316615470
<i>Serratia marcescens</i>	Device: Thoracostomy Tube Insertion	-0-04511735839046700	0-9558852940905570
<i>Enterobacter cloacae</i>	Comorbidity: certain conditions originating in the perinatal period	-0-04538971243553360	0-9556249903130940

<i>Escherichia coli</i>	Comorbidity: symptoms, signs, and ill-defined conditions	-0-04749305062791410	0-9536171001496560
<i>Serratia marcescens</i>	Device: Chest Tube Insertion	-0-04860684429243760	0-9525555587439140
<i>Beta-hemolytic Streptococcus, group B</i>	Comorbidity: symptoms, signs, and ill-defined conditions	-0-04887549568000120	0-9522996877429150
<i>Staphylococcus</i>	Comorbidity: diseases of the circulatory system	-0-049978393703463000	0-9512499772677680
<i>Pseudomonas aeruginosa</i>	Comorbidity: certain conditions originating in the perinatal period	-0-050136134954775000	0-9510999377400660
<i>Proteus mirabilis</i>	Device: Catheter Insertion	-0-0502215736542443	0-9510186804696280
<i>Enterococcus faecalis</i>	Comorbidity: diseases of the skin and subcutaneous tissue	-0-051710206865811500	0-9496040156967860
<i>Enterococcus faecium</i>	Comorbidity: mental disorders	-0-054722293597646100	0-9467480294390500
<i>Enterobacter cloacae</i>	Comorbidity: congenital anomalies	-0-054734874021642500	0-9467361190223410
<i>Proteus mirabilis</i>	Device: Hepatic Hunt Tips Insertion	-0-05563025581621960	0-9458888081270830
<i>Proteus mirabilis</i>	Comorbidity: diseases of the respiratory system	-0-05632184788546400	0-9452348650859710
<i>Klebsiella pneumoniae</i>	Comorbidity: symptoms, signs, and ill-defined conditions	-0-0578835137566756	0-9437598760766520
<i>Enterobacter cloacae</i>	Device: Catheter Insertion	-0-058586475528880400	0-9430966820889500
<i>Streptococcus</i>	Device: Thoracostomy Tube Insertion	-0-060750649415801900	0-9410578638510850
<i>Pseudomonas aeruginosa</i>	Comorbidity: congenital anomalies	-0-06168439542918960	0-940179564940214
<i>Stenotrophomonas maltophilia</i>	Comorbidity: diseases of the respiratory system	-0-062314464917760400	0-9395873730631750
<i>Enterococcus faecalis</i>	Comorbidity: symptoms, signs, and ill-defined conditions	-0-06274217384275550	0-9391855890873250
<i>Pseudomonas aeruginosa</i>	Comorbidity: diseases of the circulatory system	-0-06282927393610810	0-9391037894972670
<i>Streptococcus pneumoniae</i>	Comorbidity: endocrine, nutritional and metabolic diseases, and immunity disorders	-0-06424858933436820	0-9377718504726470
<i>Enterococcus faecium</i>	Comorbidity: injury and poisoning	-0-06712702601387200	0-9350764147628110
<i>Escherichia coli</i>	Device: Abscess change & Reinsertion	-0-06747061612441390	0-9347551869426090
<i>Escherichia coli</i>	Comorbidity: certain conditions originating in the perinatal period	-0-0680181848989219	0-9342434842994090
<i>Proteus mirabilis</i>	Device: Thoracostomy Tube Insertion	-0-06851762370745970	0-9337770033457690
<i>Streptococcus</i>	Comorbidity: symptoms, signs, and ill-defined conditions	-0-07005696898896820	0-9323407038857050
<i>Pseudomonas aeruginosa</i>	Device: Chest Tube Insertion	-0-07121713141601840	0-9312596644437740
<i>Pseudomonas aeruginosa</i>	Device: Thoracostomy Tube Insertion	-0-07218603122429830	0-9303578041101400
<i>Enterococcus</i>	Age: 31-60 years	-0-07518942967086200	0-9275677608296300
<i>Beta-hemolytic Streptococcus, group B</i>	Device: Thoracostomy Tube Insertion	-0-07546452335190690	0-9273126278942230

<i>Streptococcus</i>	Sex Female	-0-0769263670132356	0-9259580321518950
<i>Klebsiella pneumoniae</i>	Device: Chest Tube Insertion	-0-07730883450956440	0-9256039510182110
<i>Enterococcus faecium</i>	Comorbidity: diseases of the skin and subcutaneous tissue	-0-08507042106780610	0-9184476040630530
<i>Enterococcus faecium</i>	Device: Thoracostomy Tube Insertion	-0-08850949021101330	0-9152944243575540
<i>Pseudomonas aeruginosa</i>	Device: Catheter Insertion	-0-09446518841059190	0-9098594077268520
<i>Staphylococcus aureus</i>	Comorbidity: injury and poisoning	-0-09556576257435830	0-9088585908076910
<i>Escherichia coli</i>	Comorbidity: diseases of the skin and subcutaneous tissue	-0-09870449574858930	0-9060103983943270
<i>Staphylococcus</i>	Comorbidity: endocrine, nutritional and metabolic diseases, and immunity disorders	-0-10139234300556100	0-9035784506463950
<i>Staphylococcus</i>	Comorbidity: diseases of the respiratory system	-0-10503756038250600	0-900290706687891
<i>Streptococcus</i>	Comorbidity: diseases of the digestive system	-0-1072041195132540	0-8983422850844500
<i>Enterococcus faecalis</i>	Comorbidity: diseases of the digestive system	-0-10845041136445100	0-897223385797323
<i>Enterococcus faecalis</i>	Device: Catheter Insertion	-0-10997744353139000	0-8958543423789800
<i>Stenotrophomonas maltophilia</i>	Age: >60 years	-0-11124712290916600	0-894717616386454
<i>Stenotrophomonas maltophilia</i>	Comorbidity: infectious and parasitic diseases	-0-11485280583938100	0-8914973574548850
<i>Staphylococcus epidermidis</i>	Comorbidity: infectious and parasitic diseases	-0-11653184314878500	0-890001756067111
<i>Serratia marcescens</i>	Sex Female	-0-11745633692218400	0-8891793352053720
<i>Streptococcus pneumoniae</i>	Device: Thoracostomy Tube Insertion	-0-12029757109738800	0-8866565540933760
<i>Klebsiella pneumoniae</i>	Sex Female	-0-13158591129770600	0-87670395312802
<i>Escherichia coli</i>	Comorbidity: diseases of the circulatory system	-0-1321047951078960	0-876249163642067
<i>Enterococcus faecium</i>	Comorbidity: infectious and parasitic diseases	-0-1325481660800690	0-8758607463113650
<i>Enterococcus faecalis</i>	Device: Thoracostomy Tube Insertion	-0-13312714786794500	0-8753537856651870
<i>Staphylococcus aureus</i>	Device: Abscess change & Reinsertion	-0-13503066217667000	0-8736891220671070
<i>Beta-hemolytic Streptococcus, group B</i>	# Previous Admissions	-0-14087014549988300	0-8686020962657280
<i>Klebsiella oxytoca</i>	Age: 31-60 years	-0-1409232185660090	0-8685559981125330
<i>Escherichia coli</i>	Device: Chest Tube Insertion	-0-14404065740976500	0-8658525440218790
<i>Klebsiella oxytoca</i>	Comorbidity: endocrine, nutritional and metabolic diseases, and immunity disorders	-0-14445312131041400	0-8654954847462780
<i>Serratia marcescens</i>	Age: 31-60 years	-0-14521125295567200	0-864839573895266
<i>Enterococcus faecalis</i>	Sex Female	-0-1456239165762580	0-8644827596926610
<i>Enterococcus faecium</i>	Device: Chest Tube Insertion	-0-14569085825230000	0-8644248917047290

<i>Escherichia coli</i>	# Previous Admissions	-0·14644033109300700	0·8637772714427790
<i>Staphylococcus aureus</i>	Comorbidity: endocrine, nutritional and metabolic diseases, and immunity disorders	-0·1476322548673130	0·8627483281100670
<i>Staphylococcus aureus</i>	Comorbidity: diseases of the respiratory system	-0·15485894492556800	0·8565359877104660
<i>Beta-hemolytic Streptococcus, group B</i>	Comorbidity: diseases of the digestive system	-0·15611922598645100	0·8554571915631550
<i>Beta-hemolytic Streptococcus, group B</i>	Comorbidity: infectious and parasitic diseases	-0·15936176723061900	0·8526878286500640
<i>Klebsiella pneumoniae</i>	Device: Catheter Insertion	-0·16742315088671300	0·8458416169694730
<i>Klebsiella pneumoniae</i>	Interval >5 days	-0·1686915382202290	0·8447694422864860
<i>Enterococcus faecium</i>	Device: Catheter Insertion	-0·17967608929569900	0·8355408081959640
<i>Staphylococcus</i>	Device: Abscess change & Reinsertion	-0·1867101970921360	0·8296841464262000
<i>Enterococcus faecium</i>	Comorbidity: diseases of the respiratory system	-0·1876047953637010	0·8289422443245110
<i>Streptococcus</i>	Comorbidity: infectious and parasitic diseases	-0·19543836154657000	0·8224740380294930
<i>Enterococcus faecium</i>	Comorbidity: endocrine, nutritional and metabolic diseases, and immunity disorders	-0·19583670911892500	0·8221464727398690
<i>Escherichia coli</i>	Device: Catheter Insertion	-0·1989163508624230	0·8196184508420520
<i>Stenotrophomonas maltophilia</i>	Comorbidity: endocrine, nutritional and metabolic diseases, and immunity disorders	-0·20155448612674600	0·817459036170011
<i>Klebsiella pneumoniae</i>	Device: Thoracostomy Tube Insertion	-0·2067484006346630	0·8132242309506550
<i>Staphylococcus</i>	Comorbidity: diseases of the nervous system and sense organs	-0·2099521331997180	0·8106230469730340
<i>Klebsiella oxytoca</i>	Comorbidity: infectious and parasitic diseases	-0·22525477377017200	0·7983128036852930
<i>Escherichia coli</i>	Comorbidity: diseases of the blood and blood-forming organs	-0·22653836856102800	0·7972887509040210
<i>Staphylococcus</i>	Device: Chest Tube Insertion	-0·23493225863965100	0·7906244057875050
<i>Klebsiella oxytoca</i>	Sex Female	-0·23500245288425300	0·7905689104523260
<i>Enterococcus faecalis</i>	Age: 31-60 years	-0·2468334843842320	0·7812707764850820
<i>Staphylococcus aureus</i>	Comorbidity: symptoms, signs, and ill-defined conditions	-0·25121574105672900	0·777854538295272
<i>Proteus mirabilis</i>	Age: 31-60 years	-0·2578066353655340	0·7727446391461280
<i>Staphylococcus aureus</i>	Comorbidity: neoplasms	-0·27160318226154200	0·7621566383651230
<i>Pseudomonas aeruginosa</i>	Age: 0-15 years	-0·2776469820794330	0·757564208056862
<i>Staphylococcus aureus</i>	Comorbidity: infectious and parasitic diseases	-0·27804366624075700	0·7572637539309770
<i>Staphylococcus</i>	Age: 31-60 years	-0·30406503920679000	0·7378128781256940
<i>Beta-hemolytic Streptococcus, group B</i>	Comorbidity: neoplasms	-0·3052780959621410	0·7369184118585570
<i>Streptococcus</i>	Interval 3-5 days	-0·3186941279634480	0·727097914216795

<i>Staphylococcus</i>	Device: Catheter Insertion	-0·319132881337914	0·7267789675279500
<i>Klebsiella pneumoniae</i>	Comorbidity: endocrine, nutritional and metabolic diseases, and immunity disorders	-0·32642647604799100	0·7214974204402500
<i>Escherichia coli</i>	Comorbidity: endocrine, nutritional and metabolic diseases, and immunity disorders	-0·343151182481105	0·7095309348040860
<i>Staphylococcus aureus</i>	Comorbidity: diseases of the nervous system and sense organs	-0·3583304247014970	0·698842122152757
<i>Staphylococcus</i>	Comorbidity: mental disorders	-0·36306164042407100	0·6955435585777840
<i>Staphylococcus epidermidis</i>	Interval 3-5 days	-0·38047225977702300	0·6835385252242880
<i>Klebsiella oxytoca</i>	Age: >60 years	-0·3892415320974750	0·6775705952013600
<i>Pseudomonas aeruginosa</i>	Comorbidity: neoplasms	-0·3944967677737520	0·6740191420713760
<i>Staphylococcus aureus</i>	Device: Catheter Insertion	-0·42649164342622800	0·6527953206850150
<i>Staphylococcus</i>	Comorbidity: diseases of the musculoskeletal system and connective tissue	-0·43391217755299500	0·6479691592237480
<i>Enterococcus faecalis</i>	Age: 0-15 years	-0·4448816060928770	0·6409001502135690
<i>Klebsiella pneumoniae</i>	Comorbidity: diseases of the blood and blood-forming organs	-0·4730753787912340	0·6230831021563670
<i>Enterococcus faecalis</i>	Comorbidity: neoplasms	-0·5164133749111160	0·596656698779513
<i>Beta-hemolytic Streptococcus, group B</i>	Age: 31-60 years	-0·5299918402596870	0·58860977256165
<i>Streptococcus</i>	Comorbidity: endocrine, nutritional and metabolic diseases, and immunity disorders	-0·5773391440843770	0·5613901592887950
<i>Proteus mirabilis</i>	Comorbidity: endocrine, nutritional and metabolic diseases, and immunity disorders	-0·6043474131329070	0·546430903942542
<i>Staphylococcus epidermidis</i>	Sex Female	-0·6329683227323000	0·5310132406542720
<i>Staphylococcus</i>	Comorbidity: diseases of the digestive system	-0·659846308750758	0·5169307761235550

Table S2. Mean of performance measures for different classifiers over 100 iterations of 70-30 random split.

Sample	Model	Accuracy	F1_score	Precision	Specificity	Recall	Youden's J	Kappa	AUC_ROC
Urine	Decision Tree	83·59	0·89	0·89	0·67	0·89	0·56	0·56	0·82
Urine	Adaptive Boosting	76·33	0·86	0·77	0·16	0·97	0·13	0·17	0·76
Urine	Gradient Boosting	77·97	0·87	0·79	0·25	0·96	0·21	0·26	0·78
Urine	kNN	81·1	0·88	0·82	0·39	0·96	0·34	0·41	0·81
Urine	Ensemble	85·8	0·91	0·87	0·57	0·96	0·53	0·58	0·88
Sputum	Decision Tree	86·11	0·89	0·91	0·82	0·88	0·7	0·69	0·87

Sputum	Adaptive Boosting	76.25	0.84	0.77	0.45	0.92	0.37	0.41	0.81
Sputum	Gradient Boosting	77.88	0.85	0.79	0.52	0.9	0.43	0.46	0.83
Sputum	kNN	82.51	0.88	0.83	0.6	0.94	0.54	0.58	0.87
Sputum	Ensemble	87.03	0.9	0.9	0.79	0.91	0.7	0.71	0.92
Blood	Decision Tree	84.93	0.88	0.9	0.81	0.87	0.68	0.67	0.87
Blood	Adaptive Boosting	76.79	0.83	0.78	0.54	0.89	0.43	0.46	0.81
Blood	Gradient Boosting	78.25	0.84	0.8	0.59	0.89	0.48	0.5	0.83
Blood	kNN	82.66	0.87	0.83	0.64	0.92	0.57	0.6	0.87
Blood	Ensemble	86.28	0.9	0.88	0.76	0.91	0.68	0.69	0.92
Pus Swab	Decision Tree	88.82	0.91	0.92	0.87	0.9	0.77	0.76	0.9
Pus Swab	Adaptive Boosting	74.03	0.81	0.75	0.52	0.87	0.39	0.41	0.81
Pus Swab	Gradient Boosting	76.95	0.82	0.8	0.64	0.85	0.49	0.5	0.84
Pus Swab	kNN	84.71	0.88	0.85	0.72	0.92	0.64	0.66	0.91
Pus Swab	Ensemble	89.17	0.91	0.91	0.85	0.92	0.77	0.77	0.94