Economic Burden of Informal Caregiving Associated With History of Stroke and Falls Among Older Adults in the U.S.

Heesoo Joo, PhD[1,2], **Guijing Wang, PhD**[2], **Sue Lin Yee, MPH, MA**[3], **Ping Zhang, PhD**[4], and **David Sleet, PhD**[5,6]

[1]IHRC Inc., Atlanta, Georgia [2]Division for Heart Disease and Stroke Prevention, Centers for Disease Control and Prevention, Atlanta, Georgia [3]Center for Global Health, Centers for Disease Control and Prevention, Atlanta, Georgia [4]Division of Diabetes Translation, Centers for Disease Control and Prevention, Atlanta, Georgia [5]Bizzell Group, LLC, Lanham, Maryland [6]Division of Unintentional Injury Prevention, Centers for Disease Control and Prevention, Atlanta, Georgia

Abstract

Introduction—Older adults are at high risk for stroke and falls, both of which require a large amount of informal caregiving. However, the economic burden of informal caregiving associated with stroke and fall history is not well known.

Methods—Using the 2010 Health and Retirement Study, data on non-institutionalized adults aged 65 years (N=10,129) in 2015–2017 were analyzed. Two-part models were used to estimate informal caregiving hours. Based on estimates from the models using a replacement cost approach, the authors derived informal caregiving hours and costs associated with falls in the past 2 years for stroke and non-stroke persons.

Results—Both the prevalence of falls overall and of falls with injuries were higher among people with stroke than those without (49.5% vs 35.1% for falls and 16.0% vs 10.3% for injurious falls, p<0.01). Stroke survivors needed more informal caregiving hours than their non-stroke counterparts, and the number of informal caregiving hours was positively associated with non-injurious falls and even more so with injurious falls. The national burden of informal caregiving (2015 U.S. dollars) associated with injurious falls amounted to $2.9 billion (95% CI=$1.1 billion, $4.7 billion) for stroke survivors (about 0.5 million people), and $6.5 billion (95% CI=$4.3 billion, $8.7 billion) for those who never had a stroke (about 3.6 million people).

Conclusions—In U.S. older adults, informal caregiving hours and costs associated with falls are substantial, especially for stroke survivors. Preventing falls and fall-related injuries, especially among stroke survivors, therefore has potential for reducing the burden of informal caregiving.

Address correspondence to: Heesoo Joo, PhD, Division of Global Migration and Quarantine, U.S. Centers for Disease Control and Prevention, 1600 Clifton Road NE, Mailstop E-03, Atlanta GA 30333. hjoo@cdc.gov.

INTRODUCTION

Older adults are at high risk for stroke and falls.[1–3] Each year in the U.S., one third of adults aged 65 years experience a fall.[4] An estimated 6.6 million Americans aged 20 years are living with a stroke in 2012.[1] In 2009, more than two thirds of the one million stroke-related hospitalizations that year were among people aged 65 years.[1,5] Falls and fall-related injuries are common complications among stroke survivors.[6,7] The 2-year risk of falls among stroke survivors was 46%.[8]

Both stroke and falls rank among the leading causes of disability in the U.S. In terms of their contributions to years lived with disability, falls ranked 15th in the U.S. in 1990 and 11th in 2010, while the rank for stroke changed from 23rd to 17th over the same time period.[9] Among those aged 65 years, one of five falls are severe incidents, including broken bones and head injuries.[10]

Not surprisingly, the disabilities caused by stroke and falls frequently are permanent, and care involves support for both the patient's physical and emotional needs. Thus, stroke and falls often require a large amount of informal caregiving provided by relatives or unpaid nonrelatives in addition to paid professionals.[11–15] Stroke survivors in the U.S. used on average 12–22 hours of informal caregiving each week.[14] Although a study found the direct medical costs in the U.S. for nonfatal fall injuries among those aged 65 years to be $31 billion,[16] neither the burden of informal caregiving among those who had fall-related injuries was examined, nor was the economic burden of informal caregiving estimated by stroke and fall status. To address these gaps, in the present study the authors estimate hours of informal caregiving and the economic burden associated with stroke and falls among U.S. older adults using nationally representative samples.

METHODS

Study Sample

The authors used the 2010 Health and Retirement Study (HRS), a biennial, nationally representative longitudinal household survey of U.S. residents aged >50 years.[17] The study sample was limited to non-institutionalized individuals aged 65 years at the time of the interview (Figure 1, N=10,129).

Measures

Stroke survivors were defined as those who self-reported a stroke during their lifetime. HRS survey participants aged 65 years were asked whether they had fallen in the last 2 years. Those who reported falling were asked whether they had sustained serious injuries that required medical treatment because of these falls. Based on the responses, two indicator variables were defined. The first variable was whether a respondent self-reported a fall in the last 2 years but did not report severe injuries due to the fall, whereas the second variable was whether a respondent self-reported at least one injurious fall. Stroke survivors without any falls in the last 2 years were used as the baseline. The authors obtained the 2010 HRS data in 2014 and all analyses were conducted between 2015 and 2017.

Informal caregiving was defined as caregiving activities provided by relatives, with or without compensation, or by unpaid non-family members.[18] These activities included providing support for activities of daily living or instrumental activities of daily living.[19] Weekly hours of informal caregiving were defined as hours provided by all informal caregivers, based on reports by respondents of the number of hours per day and days during the last month that they received informal caregiving. For respondents with multiple informal caregivers, the authors calculated a weekly total of informal caregiving hours using all of these caregivers. The daily hours of informal caregiving per caregiver was limited to a maximum of 16.[13,19] Days per month were divided by 4.3 to obtain a weekly average; and for respondents who needed help every day, it was assumed 7 days per week.[20]

Statistical Analysis

The authors used two-part models to estimate the hours of informal caregiving associated with injurious and non-injurious falls, by stroke status.[13,19] Two-part models were applied because 89% of the study sample without stroke and 67% of the study sample with stroke did not utilize informal caregiving (Tables 1 and 2), and the distribution of informal caregiving hours in both groups was skewed. The model was adapted in several previous studies to estimate the economic burden of informal caregiving for chronic diseases, all of which used data with a skewed distribution.[13,19,20]

In the first part of the model, the authors used a logit model to estimate the associations of injurious and non-injurious falls with the likelihood of receiving informal caregiving. In the second part, the authors estimated the associations of injurious and non-injurious falls with hours of informal caregiving among those who used informal care by employing ordinary least squares regression with log-transformed hours of informal caregiving. In both parts of the model, the authors controlled for race/ethnicity (non-Hispanic white, non-Hispanic black, Hispanic, and other races); age (65–74, 75–84, and ≥85 years); sex (male or female); marital status (currently married or not); education (less than high school, high school graduate, some college graduate, and college and more); numbers of self-reported chronic conditions (zero to one, two to three, and four to 11); net total non-housing wealth (quartiles from the sample); and usage of formal caregiving (currently use formal caregiving or not). The model included 11 chronic conditions: hypertension; diabetes; cancer; lung disease; heart disease; any emotional, nervous, or psychiatric problems; arthritis; dementia; urinary incontinence; visual impairment (corrected eyesight self-reported as "legally blind" or "poor"); and hearing impairment (corrected hearing ability self-reported as "poor").

The authors estimated two-part models for two separate groups: (1) stroke survivors and (2) those who never had a stroke. A two-part model using the total sample (1 and 2) was also estimated. The conceptual model for the analysis is shown in Appendix Figure 1 (available online). The results from both parts of the model were used to estimate the average marginal associations of injurious and non-injurious falls with weekly hours of informal caregiving. Stata, version 14.0, was used for all analyses.

The authors estimated the economic burden of informal caregiving by adapting a replacement cost approach.[13,21] This approach assumes that the value of informal caregiving is equivalent to the typical wage of paid workers who provide similar services.[14] The 2015

median hourly wage of home health aides ($10.54) reported by the Bureau of Labor Statistics as the unit cost of informal caregiving was used.[13,22] Also, the authors used the federal minimum wage rate ($7.25 per hour) as of 2015 as a lower-bound estimate to conduct a sensitivity analysis.[23,24]

The authors estimated the national economic burden of informal caregiving associated with injurious and non-injurious falls according to stroke status by using population prevalence estimates among those aged 65 years from the 2010 HRS.[13] The annual national economic burden of informal caregiving was estimated by multiplying the weekly cost of informal caregiving by the number of individuals with injurious and non-injurious falls in the past 2 years, and the numbers of weeks in 1 year (i.e., 52), assuming that informal caregiving was required for an entire year.

RESULTS

Among the 10,129 study subjects, 970 were stroke survivors (Figure 1). In all, 49.5% of stroke survivors reported that they had had at least one fall in the past 2 years, and 149, or 16.0% of the stroke survivors, had a fall-related injury during this period. In the past 2 years among those who had never had a stroke, 10.3% had an injurious fall, whereas 24.8% had a non-injurious fall. All percentages were weighted by population sampling weight from the 2010 HRS data.

Among both stroke survivors and those who never had a stroke, those who had a fall in the past 2 years were more likely to be non-Hispanic white, and to have four or more chronic health conditions, than those who had no falls in the past 2 years (Tables 1 and 2). Also, those who had a fall in the past 2 years were more likely to use informal and formal caregiving services than those who did not have a fall during this period. Among stroke survivors, age, education, marital status, and net total non-housing wealth did not differ significantly between those who had had and those who had not had a fall during the period of interest (Table 2). In addition, among those who had never had a stroke, those who had a fall in the past 2 years were less likely to be married, less likely to be male, and older than their counterparts who did not fall in the past 2 years (Table 1).

Stroke survivors used more hours of informal caregiving than their non-stroke counterparts did. Although stroke survivors used an average of 11.3 hours of informal caregiving per week, their non-stroke counterparts reported only 2.8 hours ($p<0.01$; Appendix Figure 2, available online). Hours of informal caregiving were positively associated with non-injurious falls and even more with injurious falls. Among those without stroke, people with no falls in the past 2 years reported an average of 1.7 hours of informal caregiving; this number was 4.1 hours for those with a fall but no injury and 7.1 hours for those with a fall that caused an injury ($p<0.01$; Table 1). A similar pattern was seen for stroke survivors; those without a fall in the past 2 years averaged 7.1 hours of informal caregiving per week, whereas those with non-injurious falls used 12.9 hours and those with a fall causing an injury used 21.1 hours ($p<0.01$; Table 2; Appendix Figure 2, available online).

Table 3 shows the estimates from the two-part models for hours of informal caregiving and economic burden associated with falls and fall-related injuries. After controlling for potential confounders, among people with stroke the weekly duration of informal caregiving was 10.5 hours ($p<0.01$) higher for those with injurious falls than it was for those who had not fallen in the past 2 years. Employing the median wage of home health aides in 2015 ($10.54/hour), and using for comparison adults with no falls, the authors estimated that a stroke survivor who had fall-related injuries on average had an additional economic burden of $5,777 per year (95% CI=$2,247, $9,306) for informal caregiving. Applying the results to the estimated U.S. population of stroke patients from the 2010 HRS, the economic burden of informal caregiving associated with fall-related injuries among elderly stroke survivors (about 0.5 million people) was $2.9 billion per year (95% CI=$1.1 billion, $4.7 billion). For people without stroke, in comparison with those without falls, hours of weekly informal caregiving due to non-injurious falls and to injurious falls equaled 1.7 ($p<0.01$), corresponding to an annual national economic burden of $8.1 billion (95% CI=$4.6 billion, $11.5 billion), and 3.3 ($p<0.01$), respectively, the latter corresponding to an annual national economic burden of $6.5 billion (95% CI=$4.3 billion, $8.7 billion).

When the lower-bound value estimates of informal caregiving ($7.25/hour) was used, the economic burden of informal caregiving associated with fall-related injuries among elderly stroke survivors was about $2.0 billion per year, and the annual burden associated with falls without injuries among the same population was about $2.2 billion (Appendix Table 3, available online). For those who never had a stroke, the annual national economic burden of informal caregiving associated with falls without injuries and falls with injuries was $5.6 billion and $4.5 billion, respectively.

DISCUSSION

In this study, the authors found that both non-injurious falls and falls that produced an injury were positively associated with the burden of informal caregiving among older adults in the U.S. Although stroke survivors without falls in the past 2 years reported an average 7.1 hours a week of informal caregiving, the estimates of an additional weekly 10.5 hours of informal caregiving associated with injurious falls for stroke survivors suggests that injurious falls more than doubled the informal caregiving burden among stroke survivors who experienced such falls.

This study has some significant strengths, including being the first study examining the costs of informal caregiving associated with falls among older adults. The findings may suggest potential economic benefit to society associated with fall intervention programs. Several types of fall prevention interventions are known to reduce the risk of falling among older adults. Group and home-based exercise programs as well as interventions involving an assessment of home safety have been shown to reduce the rate of falls and risk of falling.[25] A home safety assessment, including the addition of grab bars near a tub, shower, and a toilet, and installation of railings on both sides of stairs,[10] can help maintain the independent living of care recipients.[26]

In addition, the present study examined the burden of informal caregiving associated with falls by stroke status and found that the stroke survivors with injurious falls used more informal caregiving than stroke survivors without falls. This finding underscores the importance of fall prevention policies, guidelines, and programs that are tailored to specific post-stroke deficits among elderly survivors of stroke.[27] Although general fall precautions are insufficient for stroke survivors, stroke-specific interventions to prevent falls are not well developed yet.[28] Because the post-stroke deficits vary by location of stroke and damaged brain, it is important to develop a patient-specific fall prevention program among stroke survivors. For instance, those who have had a left-sided stroke generally have right-sided weakness, including right-side visual deficits.[28] Putting the right side of the bed against a wall and thus ensuring getting out of bed from the left side (unaffected side) may prevent falls for those who have had a left-side stroke.[28] The findings also emphasize the value of benefits of a healthcare plan, which helps stroke survivors manage their recovery.

Another strength of this study is its use of a nationally representative data set and two-part models to estimate the economic burden of informal caregiving. Because the data are able to provide population estimates, one could estimate the national-level burden of informal caregiving associated with falls. Those with injurious falls used more informal caregiving hours than those whose falls did not cause an injury. However, the number of older adults suffering a fall that did not cause injury was substantially larger than the number who were injured in a fall. As a consequence, the national estimates showed that the economic burden of informal caregiving associated with falls that did not cause an injury was higher than the economic burden with injurious falls ($12.0 billion vs $9.6 billion). This finding emphasizes the importance of preventing both injurious and non-injurious falls.

Limitations

There are some limitations to this study that should be noted. First, the study used self-reported information about falls, stroke, and other chronic conditions. Thus, there could be a self-reporting bias in the data. Although the authors tried to control many chronic health conditions, there is still a possibility that omitted variables, such as mobility issues, which can be correlated with both falls and informal caregiving, might have caused possible bias in the analyses. The authors assumed activities of daily living/instrumental activities of daily living, which is highly correlated with mobility, as mediators between fall and informal caregiving in the conceptual model, and did not use them for a predictor of informal caregiving.

Another limitation is that the self-reported fall indicators captured falls in the past 2 years without information on timing. Unlike a stroke, which usually leaves long-term disability after its onset, non-injurious fall status 1–2 years earlier may not be associated with the current burden of informal caregiving. Also, although it was assumed that typically stroke preceded recent falls in the sample, the authors acknowledge that some people may have had a first-ever stroke in the past 2 years and had a fall before they had a stroke.

Because the authors do not have a proper unit cost measure for an opportunity cost approach, which estimates the value of informal caregivers' foregone time, they could not compare the results from a replacement cost approach to the results from the opportunity

cost approach. A range of estimates is provided by using a federal minimum wage as a lower-bound estimate and a median wage of home health aide as a baseline estimate. The latter may be conservative because the cost of hiring a home health aide can include taxes and fringe benefits as well as agency fees.

One should also note that this study could not compare the burden of informal caregiving before and after falls. After injurious falls, older adults may need to move into formal services rather than using informal care as they did before because of higher demands of caregiving.[29] Examining the needs for informal and formal caregiving before and after falls would be an important topic.

CONCLUSIONS

This study found that the economic burden of informal caregiving associated with falls was substantial among both stroke survivors and those who had never had a stroke. Stroke survivors are more likely to have both falls in general and injurious falls in the past 2 years. Falls are associated with a greater burden of informal caregiving among stroke survivors than among those who had not experienced a stroke. Developing strategies for preventing falls and fall-related injuries among older adults, especially among stroke survivors, has the potential for reducing the burden of informal caregiving in the U.S.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

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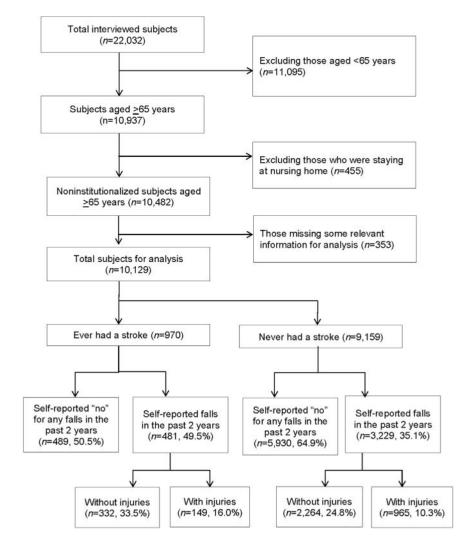
Figure 1. Process for selecting study population in 2010 Health and Retirement Study
Note: All percentages were weighted by population.

Table 1

Sample Characteristics of People With No History of Stroke: 2010 Health and Retirement Study

| Parameters | Total, % (N=9,159) | No falls, % (n=5,930) | Falls in the past 2 years[a] | | | | | |
			Without injury (n=2,264) %	p-value	With injury (n=965) %	p-value	Total (n=3,229) %	p-value
Race/ethnicity								
Non-Hispanic white	84.7	84.0	86.5	**0.008**	85.0	0.380	86.1	**0.004**
Non-Hispanic black	7.4	8.2	5.9	**<0.001**	6.1	**0.015**	6.0	**<0.001**
Hispanic	6.3	6.2	6.1	0.957	7.5	0.128	6.5	0.528
Other races	1.6	1.7	1.5	0.543	1.4	0.526	1.5	0.455
Male	43.3	45.0	44.3	0.630	30.0	**<0.001**	40.1	**0.001**
Age, years								
65–74	57.1	60.0	52.9	**<0.001**	48.5	**<0.001**	51.6	**<0.001**
75–84	31.5	30.3	33.7	**0.008**	33.8	**0.043**	33.7	**0.001**
85	11.4	9.7	13.4	**<0.001**	17.7	**<0.001**	14.7	**<0.001**
Education								
Less than high school	20.2	19.4	20.9	0.250	23.1	0.017	21.6	0.062
High school	35.1	35.0	36.3	0.341	32.7	0.243	35.2	0.876
Some college	21.3	20.9	21.8	0.466	22.6	0.256	22.0	0.287
College and more	23.4	24.7	21.0	**0.008**	21.6	0.075	21.2	**0.002**
Currently married	56.3	58.9	53.6	**<0.001**	46.8	**<0.001**	51.6	**<0.001**
Number of chronic conditions[b]								
0–1	22.1	26.0	16.1	**<0.001**	11.8	**<0.001**	14.8	**<0.001**
2–3	48.2	50.1	45.8	**0.007**	41.9	**<0.001**	44.7	**<0.001**
4	29.7	23.9	38.1	**<0.001**	46.3	**<0.001**	40.5	**<0.001**
Total non-housing wealth (U.S. $)								
6,000	20.5	19.2	21.9	0.060	25.2	**0.003**	22.9	**0.007**
6,001–66,000	23.3	23.1	24.2	0.330	22.7	0.828	23.8	0.521
66,001–306,000	27.2	28.1	25.3	**0.039**	26.1	0.349	25.5	0.061

Parameters	Total, % (N=9,159)	No falls, % (n=5,930)	Falls in the past 2 years[a]					
			Without injury (n=2,264)		With injury (n=965)		Total (n=3,229)	
			%	*p*-value	%	*p*-value	%	*p*-value
>306,000	29.0	29.6	28.6	0.496	26.0	0.052	27.8	0.168
Formal caregiving								
Utilization	2.3	1.4	3.3	**0.002**	6.3	**<0.001**	4.1	**<0.001**
Hours per week	0.8	0.4	0.9	**0.018**	3.0	**0.001**	1.5	**< 0.001**
Informal caregiving								
Utilization	11.4	7.4	16.8	**< 0.001**	23.7	**< 0.001**	18.9	**< 0.001**
Hours per week	2.8	1.7	4.1	**< 0.001**	7.1	**< 0.001**	5.0	**< 0.001**

Note: Boldface indicates statistical significance (*p*<0.05).

[a]
p-values compare values in "No falls" column to values in each subcolumn of "Falls in past 2 years."

[b]
Authors included 11 chronic conditions: hypertension; diabetes; cancer; lung disease; heart disease; any emotional, nervous, or psychiatric problems; arthritis; dementia or Alzheimer's disease; urinary incontinence; visual impairment (corrected eyesight reported as "poor" or "legally blind"); and hearing impairment (corrected hearing ability reported as "poor").

Table 2

Sample Characteristics of People Who Had Had a Stroke: 2010 Health and Retirement Study

Parameters	Total, % (N=970)	No falls, % (n=489)	Falls in the past 2 years[a]					
			Without injury (n=332)		With injury (n=149)		Total (n=481)	
			%	p-value	%	p-value	%	p-value
Race/ethnicity								
Non-Hispanic white	83.0	80.4	84.3	0.158	88.8	**0.010**	85.7	**0.035**
Non-Hispanic black	10.8	12.9	9.5	0.170	7.1	**0.030**	8.7	0.066
Hispanic	4.8	5.2	4.5	0.534	4.0	0.486	4.3	0.409
Other races	1.3	1.5	1.8	0.724	0.0	0.059	1.2	0.771
Male	49.6	52.6	51.7	0.832	35.9	**0.001**	46.6	0.095
Age, years								
65–74	40.5	43.8	36.3	0.063	39.0	0.311	37.1	0.053
75–84	39.5	36.9	44.0	0.120	38.0	0.816	42.1	0.196
85	20.0	19.3	19.7	0.916	23.0	0.261	20.8	0.623
Education								
Less than high school	26.4	24.0	28.4	0.237	29.6	0.239	28.9	0.166
High school	36.5	38.2	35.6	0.476	32.8	0.249	34.7	0.312
Some college	18.4	18.0	19.2	0.664	18.1	0.980	18.8	0.703
College and more	18.7	19.8	16.8	0.344	19.5	0.959	17.6	0.456
Currently married	50.1	51.4	50.7	0.861	44.9	0.313	48.8	0.555
Number of chronic conditions[b]								
0–1	8.5	12.6	5.3	**0.003**	2.2	**< 0.001**	4.3	**< 0.001**
2–3	38.3	46.8	29.7	**< 0.001**	29.5	**0.003**	29.6	**< 0.001**
4	53.2	40.6	65.0	**< 0.001**	68.4	**< 0.001**	66.1	**< 0.001**
Total non-housing wealth, U.S. $								
6,000	28.8	27.3	28.7	0.667	33.9	0.215	30.4	0.373
6,001–66,000	27.4	26.7	31.2	0.257	21.9	0.302	28.2	0.688
66,001–306,000	23.9	24.3	22.3	0.662	25.7	0.768	23.4	0.826

Parameters	Total, % (N=970)	No falls, % (n=489)	Falls in the past 2 years[a]					
			Without injury (n=332)		With injury (n=149)		Total (n=481)	
			%	p-value	%	p-value	%	p-value
>306,000	19.9	21.7	17.8	0.240	18.5	0.510	18.1	0.225
Formal caregiving								
Utilization	11.7	7.8	12.5	0.082	21.9	**0.002**	15.6	**0.008**
Hours per week	3.6	3.8	3.3	0.766	3.6	0.915	3.4	0.808
Informal caregiving								
Utilization	32.4	20.7	38.8	**<0.001**	56.0	**<0.001**	44.3	**<0.001**
Hours per week	11.3	7.1	12.9	**0.008**	21.1	**0.001**	15.5	**<0.001**

Note: Boldface indicates statistical significance (*p*<0.05).

[a] *p*-values compare values in "No falls" column to values in each subcolumn of "Falls in past 2 years."

[b] Authors included 11 chronic conditions: hypertension; diabetes; cancer; lung disease; heart disease; any emotional, nervous, or psychiatric problems; arthritis; dementia or Alzheimer's disease; urinary incontinence; visual impairment (corrected eyesight reported as "poor" or "legally blind"); and hearing impairment (corrected hearing ability reported as "poor").

Table 3

Estimated Incremental Hours and Economic Burden of Informal Caregiving Associated With Falls With and Without Injuries, per Person

Model[a]/Fall status[b]	Weekly hours[c,d]	Per patient ($)[d,e]	National estimates ($ billion)[d,f]
		Burden of informal caregiving	
		Annual economic burden	
Stroke			
Falls without injuries	5.26 (−0.94, 11.46)	2,883 (−515, 6,281)	3.17 (−0.57, 6.91)
Fall with injuries	**10.54** (4.10, 16.98)	**5,777** (2,247, 9,306)	**2.89** (1.12, 4.65)
Non-stroke			
Falls without injuries	**1.70** (0.97, 2.42)	**932** (532, 1,326)	**8.11** (4.63, 11.54)
Fall with injuries	**3.28** (2.17, 4.39)	**1,798** (1,189, 2,406)	**6.47** (4.28, 8.66)
Total			
Falls without injuries	**2.12** (1.34, 2.90)	**1,162** (734, 1,589)	**11.50** (7.27, 15.74)
Fall with injuries	**4.06** (3.02, 5.11)	**2,225** (1,655, 2,801)	**9.35** (6.95, 11.76)

Note: Boldface indicates statistical significance ($p<0.05$).

[a]Authors conducted three two-part models separately, using different samples. The first model used stroke survivors only, the second used only those who never had a stroke, and the last model used all samples.

[b]Fall status is the main independent variable. Other independent variables used in the model is shown in footnote c.

[c]Estimated results are from two-part models with adjustment for race; gender; age; marital status; education; number of chronic diseases (0–1, 2–3, and >4); net total non-housing wealth; and usage of formal caregiving.

[d]Numbers in parentheses are the 95% CIs.

[e]Per-patient annual economic burden of informal caregiving associated with falls with and without injuries were estimated by multiplying total weekly hours by 52 weeks and then multiplying the product by median wages for health aides ($10.54/hour) supplied by the 2015 U.S. Bureau of Labor Statistics.

[f]National estimates were derived by multiplying the per capita annual economic burden of informal caregiving times the national estimate of people with stroke and without stroke aged 65 years from the 2010 Health and Retirement Study by their experience with falling.