Marital Status and the Epidemiology and Outcomes of Sepsis

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e-Table 1. ICD-9-CM diagnosis and procedures codes used to define sepsis. Adapted from Martin et al.[1]

038 (septicemia), 020.0 (septicemic), 790.7 (bacteremia), 117.9 (disseminated fungal infection), 112.5 (disseminated candida infection), 112.81 (disseminated candida endocarditis, 995.91 (Systemic inflammatory response syndrome due to infectious process without acute organ dysfunction), 995.92 (severe sepsis), 785.52 (shock without mention of trauma; septic shock)

e-Table 2. ICD-9-CM diagnosis and procedures codes and Clinical Classifications Software (CCS) codes used to define additional co-morbidities[30,31]

Cancer: CCS 11-43

Human immunodeficiency virus positive: CCS 5

Congestive heart failure: 391.8, 398.9, 402.9, 425.0-425.7, 428.0-428.9, 429.3, 440.9, 648.6

Hypertension: 401.0, 401.1, 401.9

Chronic obstructive pulmonary disease: 490.x-496.x

Diabetes: CCS 49-50

e-Table 3. ICD-9-CM diagnosis and procedures codes used to define source of sepsis [1,4]

Pulmonary: 010.0-011.9, 018, 034.0, 098.6, 461.0-513.9

Genitourinary: 098.17, 112.2, 590.0-616.9

Skin, soft tissue, or bone: 003.24, 015, 035, 036.82, 040.0, 095.5, 098.5, 680.0-686.9, 711.0-730.9

Gastrointestinal: 001.0-009.9, 129, 530.0-577.9

Central nervous system: 012.0, 036.0, 091.81, 094, 098.82, 320.0-326.9

Cardiovascular: 036.41-036.43, 093.0-093.82, 098.83-098.84, 391.2, 421.0-422.9

e-Table 4. ICD-9-CM diagnosis and procedures codes used to define acute organ dysfunction.[1,32]

Cardiovascular: 458.0, 785.5, 785.51, 785.59, 458.0, 458.8, 458.9, 796.3

Pulmonary: 518.81, 518.82, 518.85, 786.09, 799.1, 96.7

Renal: 584, 580, 585, 39.95

Neurological: 293, 348.1, 348.3, 780.01, 780.09, 89.14

Hepatic: 570, 572.2, 573.3

Hematologic: 286.2, 286.6, 286.9, 287.3-.5

e-Table 5. Adjusted incidence rate ratios for hospitalization for sepsis. Base model.

Covariate	Incidence rate ratio	95% CI	P value
Gender			
Male	1	.	.
Female	0.80	0.72, 0.88	<0.01
Race/Ethnicity			
White, non-Hispanic	1	.	.
Black, non-Hispanic	2.0	1.8, 2.3	<0.01
Hispanic	1.17	1.05, 1.31	<0.01
Age	1.46	1.44, 1.48	<0.01
Marital status			
Married	1	.	.
Divorced	0.94	0.83, 1.06	0.33
Widowed	1.38	1.17, 1.62	<0.01
Legally separated	1.46	1.20, 1.77	<0.01
Single	3.47	3.09, 3.9	<0.01

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e-Table 6. Adjusted incidence rate ratios for hospitalization for sepsis. Sensitivity analysis 1, Alternative case definition: sepsis as ICD-9 CM = "995.91" only

Covariate	Incidence rate ratio	95% CI	P value
Gender			
Male	1.0 [ref]	.	.
Female	0.85	0.77, 0.93	<0.01
Race/Ethnicity			
White, non-Hispanic	1.0 [ref]	.	.
Black, non-Hispanic	2.05	1.87, 2.27	<0.01
Hispanic	1.34	1.18, 1.53	<0.01
Age	1.46	1.43, 1.48	<0.01
Marital status			
Married	1.0 [ref]	.	.
Divorced	0.92	0.81, 1.05	0.23
Widowed	1.21	1.05, 1.40	<0.01
Legally separated	1.32	1.06, 1.64	0.01
Single	3.3	2.92, 3.7	<0.01

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e-Table 7. Adjusted incidence rate ratios for hospitalization for sepsis. Sensitivity analysis 2, Alternative numerator: excluding hospitalizations coded as re-admissions

Covariate	Incidence rate ratio	95% CI	P value
Gender			
Male	1 [ref]	.	.
Female	0.81	0.73, 0.89	<0.01
Race/Ethnicity			
White, non-Hispanic	1 [ref]	.	.
Black, non-Hispanic	2.05	1.84, 2.27	<0.01
Hispanic	1.19	1.06, 1.32	<0.01
Age	1.46	1.44, 1.49	<0.01
Marital status			
Married	1 [ref]	.	.
Divorced	0.95	0.84,1.06	0.37
Widowed	1.35	1.16, 1.59	<0.01
Legally separated	1.46	1.21, 1.78	<0.01
Single	3.56	3.17, 3.99	<0.01

e-Table 8. Adjusted incidence rate ratios for hospitalization for sepsis. Sensitivity analysis 3, Alternative denominator: excluding "Married: spouse absent" from married

Covariate		Incidence rate ratio	95% CI	P value
Gender				
	Male	1 [ref]	.	.
	Female	0.81	0.73, 0.89	<0.001
Race/Ethnicity				
	White, non-Hispanic	1 [ref]	.	.
	Black, non-Hispanic	2.09	1.87, 2.34	<0.01
	Hispanic	1.19	1.07, 1.34	<0.01
Age		1.46	1.44, 1.48	<0.01
Marital status				
	Married	1 [ref]	.	.
	Divorced	0.86	0.75, 0.97	0.02
	Widowed	1.25	1.06, 1.48	<0.01
	Legally separated	1.32	1.09, 1.6	<0.01
	Single	3.14	2.79, 3.54	<0.01

e-Table 9. Adjusted incidence rate ratios for hospitalization for sepsis. Sensitivity analysis 4, Alternative denominator: US Census 2000 population

Covariate	Incidence rate ratio	95% CI	P value
Gender			
Male	1 [ref]	.	.
Female	0.75	0.69, 0.82	<0.01
Race/Ethnicity			
White, non-Hispanic	1 [ref]	.	.
Black, non-Hispanic	2.21	2.0, 2.43	<0.01
Hispanic	1.62	1.47, 1.80	<0.01
Age	1.50	1.48, 1.53	<0.01
Marital status			
Married	1 [ref]	.	.
Divorced	1.18	1.06, 1.30	<0.01
Widowed	1.35	1.18, 1.55	<0.01
Legally separated	1.38	1.22, 1.55	<0.01
Single	4.81	4.24, 5.46	<0.01

e-Table 10. Multivariable logistic regression model for in-hospital mortality among hospitalizations for sepsis: Sensitivity analysis 1: Model B + re-admission

Covariate	Odds Ratio [95% CI]	P value
Female		
Married	0.94 [0.87, 1.03]	0.24
Divorced	0.8 [0.66, 1.0]	0.06
Widowed	1.0 [0.91, 1.1]	0.95
Single	1.24 [1.1, 1.4]	<0.01
Legally separated	0.95 [0.65, 1.38]	0.8
Male		
Married	1.0 [ref]	.
Divorced	1.28 [1.06, 1.55]	<0.01
Widowed	0.98 [0.89, 1.09]	0.76
Single	1.14 [1.00, 1.29]	0.04
Legally separated	1.17 [0.8, 1.6]	0.37
Age, yrs	1.03 [1.03, 1.03]	<0.01
Race/Ethnicity		
White, non-Hispanic	1.0 [ref]	.
Black, non-Hispanic	0.84 [0.78, 0.92]	<0.01
Hispanic	0.79 [0.66, 0.95]	0.01
Urbanicity		
Non-metropolitan	1.0 [ref]	.
Metropolitan	0.92 [0.74, 1.13]	0.4
Quartile of median income by zip code:		
Lowest	1.0 [ref]	.
2nd	1.02 [0.88, 1.19]	0.72
3rd	0.97 [0.86, 1.09]	0.6
Highest	1.01 [0.9, 1.13]	0.85
Payer:		
Primary: Medicaid	1.07 [0.9, 1.26]	0.43
Secondary: Medicaid	0.86 [0.79, 0.95]	<0.01
Charlson-Deyo score	1.12 [1.00, 1.29]	0.04
Re-admission hospitalization	1.14 [1.01, 1.3]	0.04

Abbreviations: OR = odds ratio

e-Table 11. Multivariable logistic regression model for in-hospital mortality among hospitalizations for sepsis: Sensitivity analysis 2: Model B + source of sepsis + gram positive pathogen

Covariate	Odds ratio [95% CI]	P value
Female		
Married	1.0 [0.92, 1.08]	0.91
Divorced	0.88 [0.73, 1.06]	0.2
Widowed	1.02 [0.94, 1.1]	0.64
Single	1.16 [1.03, 1.3]	<0.01
Legally separated	0.93 [0.71, 1.24]	0.67
Male		
Married	1.0 [ref]	.
Divorced	1.21 [1.05, 1.42]	0.01
Widowed	1.02 [0.94, 1.12]	0.61
Single	1.15 [1.05, 1.25]	<0.01
Leglly separated	1.19 [0.9, 1.56]	0.21
Age, yrs	1.03 [1.03, 1.03]	<0.01
Race/Ethnicity		
White, non-Hispanic	1.0 [ref]	.
Black, non-Hispanic	0.86 [0.79, 0.94]	<0.01
Hispanic	0.84 [0.72, 0.95]	<0.01
Urbanicity		
Non-metropolitan	1.0 [ref]	.
Metropolitan	0.93 [0.80, 1.08]	0.37
Quartile of median income by zip code:		
Lowest	1.0 [ref]	.
2nd	0.98 [0.87, 1.11]	0.81
3rd	0.98 [0.89, 1.08]	0.76
Highest	1.0 [0.9, 1.1]	0.99
Payer:		
Primary: Medicaid	1.01 [0.87, 1.17]	0.85
Secondary: Medicaid	0.90 [0.83, 0.97]	<0.01
Charlson-Deyo score	1.08 [1.07, 1.1]	<0.01
Gram positive infection	0.79 [0.71, 0.87]	<0.01
Source of sepsis		
Respiratory	1.37 [1.28, 1.46]	<0.01
CNS	1.04 [0.7, 1.52]	0.85
Gastrointestinal	1.14 [1.07, 1.23]	<0.01
Skin, soft tissue, joint	0.44 [0.39, 0.49]	<0.01
Cardiovascular	0.74 [0.59, 0.92]	<0.01
Urological	0.47 [0.44, 0.51]	<0.01

Abbreviations: OR = odds ratio