

**TABLE E-1 ICD-9-CM Diagnosis Codes Used in the Study\***

Condition	ICD-9-CM Codes
Cancer	140.x-172.x, 174.x-208.x, 238.6
Cerebrovascular disease	362.34, 430.x-438.x
Chronic obstructive pulmonary disease	416.8, 416.9, 490-505, 506.4, 508.1, 508.8
Congestive heart failure	398.91, 402.01, 402.11, 402.91, 404.01, 404.03, 404.11, 404.13, 404.91, 404.93, 425.4-425.9, 428.x
Dementia	290.x, 294.1, 331.2
Diabetes mellitus	250.x
Hypertension	401.x-405.x 437.2
Infection due to internal joint prosthesis	996.66
Ischemic heart disease	410.x-414.x, 429.2, V45.81
Knee fracture	821.2x, 821.3x, 822.xx-823.xx
Myocardial infarction, acute	410.x (acute), 412.x (old)
Osteoarthritis	715.x
Peripheral vascular disease	093.0 437.3, 440.x, 441.x, 443.1-443.9, 447.1, 557.1, 557.9, V43.4
Renal disease	403.01, 403.11, 403.91, 404.02, 404.03, 404.12, 404.13, 404.92, 404.93, 582.x, 583.0-583.7, 585.x, 586.x, 588.0, V42.0, V45.1, V56.x
Rheumatoid arthritis	714.x
Thromboembolic event	415.1x, 451.1x, 451.2, 451.81, 451.9, 452.x, 453.x

\*ICD-9-CM = International Classification of Diseases, Ninth Revision, Clinical Modification.

**TABLE E-2 Univariate and Multivariable-Adjusted Predictors of One-Year Mortality Among Patients Managed with Unilateral Knee Arthroplasty, 2000 to 2009\***

Variable	Unadjusted HR (95% CI)†	P Value	Adjusted HR (95% CI)†	P Value
Type of unilateral knee arthroplasty				
Partial	0.65 (0.44 to 0.97)	0.04	0.75 (0.50 to 1.11)	0.15
Total	1.00 [Reference]		1.00 [Reference]	
Age, per 5 years	1.53 (1.46 to 1.61)	<0.001	1.47 (1.40 to 1.54)	<0.001
Male	1.73 (1.55 to 1.94)	<0.001	1.64 (1.45 to 1.86)	<0.001
Race				
Black	1.18 (0.92 to 1.50)	0.19	1.06 (0.82 to 1.38)	0.64
White	1.00 [Reference]		1.00 [Reference]	
Other/unknown	0.80 (0.54 to 1.18)	0.26	0.60 (0.40 to 0.89)	0.01
Medical history				
Cancer	1.57 (1.36 to 1.82)	<0.001	1.23 (1.05 to 1.43)	0.009
Cerebrovascular disease	1.98 (1.73 to 2.27)	<0.001	1.35 (1.16 to 1.57)	<0.001
Chronic obstructive pulmonary disease	1.46 (1.29 to 1.66)	<0.001	1.08 (0.94 to 1.23)	0.28
Congestive heart failure	3.08 (2.71 to 3.50)	<0.001	1.76 (1.52 to 2.03)	<0.001
Dementia	2.70 (1.98 to 3.69)	<0.001	1.58 (1.14 to 2.19)	0.006
Diabetes mellitus	1.55 (1.38 to 1.74)	<0.001	1.37 (1.21 to 1.56)	<0.001
Hypertension	1.21 (1.04 to 1.40)	0.01	0.93 (0.80 to 1.09)	0.38
Ischemic heart disease	1.90 (1.70 to 2.14)	<0.001	1.12 (0.98 to 1.29)	0.10
Myocardial infarction	2.10 (1.75 to 2.52)	<0.001	1.21 (0.98 to 1.48)	0.07
Peripheral vascular disease	1.91 (1.67 to 2.18)	<0.001	1.17 (1.01 to 1.35)	0.04
Renal disease	3.41 (2.89 to 4.03)	<0.001	2.22 (1.86 to 2.64)	<0.001
Rheumatoid arthritis	1.57 (1.29 to 1.91)	<0.001	1.55 (1.27 to 1.89)	<0.001
Duration of stay	1.07 (1.06 to 1.09)	<0.001	1.07 (1.05 to 1.08)	<0.001
State Medicaid buy-in	1.54 (1.29 to 1.84)	<0.001	1.31 (1.05 to 1.62)	0.02
Rural residence	1.04 (0.92 to 1.18)	0.52	1.09 (0.92 to 1.29)	0.31
U.S. geographic region				
Midwest	0.92 (0.80 to 1.06)	0.27	0.93 (0.80 to 1.07)	0.31
Northeast	0.97 (0.81 to 1.15)	0.70	0.86 (0.71 to 1.05)	0.14
South	1.00 [Reference]		1.00 [Reference]	
West	1.06 (0.90 to 1.27)	0.48	1.05 (0.88 to 1.26)	0.59
Year of surgery				
2000	1.00 [Reference]		1.00 [Reference]	
2001	0.74 (0.58 to 0.96)	0.02	0.72 (0.55 to 0.92)	0.01
2002	0.77 (0.60 to 0.99)	0.04	0.73 (0.57 to 0.94)	0.01
2003	0.69 (0.54 to 0.88)	0.003	0.69 (0.54 to 0.88)	0.003
2004	0.88 (0.69 to 1.12)	0.29	0.82 (0.65 to 1.04)	0.10
2005	0.70 (0.55 to 0.90)	0.005	0.67 (0.53 to 0.86)	0.001
2006	0.61 (0.48 to 0.79)	<0.001	0.58 (0.45 to 0.75)	<0.001
2007	0.63 (0.49 to 0.81)	<0.001	0.55 (0.41 to 0.72)	<0.001
2008	0.77 (0.61 to 0.97)	0.03	0.73 (0.57 to 0.92)	0.008
2009	0.39 (0.27 to 0.56)	<0.001	0.37 (0.26 to 0.53)	<0.001
Physician characteristics				
Orthopaedic surgery specialty	0.87 (0.65 to 1.16)	0.34	1.04 (0.71 to 1.51)	0.84
Years since graduation	1.00 (0.96 to 1.03)	0.78	1.00 (0.97 to 1.03)	0.94

**TABLE E-2 (continued)**

Variable	Unadjusted HR (95% CI)†	P Value	Adjusted HR (95% CI)†	P Value
Hospital characteristics				
COTH member‡	0.95 (0.80 to 1.13)	0.55	0.94 (0.75 to 1.17)	0.57
No. of beds, per 100	0.99 (0.97 to 1.01)	0.31	0.99 (0.96 to 1.02)	0.55
Rural hospital location	1.07 (0.92 to 1.25)	0.37	0.97 (0.79 to 1.19)	0.76
*There were 66,079 patients in the analysis after 2524 patients were excluded because they had missing American Hospital Association or American Medical Association data. †HR = hazard ratio, and CI = confidence interval. ‡COTH = Council of Teaching Hospitals.				

**TABLE E-3 Univariate and Multivariable-Adjusted Predictors of One-Year Myocardial Infarction Among Patients Managed with Unilateral Knee Arthroplasty, 2000 to 2009\***

Variable	Unadjusted HR (95% CI)†	P Value	Adjusted HR (95% CI)†	P Value
Type of unilateral knee arthroplasty				
Partial	0.73 (0.46 to 1.14)	0.17	0.85 (0.54 to 1.34)	0.49
Total	1.00 [Reference]		1.00 [Reference]	
Age, per 5 years	1.35 (1.26 to 1.45)	<0.001	1.32 (1.23 to 1.42)	<0.001
Male	1.49 (1.26 to 1.76)	<0.001	1.42 (1.19 to 1.68)	<0.001
Race				
Black	0.96 (0.66 to 1.41)	0.85	0.80 (0.52 to 1.23)	0.31
White	1.00 [Reference]		1.00 [Reference]	
Other/unknown	0.65 (0.35 to 1.22)	0.18	0.56 (0.30 to 1.05)	0.07
Medical history				
Cancer	0.98 (0.77 to 1.25)	0.88	0.83 (0.65 to 1.07)	0.16
Cerebrovascular disease	1.65 (1.32 to 2.04)	<0.001	1.13 (0.89 to 1.42)	0.32
Chronic obstructive pulmonary disease	1.03 (0.84 to 1.26)	0.81	0.79 (0.64 to 0.99)	0.04
Congestive heart failure	2.14 (1.76 to 2.61)	<0.001	1.22 (0.98 to 1.53)	0.07
Dementia	1.93 (1.12 to 3.33)	0.02	1.28 (0.73 to 2.24)	0.38
Diabetes mellitus	1.85 (1.55 to 2.20)	<0.001	1.60 (1.34 to 1.92)	<0.001
Hypertension	1.63 (1.28 to 2.08)	<0.001	1.24 (0.96 to 1.59)	0.10
Ischemic heart disease	2.31 (1.94 to 2.75)	<0.001	1.54 (1.25 to 1.88)	<0.001
Myocardial infarction	2.77 (2.16 to 3.56)	<0.001	1.61 (1.23 to 2.10)	<0.001
Peripheral vascular disease	1.79 (1.46 to 2.18)	<0.001	1.22 (0.98 to 1.52)	0.08
Renal disease	2.17 (1.63 to 2.90)	<0.001	1.45 (1.07 to 1.97)	0.02
Rheumatoid arthritis	0.91 (0.63 to 1.32)	0.64	0.92 (0.64 to 1.34)	0.67
Duration of stay	1.07 (1.05 to 1.08)	<0.001	1.07 (1.05 to 1.08)	<0.001
State Medicaid buy-in	1.53 (1.18 to 1.97)	0.001	1.47 (1.10 to 1.96)	0.01
Rural residence	1.19 (0.99 to 1.41)	0.06	1.13 (0.89 to 1.45)	0.31
U.S. geographic region				
Midwest	0.94 (0.76 to 1.16)	0.56	0.94 (0.76 to 1.17)	0.57
Northeast	1.16 (0.92 to 1.46)	0.20	1.12 (0.88 to 1.42)	0.34
South	1.00 [Reference]		1.00 [Reference]	
West	0.56 (0.41 to 0.75)	<0.001	0.56 (0.41 to 0.76)	<0.001
Year of surgery				
2000	1.00 [Reference]		1.00 [Reference]	
2001	0.97 (0.66 to 1.42)	0.88	0.94 (0.64 to 1.38)	0.75
2002	1.11 (0.76 to 1.62)	0.58	1.04 (0.71 to 1.52)	0.84
2003	0.79 (0.54 to 1.15)	0.22	0.77 (0.52 to 1.12)	0.17
2004	0.78 (0.54 to 1.14)	0.20	0.75 (0.51 to 1.10)	0.14
2005	1.00 (0.69 to 1.43)	0.98	0.96 (0.66 to 1.38)	0.81
2006	0.71 (0.48 to 1.05)	0.08	0.68 (0.46 to 1.01)	0.06
2007	0.58 (0.39 to 0.87)	0.009	0.53 (0.35 to 0.81)	0.003
2008	1.03 (0.72 to 1.47)	0.89	1.00 (0.70 to 1.45)	0.98
2009	0.73 (0.47 to 1.12)	0.15	0.73 (0.47 to 1.13)	0.16
Physician characteristics				
Orthopaedic surgery specialty	1.36 (0.83 to 2.21)	0.22	1.60 (0.91 to 2.81)	0.11
Years since graduation	0.97 (0.93 to 1.02)	0.29	0.98 (0.93 to 1.03)	0.36

**TABLE E-3 (continued)**

Variable	Unadjusted HR (95% CI)†	P Value	Adjusted HR (95% CI)†	P Value
Hospital characteristics				
COTH member‡	0.78 (0.59 to 1.02)	0.07	0.78 (0.57 to 1.07)	0.13
No. of beds, per 100	0.97 (0.93 to 1.00)	0.08	0.98 (0.93 to 1.02)	0.34
Rural hospital location	1.25 (1.02 to 1.54)	0.03	1.04 (0.78 to 1.38)	0.79
*There were 66,079 patients in the analysis after 2524 patients were excluded because they had missing American Hospital Association or American Medical Association data. †HR = hazard ratio, and CI = confidence interval. ‡COTH = Council of Teaching Hospitals.				

**TABLE E-4 Univariate and Multivariable-Adjusted Predictors of One-Year Thromboembolic Events Among Patients Managed with Unilateral Knee Arthroplasty, 2000 to 2009\***

Variable	Unadjusted HR (95% CI)†	P Value	Adjusted HR (95% CI)†	P Value
Type of unilateral knee arthroplasty				
Partial	0.79 (0.53 to 1.18)	0.24	0.86 (0.57 to 1.29)	0.46
Total	1.00 [Reference]		1.00 [Reference]	
Age, per 5 years	1.16 (1.09 to 1.23)	<0.001	1.13 (1.05 to 1.20)	<0.001
Male	0.94 (0.80 to 1.11)	0.48	0.89 (0.75 to 1.05)	0.17
Race				
Black	1.59 (1.20 to 2.12)	0.001	1.61 (1.18 to 2.19)	0.003
White	1.00 [Reference]		1.00 [Reference]	
Other/unknown	0.68 (0.39 to 1.20)	0.19	0.81 (0.46 to 1.44)	0.48
Medical history				
Cancer	1.44 (1.17 to 1.76)	<0.001	1.42 (1.16 to 1.74)	<0.001
Cerebrovascular disease	1.12 (0.90 to 1.40)	0.30	0.97 (0.77 to 1.22)	0.79
Chronic obstructive pulmonary disease	1.14 (0.94 to 1.36)	0.18	1.06 (0.88 to 1.28)	0.55
Congestive heart failure	1.41 (1.14 to 1.75)	0.002	1.20 (0.95 to 1.52)	0.12
Dementia	1.75 (1.03 to 2.96)	0.04	1.49 (0.87 to 2.54)	0.15
Diabetes mellitus	0.91 (0.76 to 1.09)	0.32	0.88 (0.73 to 1.05)	0.16
Hypertension	1.07 (0.89 to 1.29)	0.47	0.98 (0.80 to 1.19)	0.81
Ischemic heart disease	1.36 (1.16 to 1.58)	<0.001	1.30 (1.09 to 1.55)	0.004
Myocardial infarction	1.16 (0.84 to 1.61)	0.36	0.94 (0.66 to 1.33)	0.72
Peripheral vascular disease	1.24 (1.02 to 1.52)	0.03	1.11 (0.90 to 1.37)	0.32
Renal disease	1.18 (0.84 to 1.66)	0.33	1.06 (0.75 to 1.50)	0.75
Rheumatoid arthritis	1.13 (0.82 to 1.54)	0.46	1.07 (0.78 to 1.47)	0.66
Duration of stay	1.04 (1.03 to 1.06)	<0.001	1.03 (1.01 to 1.05)	<0.001
State Medicaid buy-in	0.90 (0.67 to 1.22)	0.50	0.80 (0.58 to 1.10)	0.17
Rural residence	1.05 (0.88 to 1.24)	0.59	1.08 (0.87 to 1.35)	0.47
U.S. geographic region				
Midwest	0.90 (0.75 to 1.08)	0.25	0.90 (0.75 to 1.09)	0.30
Northeast	0.77 (0.60 to 0.98)	0.03	0.74 (0.58 to 0.96)	0.02
South	1.00 [Reference]		1.00 [Reference]	
West	0.59 (0.46 to 0.77)	<0.001	0.61 (0.47 to 0.80)	<0.001
Year of surgery				
2000	1.00 [Reference]		1.00 [Reference]	
2001	0.81 (0.55 to 1.18)	0.27	0.81 (0.55 to 1.19)	0.29
2002	1.16 (0.82 to 1.65)	0.40	1.18 (0.83 to 1.68)	0.36
2003	0.92 (0.65 to 1.30)	0.64	0.94 (0.66 to 1.33)	0.71
2004	1.02 (0.73 to 1.43)	0.91	1.02 (0.73 to 1.44)	0.90
2005	0.88 (0.63 to 1.24)	0.48	0.90 (0.64 to 1.28)	0.56
2006	0.73 (0.51 to 1.05)	0.09	0.75 (0.52 to 1.08)	0.12
2007	0.75 (0.53 to 1.08)	0.12	0.78 (0.54 to 1.12)	0.18
2008	0.87 (0.62 to 1.24)	0.45	0.92 (0.64 to 1.31)	0.63
2009	0.73 (0.49 to 1.07)	0.11	0.76 (0.51 to 1.13)	0.17
Physician characteristics				
Orthopaedic surgery specialty	1.51 (0.94 to 2.45)	0.09	1.44 (0.88 to 2.35)	0.14
Years since graduation	1.03 (0.98 to 1.07)	0.24	1.03 (0.98 to 1.07)	0.29

**TABLE E-4 (continued)**

Variable	Unadjusted HR (95% CI)†	P Value	Adjusted HR (95% CI)†	P Value
Hospital characteristics				
COTH member‡	0.98 (0.79 to 1.22)	0.88	1.03 (0.80 to 1.31)	0.84
No. of beds, per 100	0.99 (0.96 to 1.03)	0.73	0.98 (0.94 to 1.02)	0.27
Rural hospital location	0.99 (0.80 to 1.22)	0.94	0.91 (0.69 to 1.21)	0.53
*There were 66,079 patients in the analysis after 2524 patients were excluded because they had missing American Hospital Association or American Medical Association data. †HR = hazard ratio, and CI = confidence interval. ‡COTH = Council of Teaching Hospitals.				

**TABLE E-5 Univariate and Multivariable-Adjusted Predictors of One-Year Infection Among Patients Managed with Unilateral Knee Arthroplasty, 2000 to 2009\***

Variable	Unadjusted HR (95% CI)†	P Value	Adjusted HR (95% CI)†	P Value
Type of unilateral knee arthroplasty				
Partial	0.67 (0.49 to 0.91)	0.01	0.74 (0.55 to 1.01)	0.06
Total	1.00 [Reference]		1.00 [Reference]	
Age, per 5 years	1.01 (0.96 to 1.06)	0.79	0.99 (0.94 to 1.04)	0.60
Male	1.37 (1.23 to 1.53)	<0.001	1.36 (1.21 to 1.53)	<0.001
Race				
Black	1.19 (0.93 to 1.51)	0.16	0.99 (0.76 to 1.28)	0.93
White	1.00 [Reference]		1.00 [Reference]	
Other/unknown	1.17 (0.86 to 1.59)	0.33	0.89 (0.64 to 1.22)	0.47
Medical history				
Cancer	1.06 (0.90 to 1.24)	0.51	0.98 (0.83 to 1.15)	0.76
Cerebrovascular disease	1.14 (0.98 to 1.33)	0.10	0.93 (0.79 to 1.09)	0.37
Chronic obstructive pulmonary disease	1.57 (1.40 to 1.76)	<0.001	1.38 (1.22 to 1.56)	<0.001
Congestive heart failure	1.86 (1.63 to 2.13)	<0.001	1.39 (1.20 to 1.62)	<0.001
Dementia	1.32 (0.85 to 2.03)	0.21	1.14 (0.73 to 1.77)	0.56
Diabetes mellitus	1.37 (1.21 to 1.54)	<0.001	1.17 (1.03 to 1.32)	0.02
Hypertension	1.24 (1.07 to 1.42)	0.003	1.09 (0.94 to 1.26)	0.27
Ischemic heart disease	1.43 (1.27 to 1.59)	<0.001	1.09 (0.96 to 1.24)	0.20
Myocardial infarction	1.64 (1.34 to 2.01)	<0.001	1.20 (0.96 to 1.49)	0.10
Peripheral vascular disease	1.25 (1.09 to 1.44)	0.002	1.02 (0.88 to 1.18)	0.79
Renal disease	1.91 (1.57 to 2.32)	<0.001	1.44 (1.18 to 1.77)	<0.001
Rheumatoid arthritis	1.23 (0.99 to 1.53)	0.06	1.16 (0.94 to 1.45)	0.17
Duration of stay	1.07 (1.06 to 1.08)	<0.001	1.06 (1.06 to 1.07)	<0.001
State Medicaid buy-in	1.49 (1.26 to 1.77)	<0.001	1.34 (1.10 to 1.62)	0.003
Rural residence	0.91 (0.80 to 1.03)	0.15	0.96 (0.82 to 1.12)	0.61
U.S. geographic region				
Midwest	0.95 (0.83 to 1.09)	0.48	1.01 (0.87 to 1.16)	0.91
Northeast	1.04 (0.88 to 1.24)	0.63	1.04 (0.86 to 1.25)	0.69
South	1.00 [Reference]		1.00 [Reference]	
West	1.04 (0.88 to 1.23)	0.65	1.06 (0.89 to 1.25)	0.51
Year of surgery				
2000	1.00 [Reference]		1.00 [Reference]	
2001	1.02 (0.77 to 1.33)	0.91	1.02 (0.78 to 1.34)	0.88
2002	1.06 (0.81 to 1.38)	0.67	1.03 (0.79 to 1.34)	0.83
2003	0.91 (0.70 to 1.18)	0.48	0.93 (0.71 to 1.21)	0.59
2004	1.01 (0.78 to 1.30)	0.96	1.00 (0.77 to 1.29)	0.98
2005	0.98 (0.76 to 1.27)	0.87	0.97 (0.75 to 1.26)	0.84
2006	1.00 (0.77 to 1.29)	>0.99	1.01 (0.78 to 1.30)	0.97
2007	0.91 (0.70 to 1.19)	0.50	0.91 (0.70 to 1.19)	0.48
2008	1.09 (0.85 to 1.40)	0.50	1.10 (0.85 to 1.42)	0.47
2009	1.06 (0.80 to 1.41)	0.67	1.06 (0.80 to 1.42)	0.68
Physician characteristics				
Orthopaedic surgery specialty	0.75 (0.57 to 0.99)	0.04	0.75 (0.57 to 0.99)	0.04
Years since graduation	1.02 (0.98 to 1.06)	0.27	1.02 (0.99 to 1.06)	0.21



**TABLE E-5 (continued)**

Variable	Unadjusted HR (95% CI)†	P Value	Adjusted HR (95% CI)†	P Value
Hospital characteristics				
COTH member‡	1.05 (0.89 to 1.24)	0.53	0.98 (0.80 to 1.20)	0.86
No. of beds, per 100	1.01 (0.99 to 1.04)	0.24	1.01 (0.98 to 1.04)	0.58
Rural hospital location	0.89 (0.76 to 1.04)	0.13	0.92 (0.75 to 1.12)	0.38
*There were 66,079 patients in the analysis after 2524 patients were excluded because they had missing American Hospital Association or American Medical Association data. †HR = hazard ratio, and CI = confidence interval. ‡COTH = Council of Teaching Hospitals.				

**TABLE E-6 Univariate and Multivariable-Adjusted Predictors of Five-Year Revision Among Patients Managed with Unilateral Knee Arthroplasty, 2000 to 2009\***

Variable	Unadjusted HR (95% CI)†	P Value	Adjusted HR (95% CI)†	P Value
Type of unilateral knee arthroplasty				
Partial	2.30 (1.96 to 2.70)	<0.001	2.40 (2.03 to 2.83)	<0.001
Total	1.00 [Reference]		1.00 [Reference]	
Age, per 5 years	0.79 (0.76 to 0.83)	<0.001	0.78 (0.75 to 0.82)	<0.001
Male	1.24 (1.13 to 1.37)	<0.001	1.18 (1.07 to 1.30)	<0.001
Race				
Black	1.17 (0.96 to 1.42)	0.12	1.10 (0.90 to 1.34)	0.37
White	1.00 [Reference]		1.00 [Reference]	
Other/unknown	0.94 (0.69 to 1.28)	0.70	0.86 (0.62 to 1.17)	0.33
Medical history				
Cancer	0.97 (0.85 to 1.11)	0.68	0.96 (0.84 to 1.10)	0.57
Cerebrovascular disease	1.04 (0.91 to 1.20)	0.57	0.99 (0.86 to 1.14)	0.89
Chronic obstructive pulmonary disease	1.27 (1.15 to 1.41)	<0.001	1.22 (1.09 to 1.35)	<0.001
Congestive heart failure	1.28 (1.13 to 1.46)	<0.001	1.18 (1.03 to 1.36)	0.02
Dementia	1.05 (0.70 to 1.59)	0.80	1.17 (0.77 to 1.76)	0.46
Diabetes mellitus	1.22 (1.10 to 1.35)	<0.001	1.11 (1.00 to 1.24)	0.06
Hypertension	1.13 (1.01 to 1.27)	0.03	1.11 (0.99 to 1.25)	0.08
Ischemic heart disease	1.16 (1.06 to 1.28)	0.002	1.06 (0.95 to 1.18)	0.29
Myocardial infarction	1.24 (1.02 to 1.50)	0.03	1.07 (0.87 to 1.32)	0.50
Peripheral vascular disease	1.10 (0.97 to 1.23)	0.13	1.07 (0.95 to 1.22)	0.26
Renal disease	1.36 (1.10 to 1.67)	0.004	1.22 (0.98 to 1.52)	0.07
Rheumatoid arthritis	1.14 (0.95 to 1.36)	0.18	1.12 (0.93 to 1.34)	0.23
Duration of stay	1.02 (1.00 to 1.05)	0.04	1.03 (1.02 to 1.05)	<0.001
State Medicaid buy-in	1.07 (0.90 to 1.27)	0.48	0.97 (0.81 to 1.17)	0.78
Rural residence	0.94 (0.85 to 1.05)	0.27	0.92 (0.81 to 1.06)	0.26
U.S. geographic region				
Midwest	0.89 (0.79 to 1.00)	0.06	0.94 (0.83 to 1.05)	0.27
Northeast	0.92 (0.79 to 1.07)	0.26	0.93 (0.80 to 1.09)	0.38
South	1.00 [Reference]		1.00 [Reference]	
West	1.06 (0.92 to 1.22)	0.44	1.09 (0.94 to 1.27)	0.24
Year of surgery				
2000	1.00 [Reference]		1.00 [Reference]	
2001	0.94 (0.77 to 1.15)	0.56	0.92 (0.75 to 1.13)	0.43
2002	1.06 (0.86 to 1.29)	0.60	1.00 (0.82 to 1.22)	0.99
2003	0.97 (0.79 to 1.18)	0.76	0.92 (0.75 to 1.12)	0.41
2004	1.03 (0.85 to 1.25)	0.79	0.96 (0.79 to 1.17)	0.70
2005	0.88 (0.72 to 1.07)	0.21	0.82 (0.67 to 1.00)	0.05
2006	1.08 (0.88 to 1.31)	0.47	1.00 (0.82 to 1.22)	>0.99
2007	0.92 (0.73 to 1.14)	0.44	0.82 (0.66 to 1.03)	0.09
2008	1.08 (0.86 to 1.36)	0.51	0.98 (0.77 to 1.23)	0.84
2009	1.02 (0.73 to 1.42)	0.92	0.91 (0.65 to 1.28)	0.60
Physician characteristics				
Orthopaedic surgery specialty	0.99 (0.78 to 1.26)	0.94	0.96 (0.75 to 1.23)	0.76
Years since graduation	1.03 (1.00 to 1.06)	0.03	1.03 (1.01 to 1.06)	0.02

**TABLE E-6 (continued)**

Variable	Unadjusted HR (95% CI)†	P Value	Adjusted HR (95% CI)†	P Value
Hospital characteristics				
COTH member‡	0.94 (0.81 to 1.08)	0.37	0.96 (0.82 to 1.14)	0.66
No. of beds, per 100	0.99 (0.98 to 1.01)	0.54	0.99 (0.97 to 1.02)	0.59
Rural hospital location	0.96 (0.85 to 1.09)	0.55	1.02 (0.87 to 1.21)	0.79
*There were 66,079 patients in the analysis after 2524 patients were excluded because they had missing American Hospital Association or American Medical Association data. †HR = hazard ratio, and CI = confidence interval. ‡COTH = Council of Teaching Hospitals.				

**TABLE E-7 Univariate and Multivariable-Adjusted Predictors of Five-Year Removal Among Patients Undergoing Unilateral Knee Arthroplasty, 2000 to 2009\***

Variable	Unadjusted HR (95% CI)†	P Value	Adjusted HR (95% CI)†	P Value
Type of unilateral knee arthroplasty				
Partial	1.01 (0.65 to 1.56)	0.98	1.08 (0.70 to 1.69)	0.72
Total	1.00 [Reference]		1.00 [Reference]	
Age, per 5 years	0.85 (0.78 to 0.92)	<0.001	0.84 (0.77 to 0.91)	<0.001
Male	1.59 (1.32 to 1.90)	<0.001	1.61 (1.33 to 1.94)	<0.001
Race				
Black	1.37 (0.96 to 1.96)	0.08	1.16 (0.79 to 1.69)	0.45
White	1.00 [Reference]		1.00 [Reference]	
Other/unknown	1.03 (0.58 to 1.84)	0.92	0.75 (0.42 to 1.34)	0.33
Medical history				
Cancer	1.05 (0.80 to 1.37)	0.72	1.00 (0.76 to 1.32)	>0.99
Cerebrovascular disease	1.10 (0.85 to 1.43)	0.47	0.93 (0.72 to 1.22)	0.62
Chronic obstructive pulmonary disease	1.56 (1.29 to 1.89)	<0.001	1.35 (1.11 to 1.64)	0.003
Congestive heart failure	1.99 (1.59 to 2.49)	<0.001	1.60 (1.25 to 2.05)	<0.001
Dementia	0.87 (0.36 to 2.09)	0.75	0.83 (0.34 to 2.02)	0.67
Diabetes mellitus	1.47 (1.22 to 1.78)	<0.001	1.24 (1.01 to 1.51)	0.04
Hypertension	1.32 (1.04 to 1.67)	0.02	1.22 (0.95 to 1.57)	0.12
Ischemic heart disease	1.27 (1.06 to 1.52)	0.01	0.93 (0.76 to 1.14)	0.48
Myocardial infarction	1.62 (1.16 to 2.26)	0.004	1.23 (0.86 to 1.75)	0.26
Peripheral vascular disease	1.36 (1.09 to 1.71)	0.008	1.20 (0.94 to 1.53)	0.15
Renal disease	1.89 (1.34 to 2.68)	<0.001	1.42 (0.98 to 2.06)	0.07
Rheumatoid arthritis	1.56 (1.14 to 2.12)	0.005	1.51 (1.11 to 2.07)	0.009
Duration of stay	1.05 (1.03 to 1.07)	<0.001	1.04 (1.02 to 1.07)	<0.001
State Medicaid buy-in	1.63 (1.25 to 2.14)	<0.001	1.41 (1.05 to 1.88)	0.02
Rural residence	1.09 (0.90 to 1.32)	0.39	0.94 (0.72 to 1.22)	0.64
U.S. geographic region				
Midwest	0.81 (0.65 to 1.00)	0.06	0.86 (0.68 to 1.07)	0.18
Northeast	0.81 (0.61 to 1.07)	0.14	0.87 (0.65 to 1.17)	0.36
South	1.00 [Reference]		1.00 [Reference]	
West	1.03 (0.79 to 1.34)	0.83	1.03 (0.78 to 1.35)	0.84
Year of surgery				
2000	1.00 [Reference]		1.00 [Reference]	
2001	1.10 (0.75 to 1.61)	0.63	1.08 (0.73 to 1.58)	0.70
2002	1.07 (0.72 to 1.57)	0.75	1.03 (0.70 to 1.52)	0.87
2003	1.05 (0.72 to 1.53)	0.81	1.03 (0.71 to 1.51)	0.87
2004	1.10 (0.76 to 1.61)	0.61	1.07 (0.73 to 1.56)	0.73
2005	0.75 (0.50 to 1.12)	0.15	0.72 (0.48 to 1.07)	0.11
2006	1.29 (0.88 to 1.88)	0.19	1.24 (0.85 to 1.81)	0.27
2007	0.90 (0.59 to 1.37)	0.62	0.84 (0.55 to 1.29)	0.43
2008	0.99 (0.63 to 1.56)	0.97	0.94 (0.60 to 1.49)	0.80
2009	0.55 (0.26 to 1.17)	0.12	0.52 (0.24 to 1.10)	0.09
Physician characteristics				
Orthopaedic surgery specialty	0.81 (0.53 to 1.23)	0.32	0.86 (0.56 to 1.32)	0.48
Years since graduation	0.99 (0.93 to 1.04)	0.63	1.00 (0.95 to 1.05)	0.97

**TABLE E-7 (continued)**

Variable	Unadjusted HR (95% CI)†	P Value	Adjusted HR (95% CI)†	P Value
Hospital characteristics				
COTH member‡	0.59 (0.43 to 0.82)	0.001	0.69 (0.47 to 1.00)	0.05
No. of beds, per 100	0.94 (0.90 to 0.98)	0.002	0.96 (0.92 to 1.01)	0.09
Rural hospital location	1.20 (0.96 to 1.50)	0.11	1.09 (0.80 to 1.49)	0.58
*There were 66,079 patients in the analysis after 2524 patients were excluded because they had missing American Hospital Association or American Medical Association data. †HR = hazard ratio, and CI = confidence interval. ‡COTH = Council of Teaching Hospitals.				