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Diagnosis of Elder Abuse in US Emergency Departments

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Elements of Financial/Personal Conflicts	CE		KH		TR		TPM	
	Yes	No	Yes	No	Yes	No	Yes	No
Employment or Affiliation		X		X		X		X
Grants/Funds		X		X	X		X	
Honoraria		X		X		X		X
Speaker Forum		X		X		X		X
Consultant		X		X		X		X
Stocks		X		X		X		X
Royalties		X		X		X		X
Expert Testimony		X		X		X		X
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Abstract

OBJECTIVE—To estimate the proportion of visits to United States emergency departments (EDs) receiving a diagnosis of elder abuse using two nationally representative datasets.

DESIGN—Retrospective cross-sectional analysis.

SETTING—U.S. ED visits recorded in either the 2012 Nationwide Emergency Department Sample (NEDS), or the 2011 National Hospital Ambulatory Medical Care Survey (NHAMCS).

PARTICIPANTS—All ED visits by patients aged 60 years and older.

MEASUREMENTS—The primary outcome was elder abuse as defined by ICD-9-CM diagnosis codes. The proportion of visits with elder abuse was estimated using survey weights. Odds ratios (OR) were calculated to identify patient demographics and common ED diagnoses associated with elder abuse.

RESULTS—In 2012, NEDS contained 6,723,667 ED visits by older adults, representing an estimated 29,056,673 ED visits. Elder abuse was diagnosed in an estimated 3,846 visits, corresponding to a weighted diagnosis period prevalence of elder abuse in U.S. EDs of 0.013% (95% Confidence Interval (CI) 0.012– 0.015%). Neglect and physical abuse were the most common types diagnosed, accounting for 32.9% and 32.2% of cases, respectively. Multivariable analysis showed increased weighted odds of elder abuse diagnosis in females (OR 1.95, 95% CI 1.68–2.26), and patients with contusion (OR 2.91, 95% CI 2.36–3.57), urinary tract infection (OR 2.21, 95% CI 1.84–2.65), or septicemia (OR 1.92, 95% CI 1.44–2.55). In the 2011 NHAMCS dataset, zero cases of elder abuse were recorded among the 5,965 older adult ED visits.

CONCLUSION—Among US ED visits by older adults, the proportion of visits receiving a diagnosis of elder abuse is at least two orders of magnitude lower than the estimated prevalence in the population. Efforts to improve the identification of elder abuse in EDs may be warranted.

Keywords

elder abuse; emergency department; prevalence

INTRODUCTION

Elder abuse is an under-recognized and under-reported public health issue which places victims at increased risk for disability and death[1–3] and increased use of health care resources.[4,5] Although difficult to estimate,[6,7] elder abuse is estimated to cost billions of dollars annually.[8] Estimates of the prevalence of elder abuse among community-dwelling older adults range from 5–10%.[9–11] Elder abuse can be classified into five types that may occur concurrently: physical, psychological/verbal, sexual, neglect, and financial exploitation.[12] Described risk factors for elder abuse include female, younger age (among older adults), living with multiple household members other than a spouse, lack of social support, low income, poor physical health, and functional impairment.[9]

Emergency departments (EDs) have been shown to be important sites for identifying other types of abuse including intimate partner violence[13] and child abuse,[14,15] and similar to other forms of abuse, elder abuse may result in injuries or illness prompting emergency

evaluation.[16] For these reasons and because of the increasing use of EDs by older adults,[17] EDs are a potentially important setting for identifying elder abuse.[18,19] In two Virginia EDs, Eulitt et al. observed that 46% of elderly patients had functional difficulties which might place them at increased risk for elder abuse.[19] In a single ED in North Carolina, Stevens et al. observed that 7% of older adults reported experiencing physical or psychological abuse in the past year.[10] However, little is known about how often elder abuse is diagnosed in EDs, or the characteristics of patients that are diagnosed in EDs. A better understanding of current practice patterns regarding the diagnosis of elder abuse in US EDs is needed to inform efforts to improve identification of this common and costly problem.

The objective of this study is to estimate the frequency of elder abuse diagnosis in US EDs and to describe the characteristics of these patients.

METHODS

Study Design and Setting

This was a retrospective cross-sectional study using two nationally representative databases and was approved by the Institutional Review Board of the University of North Carolina at Chapel Hill. Analyses used the 2012 Nationwide Emergency Department Sample (NEDS) and the 2011 National Hospital Ambulatory Medical Care Survey (NHAMCS), the most recent years available for each dataset. A similar study design using NEDS was used to report on the frequency of identification of intimate partner violence in US EDs.[20]

The NEDS is an annual dataset compiled by the Agency for Healthcare Research and Quality (AHRQ) using the Healthcare Cost and Utilization Project's (HCUP) Databases. NEDS includes approximately 20% of all US ED visits and, in using a weighted sampling methodology, allows for calculation of national and regional estimates. A complete description of NEDS is available on the HCUP website.[21]

The NHAMCS is an annual survey administered by the U.S. Census Bureau using a four-stage probability sampling design to characterize U.S. ED care at non-institutional general and short-stay hospitals. The 2011 NHAMCS data inlcudes a representative sample of 322 EDs over four-week reporting periods. Similar to NEDS, NHAMCS provides sample weights that can be used to obtain national estimates. A complete description of NHAMCS is available from the National Center for Health Statistics.[22]

Case Definition

A common legal definition of elder abuse is actions or neglect against a vulnerable or dependent older adult committed by someone serving as a caregiver.[23] The primary outcome of elder abuse was defined as an ED visits by an adult aged 60 years and older with one of the following International Classification of Disease, Ninth Revision, Clinical Modification (ICD9-CM) diagnosis codes: Adult Maltreatment, unspecified (995.80); Physical abuse (995.81); Emotional/Psychological Abuse (995.82); Sexual Abuse (995.83); Neglect (nutritional) (995.84); and Other Forms of Abuse and Neglect (995.85). Age 60 was chosen as the minimum age for eligible cases as it is used for elder abuse laws in many states, it

defines eligibility for services under the Older Americas Act,[24] and allows for comparisons with prior studies.[25,26]

A broader definition of elder abuse has also been described to include any form of physical, sexual, or psychological abuse, or neglect, abandonment, financial exploitation of an older person independent of setting or relationship between offender and victim.[8] Recognizing that distinguishing between elder abuse and other forms of intimate partner violence experienced by older adults may be difficult, we also considered additional diagnosis codes as a broader definition of elder abuse[27] as listed in Table 1.

Measures

Visit characteristics examined included patient age, gender, income quartile, Charlson comorbidity index (0, 1–2, 2–3, and ≥3),[28] disposition, and among those admitted, inpatient length of stay in days. Commonly occurring ED diagnoses were characterized using the Clinical Classification Software (CCS) tool developed by HCUP.[29] The CCS tool groups individual ICD-9 diagnoses codes into clinically similar entities, which allows for analysis of broad categories of diagnoses and avoids the problem of model overfitting. The ten most common primary CCS diagnoses were selected using the HCUPNet Data Tool among all ED patients 65–85 years old.[30] Only using CCS diagnosis groups ensures at least ten events per covariate in multivariable analysis.[31] Hospital region and hospital teaching status were also examined.

Data Analysis

All analyses used the observation weights, strata, and primary sampling units provided in each dataset to calculate weighted estimates. Population totals, weighted proportions, and weighted 95% confidence intervals were determined using Stata command *svy: total* and *svy: proportion*, respectively. For continuous variables, weighted means and 95% confidence intervals were reported using *svy: mean*. A logistic regression model was employed using the *svy: logistic* command to calculate weighted odds ratios and 95% confidence intervals for potential predictors of elder abuse. Covariates included in the model were patient gender, age, Charlson comorbidity index, presence or absence of the ten most common ED diagnoses, hospital teaching status, and hospital region. Statistical significance was set at $p<0.05$.

Analysis of NEDs data was performed using STATA version 14 (StataCorp., College Station, TX). Analysis of NAHMCS used SAS 9.2 (SAS Institute, Inc., Cary, NC).

RESULTS

The 2012 NEDS contained 6,723,667 patient visits by adults aged 60 years and older, representing an estimated 29,056,673 ED visits nationally (Table 1). Using survey weights, an estimated 3,846 cases (95% CI 3,434–4,258) of elder abuse were diagnosed, corresponding to a weighted period prevalence of 0.013% (95% CI 0.012–0.015%). Among visits with at least one of these diagnoses, 3% were diagnosed with two types of elder abuse and 0.1% were diagnosed with three types of elder abuse. When the broader definition of elder abuse was used there were 7,154 weighted cases diagnosed, corresponding to a

weighted period prevalence of 0.025% (95% CI 0.021–0.028). When stratified by region, the Northeast had the lowest prevalence (0.011%, 95% CI 0.008– 0.014%), while the Western region had the highest prevalence (0.016%, 95% CI 0.012–0.020%). Among patients diagnosed with elder abuse, neglect and physical abuse were the most common (32.9% and 32.2%, respectively).

Table 2 lists weighted patient demographics and hospital characteristics among all ED visits by older adults, and among visits by patients who were diagnosed with elder abuse. Overall, the mean age of patients was 74.0 years (95% CI 73.9–74.2). Those diagnosed with elder abuse had similar mean age and distribution of comorbidity scores compared to all ED patients 60 years and older. Visits diagnosed with elder abuse were disproportionately by females (73.7% vs. 57.4% female for all visits), and patients in the lowest income quartile (36.8% vs. 29.4%). Additionally, visits in which elder abuse was diagnosed were disproportionately by patients with contusion/superficial injury (15.3% vs. 6.4% of all visits), urinary tract infection (22% vs. 10.2%), and septicemia (7.5% vs. 3.3%). Patients with elder abuse were also more likely to be admitted to inpatient care (58.8% vs. 34.7% of all visits), and among patients admitted, they had greater mean length of stay in the hospital (7.97 days, 95% CI 6.89–9.05 vs. 5.08 days, 95% CI 5.00–5.16).

Based on multivariable logistic regression, women had 1.95 times the odds of being diagnosed with elder abuse compared to men (OR 1.95, 95% CI 1.68–2.26) after adjusting for age, comorbidity, common ED diagnoses, hospital teaching status, and hospital region (Table 3). There were no age categories with a significantly increased odds of the diagnosis of elder abuse. When compared to patients without a given CCS diagnosis, the following were associated with increased odds of the diagnosis of elder abuse: contusion (OR 2.91, 95% CI 2.36–3.57), urinary tract infection (OR 2.21, 95% CI 1.84–2.65), and septicemia (OR 1.92, 95% CI 1.44–2.55). The only diagnosis associated with a decreased odds of the diagnosis of elder abuse was abdominal pain (OR 0.34 95% CI 0.20–0.58). Visits by patients seen at metropolitan teaching hospitals had 1.74 times the odds of having a diagnosis of elder abuse compared to visits by patients seen at a metropolitan non-teaching hospitals (OR 1.74 95% CI 1.42–2.14). A logistic regression model using the broad definition of elder abuse yielded similar results, except for increasing age was associated with decreasing odds of elder abuse diagnosis (Appendix 1).

To ensure correct weighting of NEDs data our estimates were cross-referenced to HCUPnet estimates and were found to be in agreement.[30,32] Among the variables examined, missing data is described in Appendix 2.

In the 2011 NHAMCS, no diagnoses of elder abuse were made among the 5,965 visits by adults aged 60 years and older. In an attempt to determine if 2011 was an outlier, calendar years 2006–2010 were analyzed and a similarly low numbers of visits diagnosed with elder abuse were found: one of 6,224 (2006), one of 6,495 (2007), one of 6,528 (2008), zero of 6,484 (2009), and one of 6,562 (2010). The unweighted period prevalences for these years range from 0 to 0.016%. However, according to the NHAMCS analysis guidelines, outcomes cannot be reported with less than ten cases, and when all years from 2006–2011

were combined, there were still fewer than 10 cases. Therefore, no further analysis was conducted using the NHAMCS data.

DISCUSSION

In our analysis of NEDS, the largest available all-payer ED dataset, we find the period prevalence of a diagnosis of elder abuse among ED visits by adults aged 60 years and older is at least two orders of magnitude lower than available estimates for community-dwelling older adults (0.01% vs. 5–10%).[9] Using a broader definition of elder abuse which includes cases of intimate partner violence, the number of cases we identified doubled but the percentage of patients diagnosed with elder abuse remained two orders of magnitude lower than the estimated prevalence among community-dwelling older adults. In a separate analysis of the six most recent years of NHAMCS data, so few cases of elder abuse were found that results cannot be reported.

These findings suggest that emergency physicians are failing to make the diagnosis of elder abuse for the vast majority of victims for whom they provide care. A different interpretation of these data is that prior estimates of elder abuse are inaccurate, but this explanation seems unlikely given prior studies, which consistently observe prevalences between 5% and 10%.[9–11] In a single academic ED, Stevens et al. found nine of 138 (7%) patients aged 65 years and older reported physical or psychological abuse in the past year, but none were identified by the emergency physician.[10] Among community dwelling older adults known to be victims of elder abuse, Lachs et al. found that only fifty two out of 572 visits (9%) resulted in referral for an abuse investigation from ED personnel.[11] Among older adults presenting to a single ED in Singapore, Cham et al. found 17 cases of elder abuse identified by emergency providers among 62,826 visits, yielding a prevalence of the diagnosis of 0.03%, which is similar to our findings.[33]

A number of explanations have been offered for why emergency physicians do not make the diagnosis of elder abuse. One explanation is that elder abuse is difficult to identify. The elderly have a greater burden of health problems than younger individuals, and thus an ED visit by victims of elder abuse may be for an injury or illness unrelated or only indirectly related to elder abuse. Some victims of elder abuse may lack the mental capacity to report abuse, or may not feel empowered to report abuse due to a fear of retribution or an externally imposed solution, such as being moved to a nursing home. Additionally due to physiological changes, comorbid conditions, and medications such as blood-thinners, fractures and bruising can result from even minimal trauma in older adults making it difficult to differentiate between accidental and inflicted trauma. Unlike the well described findings shown to be suggestive of child abuse, injury patterns and radiological findings suggestive of elder abuse are only beginning to be described.[34,35] An estimated 39% of cases of elder abuse are neglect,[36] which may be a particularly difficult form of abuse to identify because the clinical manifestations of neglect may look similar to progression of an illness occuring despite appropriate care.

Furthermore, emergency physicians may be less aggressive about diagnosing elder abuse because of a lack of formal training in recognizing elder abuse, because they tend to focus

on the immediate medical problem and less on identifying underlying conditions, or because they are unsure about the necessary actions to improve outcomes for patients.[37] Finally, the desire to ensure timely care for all patients and volume-based reimbursement mechanisms incentivize U.S. emergency physicians to make rapid dispositions. Assessing patients for elder abuse takes time, and acting on a suspicion of elder abuse to notify adult protective services (APS) and ensure the patient's immediate safety is almost certain to delay disposition.

The aforementioned challenge of recognizing if a patient is or is not a victim of elder abuse raises a key challenge in this work: any method used to identify elder abuse, must also weigh the harms of falsely identifying elder abuse when it is not present and the risks associated with over diagnosis. One solution to this problem is that screening instruments should be used not to define the presence of elder abuse but, rather, to define patients who appear to be *possible* victims of elder abuse, triggering a more careful assessment by an ED clinical provider or social worker rather than an immediate call to APS. Of course any such approach will need to be mindful of mandatory reporting laws, which typically require APS referral for any patients for whom there is a reasonable cause for concern.

An alternative explanation for the extremely low prevalence of the diagnosis of elder abuse in these datasets is that emergency providers are making the diagnosis of elder abuse, or at least suspecting it, and possibly reporting their concerns to APS, but not recording elder abuse as a formal diagnosis which translates into an ICD-9 diagnosis code. Although this explanation likely partly explains the low prevalence of the diagnosis of elder abuse in these datasets, we believe this explanation is inadequate. Child abuse in the US has an estimated prevalence of 5%[38] which is similar to the estimated prevalence of elder abuse. But, among children aged 0 to 3, the percentage of visits in which child abuse is diagnosed in NEDS is 1.2%.[39] This is 100 times the percentage of visits diagnosed with elder abuse. In NEDS the estimated prevalence of intimate partner violence (IPV) among women aged 18–64 years is 0.07%.[20,30] Thus, the percentage of visits resulting in a diagnosis of IPV is 5 times the percentage of visits by older adults diagnosed with elder abuse, even though the estimated 1 year prevalence of IPV among women in the US (1.3%) is 4 times lower than the lowest estimates of the prevalence of elder abuse among community dwelling older adults.[40] The substantially higher rates of diagnosis of child abuse and IPV in recent analyses of NEDS suggests that the low rate of diagnosis of elder abuse results from a failure of emergency providers to identify this problem rather than a failure of the dataset to capture diagnoses being made by physicians.

Our findings from the NEDS analysis allow us to examine associations between patient and hospital characteristics and the diagnosis of elder abuse. Consistent with other work, women in the NEDS sample were more likely to be diagnosed with elder abuse, and the strength of association was similar to what is described in non-ED settings.[12,41] A prior study found lower rates of elder abuse with advancing age,[42] we observed this association using our broad definition of elder abuse, but not the restricted definition. Our analysis suggests that neglect and physical abuse are more often diagnosed in the ED than sexual or psychological abuse. The nearly three fold increased odds of elder abuse among patients with contusions in this study is consistent with prior research,[33,35] and is likely already a factor that prompts

consideration of abuse for some providers. The finding that victims of elder abuse are more likely to be admitted, and once admitted, have longer lengths of stay, suggests that interventions are occurring to address the abuse, or, alternatively, suggest an opportunity for interventions. Our findings also illustrate there is variation in elder abuse diagnoses across hospital characteristics, including hospital region and teaching status. Because of the very low proportion of cases identified relative to the presumed prevalence among these patients, it is not possible to know whether these associations indicate settings where there are higher percentages of visits made by victims of elder abuse or settings in which the diagnosis is made more frequently.

A strength of this study is the very large sample size in the NEDS which identified over 3,000 cases of elder abuse across the United States. A second strength is the analysis of two different nationally representative datasets with slightly different data elements. The results from these two datasets, including a total of 4 cases of elder abuse diagnosed over a period of 6 years in NAHMCS and a similarly small proportion of cases in NEDS, provide similar estimates to those reported in Singapore, which further strengthens the validity of our findings.

This study has several limitations. Our estimates are based on ICD-9 diagnosis codes, which may not capture all visits in which elder abuse was suspected or even acted on by the emergency provider.[43] There is no ICD-9 code for possible or suspected abuse, nor is there a code for financial exploitation, an increasingly prevalent type of elder abuse.[9,44] We did not have information on chief complaint, functional status, mode of arrival, or who lives with the patient, all of which could be important in understanding which patients are likely to be victims of elder abuse. Another limitation is the inability to estimate prevalences in racial minorities (race is not recorded in NEDS), who may be at higher risk of elder abuse.[12] Also, our multivariable analysis groups all types of elder abuse into one aggregate outcome, but the predictors of elder abuse diagnosis may differ depending on the type of abuse.[45]

Although there are limitations to NEDS and NAHMCS, both have the potential to provide important information on temporal changes in the diagnosis of elder abuse. Our results also have important implications for multiple stake-holders. For educators and guideline developers, there is a need for the development of methods to efficiently identify elder abuse in the ED, and develop interventions which improve outcomes for these patients.[46,47] A possible way to approach the challenge of identifying elder abuse in the ED is routine screening of all older adults or targeted screening of high risk patients. Defining a high risk subgroup of patients will require further prospective work to characterize the clinical presentation of victims of elder abuse. The development of screening strategies must also consider who would administer the screener and consider the benefits of true positives and the harms of misclassifcation. In regard to the former, we think the nurse, rather than the triage nurse, is the person best positioned to identify elder abuse. For policy-makers and payers, there is a need to improve the confidence in population-based estimates of elder abuse in the ED setting. Data sources like NEDS or NHAMCS provide powerful disease surveillance opportunities but only if the data accurately capture the diagnosis. More specific diagnosis codes in ICD-10 designating suspected abuse as well as changes in Diagnosis Related Groups (DRG) reimbursements have been proposed.[48,49] Given likely limitations to

routine screening, a team approach that leverages the various skills and vantage points of all care providers that intersect with the patients in the ED may be necessary.[50] Given the large societal cost of elder abuse, additional federal funding to develop and implement screening tools may be warranted.

CONCLUSION

Across United States EDs, a formal diagnosis of elder abuse is made in less than 0.02% of visits by patients aged 60 years and older despite an estimated prevalence of elder abuse in the community of 5–10%. Our findings expose, on a national-level, the failure of US EDs to address a major public health problem. Efforts to improve the identification of elder abuse among ED patients and link these patients to effective interventions are needed.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1

Weighted number of cases and estimated period prevalence of elder abuse diagnosis in US Emergency Departments in calendar year 2012, stratified by region, abuse category, and hospital teaching status using the Nationwide Emergency Department Sample (NEDS).

	Cases 95% CI	Population Size	Prevalence	Prevalence Range
All Cases				
Restricted Definition[a]	3,846 (3,434–4,258)	29,056,673	0.013%	0.012%–0.015%
Broad Definition[b]	7,154 (6,090–8,219)	29,056,673	0.025%	0.021%–0.028%
By Region[c]				
Northeast	636 (480–792)	5,688,872	0.011%	0.008%–0.014%
Midwest	848 (639–1057)	6,607,365	0.013%	0.010%–0.016%
South	1,476 (1,225–1726)	11,196,657	0.013%	0.011%–0.015%
West	886 (685–1,088)	5,563,780	0.016%	0.012%–0.020%
By Elder Abuse Type[c,d]				
Neglect	1,265 (1,088–1,442)	29,056,673	0.004%	0.004%–0.005%
Physical Abuse	1,239 (1,040–1,439)	29,056,673	0.004%	0.004%–0.005%
Adult Maltreatment, Unspecified	582 (439–727)	29,056,673	0.002%	0.002%–0.003%
Other Forms of Abuse and Neglect	401 (310–491)	29,056,673	0.001%	0.001%–0.002%
Emotional/Psychological Abuse	339 (233–445)	29,056,673	0.001%	0.001%–0.002%
Sexual Abuse	131 (82–181)	29,056,673	0.001%	0.000%–0.001%
By Teaching Hospital Status[c]				
Metropolitan Non-teaching	1,302 (1,107–1,497)	12,256,374	0.011%	0.009%–0.012%
Metropolitan Teaching	1,927 (1,584–2,270)	11,235,492	0.017%	0.014%–0.020%
Non-metropolitan	617 (492–742)	5,564,807	0.011%	0.009%–0.013%

[a] Restricted definition: adult maltreatment, unspecified (995.80), physical abuse (995.81), emotional/psychological abuse (995.82), sexual abuse (995.83), neglect nutritional (995.84), and other forms of abuse and neglect (995.85).

[b] Broad definition included restricted definition as well as: history of of physical abuse and rape (V15.41), emotional abuse (V15.42), other abuse (V15.49), marital problem (V61.10), counseling for the victim of spousal abuse (V61.11), family conflict (V61.80), and interpersonal relationship problems, not elsewhere classified (V62.81).

[c] Estimates stratified by region, type, and teaching status using the restricted definition.

[d] Elder abuse types are not mutually exclusive

Table 2

Weighted patient and hospital characteristics of all Emergency Department (ED) visits and ED visits diagnosed with elder abuse, 2012 Nationwide Emergency Department Sample (NEDS)

	All ED visits aged 60 and older (Weighted, n= 29,056,673) % (95% CI)	ED visits diagnosed with elder abuse (Weighted, n= 3,846) % (95% CI)
Age, mean (95% CI)	74.0 (73.9–74.2)	74.9 (74.1–75.8)
Age categories (years)		
60–64	20.5 (20.1–20.9)	18.3 (15.5–21.5)
65–69	18.0 (17.8–18.2)	15.8 (13.3–18.6)
70–74	15.4 (15.3–15.5)	16.5 (14.2–19.1)
75–79	14.3 (14.1–14.4)	14.9 (12.6–17.4)
80–84	13.7 (13.5–13.8)	12.2 (10.1–14.7)
85–89	10.9 (10.7–11.2)	13.9 (11.6–16.4)
>90	7.3 (7.1–7.5)	8.5 (6.7–10.9)
Female	57.4 (57.2–57.6)	73.7 (70.7–76.4)
Income quartile, USD		
$ 1–38,999	29.4 (27.5–31.3)	36.8 (32.6–41.2)
$ 39,000– 47,999	25.3 (23.9–26.8)	24.3 (21.0–27.9)
$ 48,000– 62,999	23.6 (22.1–25.3)	22.4 (18.2–27.2)
$ >63,000	21.7 (19.6–23.9)	16.5 (13.5–20.0)
Charlson Comorbidity Index		
<1	48.3 (47.6–49.0)	44.1 (40.2–48.2)
1–2	23.7 (23.4–24.0)	26.7 (23.5–30.2)
2–3	12.2 (12.1–12.4)	12.6 (10.4–15.2)
>3	15.8 (15.4–16.2)	16.5 (14.2–19.2)
Common ED diagnosis[a]		
Cardiac dysrhythmias	17.1 (16.7–17.4)	17.4 (14.7–20.4)
Chronic obstructive pulmonary disease	13.6 (13.3–13.9)	13.6 (11.4–16.2)
Congestive heart failure, nonhypertensive	12.1 (11.8–12.4)	12.7 (10.6–15.2)
Urinary tract infection	10.2 (10.0–10.4)	22.0 (19.2–25.1)
Spondylosis, other back problems	8.2 (8.0–8.4)	8.0 (6.2–10.4)
Non-specific chest pain	7.1 (7.0–7.3)	5.8 (4.3–7.8)
Contusion/superficial injury	6.4 (6.2–6.5)	15.3 (12.9–18.1)
Pneumonia	5.7 (5.6–5.8)	4.9 (3.5–6.7)
Abdominal pain	5.1 (5.0–5.3)	1.6 (0.9–2.8)
Septicemia	3.3 (3.2–3.4)	7.5 (5.9–9.5)
Hospital region		
Northeast	19.6 (17.8–21.5)	16.5 (13.1–20.6)
Midwest	22.7 (21.0–24.6)	22.0 (17.7–27.1)
South	38.5 (36.1–41.1)	38.4 (33.4–43.7)
West	19.1 (17.4 –21.0)	23.0 (18.8–27.9)
Hospital type		

	All ED visits aged 60 and older (Weighted, n= 29,056,673) % (95% CI)	ED visits diagnosed with elder abuse (Weighted, n= 3,846) % (95% CI)
Metropolitan non-teaching	42.2 (39.9–44.5)	33.9 (29.4–38.6)
Metropolitan teaching	38.7 (36.1–41.3)	50.1 (44.8–55.4)
Non-metropolitan	19.2 (17.8–20.5)	16.0 (13.1–19.5)
Disposition		
Discharged	58.2 (57.4–59.0)	32.8 (28.7–37.1)
Admitted	34.7 (33.9–35.6)	58.8 (54.6–63.0)
Transfer	5.5 (5.2–5.9)	7.8 (6.1–10.0)
Left AMA	0.9 (0.9–1.0)	0.3 (0.1–1.0)
Died in ED	0.4 (0.4–0.4)	0.2 (0.1–0.9)
Length of stay (days), mean (95% CI)	5.08 (5.0–5.2)	7.97 (6.9–9.1)

[a]Common ED diagnoses groups, ordered most to least common, identified using Clincial Classification Software (CCS) developed by the Agency for Health Research and Quality HCUPnet data tool.

Table 3

Adjusted odds ratios for elder abuse diagnosis in US EDs in calendar year 2012 (n= 23,097,740 ED visits). Odds ratios are generated from a single logistic model; all odds ratios are adjusted for all other variables reported.

	Odds ratio (95% CI)	p Value
Female	1.95 (1.68–2.26)	<0.001
Age, (years)		
60–64	Reference	
65–69	0.97 (0.76–1.23)	0.78
70–74	1.14 (0.89–1.47)	0.29
75–79	1.06 (0.82–1.37)	0.64
80–84	0.87 (0.66–1.15)	0.32
85–89	1.15 (0.88–1.52)	0.30
>90	1.00 (0.71–1.42)	0.99
Charlson comorbidity index, categories		
<1	Reference	
1–2	1.24 (1.02–1.51)	0.03
2–3	1.11 (0.86–1.43)	0.44
>3	1.13 (0.89–1.43)	0.32
Common ED diagnoses[a,b]		
Non-specific chest pain	0.95 (0.69–1.30)	0.73
Contusion/superficial injury	2.91 (2.36–3.57)	<0.001
Chronic obstructive pulmonary disease	1.05 (0.85–1.30)	0.66
Urinary tract infection	2.21 (1.84–2.65)	<0.001
Cardiac dysrhythmias	0.99 (0.81–1.21)	0.93
Abdominal pain	0.34 (0.20–0.58)	<0.001
Spondylosis, other back problems	0.96 (0.73–1.26)	0.76
Pneumonia	0.73 (0.51–1.03)	0.08
Septicemia	1.92 (1.44–2.55)	<0.001
Congestive heart failure, nonhypertensive	0.97 (0.77–1.22)	0.78
Hospital Region		
Northeast	Reference	
Midwest	1.23 (0.90–1.68)	0.20
South	1.26 (0.98–1.63)	0.08
West	1.62 (1.21–2.17)	0.001
Hospital Teaching Status		
Metropolitan non-teaching	Reference	
Metropolitan teaching	1.74 (1.42–2.14)	<0.001
Non-metropolitan	1.11 (0.88–1.41)	0.37

[a]10 most common ED diagnosis groups, ordered most to least common, identified using Clinical Classification Software (CCS) developed by the Agency for Health Research and Quality HCUPnet data tool.

[b] Each diagnosis is a discrete variable in the model; diagnoses are not mutually exclusive. The referent group for each diagnosis are those patients without the diagnosis.