Supplementary Table S1 - Comparison of comorbidities between ICD-9 and ICD-10

Item	Score	ICD-9[1] N=86	ICD-10[1] N=267	p-value
Myocardial infarction	1	10 (11.6)	49 (18.4)	0.15
Congestive heart failure	1	26 (30.2)	62 (23.2)	0.19
Peripheral vascular disease	1	16 (18.6)	59 (22.1)	0.49
Cerebrovascular disease	1	14 (16.3)	62 (23.2)	0.17
Dementia	1	3 (3.5)	13 (4.9)	0.77[3]
Chronic pulmonary disease	1	32 (37.2)	82 (30.7)	0.26
Rheumatic disease	1	2 (2.3)	9 (3.4)	1.00[3]
Peptic ulcer disease	1	7 (8.1)	25 (9.4)	0.73
Mild liver disease	1	12 (14.0)	35 (13.1)	0.84
Diabetes without chronic complication	1	16 (18.6)	50 (18.7)	0.98
Diabetes with chronic complication	2	5 (5.8)	31 (11.6)	0.12
Hemiplegia or paraplegia	2	10 (11.6)	42 (15.7)	0.35
Renal disease	2	20 (23.3)	75 (28.1)	0.38
Any malignancy[2]	2	26 (30.2)	87 (32.6)	0.68
Moderate or severe liver disease	3	3 (3.5)	22 (8.2)	0.14
Metastatic solid tumor	3	18 (20.9)	47 (17.6)	0.49
AIDS/HIV	6	0 (0.0)	2 (0.7)	1.00[3]

[1] Data reported as n (%)

[2] Including lymphoma and leukemia, except malignant neoplasm of skin

[3] Exact Fisher test

Supplementary Table S2 – Comparison of components of Charlson comorbidity index between therapy groups.

Item	Score	3GC definitive therapy[1] N=129	Non-3GC definitive therapy[1] N=224	p-value[2]
Myocardial infarction	1	19 (14.7)	40 (17.9)	0.45
Congestive heart failure	1	41 (31.8)	47 (21.0)	**0.024**
Peripheral vascular disease	1	29 (22.5)	46 (20.5)	0.67
Cerebrovascular disease	1	31 (24.0)	45 (20.1)	0.39
Dementia	1	7 (5.4)	9 (4.0)	0.54
Chronic pulmonary disease	1	47 (36.4)	67 (29.9)	0.21
Rheumatic disease	1	3 (2.3)	8 (3.6)	0.75[3]
Peptic ulcer disease	1	10 (7.8)	22 (9.8)	0.51
Mild liver disease	1	17 (13.2)	30 (13.4)	0.95
Diabetes without chronic complication	1	23 (17.8)	43 (19.2)	0.75
Diabetes with chronic complication	2	15 (11.6)	21 (9.4)	0.50
Hemiplegia or paraplegia	2	20 (15.5)	32 (14.3)	0.76
Renal disease	2	43 (33.3)	52 (23.2)	**0.039**
Any malignancy[3]	2	38 (29.5)	75 (33.5)	0.44
Moderate or severe liver disease	3	8 (6.2)	17 (7.6)	0.62
Metastatic solid tumor	3	18 (14.0)	47 (21.0)	0.10
AIDS/HIV	6	1 (0.8)	1 (0.4)	1.00[4]

[1] Data reported as n (%)

[2] In order to avoid the problem of multiple testing, p-values are compared to Bonferroni adjusted significant level 0.05/17 = 0.0029

[3] Including lymphoma and leukemia, except malignant neoplasm of skin

[4] Exact Fisher test

Supplementary Table S3 – Comparison of events involved in qSOFA and qPitt scores between therapy groups

Item	3GC definitive therapy[1] N=129	Non-3GC definitive therapy[1] N=224	p-value[2]
RR > 22/min	31 (28.2)	27 (13.4)	**0.0013**
RR > 25/min	31 (28.2)	26 (12.9)	**0.0008**
Altered mental status	44 (40.0)	42 (20.8)	**0.0003**
Cardiac arrest	4 (3.1)	7 (3.1)	1.00[3]
Systolic BP < 100 mmHg	72 (55.8)	122 (54.5)	0.81
Systolic BP < 90 mmHg	52 (40.3)	79 (35.3)	0.35
Temperature < 36°C	55 (42.6)	99 (44.2)	0.78

[1] Data reported as n (%)

[2] In order to avoid the problem of multiple testing, p-values are compared to Bonferroni adjusted significant level 0.05/7 = 0.0071

[3] Exact Fisher test

Supplementary Table S4 – Simple (HR/OR) and adjusted (aHR/aOR) estimates for secondary outcomes in regards to the principal analysis – 3GCs vs. non-3GCs for patients presenting BSIs due to any AmpC-E

Outcomes	Death (all-cause) within 90 days[1]		Reinfection within 90 days[1]		Readmission within 90 days[1]		In-hospital mortality[2]	
Covariates	HR (CI95%)	aHR (CI95%)	HR (CI95%)	aHR (CI95%)	HR (CI95%)	aHR (CI95%)	OR (CI95%)	aOR (CI95%)
3CG vs. non-3CG therapy	1.15 (0.76-1.76)	0.97 (0.60-1.55)	2.10 (0.87-5.25)	1.85 (0.74-4.60)	0.87 (0.50-1.47)	-	1.96 (1.12-3.44)	1.58 (2.80-3.11)
qPitt	1.54 (1.28-1.84)*	1.54 (1.28-1.85)*	1.07 (0.64-1.80)	-	0.98 (0.76-1.25)	-	2.25 (1.70-3.06)	2.20 (1.65-2.98)*
qSOFA	1.78 (1.40-2.28)*	-	1.60 (0.86-3.00)	-	0.99 (0.73-1.33)	-	2.84 (1.97-4.20)	-
ICU admission	2.28 (1.50-3.45)*	-	2.55 (1.03-6.27)*	2.27 (0.91-5.68)	0.54 (0.28-1.10)	-	5.70 (3.18-10.47)	-

[1] Cox regression model applied

[2] Logistic regression model applied

* 95% level of significance

HR - Hazard Ratio ; aHR - adjusted Hazard Ratio ; OR-Odds Ratio ; aOR - adjusted Odds Ratio ; CI95%-95% Confidence Intervals

Supplementary Table S5 – Comparison of clinical outcomes between 3GC and cefepime/meropenem therapy groups for patients presenting BSIs due to any AmpC-E

Outcome	3GC definitive therapy N=129	Cefepime/meropenem definitive therapy N=37	p-value[1]
OTF[2]	60 (46.5)	18 (48.6)	0.81
Survival for :			
Death (all-cause) within 90 days[3]	72.9	70.3	0.92[a]
Reinfection within 90 days[3]	90.9	91.2	0.96[b]
Readmission within 90 days[3]	79.3	81.5	0.82[b]
Length of stay[4] (days)	38.0 (15.0;61.0)	52.0 (28.0;85.0)	0.024
In-hospital all-cause mortality[2]	30 (23.3)	9 (24.3)	0.89[a]

[1] Simple analysis results

[2] Data reported as n (%) and tested using logistic regression

[3] Data reported as 90-day survival probability (%) and tested using a simple Cox-regression model

[4] Data reported as median (Q1;Q3) and non-parametric Kruskal-Wallis test

[a] Significant association with qPitt score in multiple analysis, the adjusted model did not alter the conclusion

[b] No association with severity scores in multiple analysis

Supplementary Table S6 – Simple (HR/OR) and adjusted (aHR/aOR) estimates for secondary outcomes in regards to the 1st subgroup analysis – 3GCs vs. cefepime/meropenem for patients presenting BSIs due to any AmpC-E

Outcomes	Death (all-cause) within 90 days[1]		Reinfection within 90 days[1]		Readmission within 90 days[1]		In-hospital mortality[2]	
Covariates	HR (CI95%)	aHR (CI95%)	HR (CI95%)	aHR (CI95%)	HR (CI95%)	aHR (CI95%)	OR (CI95%)	aOR (CI95%)
3CG vs. non-3CG therapy	0.97 (0.50-1.90)	0.92 (0.44-1.91)	1.03 (0.28-3.73)	2.30 (0.28-19.02)	1.12 (0.42-2.97)	1.03 (0.39-2.78)	0.94 (0.41-2.31)	0.83 (0.32-2.33)
qPitt	1.46 (1.13-1.88)*	1.46 (1.13-1.89)*	0.93 (0.500-1.73)	1.35 (0.64-2.86)	1.04 (0.73-1.47)	-	1.84 (1.30-2.70)*	1.83 (1.29-2.69)*
qSOFA	1.53 (1.08-2.16)*	-	1.28 (0.60-2.72)	-	0.91 (0.58-1.43)	-	2.08 (1.34-3.35)*	-
ICU admission	1.91 (1.07-3.42)*	-	1.84 (0.62-5.45)	-	0.60 (0.25-1.45)	0.61 (0.25-1.47)	2.93 (1.41-6.33)*	-

[1] Cox regression model applied
[2] Logistic regression model applied
* 95% level of significance
HR - Hazard Ratio ; aHR - adjusted Hazard Ratio ; OR-Odds Ratio ; aOR - adjusted Odds Ratio ; CI95%-95% Confidence Intervals

Supplementary Table S7 – Comparison of clinical outcomes between 3GC and non-3GC therapy groups for patients presenting BSIs due to the *E. cloacae* complex, *K. aerogenes* and *C. freundii*.

Outcome	3GC definitive therapy N=65	Non-3GC definitive therapy N=141	p-value[4]
OTF[3]	28 (43.1)	52 (36.9)	0.37
Survival for :			
Death (all-cause) within 90 days[1]	78.7	78.5	0.77[a]
Reinfection within 90 days[1]	98.4	90.8	0.028[b]
Readmission within 90 days[1]	80.0	75.3	0.38[a]
Length of stay[2] (days)	30.0 (13.0;70.0)	20.0 (11.0;35.0)	0.001
In-hospital all-cause mortality[3]	13 (20.0)	14 (9.9)	0.051[a]

[1] Data reported as 90-day survival probability (%) and tested using a simple Cox-regression model
[2] Data reported as median (Q1;Q3) and non-parametric Kruskal-Wallis test
[3] Data reported as n (%) and tested using logistic regression
[4] Simple analysis results
[a] Significant association with qSOFA score in multiple analysis, the adjusted model did not alter the conclusion
[b] No association with severity scores in multiple analysis

Supplementary Table S8 – Simple (HR/OR) and adjusted (aHR/aOR) estimates for secondary outcomes in regards to the 2nd subgroup analysis – 3GCs vs. non-3GCs for patients presenting BSIs due to the *E. cloacae* complex, *K. aerogenes* and *C. freundii*.

Outcomes	Death (all-cause) within 90 days[1]		Reinfection within 90 days[1]		Readmission within 90 days[1]		In-hospital mortality[2]	
Covariates	HR (CI95%)	aHR (CI95%)	HR (CI95%)	aHR (CI95%)	HR (CI95%)	aHR (CI95%)	OR (CI95%)	aOR (CI95%)
3CG vs. non-3CG therapy	1.10 (0.58-2.07)	0.75 (0.35-1.62)	6.28 (1.22-32.41)*	3.32 (0.54-20.39)	0.73 (0.36-1.49)	0.77 (0.36-1.64)	2.27 (0.98-5.18)	1.66 (0.58-4.62)
qPitt	1.28 (0.97-1.68)	-	1.17 (0.55-2.45)	-	1.09 (0.83-1.42)	-	1.81 (1.20-2.80)*	-
qSOFA	1.62 (1.11-2.36)*	1.65 (1.13-2.42)*	1.97 (0.73-5.34)	1.78 (0.61-5.19)	1.22 (0.85-1.76)	1.53 (1.02-2.77)*	2.50 (1.40-4.66)*	2.40 (1.32-4.52)*
ICU admission	1.82 (0.99-3.35)	-	1.23 (0.24-6.33)	-	0.52 (0.22-1.23)	0.33 (0.11-1.02)	4.60 (2.00-10.92)*	-

[1] Cox regression model applied
[2] Logistic regression model applied
* 95% level of significance
HR - Hazard Ratio ; aHR - adjusted Hazard Ratio ; OR-Odds Ratio ; aOR - adjusted Odds Ratio ; CI95%-95% Confidence Intervals