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Healthcare expenditure on older adult non-fatal falls by state

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Abstract

Objectives: Falls are a leading preventable cause of death and injury among older adults (65+). Healthcare spending in the USA on non-fatal falls was estimated at $80 billion in 2020. We aim to estimate healthcare spending on older adult non-fatal falls by state.

Methods: Healthcare spending for all adults was derived from the 2020 Centers for Medicare and Medicaid Services (CMS) Health Expenditures by State of Residence files. These data covered three payor types: Medicare, Medicaid and private health insurance (PHI). Using the national 2020 CMS Health Expenditure by Age Group files, the national proportion of healthcare spending for older adults was calculated for each payor type. These national proportions were applied to each state's healthcare spending data to estimate healthcare spending for older adults in each state, adjusted for the proportion of older adults in each state. To estimate the proportion of older adult healthcare spending attributed to non-fatal falls, these adjusted values were combined with the falls-attributable expenditure factors calculated in Haddad (2024). The final state-level estimates of healthcare spending on non-fatal older adult falls were calculated for each payer type: Medicare, Medicaid and PHI. All estimates were inflated to 2023 dollars.

Results: Overall state-level spending on non-fatal falls ranged between $112.7 million in Alaska to $8.3 billion in Florida. Per-capita spending estimates ranged between $1085 in Utah to $2262 in Wisconsin.

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Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

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Conclusions: Measuring the cost of non-fatal falls at the state level can help inform regional differences and improve targeted fall prevention efforts.

INTRODUCTION

Unintentional falls are defined as a sudden, unplanned descent to the ground or lower level not caused by an intentional force (eg, being pushed). Unintentional falls among older adults (ages 65 and older) are a leading cause of preventable death and injury in the United States. Each year, one in four older adults reports falling, which resulted in 3.6 million emergency department visits and 1.2 million hospitalizations in 2022.[1–3] Over 41 000 older adults died from fall-related injuries in 2022, making it the top cause of injury death for this age group.[3] The consequences of a non-fatal fall, sustained by an older adult, may be serious and result in increased healthcare needs, procedures and costs, as well as decreased functional independence and overall quality of life.[4–7] In 2020, the USA spent an estimated $80 billion on healthcare for older adult nonfatal falls, with two-thirds paid for by Medicare alone.[8] In 2016, falls were the fifth most costly healthcare expenditure in the USA at an estimated $87.4 billion and ranked eighth for government funded healthcare spending at $46.7 billion.[9] Healthcare spending for falls increases at age 65, coinciding with greater use of government-funded health insurance in the USA[9].

To date, several studies have used varying data sources and methodology to estimate costs of older adult falls, with few focused on healthcare spending by state.[9–13] The purpose of this study was to estimate the healthcare spending on non-fatal older adult falls by state and payor type using similar methodology to previously published work using a fall attributable fraction of expenditure (FAFE).[1 8] We apply the national FAFE to the most recent Health Expenditures by State of Residence files from the Centers for Medicare and Medicaid Services (CMS).[8] Estimating fall-related expenditures at the state level can be used to inform specific public health policies, guiding resource allocation and supporting the development and evaluation of state-specific falls prevention initiatives.

METHODS

This study was limited to older adults aged 65 and older, living in the USA. Publicly available data from multiple sources were used: Health Expenditures by State of Residence files by CMS,[14] Census data for state and national population percentages of older adults,[15] Age and Sex files from the National Health Expenditure Account (NHEA) data from CMS,[16] and Personal Consumption Expenditure data from the Federal Reserve Bank of St. Louis.[17] To estimate the share of healthcare expenditures attributable specifically to non-fatal falls, we applied the updated 2020 estimates for the FAFE per payor (Medicare, Medicaid and private health insurance (PHI)).[8] The FAFE represents the proportion of healthcare spending that is attributable to non-fatal falls among older adults based on national-level analyses of fall-related healthcare utilisation and costs. These fractions were derived using healthcare claims and survey data that identified fall-related medical events, combined with cost information stratified by payer. We applied the FAFE values to each state's total healthcare expenditures by payer type to estimate state-specific spending attributable to nonfatal falls. A formula summarising this calculation is included in figure 1.

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First, national health expenditure data from the CMS's 2020 Health Expenditure Age and Sex tables were used to determine the proportion of total health expenditures attributable to non-fatal older adult falls for each payor. This included 82.1% of Medicare expenditures, 20.9% of Medicaid expenditures and 16.3% of private insurance expenditures.[16]

Second, the proportions of older adults per state were calculated by using Census data collected from the American Community Survey, 1-year estimates for 2021.[15] The state-level percentages of older adults were divided by the national percentage of older adults, creating a proportion for each state, also called the older adult factor (online supplemental table 1). Each state's older adult factor was multiplied by the national proportion of health expenditures attributable to older adults to estimate each state's proportion of health expenditures attributable to older adults. Third, the CMS's 2020 Health Expenditures by State of Residence files were used to collect 2020, state-level, personal healthcare spending estimates by the three payor sources for all ages. These data did not have expenditures broken down by age or by injury cause. These data represent aggregate, per capita spending by various healthcare organisations (eg, hospitals, clinics) and for retail spending on healthcare-related products (eg, prescriptions, eyeglasses).[14] Each state's total health expenditures were multiplied by the state's proportion of health expenditures attributable to older adults to estimate the total of each state's health expenditures attributable to older adults.

Fourth, the FAFE, calculated in Haddad et al., 2024, was multiplied by the estimated total of each state's health expenditures attributed to older adults to estimate each state's total health expenditures attributable to nonfatal older adult falls. Additionally, the 95% CIs were established based on the FAFE's CIs calculated in Haddad et al., 2024. The proportion of spending due to non-fatal older adult falls by payor in 2019 was 9.0% of Medicare spending (95% CI: 5.3 to 12.8), 3.1% of Medicaid spending (95% CI: −11.0 to 17.2) and 6.8% of PHI spending (95% CI: 3.8 to 9.7).[8]

Fifth, the 2020 cost of non-fatal falls estimates were then inflated to 2023 estimates using a Gross Domestic Product (GDP) deflator. The GDP deflator was calculated based on the ratio of the 2017 and 2023 Personal Consumption Expenditure (PCE) price indexes from the Federal Reserve Bank of St. Louis.[17]

Finally, the state fall incidence ratio was applied to account for geographical variations in fall risks beyond demographic differences. This ratio was calculated based on the 2021 state and national fall incidence rates reported from the Global Burden of Disease Study.[18]

In addition to the state total expenditure estimates, per capita spending by state was calculated by dividing state costs by the older adult population in each state in 2021, as reported in the 2021 U.S. Census Bureau.[15] The public was not involved in the design of this secondary analysis of existing data sets. IRB approval was not required due to the nature of the study.

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RESULTS

Total spending for non-fatal older adult falls across all three payor types was estimated to be $83.4 billion nationally in 2023 (table 1). By payor, national Medicare spending for non-fatal older adult falls was estimated to be $66.4 billion, Medicaid spending was estimated at $4.4 billion and PHI spending was estimated to be $12.7 billion. Overall, state-level spending estimates ranged between $112.7 million in Alaska to $8.3 billion in Florida. Per capita spending estimates ranged between $1085 in Utah, to $2262 in Wisconsin (figure 2). Overall per capita spending was $1493. Figure 2 provides a visual per capita spending by each state. Medicare spending estimates for non-fatal older adult falls ranged from $74.8 million in Alaska to $7.1 billion in Florida. Medicaid spending estimates for nonfatal older adult falls ranged from $5.0 million in Wyoming to $450.8 million in California. PHI estimated spending on non-fatal older adult falls ranged from $26.5 million in Wyoming to $1.1 billion in California.

DISCUSSION

Healthcare spending varied widely by state and payor type, with Florida having the highest in total spending and Medicare spending, while California was the highest in Medicaid and PHI spending. While spending was highest overall in these states, Wisconsin had the highest per capita spending overall, with Minnesota having a similar per capita estimate. These estimates are also substantially higher than previous reports from 2014.[1] Our findings are consistent with previous reports that have indicated an increase in medical spending over the last couple of decades.[8 9]

The national total healthcare spending attributed to non-fatal older adult falls was estimated at $80 billion in 2020, comprising $53.3 billion for Medicare, $3.5 billion for Medicaid and $23.2 billion in private and out-of-pocket spending.[8] The previous estimate from 2015 was $49.5 billion in total spending, comprising $28.9 billion for Medicare, $8.7 billion for Medicaid and $12.0 billion for private, out-of-pocket and other payors.[11] The USA experienced the largest increase in yearly per capita healthcare spending of all countries between 1996 and 2016, and in 2016, spent more on healthcare than nearly every other country.[19] Overall healthcare spending in the USA was estimated to have grown from $1.4 trillion to $3.1 trillion between 1996 to 2016.[9] As the number of older adults in the population climbs, healthcare needs and costs are likewise projected to rise.[20 21] From 2019 to 2023, there was a 9.7% increase in the number of people over age 65 in the country, compared with about a 0.4% increase in the population under the age of 65.[22 23] In 2023, those aged 85 and older, who have the highest rate of falls of all age groups, made up about 2.1% of the population, and this proportion is expected to grow to 3.8% by 2040 and 4.8% by 2050.[24]

These changing demographics are accompanied by a higher prevalence of chronic disease,[20 21] many of which, such as depression, stroke, arthritis, diabetes, cognitive impairments and dementia, have side effects and impacts that are also risk factors for falls.[11 25 26] Additionally, several medications used to manage chronic conditions also increase fall risk for older adults.[11 27] As fall risk factors become more prevalent, the health significance of

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falls will increase. By 2030, the burden of older adult falls is predicted to increase to 5.7 million injuries and 100 000 deaths.[28 29] Furthermore, the total lifetime medical costs related to older adult falls are predicted to be over $101 billion in 2030.[28]

In comparison to a recent study by Dieleman et al. (2025) that tracked healthcare spending by condition at the county level, our findings suggest higher national-level spending on falls.[30] Dieleman *et al.*'s study, which analysed a broad range of health conditions, reported lower fall-related expenditures at the national level. These differences could be attributed to several factors, including variations in the data sources, geographical focus (county-level vs state-level) and the specific expenditure categories considered. While their study provides valuable insights into overall healthcare spending trends, our analysis offers a more detailed view of state-level fall-related expenditures, which can be used to inform localised public health strategies and resource allocation.[30]

While they are common and costly, older adult falls can be prevented. The Centres for Disease Control and Prevention's (CDC), Stopping Elderly Accidents Deaths & Injuries (STEADI) initiative offers healthcare professionals resources for clinical fall prevention and includes strategies for community and clinical effective fall prevention (www.cdc.gov/steadi). The Association of State and Territorial Health Officials (ASTHO), through a funded collaboration with CDC, developed a best practices guide for state health departments on how to facilitate community–clinical linkages for fall prevention.[31]Additionally, the National Association for City and County Health Officials developed a guide offering local health departments guidance on building capacity to support clinical older adult fall prevention.[32] Public health officials, state officials and local health department officials can use these guides in implementing fall prevention in their respective states or organisations.

LIMITATIONS

Our study has several limitations. State-level spending was estimated using a national fall attributable fraction estimate and a national age and sex estimate. Even though we use an older adult factor to adjust for population differences by state, it is possible that our estimates do not accurately reflect healthcare expenditure by payor type and state. Additionally, the calculation for the proportion of PHI spending for the FAFE also included out-of-pocket and other payor/programme spending; however, the state-level personal healthcare spending and NHEA proportions for PHI did not. Estimates for out-of-pocket and other payor/programme spending were not available at the state level through CMS files. The CI for the estimates for Medicaid spending is large, indicating low precision around these estimates, and is not statistically significant. Finally, while this study does not consider per capita cost by payer, future research could consider the differences per payer by state.

CONCLUSIONS

Falls are a leading cause of both fatal and nonfatal unintentional injuries in older adults. The economic burden of falls varies by state and payor type. Understanding the financial impact

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of non-fatal falls on healthcare payors can help inform decision-making on state-specific resource allocation and targeted interventions to reduce falls among older adult residents.

Our findings of healthcare spending attributable to older adult non-fatal falls across all 50 states can have important implications for policy and practice. Understanding the financial impact of falls can help states make informed decisions regarding healthcare resource allocation, particularly in Medicaid and Medicare programmes. States can develop specific fall prevention programmes and interventions tailored to regional needs, incorporating strategies such as home safety modifications, establishing or expanding community-based strength and balance programmes and expanding access to physical therapy or healthcare access. Additionally, highlighting healthcare spending related to falls can raise public awareness about the importance of fall-related prevention strategies, encouraging older adults, their caregivers and healthcare providers to adopt preventive measures. Investing in fall prevention and promoting collaborations with community organisations can reduce healthcare costs by preventing hospitalisations and long-term care needs. Cross-state comparisons and data-driven policy can help identify best practices and guide future efforts to improve outcomes for older adults and support ageing-in-place initiatives.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Data availability statement

Data are available in a public, open access repository. Data are publicly available.

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WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ One in four older adults falls each year, and of the $80 billion spent on older adult falls in 2020, Medicare paid for two-thirds or $58 billion. That is 9% of Medicare's total spending on older adults attributed to falls alone.

WHAT THIS STUDY ADDS

⇒ Healthcare spending on older adult falls was estimated to be $83.4 billion with states spending ranging between $112.7 million and $8.3 billion in overall spending.

HOW MIGHT THIS STUDY AFFECT RESEARCH, PRACTICE OR POLICY

⇒ While common and costly, older adult falls can be prevented. Centres for Disease Control and Prevention's Stopping Elderly Accidents Deaths & Injuries (STEADI)-initiative offers healthcare professionals resources for clinical fall prevention and includes strategies for community and clinical effective fall prevention. States and local health departments can use STEADI or the Association of State and Territorial Health Officials best practices guide to facilitate community–clinical linkages for fall prevention.

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$$A * \left(\frac{B}{C}\right) * D * E * \left(\frac{F}{G}\right) * \left(\frac{H}{I}\right)$$

A = National proportion of payor spending on adults aged 65+
(2020 CMS Health Expenditures by Age and Sex)
[Medicare: 82.1%, Medicaid: 20.9%, PHI: 16.3%]
B = Proportion of state population aged 65+
(U.S. Census Bureau, 2021 American Community Survey 1-Year Estimates)
C = National proportion of population aged 65+
(U.S. Census Bureau, 2021 American Community Survey 1-Year Estimates)
D = Total healthcare spending in the state for all ages (by payor, in millions)
(2020 CMS Health Expenditures by State of Residence)
E = National Fall Attributable Fraction of Expenditure
(Haddad, et al. 2024, Healthcare spending for non-fatal falls among older adults, USA)
F = 2023 Personal Consumption Expenditures Price Index
(U.S. Bureau of Economic Analysis)
G = 2020 Personal Consumption Expenditures Price Index
(U.S. Bureau of Economic Analysis)
H = 2021 State-specific fall incidence rate among adults aged 65+
(Global Burden of Disease study)
I = 2021 National average fall incidence rate among adults aged 65+
(Global Burden of Disease study)

Figure 1.
Estimating 2023 State Cost of Older Adults (65+) Falls for Medicare, Medicaid, and Private Insurance Payors. CMS, Centers for Medicare and Medicaid Services; PHI, private health insurance.

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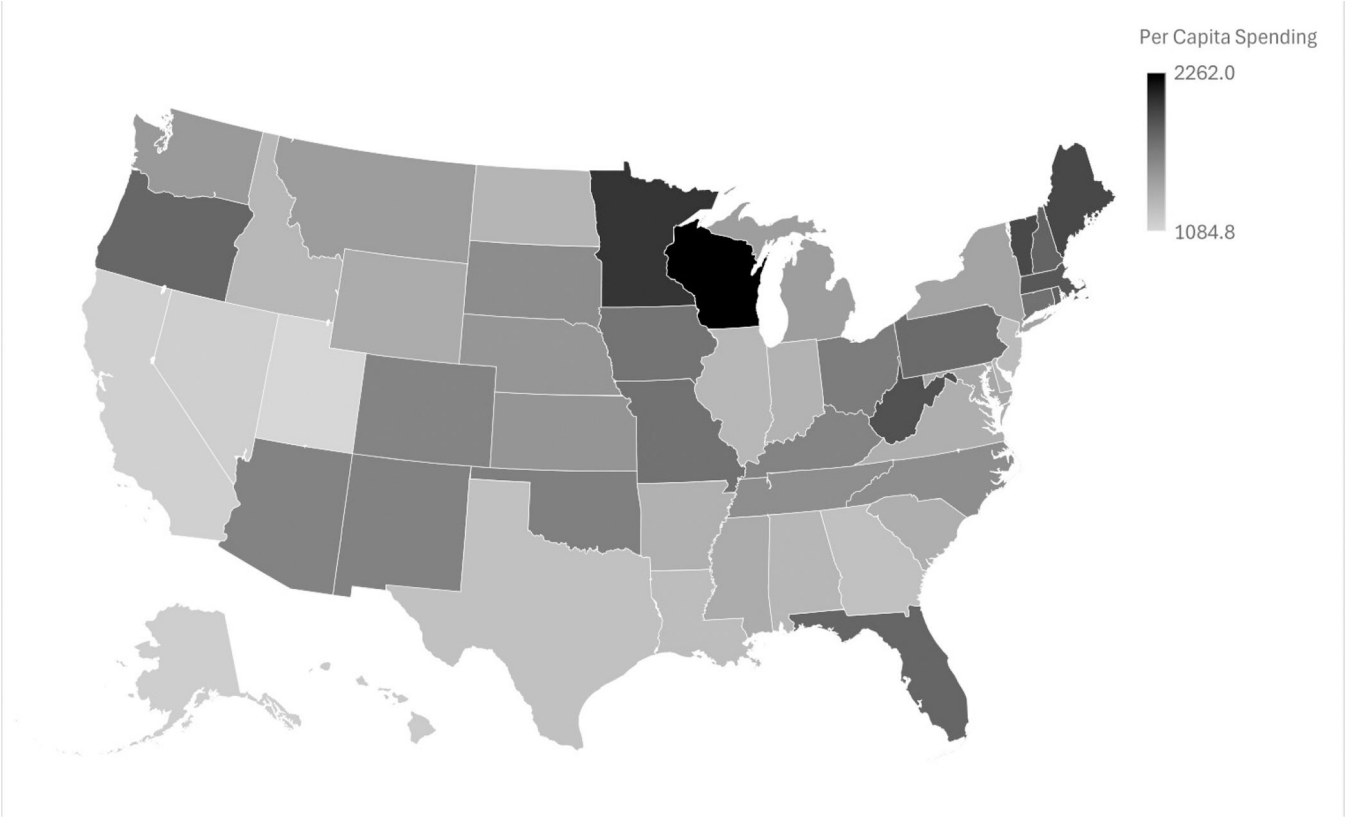


Figure 2.
Per Capita Healthcare Expenditures on Older Adult Falls in the United States by States, Medicare Current Beneficiary Survey, 2023.

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Table 1

Healthcare Spending for Non-Fatal Older Adult (aged 65+) Falls by Payor by State, USA, 2023

State	Private Health Insurance falls spending (95% CI)	Medicaid falls spending (95% CI)	Medicare falls spending (95% CI)	Total falls spending	Total falls per capita Spending*
	In Millions of Dollars				In Dollars
Alabama	150.5 (85.6 to 215.4)	37.5 (−131.0 to 206.0)	964.1 (549.6 to 1334.6)	1152.1	1300.6
Alaska	26.5 (15.1 to 38.0)	11.4 (−39.7 to 62.5)	74.8 (42.6 to 103.5)	112.7	1145.1
Arizona	285.5 (162.4 to 408.6)	124.1 (−433.2 to 681.3)	1763.5 (1005.4 to 2441.4)	2173.1	1629.0
Arkansas	87.3 (49.7 to 125.0)	41.8 (−146.0 to 229.6)	575.8 (328.2 to 797.1)	704.9	1342.3
California	1082.3 (615.5 to 1549.0)	450.8 (−1574.2 to 2475.8)	5193.5 (2960.7 to 7189.6)	6726.6	1127.8
Colorado	263.0 (149.6 to 376.4)	86.3 (−301.3 to 473.9)	1078.3 (614.7 to 1492.7)	1427.6	1621.9
Connecticut	170.9 (97.2 to 244.6)	71.6 (−250.1 to 393.4)	884.4 (504.2 to 1224.3)	1126.9	1735.9
Delaware	38.9 (22.1 to 55.6)	14.6 (−51 to 80.2)	213.8 (121.9 to 296)	267.3	1326.0
District of Columbia	38.8 (22.0 to 55.5)	15.3 (−53.5 to 84.2)	75.0 (42.8 to 103.9)	129.1	1508.2
Florida	1003.6 (570.7 to 1436.4)	206.4 (−720.7 to 1133.4)	7066.5 (4028.5 to 9782.6)	8276.5	1799.6
Georgia	350.2 (199.1 to 501.2)	62.3 (−217.6 to 342.3)	1547.5 (882.2 to 2142.3)	1960.0	1236.1
Hawaii	56.0 (31.8 to 80.1)	16.1 (−56.3 to 88.5)	258.6 (147.4 to 358.0)	330.7	1170.3
Idaho	65.9 (37.5 to 94.3)	19.5 (−68.1 to 107.2)	321.3 (183.2 to 444.8)	406.7	1295.2
Illinois	460.1 (261.6 to 658.5)	147.1 (−513.5 to 807.6)	2121.3 (1209.3 to 2936.6)	2728.4	1297.2
Indiana	216.9 (123.4 to 310.5)	84.8 (−296.2 to 465.9)	1183.9 (674.9 to 1639.0)	1485.7	1331.8
Iowa	166.9 (94.9 to 238.9)	45.1 (−157.4 to 247.5)	766.5 (437.0 to 1061.2)	978.5	1724.0
Kansas	119.9 (68.2 to 171.6)	26.8 (−93.5 to 147.0)	597.1 (340.4 to 826.6)	743.8	1518.9
Kentucky	164.3 (93.4 to 235.2)	80.2 (−280.1 to 440.6)	1003.9 (572.3 to 1389.8)	1248.4	1624.7
Louisiana	108.6 (61.8 to 155.5)	65.3 (−228.0 to 358.5)	791.8 (451.4 to 1096.1)	965.7	1260.1
Maine	85.9 (48.9 to 123.0)	34.4 (−120.2 to 189.0)	459.8 (262.2 to 636.6)	580.2	1952.7
Maryland	228.4 (129.9 to 326.9)	77.2 (−269.6 to 424.0)	1096.1 (624.9 to 1517.3)	1401.6	1396.9
Massachusetts	377.1 (214.5 to 539.8)	145.0 (−506.5 to 796.6)	1753.4 (999.6 to 2427.3)	2275.6	1870.7
Michigan	382.0 (217.2 to 546.7)	128.7 (−449.4 to 706.8)	2151.8 (1226.7 to 2978.9)	2662.5	1460.3
Minnesota	347.3 (197.5 to 497.1)	135.5 (−473.2 to 744.2)	1478.0 (842.6 to 2046.1)	1960.8	2044.0
Mississippi	76.6 (43.6 to 109.7)	32.0 (−111.6 to 175.5)	576.0 (328.3 to 797.3)	684.5	1377.5

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State	Private Health Insurance falls spending (95% CI)	Medicaid falls spending (95% CI)	Medicare falls spending (95% CI)	Total falls spending	Total falls per capita Spending*
Missouri	273.6 (155.6 to 391.7)	91.5 (−319.4 to 502.4)	1518.0 (865.4 to 2101.5)	1883.2	1736.0
Montana	47.2 (26.9 to 67.6)	19.4 (−67.8 to 106.7)	253.9 (144.7 to 351.5)	320.5	1475.1
Nebraska	86.3 (49.1 to 123.5)	17.5 (−61.2 to 96.3)	385.3 (219.7 to 533.5)	489.1	1515.1
Nevada	78.3 (44.5 to 112.0)	22.6 (−78.8 to 124.0)	490.2 (279.4 to 678.6)	591.0	1137.5
New Hampshire	84.2 (47.9 to 120.6)	21.5 (−74.9 to 117.8)	379.1 (216.1 to 524.9)	484.8	1810.8
New Jersey	341.4 (194.1 to 488.6)	92.4 (−322.6 to 507.4)	1548.2 (882.6 to 2143.3)	1982.0	1267.6
New Mexico	76.9 (43.7 to 110.0)	54.5 (−190.2 to 299.1)	508.7 (290.0 to 704.2)	640.0	1633.6
New York	820.1 (466.4 to 1173.9)	429.8 (−1500.8 to 2360.4)	3719.2 (2120.3 to 5148.7)	4969.1	1429.0
North Carolina	418.7 (238.1 to 599.3)	115.8 (−404.4 to 635.9)	2275.3 (1297.1 to 3149.9)	2809.9	1564.2
North Dakota	31.6 (18.0 to 45.2)	8.8 (−30.6 to 48.2)	121.9 (69.5 to 168.8)	162.3	1310.7
Ohio	463.4 (263.5 to 663.3)	193.5 (−675.5 to 1062.4)	2853.8 (1626.9 to 3950.7)	3510.7	1669.7
Oklahoma	141.4 (80.4 to 202.4)	42.4 (−148.1 to 232.9)	882.3 (503.0 to 1221.4)	1066.0	1652.3
Oregon	225.2 (128.0 to 322.3)	93.7 (−327.2 to 514.7)	1096.8 (625.3 to1518.4)	1415.7	1792.2
Pennsylvania	600.9 (341.7 to 860.1)	261.5 (−913.1 to 1436.1)	3496.6 (1993.3 to 4840.5)	4359.0	1768.4
Rhode Island	48.4 (27.5 to 69.2)	24.5 (−85.6 to 134.6)	293.8 (167.5 to 406.7)	366.6	1831.4
South Carolina	159.5 (90.7 to 228.2)	44.3 (−154.6 to 243.2)	1105.8 (630.4 to 1530.8)	1309.5	1353.9
South Dakota	41.8 (23.8 to 59.8)	8.1 (−28.4 to 44.6)	198.6 (113.2 to 275)	248.5	1574.1
Tennessee	260.6 (148.2 to 373.0)	72.9 (−254.7 to 400.6)	1522.7 (868.1 to 2108.0)	1856.3	1563.4
Texas	746.2 (424.4 to 1068.0)	218.1 (−761.5 to 1197.7)	3826.1 (2181.2 to 5296.8)	4790.4	1230.7
Utah	89.0 (50.6 to 127.3)	18.4 (−64.2 to 101.0)	313.7 (178.8 to 434.3)	421.0	1084.8
Vermont	47.8 (27.2 to 68.4)	20.1 (−70.2 to 110.5)	191.5 (109.2 to 265.1)	259.4	1947.9
Virginia	340.1 (193.4 to 486.8)	93.4 (−326.3 to 513.2)	1471.9 (839.1 to 2037.6)	1905.4	1354.7
Washington	355.5 (202.2 to 508.9)	110.9 (−387.2 to 609.0)	1399.0 (797.6 to 1936.8)	1865.4	1490.4
West Virginia	81.7 (46.5 to 117.0)	37.0 (−129.1 to 203.1)	584.1 (333.0 to 808.7)	702.8	1905.9
Wisconsin	428.5 (243.7 to 613.3)	109.8 (−383.6 to 603.2)	1846.4 (1052.6 to 2556.0)	2384.7	2262
Wyoming	26.7 (15.2 to 38.2)	5.0 (−17.3 to 27.2)	111.4 (63.5 to 154.3)	143.1	1378.2
Total	12 668.2 (7204.2 to 18132.0)	4386.9 (−15319.6 to 24093.5)	66 391.3 (37848.8 to 91909.3)	83 446.5	1493

*Population estimates for Per Capita Spending obtained from online supplemental table 1 a Age and sex from the United States Census Bureau, 2021.