Hip Fracture and the Weekend Effect: Does Weekend Admission Affect Patient Outcomes?

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Abstract

Reduced hospital staffing on weekends is a hypothesized risk factor for adverse health outcomes—commonly referred to as the *weekend effect*.

We conducted a study on the effect of weekend admission on short-term outcomes among US hip fracture patients. We selected Nationwide Inpatient Sample (1998–2010) patients with a principal diagnosis of femoral neck fracture and grouped them by day of admission (weekend or weekday). We used multivariate logistic and linear regression analyses, controlling for age, race, sex, number of comorbidities, and other risk factors, to calculate odds ratios (ORs) of mortality and perioperative complications as well as mean difference in length of hospital stay.

Our study population included 96,892 weekend and 248,097 weekday admissions. Compared with patients admitted on weekdays, patients admitted on weekends had lower mortality (OR, 0.94; 95% confidence interval [CI], 0.89-0.99) and shorter mean hospital stay (estimate, 3.74%; 95% CI, 3.40-4.08) but did not differ in risk of perioperative complications (OR, 1.00; 95% CI, 0.98-1.02).

Weekend admission did not predict death, perioperative complications, longer hospital stay, or other adverse short-term outcomes. Our study data do not support a weekend effect among hip fracture admissions in the United States.

Weekend admission has been hypothesized to be a risk factor for increased patient mortality and complications during hospital stays—commonly referred to as the *weekend effect*.[1] Reduced hospital staffing on weekends, particularly of senior-level physicians and ancillary nursing services, may affect the quality of diagnosis and management for patients admitted for traumatic and emergent conditions. Investigators have found increased mortality in weekend admissions for stroke,[2] subdural hematoma,[3] gastrointestinal bleeding,[4,5] atrial fibrillation,[6] and pulmonary embolism.[7] Investigators have not found increased mortality in weekend admissions for hip fracture, though the majority of the data was derived from European patient populations, which may be subject to management and staffing strategies different from those for US patients.[8-10] Furthermore, data on this topic in US patients are limited to a multispecialty study of 50 different admission diagnoses, which used 1 year of data from a single US state.[1]

We conducted a study to comprehensively assess the effect of weekend admission on adverse outcomes during hospital stays. The literature suggests that surgery for hip fracture can be delayed up to 48 hours without significant additional risk of death,[11-13] allowing orthopedic departments to stabilize routine hip fracture admissions on weekends and operate whenever limited surgical teams become available. Surgical delay has not been thoroughly analyzed by day of admission among US patients,[14] but the combined potential of more conservative preoperative management and the availability of fewer senior physicians and ancillary providers may result in worse outcomes for weekend versus weekday admissions.

Materials and Methods

Study Population

Part of the Healthcare Cost and Utilization Project, the Nationwide Inpatient Sample (NIS) provides a 20% representative sample of annual US hospital admissions.[15] For these admissions, the NIS includes data related to demographic and clinical variables, such as *International Classification of Diseases, Ninth Revision, Clinical Modification* (*ICD-9-CM*) diagnosis and procedure codes, as well as descriptive variables for the hospitals where the patients were admitted. The NIS is publicly available to researchers. As its health information is deidentified, we did not have to obtain institutional review board approval for this study.

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Ascertainment of Cases

Our initial study population, drawn from the period 1998–2010, consisted of 821,531 patients with a principal *ICD-9-CM* diagnosis of femoral neck fracture (820.0-820.9). To best capture the typical presentation of hip fracture, we excluded:

- Patients with open femoral neck fractures (820.1, 820.3, 820.9).
- Patients who did not have open reduction and internal fixation (ORIF) (79.35), hemiarthroplasty (81.52), closed reduction and internal fixation (CRIF) (79.15), internal fixation (78.55), or total hip arthroplasty (THA) (81.51) as their primary surgical procedure.
- Patients admitted from sources other than the emergency department.
- Patients who underwent surgery before admission.
- Patients whose admission type was not classified as emergency or urgent.

Ascertainment of Covariates

For all patients, we extracted data on exposure of interest, day of admission (weekend or weekday), and demographic variables including age, sex, race (white, black, Hispanic, other, missing), and insurance (Medicare, Medicaid, private, other). We used the Elixhauser method to determine 30 different comorbidities from *ICD-9-CM* diagnosis coding[16] and sorted patients by total number of comorbidities (0, 1, 2, 3 or 4, ≥5). As has been done before,[17] we excluded blood loss anemia, coagulopathy, and fluid and electrolyte disorders from this comorbidity calculation, as these conditions can be secondary to trauma. We also extracted data on the admission itself, including hospital region (Northeast, Midwest, South, West), hospital bed size (small, medium, large), hospital teaching status (nonteaching, teaching), and hospital location (rural, urban). We used diagnosis codes to categorize fracture location as "not otherwise specified" (820.8), intracapsular (820.0), or extracapsular (820.2).

Because of low frequencies, we collapsed 2 race designations (Native American, Asian or Pacific Islander) into the "other race" category and 2 insurance designations (self-pay, no charge) into the "other insurance" category. For a substantial number of patients, race information was missing, so we included "missing" as its own category in analyses. Patients who were missing data on day of admission, age, sex, insurance, or hospital characteristics were excluded from our final cohort, as missing frequencies for each variable were small.

Ascertainment of Outcomes

For all patients, we extracted data on death status at discharge and length of hospital stay. We log-transformed length of stay because of its right skew, assigning the value of 12 hours to patients admitted and discharged the same day. Perioperative complications were calculated using *ICD-9-CM* codes as defined by a recent study of orthopedics-related complications by Lin and colleagues.[18] There were 14 possible complications, including acute renal failure (584.5-9), tachycardia (427), wound hemorrhage (719.15, 998.31-2), wound disruption (998.3, 998.31-2), wound infection (682.6, 686.9, 891, 891.1-2, 894, 894.1-2, 998.5, 998.51, 998.6, 998.83, 998.59), deep vein thrombosis (453.4, 453.41-2, 453.9), acute myocardial infarction (410, 410.01, 410.11, 410.2, 410.21, 410.3, 410.31, 410.4, 410.41, 410.5, 410.51, 410.6, 410.9, 410.91, 997.1), pneumonia (480-480.9, 481, 482-482.9, 483, 483.1, 483.8, 484, 484.1, 484.3, 484.5-8, 485, 486, 487, 507), pulmonary embolism (415.11, 415.19), sepsis (995.91-2), stroke (997.02), urinary tract infection (599, 997.5), implant infection (996.66-7, 996.69), and incision and débridement (86.04, 86.09, 86.22, 86.28,

Table 1. Patient Characteristics, by Day of Admission[a]

Characteristic	Weekday	Weekend	*P*
Admissions, N	248,097	96,892	
Mean age, y	79.5	78.9	<.0001
Sex, %			.8801
Male	27.0	26.9	
Female	73.0	73.1	
Race, %			.0723
White	75.8	75.5	
Black	3.4	3.4	
Hispanic	3.1	3.0	
Other	2.2	2.1	
Missing	15.6	16.0	
Insurance, %			<.0001
Medicare	84.7	83.5	
Medicaid	2.1	2.1	
Private	9.9	11.4	
Other	3.4	3.0	
Comorbidities, %			<.0001
0	12.0	13.1	
1	25.9	25.8	
2	28.7	28.5	
3 or 4	29.0	28.4	
≥5	4.4	4.1	
Fracture location, %			<.0001
Not otherwise specified	18.7	18.6	
Intracapsular	30.5	29.4	
Extracapsular	50.8	52.0	
Hospital region, %			.0202
Northeast	26.3	25.9	
Midwest	16.5	16.4	
South	49.8	50.1	
West	7.5	7.6	
Bed size, %			.0039
Small	12.2	11.9	
Medium	27.6	27.3	
Large	60.2	60.8	
Teaching status, %			.7330
Nonteaching	64.8	64.8	
Teaching	35.2	35.2	
Location, %			.4970
Rural	16.6	16.5	
Urban	83.4	83.5	

[a]Percentages may not add exactly to 100 because of rounding.

86.3). In our statistical analyses, we examined both the risk of having a complicated admission (≥1 perioperative complication) and the risk of having each specific complication.

Statistical Analysis

To assess similarity between weekend and weekday admissions, we used the Fisher exact test and χ^2 *P* values. Logistic regression was used to calculate the odds ratios (ORs) of mortality and perioperative complications for weekend versus weekday admissions. Linear regression was used to calculate parameter estimates for length of hospital stay for weekend versus weekday admissions. We interpreted parameter estimates as percentage differences using the formula $100(e^b-1)$, where b is the estimated standardized regression coefficient of a log-transformed outcome variable.[19] All regression models were controlled for age, sex, race, insurance, number of comorbidities, fracture location, hospital region, hospital bed size, hospital teaching status, and hospital location. We also stratified our study population by surgical delay in hours (<24, 24-48, 49-72, 73-120, ≥121) and by surgery performed (ORIF, hemiarthroplasty, CRIF, internal fixation only, THA, multiple procedures) to examine the effect of weekend admission on mortality, perioperative complications, and length of stay within each stratum. We did not control for these variables in our regression models because they were potential mediators of mortality, complications, and length of stay. All statistical analyses in this study were performed using SAS Version 9.1 (SAS Institute), and $P < .05$ was interpreted as statistically significant.

Table 2. **Surgical Delay and Surgery Performed, by Day of Admission**[a]

	Weekday	Weekend
Mean (SD) surgical delay, d	1.26 (1.52)	1.29 (1.46)
Surgical delay, %		
<24 h	25.9	25.7
24-48 h	48.1	45.7
49-72 h	15.3	16.8
73-120 h	7.4	9.0
≥121 h	3.2	2.8
Surgery performed, %		
ORIF	44.7	45.7
Hemiarthroplasty	32.9	31.8
CRIF	13.5	13.8
Internal fixation only	5.5	5.5
Total hip arthroplasty	2.9	2.7
Multiple	0.6	0.6

Abbreviations: CRIF, closed reduction and internal fixation; ORIF, open reduction and internal fixation.
[a]Percentages may not add exactly to 100 because of rounding. All *P*s < .0001.

Results

After exclusions, our study population consisted of 96,892 weekend admissions and 248,097 weekday admissions. Among all admissions, mean age was 79.3 years (range, 0-113 years), with patients primarily being female and white, paying with Medicare, and having 1 to 4 comorbidities. Admissions were primarily for extracapsular femoral neck fractures and occurred most often in the South region, in hospitals with large beds, in nonteaching hospitals, and in urban locations. **Table 1** lists details of baseline characteristics for weekend and weekday admissions.

Hospital stay details, including surgical delay and procedure performed, were examined for weekend and weekday admissions. Mean delay to surgery was 31.0 hours for weekend admissions and 30.2 hours for weekday admissions ($P < .0001$). The difference was driven by a higher proportion of weekend admissions in which surgery was performed 24 to 120 hours after admission. Patients admitted on the weekend also underwent more ORIF procedures and fewer hemiarthroplasties. **Table 2** is a full list of hospital stay characteristics.

In regression analyses, weekend OR of mortality was 0.94 (95% CI, 0.89-0.99), weekend OR of having at least 1 complication was 1.00 (95% CI, 0.98-1.02), and weekend mean hospital stay was 3.74% shorter (95% CI, 3.40-4.08) in comparison with

Table 3. **Mortality, Perioperative Complications, and Length of Stay, With Selected Covariates**[a]

	Mortality		Complication		Length of Stay	
Covariate	**OR (95% CI)**	***P***	**OR (95% CI)**	***P***	**Estimate[b] (95% CI)**	***P***
Weekend admission	0.94 (0.89, 0.99)	.0113	1.00 (0.98, 1.02)	.8342	–3.74 (–4.08, –3.40)	<.0001
Comorbidities, n						
0	Referent	—	Referent	—	Referent	—
1	1.19 (1.08, 1.31)	<.0001	1.19 (1.08, 1.31)	.0003	7.76 (7.16, 8.37)	<.0001
2	1.51 (1.38, 1.66)	<.0001	1.51 (1.38, 1.66)	<.0001	13.76 (13.13, 14.39)	<.0001
3 or 4	1.95 (1.78, 2.13)	<.0001	1.95 (1.78, 2.13)	<.0001	21.14 (20.47, 21.81)	<.0001
≥5	2.78 (2.48, 3.12)	<.0001	2.78 (2.48, 3.12)	<.0001	31.94 (30.76, 33.13)	<.0001
Fracture location						
Not otherwise specified	Referent	—	Referent	—	Referent	—
Intracapsular	0.91 (0.85, 0.97)	.0058	1.00 (0.97, 1.02)	.7181	–0.41 (–0.87, 0.06)	.0896
Extracapsular	1.00 (0.94, 1.06)	.9569	1.02 (1.00, 1.04)	.0444	1.93 (1.49, 2.37)	<.0001

Abbreviations: CI, confidence interval; OR, odds ratio.
[a]Models adjusted for age, sex, race, insurance, number of comorbidities, fracture location, hospital region, hospital bed size, hospital teaching status, and hospital location.
[b]Interpret as percentage difference under formula $100(e^b-1)$, where b is estimated standardized regression coefficient of log-transformed outcome variable.

weekday figures. Within our models, risk of mortality and complications and mean length of stay increased as the number of patient comorbidities increased. **Table 3** lists selected results from our regression models. Comprehensive tables for each outcome's model are presented in **Appendices 1 to 3**.

In our analyses of specific complications, there were no significant associations between weekend admissions and risk of acute renal failure, wound hemorrhage, wound disruption, wound infection, deep vein thrombosis, myocardial infarction, pneumonia, pulmonary embolism, sepsis, urinary tract infection, implant infection, or incision and débridement. In addition, we found a lower risk of tachycardia (OR, 0.90; 95% CI, 0.82-1.00) and a higher risk ($P < .10$) of stroke (OR, 1.16; 95% CI, 0.99-1.35). **Table 4** is a full list of the specific complications and their risks for weekend versus weekday admissions.

According to stratified analyses involving surgical delay, weekend admissions in which patients had surgery the same day as admission had decreased risk of mortality (OR, 0.81; 95% CI, 0.72-0.91) and perioperative complications (OR, 0.96; 95% CI, 0.92-0.99). In addition, hospital stay was shorter for weekend admissions with surgical delay of less than 24 hours (4.89% shorter; 95% CI, 4.22-5.55), 24 to 48 hours (5.93% shorter; 95% CI, 5.51-6.35), and 49 to 72 hours (3.50% shorter; 95% CI, 2.80-4.20). When admissions were stratified by procedure performed, patients who were admitted on the weekend and underwent ORIF, hemiarthroplasty, CRIF, internal fixation only, and THA had shorter stays than patients admitted on weekdays. For all surgeries performed, the risk of both mortality and complications did not significantly differ by day of admission. **Table 5** lists the comprehensive results of all our stratified analyses.

Table 4. Risk of Specific Perioperative Complications, for Weekend Versus Weekday Admission[a]

Complication	OR[b] (95% CI)	*P*
Acute renal failure	1.00 (0.95, 1.05)	.9773
Tachycardia	0.90 (0.82, 1.00)	.0480
Wound hemorrhage	1.01 (0.95, 1.07)	.7782
Wound disruption	0.90 (0.58, 1.39)	.6299
Wound infection	0.90 (0.78, 1.04)	.4063
Deep vein thrombosis	0.96 (0.88, 1.05)	.1677
Myocardial infarction	1.02 (0.97, 1.08)	.4448
Pneumonia	0.99 (0.96, 1.02)	.5477
Pulmonary embolism	0.97 (0.87, 1.08)	.5407
Sepsis	0.94 (0.82, 1.08)	.3648
Stroke	1.16 (0.99, 1.35)	.0638
Urinary tract infection	1.01 (0.99, 1.03)	.5413
Implant infection	0.95 (0.67, 1.36)	.7958
Incision and débridement	1.01 (0.89, 1.14)	.9050

Abbreviations: CI, confidence interval; OR, odds ratio.
[a]Model adjusted for age, sex, race, insurance, number of comorbidities, fracture location, hospital region, hospital bed size, hospital teaching status, and hospital location.
[b]For weekend versus weekday admission.

Discussion

In this large, multiyear analysis of patients admitted for hip fracture in the United States, risk of mortality was slightly lower for weekend versus weekday admissions, hospital stay was significantly shorter, and risk of perioperative complications was not significantly different between admission types. In secondary analyses, shorter hospital stay was limited to patients who were admitted on weekends and underwent surgery within 48 hours. Our results therefore suggest that the weekend effect does not apply to hip fracture patients in the United States.

Table 5. Mortality, Perioperative Complications, and Length of Stay, by Surgical Delay and Surgery Performed, for Weekend Versus Weekday Admission[a]

	Mortality		Complication		Length of Stay	
	OR[b] (95% CI)	*P*	OR[b] (95% CI)	*P*	Estimate[b] (95% CI)	*P*
Surgical delay, h						
<24	0.81 (0.72, 0.91)	.0005	0.96 (0.92, 0.99)	.0248	−4.89 (−5.55, −4.22)	<.0001
24-48	0.97 (0.90, 1.05)	.4481	0.98 (0.96, 1.01)	.1678	−5.93 (−6.35, −5.51)	<.0001
49-72	0.90 (0.80, 1.01)	.0776	1.01 (0.97, 1.05)	.7964	−3.50 (−4.20, −2.80)	<.0001
73-120	0.94 (0.82, 1.07)	.3500	1.01 (0.95, 1.06)	.8472	0.77 (−0.24, 1.79)	.1349
≥121	1.11 (0.92, 1.34)	.2911	1.02 (0.94, 1.12)	.6239	1.81 (−0.10, 3.76)	.0634
Surgery performed						
ORIF	0.94 (0.87, 1.01)	.0979	1.01 (0.98, 1.04)	.4578	−3.88 (−4.38, −3.38)	<.0001
Hemiarthroplasty	0.93 (0.86, 1.01)	.0902	1.00 (0.97, 1.03)	.8526	−3.39 (−3.97, −2.80)	<.0001
CRIF	0.98 (0.84, 1.13)	.7353	0.97 (0.93, 1.02)	.2420	−4.27 (−5.17, −3.36)	<.0001
Internal fixation only	1.03 (0.80, 1.34)	.8153	0.99 (0.92, 1.07)	.8599	−2.98 (−4.45, −1.49)	.0001
Total hip arthroplasty	0.76 (0.57, 1.02)	.0722	0.93 (0.84, 1.03)	.1562	−2.84 (−4.87, −0.76)	.0075
Multiple	1.12 (0.65, 1.93)	.6763	0.94 (0.76, 1.17)	.5768	−0.48 (−5.99, 5.34)	.8676

Abbreviations: CI, confidence interval; CRIF, closed reduction and internal fixation; OR, odds ratio; ORIF, open reduction and internal fixation.
[a]Models adjusted for age, sex, race, insurance, number of comorbidities, fracture location, hospital region, hospital bed size, hospital teaching status, and hospital location.
[b]For weekend versus weekday admission. Interpret as percentage difference under formula $100(e^b-1)$, where b is estimated standardized regression coefficient of log-transformed outcome variable.

Our results are largely consistent with the literature on the topic.[11-14] An Australian study of 4183 patients with acute hip fracture found no significant difference in 2- or 30-day mortality among weekend and weekday admissions.[11] Similarly, 2 Danish studies did not find a difference in hospital-stay or 30-day mortality between weekend and weekday admissions among samples of 600 and 38,020 patients with hip fracture, respectively.[12,13] In US patients, a cross-specialty study that included hip fractures did not find a difference in hospital-stay mortality among 22,001 admissions in the state of California in 1998.[14] Our analysis significantly extended the findings of these studies by using comprehensive admission data from 46 US states over a 13-year period (1998–2010) and by examining outcomes other than mortality, including perioperative complications and length of hospital stay.

Our study had several limitations. First, the clinical data on fracture diagnoses and surgical procedures were based on *ICD-9-CM* codes, limiting our ability to account for the full details of fracture severity and subsequent management. Second, our analyses were limited to outcomes during the hospital stay, and we could not examine the effect of weekend admission on readmission and long-term mortality. Third, because of the dichotomization of admission day in the NIS database, we could not selectively examine the effect of Friday, Saturday, or Sunday admission on our outcomes. Fourth, we excluded admissions that were missing demographic and clinical data, potentially creating a complete-case bias. However, these exclusions were needed to accurately capture the common presentation of acute hip fracture, and there is no reason to believe that differences in record coding were nonrandom. Last, our study was observational, and we cannot rule out the effect of residual confounding on our results.

Our results failed to show a weekend effect on mortality, perioperative complications, or length of hospital stay in US patients with hip fracture. The reason for this, as suggested before,[12] may be that hip fractures are becoming easier to diagnose. Furthermore, the observation that hospital stay was shorter for weekend admissions suggests that, despite decreased staffing of nursing and rehabilitation services, the lower volume of elective surgeries on weekends may actually increase staff availability to hip fracture patients.

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Appendix 1. Risk of Mortality, Full Model[a]

Characteristic	OR (95% CI)	*P*
Weekend admission	0.94 (0.89, 0.99)	.0113
Age, 1-y increase	1.05 (1.05, 1.05)	<.0001
Sex		
Male	Referent	—
Female	0.46 (0.44, 0.48)	<.0001
Race		
White	Referent	—
Black	0.96 (0.85, 1.10)	.5757
Hispanic	0.82 (0.71, 0.95)	.0096
Other	0.95 (0.81, 1.11)	.5253
Missing	1.10 (1.03, 1.17)	.0036
Insurance		
Medicare	Referent	—
Medicaid	1.10 (0.89, 1.36)	.3805
Private	0.90 (0.82, 0.99)	.0354
Other	0.81 (0.67, 0.98)	.0328
Comorbidities, n		
0	Referent	—
1	1.19 (1.08, 1.31)	.0003
2	1.51 (1.38, 1.66)	<.0001
3 or 4	1.95 (1.78, 2.13)	<.0001
≥5	2.78 (2.48, 3.12)	<.0001
Fracture location		
Not otherwise specified	Referent	—
Intracapsular	0.91 (0.85, 0.97)	.0058
Extracapsular	1.00 (0.94, 1.06)	.9569
Hospital region		
Northeast	Referent	—
Midwest	0.91 (0.85, 0.98)	.0082
South	0.93 (0.88, 0.98)	.0056
West	0.74 (0.67, 0.82)	<.0001
Bed size		
Small	Referent	—
Medium	1.11 (1.02, 1.19)	.0109
Large	1.05 (0.98, 1.13)	.1610
Teaching status		
Nonteaching	Referent	—
Teaching	1.03 (0.98, 1.08)	.1994
Location		
Rural	Referent	—
Urban	0.90 (0.84, 0.95)	.0004

Abbreviations: CI, confidence interval; OR, odds ratio.
[a]Models adjusted for age, sex, race, insurance, number of comorbidities, fracture location, hospital region, hospital bed size, hospital teaching status, and hospital location.

Appendix 2. Risk of Perioperative Complications, Full Model[a]

Characteristic	OR (95% CI)	*P*
Weekend admission	1.00 (0.98, 1.02)	.8342
Age, 1-y increase	1.02 (1.02, 1.02)	<.0001
Sex		
Male	Referent	—
Female	0.99 (0.97, 1.01)	.3881
Race		
White	Referent	—
Black	1.08 (1.03, 1.13)	.0010
Hispanic	1.00 (0.96, 1.05)	.8420
Other	1.04 (0.99, 1.10)	.1404
Missing	1.02 (1.00, 1.05)	.0460
Insurance		
Medicare	Referent	—
Medicaid	1.13 (1.06, 1.20)	.0001
Private	0.90 (0.88, 0.93)	<.0001
Other	0.82 (0.77, 0.86)	<.0001
Comorbidities, n		
0	Referent	—
1	1.22 (1.18, 1.26)	<.0001
2	1.39 (1.35, 1.43)	<.0001
3 or 4	1.57 (1.52, 1.62)	<.0001
≥5	1.97 (1.89, 2.05)	<.0001
Fracture location		
Not otherwise specified	Referent	—
Intracapsular	1.00 (0.97, 1.02)	.7181
Extracapsular	1.02 (1.00, 1.04)	.0444
Hospital region		
Northeast	Referent	—
Midwest	0.97 (0.94, 0.99)	.0108
South	1.01 (0.99, 1.03)	.2846
West	1.04 (1.01, 1.08)	.0166
Bed size		
Small	Referent	—
Medium	1.02 (0.99, 1.05)	.1959
Large	1.02 (0.99, 1.04)	.1472
Teaching status		
Nonteaching	Referent	—
Teaching	1.05 (1.03, 1.07)	<.0001
Location		
Rural	Referent	—
Urban	1.05 (1.03, 1.08)	<.0001

Abbreviations: CI, confidence interval; OR, odds ratio.
[a]Models adjusted for age, sex, race, insurance, number of comorbidities, fracture location, hospital region, hospital bed size, hospital teaching status, and hospital location.

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Appendix 3. **Percentage Change in Length of Stay, Full Model**[a]

Characteristic	Estimate[b] (95% CI)	*P*
Weekend admission	–3.74 (–4.08, –3.40)	<.0001
Age, 1-y increase	0.32 (0.30, 0.33)	<.0001
Sex		
Male	Referent	—
Female	–7.03 (–7.37, –6.69)	<.0001
Race		
White	Referent	—
Black	9.60 (8.62, 10.58)	<.0001
Hispanic	10.19 (9.16, 11.23)	<.0001
Other	7.81 (6.63, 9.00)	<.0001
Missing	1.87 (1.41, 2.34)	<.0001
Insurance		
Medicare	Referent	—
Medicaid	13.11 (11.78, 14.44)	<.0001
Private	–1.21 (–1.78, –0.64)	<.0001
Other	0.63 (–0.33, 1.60)	.1964
Comorbidities, n		
0	Referent	—
1	7.76 (7.16, 8.37)	<.0001
2	13.76 (13.13, 14.39)	<.0001
3 or 4	21.14 (20.47, 21.81)	<.0001
≥5	31.94 (30.76, 33.13)	<.0001
Fracture location		
Not otherwise specified	Referent	—
Intracapsular	–0.41 (–0.87, 0.06)	.0896
Extracapsular	1.93 (1.49, 2.37)	<.0001
Hospital region		
Northeast	Referent	—
Midwest	–12.46 (–12.90, –12.01)	<.0001
South	–6.71 (–7.08, –6.34)	<.0001
West	–18.03 (–18.59, –17.46)	<.0001
Bed size		
Small	Referent	—
Medium	3.17 (2.60, 3.74)	<.0001
Large	5.02 (4.48, 5.55)	<.0001
Teaching status		
Nonteaching	Referent	—
Teaching	4.65 (4.28, 5.02)	<.0001
Location		
Rural	Referent	—
Urban	–1.56 (–2.01, –1.11)	<.0001

Abbreviation: CI, confidence interval.
[a]Models adjusted for age, sex, race, insurance, number of comorbidities, fracture location, hospital region, hospital bed size, hospital teaching status, and hospital location.
[b]Interpret as percentage difference under formula $100(e^{b}-1)$, where b is estimated standardized regression coefficient of log-transformed outcome variable.