Published in final edited form as:

J Am Geriatr Soc. 2016 August ; 64(8): 1651–1655. doi:10.1111/jgs.14246.

Is This Broken Bone Because of Abuse? Characteristics and Comorbid Diagnoses in Older Adults with Fractures

Melanie W. Gironde, PhD, MSW, Annie L. Nguyen, PhD, MPH, and Laura M. Mosqueda, MD
Department of Family Medicine, Keck School of Medicine, University of Southern California,
Alhambra, California

Abstract

OBJECTIVES—To examine the relationship between individual characteristics and potential correlates of elder abuse in older adults who present with fractures.

DESIGN—Cross-sectional analysis of deidentified data extracted from medical records.

SETTING—Academic medical center.

PARTICIPANTS—Individuals aged 65 and with a primary diagnosis of any fracture admitted to an outpatient department or emergency department (ED) in a single southern California medical center over a 36-month period (N = 652).

MEASUREMENTS—Participant characteristics included demographic characteristics, number of medical visits, and point of service. Corresponding *International Classification of Diseases, Ninth Revision* (ICD-9) codes, E-codes, and V-codes were extracted to identify cause, location, and type of fracture. The presence of 13 potential correlates of abuse as captured by ICD-9 codes were extracted and summed. Descriptive statistics and regression models were used for analyses.

RESULTS—Mean age of participants was 77.2, 58% were female (58%), 60% were white (60%), and 46% had one or more potential correlates of abuse. In bivariate analyses, older age (> 80), dementia, seeking care in the ED (vs inpatient or outpatient clinics), only one visit to a medical facility (vs multiple visits) in the 36-month study period, cause of fracture as something other than a fall, and fractures of the head or face were more likely to have at least one correlate of abuse. In logistic regression, dementia (B = 0.794, standard error (SE) = 0.280); seeking care in the ED (vs outpatient or outpatient clinics) (B = 1.86, SE = 0.302); at least two visits to a medical facility (vs multiple visits) (B = 0.585, SE = 0.343); and fracture of the back (B = 0.730, SE = 0.289), head (B = 1.22, SE = 0.333), and face (B = 1.28, SE = 0.474) were associated with the presence of at least one correlate of abuse.

CONCLUSION—Certain characteristics in older adults with fracture are associated with potential correlates of abuse. Medical practitioners should have a heightened awareness when these signs are present. *J Am Geriatr Soc* 64:1651–1655, 2016.

Address correspondence to Melanie W. Gironde, 1000 S. Fremont Avenue, Alhambra, CA 91803. mgironde@med.usc.edu.

Conflict of Interest: The editor in chief has reviewed the conflict of interest checklist provided by the authors and has determined that the authors have no financial or any other kind of personal conflicts with this paper.

Author Contributions: Gironde, Mosqueda: study concept and design. Nguyen, Gironde: data acquisition and analysis. All authors: data interpretation, preparation of manuscript.

Keywords

elder abuse; elder mistreatment; neglect; fractures

Elder abuse puts older adults at risk of life-threatening injuries. Victims of elder abuse are four times as likely to be admitted to a nursing home and three times as likely to be admitted to a hospital.^{1,2} Approximately one in 10 older adults in the United States has experienced some form of abuse,^{3,4} although prevalence estimates tend to be conservative because many cases of elder abuse go unreported.⁵ One reason for underreporting is that it is difficult to recognize and identify. In one study of older adults receiving in-home nursing visits, it took an average of 10.5 visits for a nurse to discern that abuse was occurring.⁶ Healthcare professionals are uniquely situated to detect clinical manifestations of abuse, but the diagnostic coding for possible elder abuse is rarely documented in medical records.^{7,8} Despite the seriousness of the problem, research on elder abuse lags behind that of child abuse and intimate partner violence, especially with regard to identifying specific injury patterns or forensic markers that raise suspicion of abuse.

Physical abuse and neglect may lead to injury patterns that differ from those related to accidents. A study on bruising patterns found that the location of bruises on the body in abused elderly adults were similar to those in situations of intimate partner violence.⁹ Fractures are considered to be a potential sign of interpersonal violence and child abuse,^{10–12} but there has been little research examining signs of elder abuse in individuals with fractures. A number of aging-related conditions such as osteoporosis and gait instability may predispose older adults to fractures. Fracture in older adults are not unusual, but their cause can be difficult to determine: “It is important to be aware that although accidents are a legitimate cause of injury for older adults with cognitive impairments, not all injuries are the result of accidents.”⁸ Thus, in older adults with fractures, there may be additional findings that should raise suspicion of abuse. If a fracture is present alongside other forensic markers that correlate with abuse, further investigation may be warranted. The goal of this study was to analyze medical records to describe the characteristics associated with potential correlates for abuse in older adults with fractures.

METHODS

Medical records were obtained for all adults aged 65 and older who sought treatment for any type of fracture as a primary diagnosis at a University of California at Irvine (UCI) medical center facility from January 1, 2010, to December 31, 2012. Six hundred fifty-two records were identified. The UCI Cohort Discovery Tool and Honest Broker Services, a data warehouse that is compliant with Health Insurance Portability and Accountability Act and human subjects protection regulations, were used to compile a dataset of deidentified medical records for analyses. Corresponding diagnoses, as captured using ICD-9 Clinical Modification (CM) codes, for all visits to a UCI medical center facility (outpatient, inpatient, emergency department (ED)) during the study period were extracted for data analyses, including codes for injury causes (E-codes) and factors influencing health status and contact

with health services (V-codes). Analyses were performed using statistical software SPSS version 21 (IBM Corp., Armonk, NY).

Descriptive statistics were calculated to illustrate demographic characteristics and frequencies. Bivariate analyses were performed to compare the characteristics of those with a fracture and at least one other correlate of abuse with the characteristics of those with a fracture and no other correlates. Multivariate analysis was performed using a logistic regression model in which the dependent variable was a dichotomous variable indicating whether an individual had at least one abuse correlate. Independent variables in the model included individual demographic characteristics, cause, location and type of fracture, point of service, and number of medical visits.

Dependent Variable

Medical Subject Heading key word search terms of “elder abuse, and neglect, and indicators” were used to locate the relevant literature in the PubMed and PsychInfo databases. The resulting review identified 13 individual codable forensic markers that clinicians and other researchers have linked to elder abuse, including abrasion, laceration, bruising, superficial wound, malnutrition, dehydration, pressure ulcer, poor hygiene, weight loss, assault, neglect, burns, and mental health problems.^{13–16} Although existing assessment instruments such as the Elder Assessment Instrument^{17–19} contain many of the items, no single instrument contained all the forensic markers that could be matched with ICD-9-CM codes. Thus, corresponding ICD-9-CM codes were identified and compiled into one index called the F13, giving equal weight to each marker. This index was then dichotomized into a single variable to indicate no correlates or the presence of one or more correlates of possible abuse.

Independent Variables

Demographic variables including age, sex, and race and ethnicity were included as independent variables. Point of care (clinical setting in which primary diagnosis of fracture was documented in medical record) was categorized into ED versus any other inpatient or outpatient facility. Information on dementia status and total number of visits made during the 3-year study period to any UCI medical facility was also extracted. Cause of fracture was dichotomized into falls versus other causes, most of which were automobile crashes. Place where the fracture occurred was dichotomized into at home or away from home. ICD-9-CM codes for fracture type were categorized according to location on the body as chest, hip, back, arm, leg, head, and face.

RESULTS

Participants were aged 65 to 100 (mean 77.2); 58.4% were female; 60.4% were white, 18.7% Hispanic, 16.1% Asian, and 4.8% other; and 13.8% had a dementia diagnosis. Most received care for their fracture in the ED (77.8%) rather than other medical center facilities (22.2%), and 87.6% had only one visit to a medical center facility in the 3-year period. The most common reported cause of fracture listed for 48.5% of participants was falls, followed by automobile crash (28.8%), none listed (17.8%), medical complications (6%), and other

accidents (2.9%). Assault, other external cause, physical activity, self-infliction, and accidental poisoning each made up less than 1% of the causes of fracture. The ICD-9-CM code for elder abuse was recorded for only one participant in the sample. Four participants had V-codes indicating a history of physical, emotional, or other abuse.

The most common forensic marker present in the sample (Table 1) was laceration ($n = 109$, 16.7%); followed by abrasion ($n = 97$, 14.8%); bruise ($n = 89$, 13.6%); depression, anxiety, or mood disorder ($n = 65$, 9.9%); malnutrition ($n = 39$, 5.9%); pressure ulcer ($n = 16$, 2.5%); and dehydration ($n = 15$, 2.3%). The remaining six markers had counts of less than 10 each. The cumulative number of markers per participant ranged from none to five, with 46% of the sample having one or more markers; 24.5% of participants had two or more markers. Participants with two or more F13 markers were less likely to have made more than one visit to a medical center facility during the study period (1.9%) than those with only one marker (8.7%) ($P = .01$) and were more likely to have been treated for the fracture in the ED (96.9%) than in any other medical facility (89.9%) ($P = .001$).

Sixty-seven (10.3%) participants had three or more markers. This subset of higher-risk participants had a mean age of 77.5 and was 50.7% female and 64.2% white, and 19.4% had dementia. Of this subset, 97% had sought care for the fracture in the ED, and 98.5% had only one visit to a medical center facility during the study period. The most common reported cause of fracture was automobile crash (52.2%) followed by fall (44.8%).

In bivariate analyses (Table 2), 50.6% of those aged 80 and older had one or more correlates of abuse, compared with 42.6% of those younger than 80 ($P = .045$). Significantly fewer Hispanic participants (32.8%) than of other racial and ethnic groups had markers ($P = .01$). Participants with a diagnosis of dementia were more likely to have markers (62.2%) than those without dementia (43.1%) ($P < .001$). Participants who sought care for the fracture in the ED more likely to have markers (55.1%) than those who sought care for the fracture in other medical center facilities (13.1%) ($P < .001$). Participants who made two or more visits to a medical center facility more likely to have markers (18.5%) than those who only made one visit during the study period (49.6%) ($P < .001$). Participants who reported something other than a fall as cause of fracture more likely to have markers (59.5%) than those who reported a fall (50.9%) ($P = .05$). Fewer than half of those with an arm (28.6%), leg (29.4%), hip (34.8%), or chest (45%) fracture had forensic markers, whereas 71.8% of those with a fracture of the head and 71.9% of those with a fracture of the face had forensic markers.

The results of a step-wise logistic regression model of variables significant at the bivariate level are shown in Table 3. Age, race and ethnicity, number of UCI medical facility visits, and cause of fracture were not significantly associated with forensic markers of abuse. Dementia (odds ratio (OR) = 2.21, standard error (SE) = 0.28, $P = .005$) and seeking care in the ED (OR = 6.40, SE = 0.30, $P < .001$) remained significantly associated with markers. Specific body locations of the fracture also remained significantly associated with having markers. Those with a fracture of the back (OR = 2.08, SE = 0.29, $P = .01$), head (OR = 3.37, SE = 0.33, $P < .001$), or face (OR = 3.61, SE = 0.41, $P = .007$) had significantly higher odds of having markers, whereas those with a fracture of the chest, hip, arm, or leg did not have significantly higher odds of having markers.

DISCUSSION

There are a number of reasons why elder abuse is hard to detect. When asked, victims are often reluctant to answer for reasons including fear of retaliation, stigma of victimization, fear of being removed from home, desire to protect the perpetrator, and in some cases involving persons with dementia, difficulty communicating what transpired. The fact that older people often have underlying health problems that may mask markers of abuse and neglect complicates detection on the part of health professionals.¹³ In most cases of abuse and neglect, the evidence is often not readily available or clearly indicative, falling into a gray area of subtle indicators. Although each forensic marker observed individually may mimic physiological age-related conditions, diseases, or injuries, these markers may be red flags for abuse when considered cumulatively. Although cause of fracture was noted in medical charts according to ICD-9 codes, a reported cause of the fracture may not be the actual cause. Injuries associated with abuse are often reported as being caused by what may seem to be a routine or typical accident.

These findings showed that individuals with fracture with forensic markers of possible elder abuse were more likely to be treated in the ED than in other hospital clinics. These findings are consistent with other elder abuse findings linking elder abuse to high ED use.^{20,21} Of elder abuse victims seen in an ED over a 7-year period, 66% had a least one visit with an injury-related discharge diagnosis or chief complaint.¹ As electronic medical records become more accessible to ED personnel, this may improve the ability to find patterns of forensic markers, which may facilitate better detection of elder abuse or neglect in ED settings.

These findings also support research that suggests that certain fracture types, especially fractures of the back, head, and face, combined with additional noted injuries or health problems, should arouse suspicion of elder abuse or neglect. A review of literature found that two-thirds of injuries that occur in elder abuse are to the upper extremities and maxillofacial region.²² These findings are consistent with domestic violence and interpersonal violence literature, which shows that interpersonal physical violence is associated with mandibular fractures and facial injuries.^{23–25}

Study findings support the importance of cognitive status over than age alone when assessing risk of elder abuse. Rates of abuse of people with dementia range from 34% to 62%.^{26–29} The effects of dementia can make it difficult for people to seek help or remove themselves from potentially abusive situations.¹³ Although there is little research on physical abuse in persons with dementia, one explanation for greater risk is that the elderly adult's memory loss may frustrate and anger an abusive caregiver.³⁰

ICD-9-CM codes are provided for billing purposes, and using these large data sets to conduct retrospective research, although innovative, presents some limitations. One limitation of the study is that the analyses were limited to deidentified data, precluding any examination of charts for notes on psychosocial information that would help substantiate possible abuse or neglect. Although there is a specific code for elder abuse, providing a potentially valid indicator of victimization, it is rarely documented, as shown in these data—

only once in the sample. Health providers in busy hospital clinics and EDs rarely have all the information needed to unequivocally document a case of elder abuse; this means that suspected cases are not reported. Another limitation is the possible inconsistency with which ICD-9-CM codes are documented. As other elder abuse researchers using ICD-9-CM codes have indicated, the accuracy of their use depends on a number of factors, including time, organizational protocol, and documenter knowledge of how and what to code.^{7,8} It may be that variation in coding practices lead to differences in documented forensic marker frequencies between EDs and other clinical settings. ED providers may have different incentives for more-aggressive coding than other clinical settings. Another limitation is that, because this study was conducted in one medical center with an elder abuse team in place, there is greater likelihood of heightened suspicion of abuse, resulting in more-frequent coding of forensic markers. Finally, the number of fractures may have been underreported because it was not possible to control for “healthcare shopping” (seeking treatment in a variety of locations), a known phenomenon in elder abuse. Future studies should be conducted in multiple settings and include comparative analyses of coding patterns across these settings.

CONCLUSION

In an effort to further the development of a knowledge base for elder abuse research, the National Research Council Panel to Review Risk and Prevalence of Elder Abuse and Neglect³¹ published a report summarizing the status of elder abuse research. This report noted that, as a field, elder mistreatment was in the stage of development where child abuse and intimate partner violence were more than 20 years ago. The Elder Justice Roadmap national research agenda includes as one of its priorities the identification of forensic markers to assist in the detection of elder abuse.³² Results of this study can be added to the growing body of literature on forensic markers of elder mistreatment to inform the development of clinical guidelines for recognizing elder mistreatment. This study provides beginning evidence-based support for the creation of clinical guidelines for the possible identification of elder abuse. Health providers in EDs should be considering elder abuse, especially when treating older adults with dementia who present with a fracture. The presence of forensic markers along with other psychosocial indicators should prompt healthcare professionals to investigate.

Acknowledgments

The authors would like to thank Paula Aisemberg, BA, and Christine Weber, MSG, for their assistance in preparing this manuscript.

This project was supported by the National Center for Research Resources and the National Center for Advancing Translational Sciences, National Institutes of Health (NIH), through Grant UL1 TR000153. The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH.

Sponsor’s Role: None.

References

1. Lachs MS, Williams CS, O’Brien S, et al. The mortality of elder mistreatment. *JAMA*. 1998; 280:428–432. [PubMed: 9701077]

2. Lachs MS, Williams CS, O'Brien S, et al. Adult protective service use and nursing home placement. *Gerontologist*. 2002; 42:734–739. [PubMed: 12451154]
3. Acierno R, Hernandez MA, Amstadter AB, et al. Prevalence and correlates of emotional, physical, sexual, and financial abuse and potential neglect in the United States: The National Elder Mistreatment Study. *Am J Public Health*. 2010; 100:292–297. [PubMed: 20019303]
4. Erlingsson CL. Searching for elder abuse: A systematic review of database citations. *J Elder Abuse Negl*. 2007; 19:59–78. [PubMed: 18160381]
5. Lifespan of Greater Rochester Inc.. Under the Radar: New York State Elder Abuse Prevalence Study. New York: Lifespan of Greater Rochester Inc; 2011.
6. Friedman B, Santos EJ, Liebel DV, et al. Longitudinal prevalence and correlates of elder mistreatment among older adults receiving home visiting nursing. *J Elder Abuse Negl*. 2015; 27:34–64. [PubMed: 25208218]
7. Rovi S, Chen PH, Vega M, et al. Mapping the elder mistreatment iceberg: U.S. hospitalizations with elder abuse and neglect diagnoses. *J Elder Abuse Negl*. 2009; 21:346–359. [PubMed: 20183139]
8. Ziminski CE, Phillips LR, Woods DL. Raising the index of suspicion for elder abuse: Cognitive impairment, falls, and injury patterns in the emergency department. *Geriatr Nurs*. 2012; 33:105–112. [PubMed: 22257963]
9. Ziminski CE, Wiglesworth A, Austin R, et al. Injury patterns and causal mechanisms of bruising in physical elder abuse. *J Forensic Nurs*. 2013; 9:84–91. quiz E81–E82. [PubMed: 24158129]
10. Garbin CA, Guimarães E, Queiroz AP, et al. Occurrence of traumatic dental injury in cases of domestic violence. *Braz Dent J*. 2012; 23:72–76. [PubMed: 22460319]
11. Egge MK, Berkowitz CD. Controversies in the evaluation of young children with fractures. *Adv Pediatr*. 2010; 57:63–83. [PubMed: 21056735]
12. Goldberg SH, McRill CM, Bruno CR, et al. Orbital fractures due to domestic violence: An epidemiologic study. *Orbit*. 2000; 19:143–154. [PubMed: 12045943]
13. Dyer, CB., Connolly, MT., McFeeley, P. The clinical and medical forensics of elder abuse and neglect. In: Bonnie, RJ., Wallace, RB., editors. *Elder Mistreatment: Abuse, Neglect, and Exploitation in an Aging America*. Washington, DC: National Academies Press; 2003. p. 339–381.
14. Pearsall C. Forensic biomarkers of elder abuse: What clinicians need to know. *J Forensic Nurs*. 2005; 1:182–186. [PubMed: 17073122]
15. Collins KA. Elder maltreatment: A review. *Arch Pathol Lab Med*. 2006; 130:1290–1296. [PubMed: 16948513]
16. Wiglesworth A, Austin R, Corona M, et al. Bruising as a forensic marker of elder abuse. *J Am Geriatr Soc*. 2009; 57:1191–1196. [PubMed: 19558476]
17. Fulmer T, Paveza G, Abraham I, et al. Elder neglect assessment in the emergency department. *J Emerg Nurs*. 2000; 26:436–443. [PubMed: 11015061]
18. Fulmer T, Street S, Carr K. Abuse of the elderly: Screening and detection. *J Emerg Nurs*. 1984; 10:131–140. [PubMed: 6374226]
19. Fulmer T, Wetle T. Elder abuse screening and intervention. *Nurse Pract*. 1986; 11:33–38.
20. Dong X, Simon MA, Evans D. Prospective study of the elder self-neglect and ED use in a community population. *Am J Emerg Med*. 2012; 30:553–561. [PubMed: 21411263]
21. Lachs MS, Williams CS, O'Brien S, et al. ED use by older victims of family violence. *Ann Emerg Med*. 1997; 30:448–454. [PubMed: 9326859]
22. Murphy K, Waa S, Jaffer H, et al. A literature review of findings in physical elder abuse. *Can Assoc Radiol J*. 2013; 64:10–14. [PubMed: 23351969]
23. Ferreira MC, Batista AM, Ferreira Fde O, et al. Pattern of oral-maxillofacial trauma stemming from interpersonal physical violence and determinant factors. *Dent Traumatol*. 2014; 30:15–21. [PubMed: 23675634]
24. Wu V, Huff H, Bhandari M. Pattern of physical injury associated with intimate partner violence in women presenting to the emergency department: A systematic review and meta-analysis. *Trauma Violence Abuse*. 2010; 11:71–82. [PubMed: 20430799]
25. Arslan ED, Solakoglu AG, Komut E, et al. Assessment of maxillofacial trauma in emergency department. *World J Emerg Surg*. 2014; 9:13. [PubMed: 24484727]

26. Cooney C, Howard R, Lawlor B. Abuse of vulnerable people with dementia by their carers: Can we identify those most at risk? *Int J Geriatr Psychiatry*. 2006; 21:564–571. [PubMed: 16783768]
27. Cooper C, Maxmin K, Selwood A, et al. The sensitivity and specificity of the Modified Conflict Tactics Scale for detecting clinically significant elder abuse. *Int Psychogeriatr*. 2009; 21:774–778. [PubMed: 19493378]
28. Wigglesworth A, Mosqueda L, Mulnard R, et al. Screening for abuse and neglect of people with dementia. *J Am Geriatr Soc*. 2010; 58:493–500. [PubMed: 20398118]
29. Yan E, Kwok T. Abuse of older Chinese with dementia by family caregivers: An inquiry into the role of caregiver burden. *Int J Geriatr Psychiatry*. 2011; 26:527–535. [PubMed: 20690132]
30. National Association of State Units on Aging. Late Life Domestic Violence: What the Aging Network Needs to Know. Washington, DC: National Center on Elder Abuse; 2006.
31. Bonnie, RJ., Fulmer, T., Kulka, RA., et al. National Research Council (U.S.) Panel to Review Risk and Prevalence of Elder Abuse and Neglect. In: Bonnie, RJ., Wallace, RB., editors. *Elder Mistreatment: Abuse, Neglect, and Exploitation in an Aging America*. Washington, DC: National Academies Press; 2003. p. 9
32. Connolly, MT.Brandl, B., Breckman, R., editors. *The Roadmap for Elder Justice: Priorities and Opportunities for the Field*. New York: The Elder Justice Roadmap; 2014.

Table 1

Elder Abuse Forensic Markers in the Sample (N = 652)

Forensic Marker	<i>International Classification of Disease, Ninth Revision, Clinical Modification Code</i>	n
Abrasion	910–919	97
Assault	E960–E969	4
Bruise	920–924	89
Burns	940–949	1
Dehydration	276.51	15
Depression, anxiety, mood disorder	300, 311, 296	65
Laceration	870–897	109
Malnutrition	262–263	39
Neglect	995.80–995.85	2
Poor hygiene	E013.8	9
Pressure ulcer	707	16
Strangulation	E963	0
Weight loss	783.2	2

Table 2

Sample Characteristics Associated with Any Forensic Marker (N = 652)

Characteristic (<i>International Classification of Diseases, Ninth Edition, Clinical Modification, Code</i>)	n	Forensic Marker, %	P-Value
Age			
65–79	395	42.5	.04
80	257	50.6	
Sex			
Female	381	44.1	.34
Male	271	48.0	
Race and ethnicity			
White	394	49.2	.01
Hispanic	122	32.8	
Asian	105	48.6	
Other (black, Native American, other, unknown)	31	41.9	
Cognitive status (290–291, 294, 331)			
Dementia diagnosis	90	62.2	.001
No dementia diagnosis	562	43.1	
UCI points of care			
Emergency department	507	55.1	<.001
Any other inpatient or outpatient facility	145	13.1	
Number of visits to a UCI medical facility in 3 years			
1	571	49.6	<.001
2	81	18.5	
Place of occurrence of fracture (E849)			
Home	258	50.8	.06
Away from home	278	57.9	
Fracture cause (E887)			
Fall	316	50.9	.05
Other cause (mostly auto crash)	220	59.5	
Fracture location (800–829)			
Chest	132	45.5	.95
Hip	132	34.8	.006
Back	109	58.7	.003
Arm	98	28.6	<.001
Head	78	71.8	<.001
Leg	71	29.6	.004
Face	32	71.9	.003

UCI = University of California at Irvine.

Table 3

Logistic Regression Analysis of Sample Characteristics Associated with Any Forensic Marker (N = 652)

Characteristics	Beta	Odds Ratio	Standard Error	P-Value
Aged 80	−0.044	0.957	0.192	.82
Race and ethnicity (reference other)				
White	0.195	1.216	0.420	.64
Hispanic	−0.428	0.652	0.458	.35
Asian	−0.103	0.902	0.461	.82
Dementia	0.794	2.212	0.280	.005
UCI point of care any inpatient or outpatient facility other than ambulatory clinic	1.86	6.390	0.302	.001
2 visits to a UCI medical facility in 3 years	−0.585	0.557	0.343	.09
Fracture caused by fall	−0.382	0.682	0.211	.07
Fracture type (primary diagnosis <i>International Classification of Diseases, Ninth Edition, Clinical Modification</i> , code 800–829) (reference chest)				
Hip	0.017	1.018	0.301	.95
Back	0.730	2.075	0.289	.01
Arm	0.020	1.020	0.325	.95
Head	1.22	3.374	0.333	<.001
Leg	0.087	1.091	0.355	.81
Face	1.28	3.608	0.474	.007

UCI = University of California at Irvine.