



Nonfatal Injuries Among Skilled Nursing and Residential Care Facility Workers Treated in U.S. Emergency Departments, 2015–2022

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Introduction: Skilled nursing and residential care facilities report among the highest nonfatal occupational injury rates compared to the overall working population. This cross-sectional study reports nonfatal emergency department-treated injury national estimates among U.S. skilled nursing and residential care facility workers.

Methods: Nonfatal ED-treated occupational injury data were analyzed (2015–2022) from the National Electronic Injury Surveillance System, Occupational Supplement, a national probability sample of approximately 67 U.S. emergency departments. Occupational injuries in skilled nursing and residential care facilities were selected using relevant U.S. Census Bureau industry codes. National estimates and rates per 10,000 worker full-time equivalents were calculated using the U.S. Current Population Survey. Piecewise linear regression models examined temporal trends in biannual injury rates.

Results: An estimated 569,800 (95% CI = 420,400; 719,200) injuries occurred from 2015 to 2022, a rate of 302 (223, 382) per 10,000 full-time equivalents. Most injuries occurred among females (81%). The most prevalent injury events were overexertion and bodily reaction (38%; 116 [85, 147] per 10,000 full-time equivalents), violence (24%; 73 [46, 100] per 10,000 full-time equivalents), and falls, slips, and trips (16%; 49 [35, 63] per 10,000 full-time equivalents). Skilled nursing and residential care facility injury rates were higher than the rest of the healthcare industry and all industries. Skilled nursing and residential care facility injury rates declined from 2015–2021 (average biannual change -9.6% [-13.3% , -5.9%], $p < 0.001$). Following a 2021 trend change, there was a non-significant increase in injury rates.

Conclusions: Among the working population, skilled nursing and residential care facility workers experience a high rate of nonfatal emergency department-treated occupational injuries. Future research should confirm trends and study effectiveness and uptake of evidence-based injury prevention interventions across settings.

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INTRODUCTION

Skilled nursing and residential care facilities (SNRCFs) provide transitional and long-term nursing, custodial, and rehabilitative care to residents. This healthcare sub-industry includes skilled nursing facilities, long-term care facilities, community care facilities for the elderly, and residential facilities for mental health and substance use.¹ The nonfatal occupational injury rate in SNRCFs is among the highest of all industries,² and nursing assistants, the main caregivers in SNRCFs, have one of the highest rates across occupations.³

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Nearly all nursing homes reporting to the Occupational Safety and Health Administration (OSHA) recorded an occupational injury in any given year from 2016–2019.⁴

Improved worker safety is associated with better patient outcomes.^{5,6} During the COVID-19 pandemic, a new spotlight was placed on workplace safety and health, especially within healthcare. Longstanding workforce issues (staffing shortages, high turnover) were exacerbated in SNRCFs,⁷ which were among the most severely affected workplaces. Adults aged 65 years and older are expected to increase by 42% from 2022 to 2050.⁸ On average, 70% of older adults will need some type of long-term care support.⁹ Increased demand for skilled nursing and residential care will put additional strain on the healthcare workforce, emphasizing the urgency for addressing workplace safety and health.

The U.S. Bureau of Labor Statistics (BLS) Survey of Occupational Injuries and Illnesses (SOII) publishes national employer-reported occupational injury estimates.¹⁰ Studies have suggested that SOII may produce underestimates.^{11,12} Emergency department (ED) visits, one of the two nationally representative nonfatal occupational injury data sources, can supplement employer-reported estimates to provide a more comprehensive understanding of national trends. While there is some overlap, the scope of ED data differs from SOII and other occupational injury data sources in that data capture is dependent on medical records and not employer reporting, and is not restricted to certain industries, worker types, or payment methods. This study describes national nonfatal ED-treated injuries among U.S. SNRCF workers from 2015 to 2022 and characterizes trends.

METHODS

Study Population

National Electronic Injury Surveillance System – Occupational Supplement (NEISS-Work) data are collected through a collaboration between the National Institute for Occupational Safety and Health (NIOSH) and the Consumer Product Safety Commission. NEISS-Work includes nationally representative data on nonfatal work-related injuries treated in EDs using a stratified probability sample of approximately 67 U.S. hospitals. NEISS-Work defines a work-related injury as one sustained while a civilian is working for pay, traveling between worksites (but not commuting to/from work), doing agricultural production activities, in a vocational training program, or volunteering with an organized group. Visit work-relatedness is determined using various parts of the ED record, including visit notes, admissions, billing, and ambulance run sheets. Active-duty military, homemakers, institutionalized persons, and ED

revisits for the same injury are excluded. Since 2015, most illnesses are also excluded.¹³

NEISS-Work includes demographic variables, injury variables, narrative information on the injury event, and employer. While race/ethnicity and occupation (e.g., job title) data are collected, they are limited by poor reliability and completeness. At the time of this study, NIOSH staff manually assigned Bureau of Census (BOC) industry codes to NEISS-Work data from 2015 to 2022, restricting industry-related analyses to these years. We selected injury cases based on relevant BOC industry codes: for SNRCFs, codes 8270 (skilled nursing facilities) and 8290 (residential care facilities, other than skilled nursing), and codes 7970–8470, excluding 8270 and 8290, for all other sub-industries in health care and social assistance (HCSA).¹⁴ Additionally, NIOSH staff assigned codes for event or exposure (manner of injury, e.g., violence; fires and explosions; falls, slips, trips; overexertion and bodily reaction) and source of injury (objects, substances, equipment, or other factors responsible for the injury) to each NEISS-Work case based on the BLS, Occupational Industry and Illness Classification System (OIICS) version 2.01.¹⁵ This activity was reviewed by the Centers for Disease Control and Prevention (CDC), deemed not research, and was conducted consistent with applicable federal law and CDC policy.^{16–20}

Measures

National estimates were calculated for NEISS-Work SNRCF injuries overall and by demographic characteristics (age, sex, paid work status) and injury characteristics (event, source, diagnosis, body part harmed). Injury rates were calculated as the number of injuries per 10,000 full-time equivalents (FTEs), where one FTE is equal to 40 hours of work per week for 50 weeks per year (2,000 working hours). Employment estimates for FTE hours worked in all jobs were derived from the U.S. Current Population Survey (CPS) using the Employed Labor Force online query system.²¹

Statistical Analysis

An inverse probability weight is assigned to each NEISS-Work case, and weights are summed to calculate national estimates. Estimates and 95% CIs were calculated using SAS version 9.4 survey procedures to account for the stratified sample design. The variances for NEISS-Work injury estimates and CPS FTE estimates²¹ were pooled to calculate 95% CIs for injury rates.

Bivariate analyses examined associations between select demographic characteristics and the most prevalent injury events. Biannual (every 6 months) injury rates, used to account for shifts during the COVID-19 pandemic²² which may have affected resident and staff illness and

staffing levels, were calculated for January through June and July through December for each year. Biannual injury rates among SNRCF workers were compared to the rest of the HCSA industry (excluding SNRCFs), and among all industries in NEISS-Work, including HCSA.

The temporal trends in biannual injury rates were modeled using the National Cancer Institute's Joinpoint Regression Software,²³ which employs piecewise linear regression to examine points of significant trend changes. The data were fit with an autocorrelated errors model. Annual average percent change in rates was calculated for each segment of the piecewise regression by calculating the slope divided by the average predicted value of the specified segment times 100.²⁴

RESULTS

Between 2015 and 2022, 7,700 injuries, representing an estimated weighted count of 569,800 (95% CI=420,400;

719,200) nonfatal injuries among SNRCF workers were treated in U.S. EDs, at a rate of 302 injuries per 10,000 SNRCF worker FTEs (95% CI=223, 382) (Table 1). The SNRCF annual injury rate was highest in 2018 (373 [95% CI=252, 494] per 10,000 FTEs) and lowest in 2021 (223 [95% CI=154, 292] per 10,000 FTEs). The rate among skilled nursing facilities was 313 injuries per 10,000 FTEs (95% CI=230, 396), while the rate among residential care facilities was 284 injuries per 10,000 FTEs (95% CI=179, 389).

Most injuries were among females (81%, 95% CI=76, 85%). The injury rate among females was 307 (95% CI=228, 386) per 10,000 FTEs, and the rate among males was 284 (95% CI=174, 394) per 10,000 FTEs. Workers in the 25–34 years age group incurred the highest proportion of injuries at 26% (375 [95% CI=276, 474] per 10,000 FTEs). Those in the 20–24 years age group incurred the highest injury rate (452 [95% CI=299, 605] per 10,000 FTEs).

Table 1. Nonfatal Emergency Department–Treated Injuries Among Skilled Nursing and Residential Care Facility Workers, 2015–2022

Characteristic	National Estimate (95% CI) ^a	%	Rate per 10,000 FTE ^b (95% CI)
Total	569,800 (420,400; 719,200)	—	302 (223, 382)
Skilled nursing facilities	373,900 (276,400; 471,400)	66	313 (230, 396)
Residential care facilities	195,900 (124,500; 267,300)	34	284 (180, 389)
Year			
2015	92,100 (59,300; 125,000)	16	369 (239, 500)
2016	85,100 (58,000; 112,200)	15	340 (232, 447)
2017	80,700 (54,400; 107,000)	14	338 (228, 447)
2018	91,200 (61,500; 120,900)	16	373 (252, 494)
2019	67,100 (50,900; 83,300)	12	264 (200, 328)
2020	54,200 (39,100; 69,200)	10	240 (173, 306)
2021	48,100 (33,100; 63,200)	8	223 (154, 292)
2022	51,200 (34,800; 67,600)	9	250 (170, 330)
Sex			
Female	458,700 (340,000; 577,400)	81	307 (228, 386)
Male	111,100 (68,200; 154,000)	19	284 (174, 394)
Age group (years)			
16–19	21,300 (14,500; 28,100)	4	412 (244, 580)
20–24	80,800 (55,100; 106,400)	14	452 (299, 605)
25–34	149,900 (110,300; 189,500)	26	375 (276, 474)
35–44	109,400 (79,100; 139,600)	19	295 (214, 376)
45–54	105,600 (75,200; 136,100)	19	255 (182, 329)
55+	102,700 (76,100–129,200)	18	219 (160, 278)
Employment status			
Paid private employee	511,300 (371,400; 651,200)	90	271 (197, 346)
Paid government employee ^c	47,200 (2,600; 91,800)	8	25 (2, 48)
Other ^d	11,300 (6,500; 16,000)	2	6 (4, 8)

FTE, full-time equivalent.

^aEstimate may not sum to total due to rounding.

^bRate per 10,000 FTE (all jobs worked, Census industry codes 8270 for skilled nursing, 8290 for residential care).

^cData are statistically unreliable with a coefficient of variation >30%.

^dIncludes self-employed, volunteer, unknown, or other.

Approximately 38% of nonfatal injuries treated in EDs were due to overexertion and bodily reaction, which describes injuries from excessive physical effort, repetitive motions, or unnatural positions (116 [95% CI=85, 147] per 10,000 FTE) (Table 2). Nearly 25% of injuries

were due to violence by other persons or animals (73 [95% CI=46, 100] per 10,000 FTEs), and of these, most were due to intentional violence by persons (17% of total; 51 [95% CI=31, 72] per 10,000 FTEs). The third most common injury event was falls, slips, and trips at

Table 2. Injury Characteristics of Emergency Department—Treated Injuries in Skilled Nursing and Residential Care Facilities, 2015–2022

Characteristic	National estimate (95 % CI) ^a	%	Rate ^b per 10,000 FTE (95% CI)
Event or exposure			
Overexertion and bodily reaction	217,900 (159,200; 276,700)	38	116 (85, 147)
Violence and other injuries by persons or animals	137,500 (86,200; 188,700)	24	73 (46, 100)
Intentional, by person	96,800 (57,200; 136,400)	17	51 (31, 72)
Unknown intent, by person	36,400 (22,100; 50,800)	6	19 (12, 27)
Animal and insect related incidents	4,200 (2,600; 5,800)	1	2 (1, 3)
Falls, slips, trips	91,900 (65,500; 118,400)	16	49 (35, 63)
Contact with objects and equipment	66,500 (46,700; 86,300)	12	35 (25, 46)
Exposure to harmful substances or environments	48,500 (32,700; 64,200)	9	26 (17, 34)
Transportation incidents	2,500 (1,400; 3,700)	<1	1 (1, 2)
Fires and explosions ^c	1,200 (381; 1,900)	<1	1 (0, 1)
Nonclassifiable	3,800 (1,800; 5,200)	1	2 (1, 3)
Primary source of injury			
By other person	283,600 (206,000; 361,200)	50	151 (109, 192)
By injured or ill worker	53,700 (38,000; 69,400)	9	29 (20, 37)
Floors, walkways, ground surfaces	82,900 (59,200; 106,600)	15	44 (31, 57)
Containers, furniture, and fixtures	31,200 (22,000; 40,400)	5	17 (12, 21)
Medical and surgical instruments and equipment	12,800 (8,200; 17,400)	2	7 (4, 9)
All other sources	105,700 (76,500; 134,800)	19	56 (41, 72)
Body part injured			
Trunk	162,500 (119,600; 205,400)	29	86 (64, 109)
Upper extremity	146,400 (104,400; 188,500)	26	78 (56, 100)
Lower extremity	87,000 (60,600; 113,300)	15	46 (32, 60)
Head and face	75,500 (48,900; 102,100)	13	40 (26, 54)
Shoulder	54,000 (39,200; 68,800)	9	29 (21, 37)
Neck	21,800 (15,300; 28,400)	4	12 (8, 15)
All other/unknown	22,500 (16,500; 28,500)	4	12 (9, 15)
Diagnosis			
Sprain or strain	179,300 (124,800; 233,800)	31	95 (66, 124)
Contusions/abrasions	87,500 (58,600; 116,300)	15	46 (31, 62)
Laceration or puncture	52,000 (34,200; 69,700)	9	28 (18, 37)
Fracture	20,700 (14,900; 26,600)	4	11 (8, 14)
Burn	9,500 (7,000; 12,000)	2	5 (4, 6)
Concussion	12,400 (5,400; 19,400)	2	7 (3, 10)
Other ^d	208,400 (150,600; 266,100)	37	111 (80, 141)
Disposition			
Treated and released	558,600 (411,300; 705,900)	98	296 (218, 375)
Other ^e	11,200 (7,600; 14,800)	2	6 (4, 8)

CI, confidence interval; FTE, full-time equivalent.

^aEstimate may not sum to total due to rounding.

^bRate per 10,000 FTE (all jobs worked, Census industry codes 8270, 8290).

^cData are statistically unreliable due to coefficient of variation >30%.

^dIncludes ingested or aspirated foreign object, amputation, avulsion, foreign body, hematoma, dental, nerve damage, internal organ injury, anoxia, hemorrhage, electric shock, other, and not stated.

^eIncludes admitted, treated and transferred to another hospital, held for observation, left against medical advice.

Table 3. Leading Injury Events by Select Demographic and Work Characteristics, SNRCF Workers, NEISS-Work 2015–2022

Characteristic	Overexertion and bodily reaction			Violence			Falls, slips, and trips		
	Weighted estimate (95% CI)	%	p-value	Weighted estimate (95% CI)	%	p-value	Weighted estimate (95% CI)	%	p-value
Sex			<0.001			<0.001			0.001
Male	26,100 (18,000; 34,200)	23		41,500 (13,300; 69,800)	37		12,300 (7,000; 17,500)	11	
Female	191,800 (139,500; 244,200)	42		96,000 (66,000; 126,000)	21		79,700 (55,900; 103,400)	17	
Age group, years			0.001			0.001			<0.001
<25	40,000 (28,700; 51,100)	39		28,500 (14,100; 43,000)	28		10,000 (6,400; 13,500)	10	
25–44	105,500 (77,500; 133,400)	41		67,400 (40,200; 94,500)	26		29,000 (19,400; 38,600)	11	
45–64	68,500 (46,300; 90,700)	36		38,500 (25,300; 51,800)	20		44,100 (31,300; 56,900)	23	
65+	4,100 (2,300; 5,900)	21		3,000 (1,600; 4,500)	15		8,800 (5,700; 12,000)	45	
Work status			0.04			0.001			0.01
Paid private	203,300 (146,600; 259,900)	40		109,400 (68,200; 150,500)	21		85,400 (59,300; 111,500)	17	
Paid government or other ^a	14,700 (6,300; 23,000)	25		— ^b	48		6,600 (2,500; 10,600)	11	

SNRCF, skilled nursing and residential care facility.

Boldface indicates statistical significance ($p < 0.05$) via Rao–Scott chi-square to account for weighted estimates.^aIncludes self-employed, volunteer, unknown, or other.^bData are statistically unreliable and do not meet minimum reporting requirements (coefficient of variation > 50).

16% (49 [95% CI=35, 63] per 10,000 FTEs). The leading primary source of injury was another person (50%), followed by floors, walkways, or ground surfaces (15%).

The most common body part harmed was the trunk (includes the back, chest, abdomen, and pelvis) at 29% of injuries (86 [95% CI=64, 109] per 10,000 FTEs), followed by the upper extremity at 26% (78 [95% CI=56, 100] per 10,000 FTEs) and the lower extremity at 15% (46 [95% CI=32, 60] per 10,000 FTEs). Nearly one third were diagnosed with a sprain or strain. Almost all injuries were treated and released from the ED (98%).

Within the leading injury events (Table 3), males were statistically significantly more likely to incur injuries due to violence (37%: 41,500 injuries [95% CI=13,300; 69,800], v. 21% among females: 96,000 [95% CI=66,000; 126,000]; $p < 0.001$), while females were more likely to incur injuries due to overexertion and bodily reaction, and falls, slips, and trips. Those aged 65 years and older were statistically significantly most likely to experience injuries due to falls, slips, and trips (45%; 8,800 [95% CI=5,700; 12,000]) than other age groups. Workers with paid private work status had a higher proportion of injuries due to overexertion and bodily reaction and falls, slips, and trips, and lower proportion of injuries due to violence compared to other work statuses.

Throughout the study period, biannual injury rates for SNRCFs remained above those of the HCSA industry excluding SNRCFs, and all industries in NEISS-Work overall (Figure 1). Injury rates for SNRCFs declined significantly from 2015 to 2021 (average biannual change

(ABC) -9.6% (95% CI= -13.3% , -5.9%). Following a non-significant trend change in 2021, SNRCF injury rates demonstrated a non-significant increase from 2021 through 2022 (Appendix Table 1). Biannual injury rates for the rest of the HCSA industry also declined until 2021 (ABC -7.9% , 95% CI= -9.5% , -6.3%). After a statistically significant trend change in 2021 ($p < 0.001$), injury rates showed a non-significant increase through 2022 (ABC 6.0%, 95% CI= -9.6% , 21.7%). In comparison, all industries in NEISS-Work declined from 2016 to the second half of 2021. The injury rates for overexertion and bodily reaction showed an overall decline until 2020, followed by a nonsignificant increase. (Appendix Table 1, Figure 1). Biannual injury rates for falls, slips, and trips declined until the second half of 2021 followed by a non-significant increase, and violence decreased throughout the study period.

DISCUSSION

To the authors' knowledge, these results are the first national estimates of work-related nonfatal ED-treated injuries for SNRCFs. No comprehensive national nonfatal occupational injury surveillance system exists, so use of results from various sources is necessary for a more complete understanding. This study adds to current knowledge by presenting detailed analyses of ED-treated nonfatal injury patterns by worker demographic and event characteristics.

The findings that nonfatal ED-treated SNRCF injury rates are higher than the rest of the HCSA industry, and

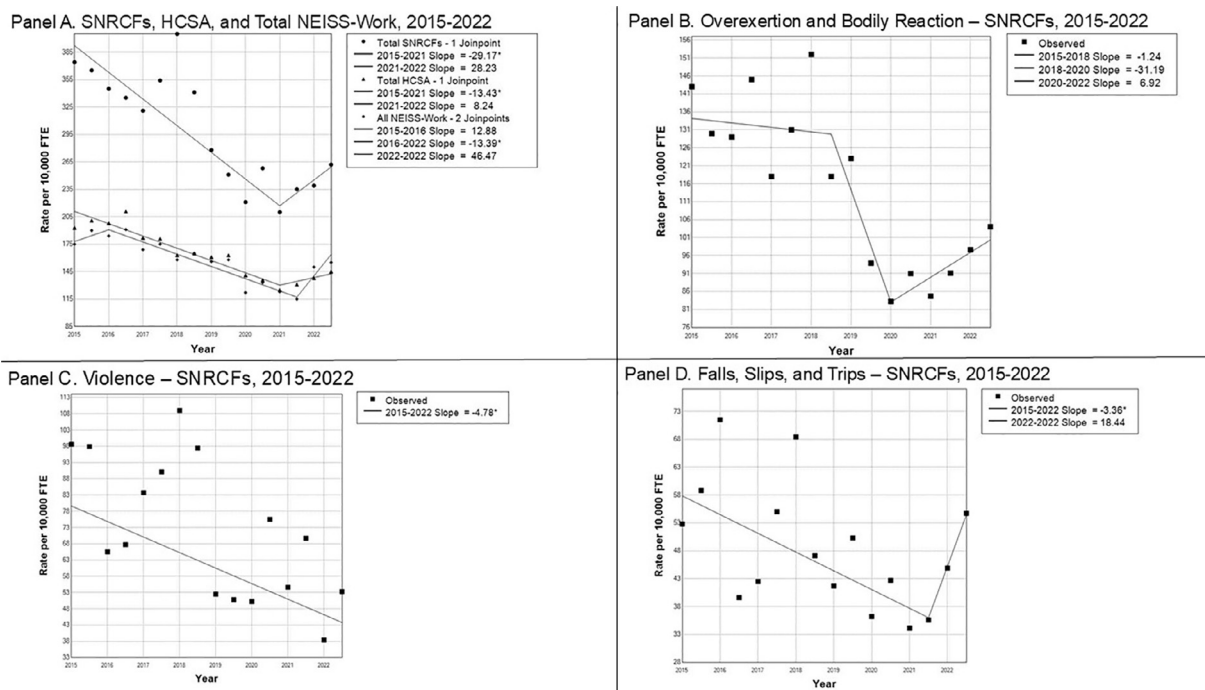


Figure 1. Piecewise linear regression trendlines and parameter estimates for biannual injury rates. Each point represents a 6-month interval (January through June, or July through December). SNRCFs, Skilled Nursing and Residential Care Facilities; HCSA, health care and social assistance, excluding SNRCFs. *Significant slope estimate at $p < 0.05$ level.

Panel A) SNRCFs, HCSA, and Total NEISS-Work, 2015–2022.

Panel B) Overexertion and Bodily Reaction – SNRCFs, 2015–2022.

Panel C) Violence – SNRCFs, 2015–2022.

Panel D) Falls, Slips, and Trips – SNRCFs, 2015–2022.

all industries combined, are consistent with BLS employer-reported estimates and worker's compensation claims data.^{2,25} Staff in SNRCFs face workplace hazards similar to other healthcare settings, but often may be less able to mitigate injury risks. Staff frequently perform physically demanding care activities, involving manual lifting, bending, twisting, and awkward positions. This includes assisting residents with activities of daily living (e.g., bathing, feeding, transferring), caring for residents with chronic medical or mental health conditions, and manipulating technology (such as patient lifts) used in patient care. High staff turnover (e.g., due to low compensation and challenging working conditions) and suboptimal staffing levels can exacerbate injury risks.^{26,27}

There is a high proportion of overexertion injuries, violence, and falls, slips, and trips in SNRCFs. While injury rates due to violence are declining, the proportion of injuries due to violence (24%) is higher than all industries in NEISS-Work (9%) during this period (data not shown). Additionally, the proportion of injuries due to violence appears higher than that of state worker's

compensation claims data.²⁸ Employer-based data such as worker's compensation often underestimates injuries and the scope of cases captured is different from NEISS-Work, which likely contributes to the different prevalence of certain injury events in ED data.²⁹ Analysis of workers' compensation claims among private skilled nursing facilities in Ohio found that 89% of claims were due to overexertion and bodily reaction, falls, slips, and trips, and contact with objects and equipment.²⁸ In a Minnesota study, only 5% of worker's compensation claims among nursing assistants were due to violence.³⁰ Other data sources suggest that workplace violence, overall and especially in healthcare, are increasing, particularly since the pandemic.³¹⁻³⁵

Most injuries were among females, which matches the proportion of female workers in the SNRCF sub-industry (approximately 80% female for 2015–2022 based on CPS numbers).²¹ Additionally, female workers largely comprise the main occupations within SNRCFs, including nursing assistants and care aides.³⁶ These occupations are associated with high injury risk due to time spent on physically demanding patient care activities.³⁰

A study of workers' compensation claims from 25 long-term care facilities in Canada found that care aides were the largest occupational group among the claims (62%).³⁷

The bivariate analyses indicated that male workers have a higher incidence of injuries due to violence compared with females. This is consistent with a U.S. report of workplace violence across all industries (2015–2019) which found that males account for a higher proportion of ED-treated nonfatal injuries due to workplace violence than females.³² In a global survey of 5,400 health-care workers, females were more likely to experience emotional or sexual violence, and males more likely to experience physical abuse.³¹ The type of violence occurring in SNRCFs (e.g. mostly physical, patient- or visitor-on-staff) may contribute to the discrepancy between sexes; however, NEISS-Work data do not allow for this level of analysis.

Injury rates were highest among the younger age groups. Possible reasons that younger, newer workers are at higher risk for injuries include limited experience, specific job characteristics (e.g. more physically demanding roles), and lower injury reporting among more experienced workers.^{38,39} In contrast, injuries from falls, slips, and trips were more prevalent among those 65 years and older, a pattern seen across various occupations, industries, and the general population.^{40–42} Notably, older adults are at higher risk for severe injury, complications, and time away from work due to falls, slips, and trips, so focused interventions may be warranted.^{43,44}

In this study, SNRCF overall ED-treated nonfatal injury rates suggest a change in early 2021, then a slight increase through 2022. Employer-reported estimates corroborate evidence for an increase in nonfatal occupational injuries during this period. Between 2020 and 2021, BLS employer-reported nonfatal injuries (all industries) increased from 2.2 to 2.3 per 100 FTEs and remained unchanged in 2022, rates lower than pre-pandemic levels.^{45–47} Among SNRCFs, employer-reported rates for injuries and illnesses increased from 5.9 to 11.5 per 100 FTEs from 2019 to 2020, and remained above pre-pandemic levels in 2022 (9.4 per 100 FTEs).⁴⁵

Trends in SNRCF ED-treated nonfatal injury rates should be contextualized with ED visit trends during the pandemic. Overall ED visit volumes decreased early in the pandemic and partially increased back to 2019 levels as of 2022.⁴⁸ The potential increase in ED-treated injury rates seen among SNRCFs in early 2021 could reflect this partial return to baseline ED volume, or represent specific characteristics of the SNRCF workforce. As frontline workers, SNRCF workers continued working in-person throughout the pandemic, experiencing

smaller reductions in workforce and working hours compared to some industries. While many SNRCFs had fewer new patient admissions and lower census levels,⁴⁹ staff were likely affected by other stressors which could have impacted workplace safety. For example, staff turnover and shortages due to illness, hiring and training of new workers including temporary agency workers, and mental health concerns including stress and burnout.^{25,50,51} The effects of these factors on staff injury rates is presumably complicated and we were unable to elucidate these in our study. Continued surveillance is needed to further characterize the potential changes in SNRCF ED-treated injury rates, and assess if rates exceed pre-pandemic levels.

These findings underline the need for reducing occupational injuries in SNRCFs. Several evidence-based interventions exist, such as “no manual lift” workplace policies for safe patient handling along with mechanical lifting and repositioning aids, multidisciplinary violence prevention programs, and housekeeping and engineering practices to reduce falls.^{5,6,52–56} Multicomponent, multilevel interventions (which could include incorporating staff training, specialized equipment, policies and procedures, support/follow-up) are more effective than standalone ones, and strong facility leadership to champion preventive practices is also key.⁵² Federal agencies have compiled guidelines and best practices for nursing homes and personal care facilities, and NIOSH has published a guide for establishing a safe resident lifting program.^{6,57,58} Improving facility monitoring and reporting of workplace injuries may help improve workplace safety culture and ensure that specific injury events of concern are addressed,^{4,52} including those relevant to specific demographic groups such as younger and older workers. State-level safe patient handling legislation has shown effectiveness in reducing injuries,⁵ and several states require employer-run workplace violence prevention programs.⁵⁹ Research to assess implementation of interventions across facility types and settings⁶⁰ and impact on occupational injuries, including those presenting to the ED, are needed.

Limitations

As NEISS-Work case identification relies on information abstracted from ED records, some work-related cases may be missed. NEISS-Work excludes injuries that are not treated (possibly due to severity, healthcare worker stigma in seeking care, or other factors) and those treated in venues other than EDs. Improving coverage of occupational injury surveillance could include incorporation of other potentially novel injury data sources,

such as outpatient clinic data and syndromic surveillance.

Trends reported in this study must be interpreted cautiously. There are large CIs for estimates due to the relatively small count estimates weighted to produce national estimates. There is a lack of information on work environment (e.g. staff-to-resident ratios, facility occupancy levels, shift timing, facility ownership),^{4,50} geographic variation, and other possible factors which may affect workplace safety. Specifically, occupation information is incomplete, and thus could not be presented. A worker's occupation provides context on the injury and health risks faced in their work, and has broader implications due to varying compensation profiles and worker protections. NEISS-Work also does not capture stress or mental health concerns, factors which may make workers more vulnerable to workplace hazards.

CONCLUSIONS

SNRCF workers experienced nonfatal ED-treated occupational injuries at a higher rate than that of other sub-industries in HCSA and all industries combined. Following years of decline, SNRCF injury rates experienced a trend change in 2021, appearing to increase. Female workers experienced most injuries, and most injuries were due to overexertion, falls, slips, trips, and violence. Continued surveillance is needed to further study these trends. Future research needs include assessing effectiveness of existing injury prevention efforts and studying strategies to improve uptake and implementation of interventions. Improving workplace safety is crucial to retaining a skilled workforce to support high quality patient care.

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REFERENCES

1. Nursing and Residential Care Facilities: NAICS 623. Industries at a Glance. <https://www.bls.gov/iag/tgs/iag623.htm>. Accessed May 2023, 2024 2024.
2. Number and rate of nonfatal work injuries in detailed private industries, 2022. In: U.S. Bureau of Labor Statistics.
3. Workplace injuries, illnesses, and fatalities by occupation. *TED: The Economics Daily*. 2017.
4. Sharma H, Xu L. Occupational Injuries in the US Nursing Homes. *Med Care*. 2024;62(5):346–351.
5. Lapane KL, Dube CE, Jesdale BM. Worker Injuries in Nursing Homes: Is Safe Patient Handling Legislation the Solution? *J Nurs Home Res Sci*. 2016;2:110–117.
6. James W. Collins AN, Virginia Sublet. Safe Lifting and Movement of Nursing Home Residents. National Institute for Occupational Safety and Health, 2006.
7. Brown N, Stone D, Hays B, Gallagher D. *COVID-19 Intensifies Nursing Home Workforce Challenges*. United States Department of Health and Human Services, Office of the Assistant Secretary for Planning and Evaluation, Office of Behavioral Health, Disability, and Aging Policy; 2020. https://aspe.hhs.gov/sites/default/files/migrated_legacy_files/196851/COVIDNH.pdf. Accessed May 22, 2025.
8. 2023 National Population Projections Tables: Main Series, 2022–2100. In: U.S. Census Bureau; 2023:Table 2. Projected Population by Age Group and Sex. <https://www2.census.gov/programs-surveys/popproj/tables/2023/2023-summary-tables/np2023-t2.xlsx>. Accessed May 29, 2025.
9. How Much Care Will You Need? *LongTermCare.gov*. [https://acli.gov/ltc/basic-needs/how-much-care-will-you-need#:~:text=Here%20are%20some%20statistics%20\(all,supports%20in%20their%20remaining%20years](https://acli.gov/ltc/basic-needs/how-much-care-will-you-need#:~:text=Here%20are%20some%20statistics%20(all,supports%20in%20their%20remaining%20years). Accessed May 23, 2024 2020.
10. Survey of Occupational Injuries and Illnesses: Handbook of Methods. <https://www.bls.gov/opub/hom/soii/home.htm>. Accessed July 2, 2024.
11. Rappin CL, Wuellner SE, Bonauto DK. Employer reasons for failing to report eligible workers' compensation claims in the BLS survey of occupational injuries and illnesses. *Am J Ind Med*. 2016;59(5):343–356.
12. Ruser J. Examining evidence on whether BLS undercounts workplace injuries and illnesses. *Monthly Labor Review*. 2008.
13. Work-Related Injury Statistics Query System: Technical Info. *Work-Related Injury Statistics Query System* <https://wwwn.cdc.gov/wisards/workrisqs/techinfo.aspx#sampleDesign>. Accessed January 31, 2025.
14. 2024. Industry and Occupation Code Lists & Crosswalks. <https://www.census.gov/topics/employment/industry-occupation/guidance/code-lists.html>.
15. Occupational Injury and Illness Classification (OIICS) Manual. *Injuries, Illnesses, and Fatalities* <https://www.bls.gov/iif/definitions/occupational-injuries-and-illnesses-classification-manual.htm>. Accessed January 31, 2025.

16. Protection of privacy of individuals who are research subjects, 42 U.S.C. § 241, 1995. [https://uscode.house.gov/view.xhtml?req=Protection+of+privacy+of+individuals+who+are+research+subjects&f=true&sort&fq=true&num=50&hl=true&edition=prelim&granuleId=USC-prelim-title42-section241.42U.S.C. §241\(d\).](https://uscode.house.gov/view.xhtml?req=Protection+of+privacy+of+individuals+who+are+research+subjects&f=true&sort&fq=true&num=50&hl=true&edition=prelim&granuleId=USC-prelim-title42-section241.42U.S.C. §241(d).) Accessed May 29, 2025.
17. Protection of Human Subjects, 45 C.F.R. part 46.102(I)(2). (2017). <https://www.ecfr.gov/current/title-45/subtitle-A/subchapter-A/part-46/subpart-A/section-46.102>. Accessed May 29, 2025.
18. Institutional Review Boards, 21 C.F.R. part. 1981;56 <https://www.ecfr.gov/current/title-21/chapter-I/subchapter-A/part-56>.
19. Records maintained on individuals, 5 U.S.C. §552a.(1974). <https://uscode.house.gov/view.xhtml?req=Title+18&f=true&sort&num=141>. Accessed May 29, 2025.
20. Paperwork Reduction Act of 1995, 44 U.S.C. §3501 et seq. (1995). <https://uscode.house.gov/view.xhtml?req=granuleid:USC-2000-title44-section3501&num=0&edition=2000>. Accessed May 29, 2025.
21. The Employed Labor Force (ELF) query system. National Institute for Occupational Safety and Health (NIOSH) Division of Safety Research. <https://wwwn.cdc.gov/Wisards/cps/default.aspx>. Updated December 9, 2023. Accessed January 31, 2025.
22. Nursing Home Covid-19 Data Dashboard. https://www.cdc.gov/nhsn/covid19/ltc-report-overview.html#anchor_1594393304. Accessed September 23, 2024.
23. Joinpoint Regression Program, Version 5.0.2 [computer program]. Statistical Methodology and Applications Branch, Surveillance Research Program, National Cancer Institute, 2023.
24. Hendricks SA, Hendricks KJ, Tiesman HM, Gomes HL, Collins JW, Hartley D. Trends in workplace homicides in the U.S., 1994-2021: An end to years of decline. *Am J Ind Med*. 2024;67(6):562–571.
25. Lee SJ, Yun Y, Hwang J, Jong S. Impact of COVID-19 on occupational injuries and illnesses among nursing care facility workers: Analysis of California workers' compensation data, 2019-2021. *Am J Ind Med*. 2023;66(11):965–976.
26. Trinkoff AM, Johantgen M, Muntaner C, Le R. Staffing and worker injury in nursing homes. *Am J Public Health*. 2005;95(7):1220–1225.
27. Gandhi A, Yu H, Grabowski DC. High Nursing Staff Turnover In Nursing Homes Offers Important Quality Information. *Health Aff (Millwood)*. 2021;40(3):384–391.
28. Bush AM, Reichard AA, Wurzelbacher SJ, Tseng CY, Lampl MP. Workers' compensation claims among private skilled nursing facilities, Ohio, 2001-2012. *Am J Ind Med*. 2020;63(12):1155–1168.
29. Azaroff LS, Levenstein C, Wegman DH. Occupational injury and illness surveillance: conceptual filters explain underreporting. *Am J Public Health*. 2002;92(9):1421–1429.
30. Rosebush CE, Zaidman B, Schofield KE, et al. Occupational differences in workers' compensation indemnity claims among direct care workers in Minnesota nursing homes, 2005-2016. *Am J Ind Med*. 2020;63(6):517–526.
31. Banga A, Mautong H, Alamoudi R, et al. ViSHWaS: Violence Study of Healthcare Workers and Systems-a global survey. *BMJ Glob Health*. 2023;8(9)..
32. Harrell E, Langton L, Petosa J, Pegula S, Zak M, Derk S, Hartley D, Reichard A. *Indicators of Workplace Violence, 2019*. Washington, DC: Bureau of Justice Statistics, Office of Justice Programs, U.S. Department of Justice; Bureau of Labor Statistics, Office of Safety, Health, and Working Conditions, U.S. Department of Labor; and National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention, U.S. Department of Health and Human Services, 2022.
33. Thornton J. Violence against health workers rises during COVID-19. *Lancet*. 2022;400(10349):348.
34. Hawkins D, Ghaziri ME. Violence in Health Care: Trends and Disparities, Bureau of Labor Statistics Survey Data of Occupational Injuries and Illnesses, 2011-2017. *Workplace Health Saf*. 2022;70(3):136–147.
35. Ramzi ZS, Fatah PW, Dalvandi A. Prevalence of Workplace Violence Against Healthcare Workers During the COVID-19 Pandemic: A Systematic Review and Meta-Analysis. *Front Psychol*. 2022;13:896156.
36. U.S.. Nursing Assistants Employed in Nursing Homes: Key Facts. Bronx, NY: PHI, 2019.
37. Chamberlain SA, Fu F, Akinlawon O, Estabrooks CA, Gruneir A. Characterizing worker compensation claims in long-term care and examining the association between facility characteristics and severe injury: a repeated cross-sectional study from Alberta, Canada. *Hum Resour Health*. 2023;21(1):63.
38. Breslin FC, Smith P. Trial by fire: a multivariate examination of the relation between job tenure and work injuries. *Occup Environ Med*. 2006;63(1):27–32.
39. Milhem M, Kalichman L, Ezra D, Alperovitch-Najenson D. Work-related musculoskeletal disorders among physical therapists: A comprehensive narrative review. *Int J Occup Med Environ Health*. 2016;29(5):735–747.
40. Chang WR, Leclercq S, Lockhart TE, Haslam R. State of science: occupational slips, trips and falls on the same level. *Ergonomics*. 2016;59(7):861–883.
41. Yeoh HT, Lockhart TE, Wu X. Non-fatal occupational falls on the same level. *Ergonomics*. 2013;56(2):153–165.
42. Older Adult Falls Data. *Older Adult Fall Prevention* 2024; <https://www.cdc.gov/falls/data-research/index.html>. Accessed October 15, 2024.
43. Older workers less likely to have severe work injuries, but they miss more work days to recover. *TED: The Economics Daily*. 2013 https://www.bls.gov/opub/ted/2013/ted_20131230.htm.
44. Layne LA, Pollack KM. Nonfatal occupational injuries from slips, trips, and falls among older workers treated in hospital emergency departments, United States 1998. *Am J Ind Med*. 2004;46(1):32–41.
45. Injuries, Illnesses, and Fatalities. <https://www.bls.gov/iif/nonfatal-injuries-and-illnesses-tables/soii-summary-historical.htm>. Accessed January 31, 2025.
46. Employer-Reported Workplace Injuries and Illnesses—2021 [press release]. U.S. Bureau of Labor Statistics, 11/9/2022 2022. https://www.bls.gov/news.release/archives/osh_11092022.pdf. Accessed May 29, 2025.
47. Employer-Reported Workplace Injuries and Illnesses, 2021-2022 [press release]. U.S. Bureau of Labor Statistics, 11/8/2023 2023. <https://www.bls.gov/news.release/osh.nr0.htm>. Accessed May 29, 2025.
48. Oskvarek JJ, Zocchi MS, Black BS, et al. Emergency Department Volume, Severity, and Crowding Since the Onset of the Coronavirus Disease 2019 Pandemic. *Ann Emerg Med*. 2023;82(6):650–660.
49. Barnett ML, Hu L, Martin T, Grabowski DC. Mortality, Admissions, and Patient Census at SNFs in 3 US Cities During the COVID-19 Pandemic. *JAMA*. 2020;324(5):507–509.
50. Brazier JF, Geng F, Meehan A, et al. Examination of Staffing Shortages at US Nursing Homes During the COVID-19 Pandemic. *JAMA Netw Open*. 2023;6(7):e2325993.
51. Bowblis JR, Brunt CS, Xu H, Applebaum R, Grabowski DC. Nursing Homes Increasingly Rely On Staffing Agencies For Direct Care Nursing. *Health Aff (Millwood)*. 2024;43(3):327–335.
52. Gideon Asuquo E, Tighe SM, Bradshaw C. Interventions to reduce work-related musculoskeletal disorders among healthcare staff in nursing homes; An integrative literature review. *Int J Nurs Stud Adv*. 2021;3:100033.
53. Guidelines for Preventing Workplace Violence for Healthcare and Social Service Workers. Occupational Safety and Health Administration (OSHA);2016.
54. Bell JL, Collins JW, Tiesman HM, et al. Slip, trip, and fall injuries among nursing care facility workers. *Workplace Health Saf*. 2013;61(4):147–152.

55. Teeple E, Collins JE, Shrestha S, Dennerlein JT, Losina E, Katz JN. Outcomes of safe patient handling and mobilization programs: A meta-analysis. *Work*. 2017;58(2):173–184.
56. Workplace Violence Prevention Standards. 2021. *R3 Report*. The Joint Commission. June 18, 2021. https://www.jointcommission.org/-/media/tjc/documents/standards/r3-reports/wpvp-r3-30_revised_06302021.pdf. Accessed May 29, 2025.
57. Improving Workplace Safety in Nursing Homes: A Resource List for Users of the AHRQ Workplace Safety Supplemental Item Set. *Surveys on Patient Safety Culture (SOPS)*. 2023 <https://www.ahrq.gov/sites/default/files/wysiwyg/sops/surveys/nursing-home/Nursing-Home-Workplace-Safety-Resource-List.pdf>.
58. Nursing Homes and Personal Care Facilities: Additional Resources. *Safety and Health Topics* <https://www.osha.gov/nursing-home/resources>. Accessed January 31, 2025.
59. Workplace Violence. nursingworld.org. <https://www.nursingworld.org/practice-policy/advocacy/state/workplace-violence2/#:~:text=There%20is%20variation%20between%20states,is%20limited%20to%20public%20employers>. Accessed July 15, 2024 2021.
60. National Occupational Research Agenda for Healthcare and Social Assistance (HCSA). 2019. https://www.cdc.gov/nora/councils/hcsa/pdfs/National_Occpational_Agenda_for_HCSA_February_2019-508.pdf. Accessed January 31, 2025.