



Injury-Related Emergency Department Visits among Older Adults

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ABSTRACT

Because of the increasing size of the older adult population and the subsequent increase in the number of elders requiring medical care for injuries, emergency departments (ED) represent an increasingly important source of medical care for older adults sustaining an injury. However, patterns and outcomes of ED visits among older adults for injury are not well understood. In response, this study draws upon five years (2000-2004) of nationally representative data from the National Hospital Ambulatory Medical Care Survey to examine the manner, mechanism and outcomes of injury-related ED visits among older adults.

INTRODUCTION AND BACKGROUND

- ∨ Injury among older adults is a formidable public health challenge as older adults experience poorer outcomes (e.g., greater disability, increased hospital length of stay, higher mortality rates) following injury than their younger counterparts.
- ∨ Despite an overall drop in injury rates among the U.S. population as a whole, the incidence of injury among older adults (age 65 years and older) is increasing.
- ∨ The trend in injury rates among older adults combined with population aging has resulted in a shift from younger men to older women as the most frequently treated demographic group for traumatic injuries.
- ∨ Despite these changes, epidemiological studies of the manner, mechanism and outcomes of injury are lacking. In response, this study exploited a nationally representative sample of ED visits to explore injury among older adults.

DATA AND METHODS

- ∨ Five years (2000-2004) of publicly available, de-identified data from the National Hospital Ambulatory Medical Care Survey (NHAMCS) were used.
- ∨ NHAMCS has been conducted annually since 1992 by the CDC's National Center for Health Statistics. For the purposes of this study, data are restricted to the emergency department component only.
- ∨ NHAMCS uses a complex, four-stage sampling design with random stratified selection at each sampling stage to achieve a nationally representative sample of emergency department visits or episodes of care.
- ∨ Sampling weights released with the data adjust estimates for potential bias resulting from the complex sampling design and nonresponse. The weighting scheme achieves essentially unbiased national estimates for estimates based on a minimum of 30 cases.
- ∨ Importantly, to obtain nationally representative estimates, all observations must be available to accurately apply the sampling weights (e.g., subsetting results in unreliable estimates). To accommodate the complex sampling design, STATA version 9.2 ©, which includes appropriate procedures, was used.

INJURY IDENTIFICATION AND VARIABLE SPECIFICATION PROCEDURES

- ∨ Injuries were identified using 3-digit ICD-9-cm codes (800.xx-999.xx) or 3-digit E-code (E800.x-E999.x).
- ∨ The Barell Injury Diagnosis Matrix was used to identify the body region and nature of injury.
- ∨ The mechanism and manner of injury were identified using the recommended framework from the National Center for Health Statistics.
- ∨ NHAMCS includes verbatim text recorded during the emergency department visit that describes the events leading to injury. The content of the verbatim text was used to group Adverse Medical Events into meaningful categories.
- ∨ Conventional recoding strategies were used to specify hospital admission, patient-visit characteristics, and hospital location characteristics from available data fields.

RESULTS

TABLE 1: Sample, National and Per Capita Estimates of Injury Related ED Use among Older Adults, 2000-2004

Variables	Observed Count	Estimated # of Occurrences	Estimated % of Patient-Visits	Estimated # of Patient-Visits Per 100 Population Per Year
Manner of Injury				
Unintentional Injuries	5,082	15,983,594	76.3	9.4
Undetermined/Unknown	855	2,699,551	12.9	1.6
Intentional Injuries	55	186,636	0.9	0.1
Nature of Injury (Top 5)				
Contusion/Superficial	1,407	4,637,166	30.2	2.7
Fracture	1,086	3,400,726	22.1	2.0
Open Wound	1,010	3,158,440	20.5	1.9
Sprains/Strains	501	1,604,973	10.4	0.9
Unspecified	371	1,071,318	7.0	0.6
Mechanism of Injury (Top 5)				
Falls	3,442	10,010,537	47.8	5.9
Adverse Effects	658	2,078,188	9.9	1.2
Other, Unspecified	540	1,614,892	7.7	1.0
Motor Vehicle Crash	438	1,388,992	6.6	0.8
Struck By/Against	421	1,333,280	6.4	0.8
Patient-Visit Characteristics				
Aged 65 to 74 Years Old	2,619	8,261,620	39.5	9.2
Aged 75 to 84 Years Old	2,544	7,963,849	38.0	12.8
Aged 85 years or Older	1,487	4,722,500	22.5	22.3
Female	4,059	12,835,867	61.3	13.1
Male	2,591	8,112,102	38.7	11.3
Non-White	954	2,694,896	12.9	13.2
Transfer from NH*	733	2,203,591	13.1	37.7
Urgent Visit	1,370	4,465,097	21.3	2.6
Study Sample				
Injury Related Visits by Adults Aged 65+	6,650	20,947,969	100.0	12.4

*Sample estimates based on years 2001-2004 of NHAMCS data. Population estimates based on 1.46 million nursing home residents per year.

TABLE 2: Taxonomy of Adverse Medical Events

Type of Event	Observed	Estimates
Medications 252 881,926 (42.4%)		
1 Analgesics (34) and OTC (11)	45	
2 Cardiovascular Drugs	49	
Antihypertensive (27)		
Digoxin (11)		
Beta Blocker (7)		
Nitrates (4)		
3 Anticoagulants	33	Single Most Prescribed Drug Responsible for AME: Coumadin®
4 Endocrine	27	
Hypoglycemics (16)		
Steroids (9)		
Others (2)		
5 Antimicrobials	23	
6 Chemotherapy	16	
7 Psychiatry Drugs including antiepileptic medications	16	
8 Nonspecific	43	
Medical Procedures 164 525,432 (25.3%)		
1 Heart procedures involving Pacemakers, Angiograms and heart catheter, etc.	74	Most Frequent Type of Procedure Responsible for AME: Complications due to Foley Catheters, especially blockages and infections
2 Urinary, Foley, and Other Catheters	59	
3 Dialysis	28	
Surgical Procedures 210 57,679 (27.8%)		
1 Other, especially wound complications including bleeding, dehiscence, hematomas	124	Single Most Common Surgical Complication Responsible for AME: Infection
2 Complications involving tubes, e.g., infections, blockages, displacement	44	
3 Post-Surgical Infections	42	
Not Determinable/Missing 32 94,151 (4.5%)		
TOTAL	658	2,078,188 (100%)

Notes: Verbatim Text was classified by SG. Weighted percentages and population estimates are not presented for all statistics until further refinement of grouping strategies are tested. Ranks based on weighted estimates. AME=Adverse Medical Events, OTC=Over-The-Counter.

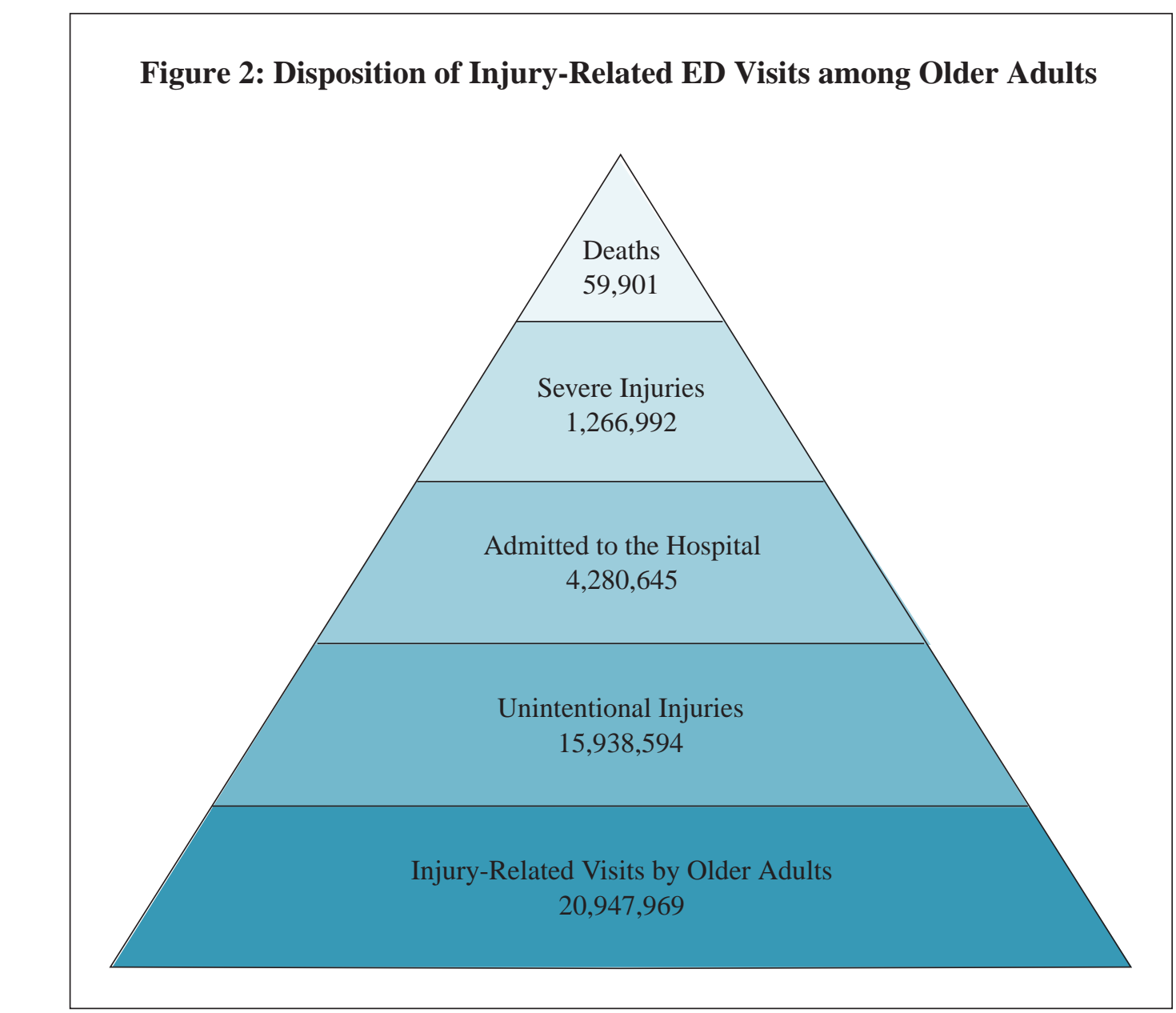
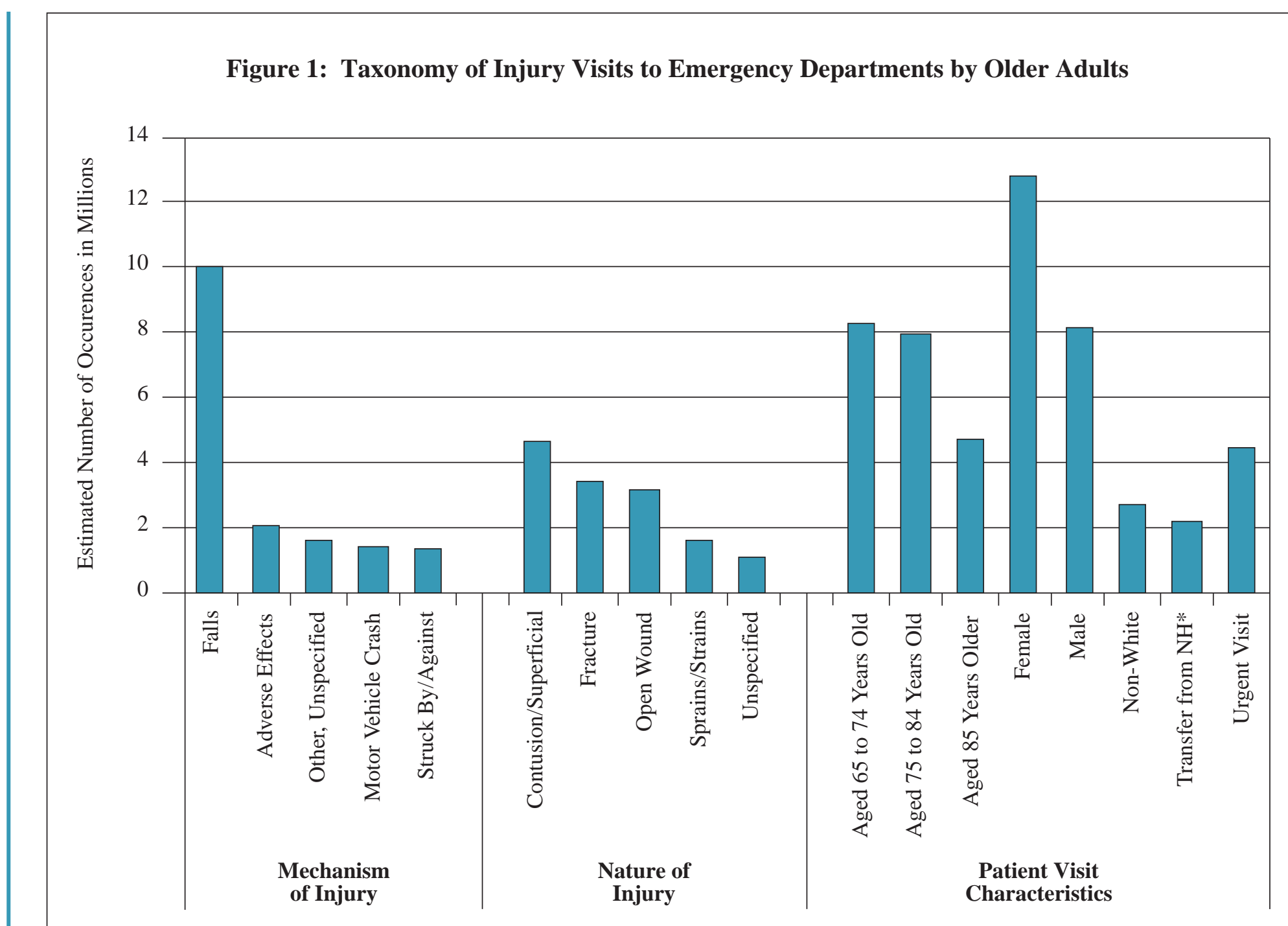


TABLE 3: Logistic Regression Results: Factors Associated with Injuries, Unintentional Injuries and Adverse Medical Events

	Injury-Related Visit Odds Ratio (95% CI)	Unintentional Injuries Odds Ratio (95% CI)	Adverse Medical Events Odds Ratio (95% CI)
Patient-Visit Characteristics:			
Age 85+	1.207 *** (1.107, 1.316)	1.612 *** (1.307, 1.988)	0.660 ** (0.486, 0.897)
Female	1.104 * (1.023, 1.191)	1.290 ** (1.118, 1.490)	0.791 * (0.627, 0.997)
Non-White Status	0.736 *** (0.668, 0.812)	0.834 (0.683, 1.018)	1.118 (0.826, 1.512)
NH Resident‡	1.158 * (1.021, 1.314)	1.044 (0.824, 1.322)	0.953 (0.677, 1.341)
Urgent Visit	0.637 *** (0.581, 0.697)	1.143 (0.962, 1.359)	0.980 (0.738, 1.301)
ED Location:			
Northern Region	1.013 (0.888, 1.156)	1.031 (0.821, 1.294)	0.860 (0.616, 1.201)
Midwestern Region	0.847 * (0.739, 0.972)	0.927 (0.723, 1.190)	0.810 (0.563, 1.166)
Southern Region	0.853 * (0.748, 0.972)	1.034 (0.818, 1.307)	0.836 (0.582, 1.199)
Rurally Located	1.102 (0.998, 1.218)	1.247 * (1.013, 1.535)	0.897 (0.642, 1.253)

Notes: *p < .05; **p < .01; ***p < .001. Reported estimates adjusted for mortality. Western region served as the omitted reference category. ‡Estimate based on 2001-2004 NHAMCS only. CI=Confidence Interval; NH=Nursing Home.

DISCUSSION

- ∨ Each year, roughly 12 out of 100 older adults seek medical care in hospital emergency departments due to injuries. During the five year period of study observation, nearly 21 million elders sought emergency care related to injury.
- ∨ Overall, Adverse Medical Events are the second most frequently occurring cause of injury-related emergency department use among older adults (falls are the most frequently occurring).
- ∨ Complications related to anticoagulant use, medical procedures involving catheters/tubes and infections following surgery posed the greatest risk to older adults.
- ∨ Although advanced age and female status is associated with greater risk of injury in general and unintentional injuries in particular, both variables were associated with lesser risk of Adverse Medical Events, most likely reflecting different patterns of comorbidities across demographic populations.
- ∨ Efforts to reduce Adverse Medical Events among non-hospitalized populations are needed and represent a potentially important area to improving health and controlling costs.