



Prevalence of indications of alcohol and drug use among patients treated for injurious falls by Emergency Medical Services in the United States

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Abstract

Objective: The association between alcohol consumption and increased injuries from falls is well established, but there is a lack of data on the prevalence of substance use by fall type. This study aims to describe the distribution of alcohol and drug involvement in injurious falls.

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Contributorship Statement

Nicole G. Itzkowitz – conducted data analyses and wrote initial drafts of the manuscript and is the guarantor of this study.

Kathryn G. Burford – conducted data analyses and edited and revised the manuscript.

Remle P. Crowe – advised on defining falls in NEMSIS, conceptualized the study and wrote and edited portions of the manuscript.

Henry E. Wang – advised on defining falls in NEMSIS and on data analyses and edited the manuscript.

Alexander X. Lo – advised on calculating GCS, defining syncope, heat illness and seizures in the NEMSIS data, helped direct the data analyses and edited the manuscript.

Andrew G. Rundle – conceptualized the study, conducted data analyses to identify patients, advised on data analysis and edited the manuscript.

Competing Interests Statement

None declared.

Ethical Approval Statement

NEMSIS data are public use, deidentified, Health Insurance Portability and Accountability Act exempt data, available from <https://nemsis.org>. Therefore, we did not request IRB review.

Patient and Public Involvement

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

Methods: Using the 2019 National Emergency Medical Services Information System dataset we identified 1,854,909 patients injured from falls requiring an Emergency Medical Services response and determined the fall location (e.g. indoors or on street/sidewalk). We analyzed data on the Emergency Medical Service clinician's notation of alcohol or drug involvement and Glasgow Coma Scale.

Results: Overall, for 7.4% of injurious falls there was a notation of substance use: 6.5% for alcohol alone, 0.6% for drugs and 0.3% for alcohol and drugs. 21.2% of falls that occurred on a street or sidewalk had a notation of substance use. Substance use prevalence was highest, at 30.3%, in the age group 21 to 64 years, for falls occurring on streets and sidewalks, without syncope or heat illness as contributing factors. Reported substance use involvement was more frequent for men compared to women for each location type. Glasgow Coma Scale scores indicative of moderate or severe trauma were more prevalent among falls involving alcohol and/or drugs.

Conclusions: Overall, 1-in-5 injurious falls on streets and sidewalks and requiring EMS attention involved substance use, and these numbers likely underestimate the true burden. As cities seek to expand nightlife districts, design strategies to protect pedestrians from falls should be enacted.

Introduction

The association between alcohol consumption and increased injuries from falls is well established. [1–3] However, a recent systematic review of substance use among falls patients found that there is a lack of data on the prevalence of substance use by fall type and on the prevalence of drug use as well as alcohol use. [3] In regard to fall type, prior studies have not distinguished between falls that are secondary to syncope or heat illness and falls without these comorbidities, which are more likely to be mechanical in etiology. In addition, prior studies of substance use and falls have rarely distinguished between falls that occur in the home and falls that occur outdoors, and particularly those occurring on streets and sidewalks. [4] Distinguishing falls that occur indoors from those that occur outdoors is important because the context of alcohol use is likely to differ for falls occurring indoors as compared to outdoors and because current fall prevention guidelines focus on indoor falls and not on falls occurring outdoors. [5–8] However, there are policy tools, such as stricter enforcement of existing licensing laws, that can be used to influence the extent of alcohol consumption in public spaces, bars and restaurants and there are urban design strategies that can be used to improve outdoor pedestrian safety environments around bars and restaurants and in nightlife districts. [9]

It has been estimated that over 500,000 falls requiring at least some form of medical attention occur on streets and sidewalks annually. [10] To our knowledge national or regional estimates of the number of alcohol and/or drug involved injurious falls that occur on streets and sidewalks do not exist. However, data on the number of pedestrians under the influence of alcohol who are killed by motor vehicles suggest that pedestrians under the influence of alcohol constitute a significant portion of vulnerable road users. [11] The National Highway Traffic Safety Administration (NHTSA) reported that 32% of pedestrians who were killed in a traffic crash had a BAC of 0.08 g/dL or higher in 2019.[11] As such,

it is likely that a large number of injurious falls occurring outdoors involve pedestrians who are alcohol impaired.

The only extant public health messaging on substance use by pedestrians comes from the NHTSA which simply advises pedestrians to “avoid alcohol and drugs when walking; they impair your judgment and coordination”. [11] The most recent set of policy and design recommendations for reducing injuries among intoxicated pedestrians was a 1996 report from Monash University. [12] This is a concern because many cities, as part of economic development plans to revitalize urban centers, are now developing and promoting nightlife and nightlife districts, prominently featuring alcohol-serving establishments, which encourage patrons to walk between nearby alcohol serving venues. [13, 14] In addition, nightlife districts and the nighttime economy are also associated with illicit drug use. [15, 16] Furthermore, multiple jurisdictions have open container laws, that allow drinking on streets and sidewalks, and to-go alcohol purchases, policies that also encourage walking and drinking. [17, 18] Since 2019, multiple states have legalized or decriminalized cannabis and within these states retail outlets selling cannabis have proliferated, with some allowing on-site consumption, and use of cannabis in public spaces is becoming common. [19–22] These economic and policy initiatives are likely to increase the number of pedestrians under the influence of alcohol or drugs and at risk of falls and injuries. [9, 13, 23]

To support advances in policies and urban design strategies to prevent pedestrian falls, there is a need for data describing the prevalence of alcohol and drug-related injurious falls by location. [3] As an initial effort to describe this prevalence, we used the 2019 National Emergency Medical Services Information System (NEMSIS) public-use research dataset to assess the prevalence of indicators for substance use among patients treated for injurious falls by Emergency Medical Services (EMS). [4]

Methods

Study design and setting

This cross-sectional study of EMS records from the 2019 National Emergency Medical Services Information System (NEMSIS) Public-Release Research Dataset included 1,854,909 occurrences of falls requiring EMS response across US states and territories. [4] We used the most recent NEMSIS dataset available prior to the COVID-19 pandemic, so as to avoid the impact of the COVID-19 pandemic and stay-at-home orders on walking behavior and the incidence of falls and traumatic injuries. We believe that the 2019 NEMSIS data most accurately reflects the true patterns of pedestrian injuries exclusive of the influence of COVID-19. [24]

Data source

NEMSIS is the national system to collect and standardize data from EMS agencies across the US. The National Highway Traffic Safety Administration Office for Emergency Medical Services provides the NEMSIS data as a public use, de-identified, Health Insurance Portability and Accountability Act exempt dataset hosted by the University of Utah. (<https://nemsis.org/using-ems-data/>). [25, 26] The use of NEMSIS to identify falls and locations of

falls have been previously described and includes a robust approach to identifying overall injurious falls and to identifying falls for which syncope (heat-related and non-heat related syncope) and heat illness were contributing factors. [4] All EMS data entry into NEMSIS must abide by the standards set forth by the NHTSA Office of EMS and outlined in the NEMSIS data dictionary (https://nemsis.org/media/nemsis_v3/release-3.5.0/DataDictionary/PDFHTML/EMSDEMSTATE/index.html). Falls with EMS notations of seizures have been removed from the analyses. Patients and/or the public were not involved in the design conduct, reporting, or dissemination plans of this research.

Variable coding

Sociodemographic and clinical data: The NEMSIS data variables ePatient.13 and ePatient.15 were used to define patient sex (male, female) and age group (0–20, 21–50, 51–64 and 65)), respectively. The time of day of the incident was classified using the eTimes_03 variable as occurring during the daytime (07:00–17:00), evening (17:00–23:00) or nighttime (23:00–07:00). To measure injury severity, we used the Glasgow Coma Scale (GCS). As previously described in Burford et al. (2024), we calculated the mean GCS by summing the average value for eye opening, verbal response, and motor response for each patient. When the tests used to calculate the GCS were administered multiple times for a patient, we used the mean of all administrations. GCS ranges from 3 to 15, and for this analysis, we use the commonly used classifications for injury severity: severe, ≤ 8 ; moderate, 9–12; and minor, ≥ 13 . [27] Prior research has shown that benzodiazepines and poly-substance use can significantly affect GCS, so that GCS scores appear worse in the intoxicated state as compared to the unintoxicated state, however alcohol intoxication largely does not affect the measurement of GCS. [28–31]

Alcohol and drug use data: The NEMSIS variable eHistory.17 contains data on the EMS clinician's evaluation of whether alcohol or drugs were involved in an incident. Using these data patients were classified for the EMS clinician's notation of evidence of: "alcohol use", "drug use", or "alcohol and drug use". In the absence of a positive notation of substance use in the eHistory.17 variable, patients were classified as "evidence of substance use not noted". The eHistory.17 variable includes multiple codes for each patient. Codes for the eHistory.17 variable of: 3117001, 3117005, 3117011, 3117009 were used to define "alcohol use". Codes 3117003, 3117007, 3117009 were used to define "drug use". If a patient had codes for both "alcohol use" and "drug use" they were coded as "alcohol and drug use". NEMSIS codes for not applicable (7701001), not recorded (7701003), none reported (88010015), refused (8801019), and unable to complete (8801023) were used to create the "evidence of substance use not noted" category.

Statistical analysis

Descriptive analyses for all EMS encounters for injurious falls by location and reported substance use were conducted, and data were cross tabulated by age group and sex. Syncope and heat illness are often causes of injurious falls and alcohol may play a different role in such falls than for falls that occurred without these co-morbidities, and falls without these comorbidities are more likely to be mechanical falls. [4, 32] As such, analyses were also conducted separately for injurious falls associated with episodes of syncope, falls

associated with episodes of heat illness and falls without accompanying syncope or heat illness. We also conducted descriptive analyses for EMS encounters for injurious falls without accompanying syncope or heat illness cross tabulated by time of day and by GCS severity classifications.

Due to the very large number of falls in the data set, most of the tables presented in the results have large sample sizes and even quite small differences in prevalences are statistically significant. In addition, as a descriptive study a substantial number of tables and cross-tabulations within tables are presented, resulting in many possible tests of statistical significance. Therefore, given the large sample size and many possible tests, p-values were not calculated. Post-hoc tests of significance for contrasts of interest to readers can be accomplished by copying presented cell counts into a spread sheet. We conducted all analyses in R Statistical Software. (v4.3.1; R Core Team 2023)

Results

In total 1,854,909 injuries from falls that required an EMS response were identified in the 2019 NEMSIS data. [4] Overall, for 7.4% (n=136,978, see table 1) of injurious falls there was a notation of substance use (alcohol and/or drug use). Notations of alcohol use alone made up 87.8% of the reports of substance use, with a notation of alcohol and drug use comprising 4.3% of reports involving substance use and drug use alone comprising 8.0% of these reports.

For falls that occurred on a street or sidewalk, there was a notation of substance use for 21.2% (n= 27,390) of patients, with alcohol use alone making up 87.4% (n=23,938) of these reports. When injurious falls were separated into falls with accompanying syncope, falls with accompanying heat illness and falls without accompanying syncope or heat illness, the overall prevalences of alcohol and/or drug involvement was similar across the three groups (Table 1). However, for falls occurring on streets and sidewalks, the prevalence of alcohol involvement alone, at 18.8%, was highest for injurious falls without accompanying syncope or heat illness.

Table 2 shows age stratified analyses for falls with a notation of accompanying syncope and Table 3 shows age stratified analyses for falls without accompanying syncope or heat illness (there were not enough falls with a notation of heat illness for meaningful age stratification). Across almost all age groups, for both fall types, the prevalence of alcohol involvement was higher for falls occurring on streets and sidewalks compared to falls occurring indoors. For falls with accompanying syncope, that occurred on streets and sidewalks, adults ages 21–50 and 51–64 had the highest proportion of falls reported to involve alcohol use alone (12.3% and 18.1% respectively). Among those experiencing falls on streets and sidewalks without accompanying syncope or heat illness, these age groups also had the highest proportion of falls reported to involve alcohol (25.3% and 27.7% respectively).

For falls with accompanying syncope and falls without accompanying syncope or heat illness, regardless of location, EMS reports for male patients were more likely to include a report of alcohol and/or drugs than for female patients (Table 3 and 4). Also, for both fall

types, the highest prevalences of substance use were found among men for falls occurring on streets and sidewalks. The highest prevalence of alcohol use alone, at 25.1%, was found among men experiencing falls on streets and sidewalks, without accompanying syncope or heat illness.

Among falls without accompanying syncope or heat illness, those with a notation of alcohol, drug or both alcohol and drug use were more likely to have moderate or severe GCS scores (5.3%, 7.4%, and 10.4%, respectively) compared to falls without a notation of substance use (2.8%), particularly among those that occurred on a street or sidewalk (6.7%, 8.2%, and 10.8% vs. 3.0%, respectively) (Table 6). Similarly, among falls without accompanying syncope or heat illness, 32.3% of those with a notation of alcohol, 27.0% with a notation of drugs and 20.5% with a notation of alcohol and drugs occurred during the evening hours compared to 16.3% of falls with no notation of substance use, and we saw a similar pattern for falls that occurred during nighttime hours (alcohol, 28.5%; drugs, 22.0%; alcohol and drugs, 26.5% vs. 16.6%) (Table 7).

Discussion

Overall, 7.4% of all falls requiring EMS response in 2019 involved reported alcohol and/or drug use, while 21.2% of injurious falls occurring on streets or sidewalks involved reported substance use. For all fall types, alcohol use alone was the most frequently reported substance involved in the fall. The prevalence of alcohol involvement for falls that occurred on streets and sidewalks was highest among falls patients who did not have accompanying syncope or heat illness. Falls without an accompanying syncope or heat illness, adults ages 21–64 and men had higher proportions of reported alcohol involvement compared to older adults or youth and women. Falls that occurred on streets or sidewalks were consistently more likely to reportedly involve alcohol across age categories and sexes compared to falls that occurred indoors. Falls with a notation of substance involvement were more likely to occur during the evening and nighttime than during the daytime and were more likely to result in a moderate or severe injury as measured by GCS.

The estimates of the overall prevalence of alcohol and substance use among falls patients presented here are consistent with recent reports using other datasets. Analyses of the 2019–2020 National Hospital Ambulatory Medical Care Survey (NHAMCS) found that 8.4% of fall-related ED visits had indications of alcohol and/or substance use. [33] Analyses of the 2011 to 2020 National Electronic Injury Surveillance System-All Injury Program (NEISS) for patients seeking treatment at EDs found that alcohol involved falls comprised 2.2% of ED visits for falls among patients age 65 and older. [1] This prevalence is consistent with the overall proportion of alcohol involved falls in this age group observed in the NEMSIS data (2.8% for falls without syncope or heat illness). Like prior studies, the analyses of the NHAMCS and NEISS data did not sub-divide falls by location of occurrence and did not separately analyze falls by indications of accompanying syncope and heat illness. [1] Fall injuries that do not have these co-morbidities are more likely to be mechanical falls, and the data presented here suggest that alcohol may play a larger role in such falls, likely due to the negative influence of alcohol on coordination.

These findings suggest that alcohol use is present in a large proportion of falls that occur on streets and sidewalks, particularly among men and adults between the ages of 21 and 64. Additionally, falls occurring during the evening and nighttime hours are more likely to involve alcohol, further suggesting that falls on streets and sidewalks that involve alcohol may be in close proximity to businesses that serve alcohol. This is consistent with previous findings that suggest a higher density of alcohol serving establishments is associated with both increased alcohol consumption [34] and increased pedestrian injury from motor vehicles. [35, 36] Furthermore, the increased prevalence of men and adults ages 21–64 among injurious falls involving alcohol is consistent with the higher prevalence of alcohol consumption in these groups in the US. [35, 37] There are several possible policy options that could be used to prevent injurious falls occurring on streets and sidewalks that involve alcohol [9], including considering appropriate lighting for commercial areas, improved maintenance of sidewalks and curb cuts and improved maintenance of roadbeds at street crossings. [38] States and cities might also re-evaluate policies around nightlife districts and open container laws that encourage the consumption of alcohol while walking. [9, 17]

Our results also suggest that substance-involved falls may be associated with greater head trauma than those that do not involve substance use, consistent with findings from the UK. [39] Except in instances of severe intoxication, alcohol has not been found to significantly affect the measurement of GCS. [28–31] However, benzodiazepine usage and poly-substance usage have been found to cause an overestimate of trauma severity using the GCS (–1.7 points and –1.12 points in GCS score). [28] Thus, the prevalence of patients with moderate or severe trauma in the Drug and Alcohol group and in the Drug group, may be slightly overestimated using the GCS.

This is the first study to describe the prevalence of substance use involved falls occurring on streets and sidewalks from a well-documented multi-state sample. These data are a first step at informing public policies and design strategies aimed at preventing alcohol-involved falls. However, there are also limitations that should be noted. First, we labelled all EMS reports where alcohol or drug use were not noted as “evidence of substance use not noted”, and functionally in our calculations of proportions treated them as indicating an absence of substance use. However, it is unlikely that EMS clinicians’ notations of substance use based on patient’s on-scene reports or physical evidence at the scene is a highly sensitive measure of substance use by patients. [40] In addition, since the NEMSIS data does not include blood alcohol data from police or hospital reports, we were unable to validate the EMS clinician’s reports with a gold standard measure of alcohol use. Therefore, these positive reports of substance involvement are likely to be an underestimate of the true prevalence of the involvement of substance use among patients treated for injurious falls. Furthermore, there are likely a large number of additional injurious falls involving alcohol and drugs, where the individuals either do not seek EMS care, perhaps due to stigma surrounding alcohol overconsumption and drug use, or those who seek care directly from a hospital or urgent care facility. Taken together, these limitations associated with the measurement of substance use in the NEMSIS dataset likely resulted in an underestimation of the prevalence of substance use involved pedestrian falls.

In conclusion, this study suggests that a large proportion of falls that occur outdoors on streets and sidewalks and require EMS response involve substance use. Research is needed to assess the link between venues serving alcohol, the built environments around these venues and risk of pedestrian falls and to examine if policies to create nightlife districts lead to an increase in pedestrian falls.

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Key Messages**WHAT IS ALREADY KNOWN ON THIS TOPIC**

Alcohol consumption is a well-established risk factor for injurious falls, but there is a lack of information on the prevalence of alcohol and drug use by fall type and location.

WHAT THIS STUDY ADDS

This study describes the prevalence of alcohol and drug involvement in injurious falls requiring Emergency Medical Services by location of fall, age and sex, time of day and injury severity, and distinguishes between mechanical falls and falls that are related to heat illness or syncope.

HOW MIGHT THIS STUDY AFFECT RESEARCH, PRACTICE OR POLICY

These findings can help cities create policies that prioritize pedestrian safety as they develop and expand their nightlife economies.

Table 1.

Reported Alcohol and Drug Use Among Fall Patients requiring Emergency Medical Services in the United States by Location of Fall and by Presence of Syncope and Heat Illness, 2019

All Injurious Falls						
Substance Use	Overall N = 1,854,909^I	Indoors N = 1,596,860^I	Not Recorded N = 51,355^I	Indoor vs Outdoor Unclear, N = 53,700^I	Outdoors – not street N = 23,586^I	Street or Sidewalk N = 129,408^I
Alcohol	120,262 (6.5%)	86,950 (5.4%)	1,494 (2.9%)	6,023 (11.2%)	1,857 (7.9%)	23,938 (18.5%)
Alcohol and drugs	5,823 (0.3%)	4,160 (0.3%)	106 (0.2%)	245 (0.5%)	107 (0.5%)	1,205 (0.9%)
Drugs	10,893 (0.6%)	7,814 (0.5%)	129 (0.3%)	545 (1.0%)	158 (0.7%)	2,247 (1.7%)
Evidence of substance use not noted	1,717,931 (92.6%)	1,497,936 (93.8%)	49,626 (96.6%)	46,887 (87.3%)	21,464 (91.0%)	102,018 (78.8%)
Injurious falls with accompanying syncope						
	Overall N = 73,600^I	Indoors N = 64,325^I	Not Recorded N = 1,402^I	Indoor vs Outdoor Unclear N = 2,351^I	Outdoors - not street N = 800^I	Street or Sidewalk N = 4,722^I
Alcohol	4,818 (6.5%)	3,902 (6.1%)	65 (4.6%)	267 (11.4%)	66 (8.3%)	518 (11.0%)
Alcohol and drugs	349 (0.5%)	286 (0.4%)	9 (0.6%)	14 (0.6%)	6 (0.8%)	34 (0.7%)
Drugs	916 (1.2%)	755 (1.2%)	12 (0.9%)	49 (2.1%)	6 (0.8%)	94 (2.0%)
Evidence of substance use not noted	67,517 (91.7%)	59,382 (92.3%)	1,316 (93.9%)	2,021 (86.0%)	722 (90.3%)	4,076 (86.3%)
Injurious falls with accompanying heat illness						
	Overall N = 9381	Indoors N = 6321	Not Recorded N = 171	Indoor vs Outdoor Unclear N = 421	Outdoors - not street N = 541	Street or Sidewalk N = 1931
Alcohol	55 (5.9%)	30 (4.7%)	2 (11.8%)	5 (11.9%)	3 (5.6%)	15 (7.8%)
Alcohol and drugs	4 (0.4%)	3 (0.5%)	0 (0.0%)	1 (2.4%)	0 (0.0%)	0 (0.0%)
Drugs	13 (1.4%)	6 (0.9%)	0 (0.0%)	1 (2.4%)	1 (1.9%)	5 (2.6%)
Evidence of substance use not noted	866 (92.3%)	593 (93.8%)	15 (88.2%)	35 (83.3%)	50 (92.6%)	173 (89.6%)
Injurious falls without accompanying syncope or heat illness						
	Overall N = 1,780,37	Indoors N = 1,531,903^I	Not Recorded N = 49,936^I	Indoor vs Outdoor Unclear N = 51,307^I	Outdoors - not street N = 22,732^I	Street or Sidewalk N = 124,493^I
Alcohol	115,389 (6.5%)	83,018 (5.4%)	1,427 (2.9%)	5,751 (11.2%)	1,788 (7.9%)	23,405 (18.8%)
Alcohol and drugs	5,470 (0.3%)	3,871 (0.3%)	97 (0.2%)	230 (0.4%)	101 (0.4%)	1,171 (0.9%)
Drugs	9,964 (0.6%)	7,053 (0.5%)	117 (0.2%)	495 (1.0%)	151 (0.7%)	2,148 (1.7%)
Evidence of substance use not noted	1,649,548 (92.7%)	1,437,961 (93.9%)	48,295 (96.7%)	44,831 (87.4%)	20,692 (91.0%)	97,769 (78.5%)

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Table 2.

Substance use by Patient Age and Location, among Falls Patients with Accompanying Syncope requiring Emergency Medical Services in the United States, 2019

Age Group	Substance Use	Overall, N = 73,600 ¹	Indoors, N = 64,325 ¹	Not Recorded, N = 1,402 ¹	Indoor vs Outdoor Unclear, N = 2,351 ¹	Outdoors - not street, N = 800 ¹	Street or Sidewalk, N = 4,722 ¹
0 to 20							
	Alcohol	52 (0.8%)	43 (0.8%)	1 (0.8%)	2 (0.6%)	2 (1.5%)	4 (0.9%)
	Alcohol and drugs	16 (0.3%)	14 (0.3%)	0 (0.0%)	0 (0.0%)	1 (0.7%)	1 (0.2%)
	Drugs	170 (2.7%)	137 (2.6%)	2 (1.7%)	9 (2.9%)	2 (1.5%)	20 (4.7%)
	Evidence of substance use not noted	6,056 (96.2%)	5,110 (96.3%)	118 (97.5%)	297 (96.4%)	132 (96.4%)	399 (94.1%)
21 to 50							
	Alcohol	1,476 (8.5%)	1,133 (7.8%)	21 (7.0%)	103 (15.2%)	33 (13.6%)	186 (12.3%)
	Alcohol and drugs	192 (1.1%)	152 (1.0%)	6 (2.0%)	8 (1.2%)	2 (0.8%)	24 (1.6%)
	Drugs	507 (2.9%)	427 (2.9%)	5 (1.7%)	26 (3.8%)	4 (1.7%)	45 (3.0%)
	Evidence of substance use not noted	15,111 (87.4%)	12,836 (88.2%)	270 (89.4%)	542 (79.8%)	203 (83.9%)	1,260 (83.2%)
51–64							
	Alcohol	1,776 (12.2%)	1,440 (11.5%)	17 (7.0%)	95 (19.3%)	21 (14.1%)	203 (18.1%)
	Alcohol and drugs	87 (0.6%)	72 (0.6%)	3 (1.2%)	2 (0.4%)	3 (2.0%)	7 (0.6%)
	Drugs	154 (1.1%)	123 (1.0%)	1 (0.4%)	11 (2.2%)	0 (0.0%)	19 (1.7%)
	Evidence of substance use not noted	12,536 (86.1%)	10,912 (87.0%)	223 (91.4%)	384 (78.0%)	125 (83.9%)	892 (79.6%)
65+							
	Alcohol	1,503 (4.3%)	1,278 (4.0%)	26 (3.6%)	67 (7.7%)	10 (3.7%)	122 (7.5%)
	Alcohol and drugs	54 (0.2%)	48 (0.2%)	0 (0.0%)	4 (0.5%)	0 (0.0%)	2 (0.1%)
	Drugs	81 (0.2%)	65 (0.2%)	4 (0.5%)	3 (0.3%)	0 (0.0%)	9 (0.6%)
	Evidence of substance use not noted	33,638 (95.4%)	30,385 (95.6%)	699 (95.9%)	792 (91.5%)	259 (96.3%)	1,503 (91.9%)
Not Reported							
	Alcohol	11 (5.8%)	8 (5.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	3 (11.5%)
	Alcohol and drugs	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
	Drugs	4 (2.1%)	3 (2.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (3.8%)
	Evidence of substance use not noted	176 (92.1%)	139 (92.7%)	6 (100.0%)	6 (100.0%)	3 (100.0%)	22 (84.6%)

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Table 3.

Substance use by Patient Age and Location, among Falls Patients without Accompanying Syncope or Heat-Illness requiring Emergency Medical Services in the United States, 2019

Age Group	Substance Use	Overall, N = 1,780,371 ^I	Indoors, N = 1,531,903 ^I	Not Recorded, N = 49,936 ^I	Indoor vs Outdoor Unclear, N = 51,307 ^I	Outdoors - not street, N = 22,732 ^I	Street or Sidewalk, N = 124,493 ^I
<21							
	Alcohol	2,039 (2.0%)	1,332 (1.7%)	26 (1.0%)	130 (1.5%)	74 (1.1%)	477 (5.8%)
	Alcohol and drugs	264 (0.3%)	178 (0.2%)	8 (0.3%)	15 (0.2%)	16 (0.2%)	47 (0.6%)
	Drugs	718 (0.7%)	486 (0.6%)	18 (0.7%)	54 (0.6%)	21 (0.3%)	139 (1.7%)
	Evidence of substance use not noted	100,948 (97.1%)	76,054 (97.4%)	2,518 (98.0%)	8,327 (97.7%)	6,493 (98.3%)	7,556 (91.9%)
21 – 50							
	Alcohol	38,150 (15.9%)	24,484 (13.9%)	471 (8.2%)	2,455 (18.8%)	800 (13.4%)	9,940 (25.3%)
	Alcohol and drugs	2,333 (1.0%)	1,449 (0.8%)	44 (0.8%)	130 (1.0%)	52 (0.9%)	658 (1.7%)
	Drugs	5,444 (2.3%)	3,469 (2.0%)	58 (1.0%)	279 (2.1%)	96 (1.6%)	1,542 (3.9%)
	Evidence of substance use not noted	193,777 (80.8%)	146,161 (83.3%)	5,157 (90.0%)	10,216 (78.1%)	5,027 (84.1%)	27,216 (69.2%)
51–64							
	Alcohol	42,537 (14.4%)	30,207 (12.6%)	467 (6.8%)	2,068 (19.7%)	590 (14.6%)	9,205 (27.7%)
	Alcohol and drugs	1,562 (0.5%)	1,100 (0.5%)	19 (0.3%)	63 (0.6%)	26 (0.6%)	354 (1.1%)
	Drugs	2,094 (0.7%)	1,556 (0.6%)	22 (0.3%)	128 (1.2%)	28 (0.7%)	360 (1.1%)
	Evidence of substance use not noted	248,822 (84.3%)	207,519 (86.3%)	6,347 (92.6%)	8,233 (78.5%)	3,393 (84.0%)	23,330 (70.2%)
65+							
	Alcohol	32,120 (2.8%)	26,653 (2.6%)	454 (1.3%)	1,083 (5.7%)	313 (5.3%)	3,617 (8.5%)
	Alcohol and drugs	1,279 (0.1%)	1,121 (0.1%)	26 (0.1%)	22 (0.1%)	6 (0.1%)	104 (0.2%)
	Drugs	1,656 (0.1%)	1,507 (0.1%)	18 (0.1%)	34 (0.2%)	5 (0.1%)	92 (0.2%)
	Evidence of substance use not noted	1,093,503 (96.9%)	997,505 (97.1%)	33,826 (98.5%)	17,742 (94.0%)	5,627 (94.6%)	38,803 (91.1%)
Not Reported							
	Alcohol	543 (4.1%)	342 (3.1%)	9 (2.0%)	15 (4.6%)	11 (6.7%)	166 (15.8%)
	Alcohol and drugs	32 (0.2%)	23 (0.2%)	0 (0.0%)	0 (0.0%)	1 (0.6%)	8 (0.8%)
	Drugs	52 (0.4%)	35 (0.3%)	1 (0.2%)	0 (0.0%)	1 (0.6%)	15 (1.4%)
	Evidence of substance use not noted	12,498 (95.2%)	10,722 (96.4%)	447 (97.8%)	313 (95.4%)	152 (92.1%)	864 (82.1%)

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Table 4.

Substance use by Patient Sex and Location, among Falls Patients with Accompanying Syncope requiring Emergency Medical Services in the United States, 2019

Patient Sex	Substance Use	Overall N = 73,600 ^I	Indoors N = 64,325 ^I	Not Recorded N = 1,402 ^I	Indoor vs Outdoor Unclear N = 2,351 ^I	Outdoors - not street N = 800 ^I	Street or Sidewalk N = 4,722 ^I
Female							
	Alcohol	1,519 (4.1%)	1,260 (3.8%)	21 (3.1%)	86 (8.3%)	17 (4.5%)	135 (6.5%)
	Alcohol and drugs	115 (0.3%)	90 (0.3%)	2 (0.3%)	6 (0.6%)	4 (1.0%)	13 (0.6%)
	Drugs	361 (1.0%)	310 (0.9%)	2 (0.3%)	15 (1.4%)	5 (1.3%)	29 (1.4%)
	Evidence of substance use not noted	34,959 (94.6%)	31,125 (94.9%)	648 (96.3%)	931 (89.7%)	355 (93.2%)	1,900 (91.5%)
Male							
	Alcohol	3,286 (9.0%)	2,633 (8.4%)	44 (6.1%)	180 (13.8%)	48 (11.6%)	381 (14.5%)
	Alcohol and drugs	234 (0.6%)	196 (0.6%)	7 (1.0%)	8 (0.6%)	2 (0.5%)	21 (0.8%)
	Drugs	553 (1.5%)	443 (1.4%)	10 (1.4%)	34 (2.6%)	1 (0.2%)	65 (2.5%)
	Evidence of substance use not noted	32,355 (88.8%)	28,081 (89.6%)	661 (91.6%)	1,083 (83.0%)	363 (87.7%)	2,167 (82.3%)
Not Reported							
	Alcohol	13 (6.0%)	9 (4.8%)	0 (0.0%)	1 (12.5%)	1 (20.0%)	2 (18.2%)
	Alcohol and drugs	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
	Drugs	2 (0.9%)	2 (1.1%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
	Evidence of substance use not noted	203 (93.1%)	176 (94.1%)	7 (100.0%)	7 (87.5%)	4 (80.0%)	9 (81.8%)

^I_n (%)

Table 5.

Substance use by Patient Sex and Location, among Falls Patients without Accompanying Syncope or Heat-Illness requiring Emergency Medical Services in the United States, 2019

Sex	Substance Use	Overall N = 1,780,371 ^I	Indoors N = 1,531,903 ^I	Not Recorded N = 49,936 ^I	Indoor vs Outdoor Unclear N = 51,307 ^I	Outdoors - not street N = 22,732 ^I	Street or Sidewalk N = 124,493 ^I
Female							
	Alcohol	38,742 (3.8%)	30,677 (3.4%)	511 (1.8%)	1,761 (6.9%)	554 (5.2%)	5,239 (10.1%)
	Alcohol and drugs	1,915 (0.2%)	1,543 (0.2%)	33 (0.1%)	59 (0.2%)	26 (0.2%)	254 (0.5%)
	Drugs	3,589 (0.3%)	2,872 (0.3%)	46 (0.2%)	131 (0.5%)	38 (0.4%)	502 (1.0%)
	Evidence of substance use not noted	985,895 (95.7%)	878,008 (96.2%)	28,371 (98.0%)	23,524 (92.3%)	10,047 (94.2%)	45,945 (88.5%)
Male							
	Alcohol	76,253 (10.3%)	52,051 (8.5%)	911 (4.4%)	3,973 (15.5%)	1,228 (10.3%)	18,090 (25.1%)
	Alcohol and drugs	3,543 (0.5%)	2,321 (0.4%)	64 (0.3%)	171 (0.7%)	74 (0.6%)	913 (1.3%)
	Drugs	6,329 (0.9%)	4,153 (0.7%)	71 (0.3%)	364 (1.4%)	111 (0.9%)	1,630 (2.3%)
	Evidence of substance use not noted	656,868 (88.4%)	554,457 (90.5%)	19,442 (94.9%)	21,107 (82.4%)	10,553 (88.2%)	51,309 (71.3%)
Not Reported							
	Alcohol	394 (5.4%)	290 (5.0%)	5 (1.0%)	17 (7.8%)	6 (5.9%)	76 (12.4%)
	Alcohol and drugs	12 (0.2%)	7 (0.1%)	0 (0.0%)	0 (0.0%)	1 (1.0%)	4 (0.7%)
	Drugs	46 (0.6%)	28 (0.5%)	0 (0.0%)	0 (0.0%)	2 (2.0%)	16 (2.6%)
	Evidence of substance use not noted	6,785 (93.8%)	5,496 (94.4%)	482 (99.0%)	200 (92.2%)	92 (91.1%)	515 (84.3%)

^I_n (%)

Table 6.

Substance use by GCS Injury Severity and Location, among Falls Patients without Accompanying Syncope or Heat-Illness requiring Emergency Medical Services in the United States, 2019

Substance Use	GCS	Overall, N = 1,780,371 ^I	Indoors, N = 1,531,903 ^I	Not Recorded, N = 49,936 ^I	Indoor vs Outdoor Unclear, N = 51,307 ^I	Outdoors - not street, N = 22,732 ^I	Street or Sidewalk, N = 124,493 ^I
Alcohol							
	Minor	101,726 (94.7%)	73,471 (95.2%)	1,223 (95.2%)	5,226 (94.2%)	1,493 (93.8%)	20,313 (93.3%)
	Moderate	3,747 (3.5%)	2,388 (3.1%)	39 (3.0%)	223 (4.0%)	58 (3.6%)	1,039 (4.8%)
	Severe	1,926 (1.8%)	1,346 (1.7%)	22 (1.7%)	99 (1.8%)	40 (2.5%)	419 (1.9%)
	Unknown	7,990	5,813	143	203	197	1,634
Alcohol and drugs							
	Minor	4,764 (92.6%)	3,380 (93.0%)	86 (95.6%)	208 (91.6%)	84 (88.4%)	1,006 (91.8%)
	Moderate	245 (4.8%)	156 (4.3%)	1 (1.1%)	13 (5.7%)	10 (10.5%)	65 (5.9%)
	Severe	134 (2.6%)	99 (2.7%)	3 (3.3%)	6 (2.6%)	1 (1.1%)	25 (2.3%)
	Unknown	327	236	7	3	6	75
Drugs							
	Minor	8,407 (89.6%)	5,972 (90.0%)	94 (92.2%)	407 (85.1%)	121 (85.2%)	1,813 (89.2%)
	Moderate	676 (7.2%)	451 (6.8%)	6 (5.9%)	50 (10.5%)	11 (7.7%)	158 (7.8%)
	Severe	305 (3.2%)	210 (3.2%)	2 (2.0%)	21 (4.4%)	10 (7.0%)	62 (3.0%)
	Unknown	576	420	15	17	9	115
Evidence of substance use not noted							
	Minor	1,479,636 (97.2%)	1,295,875 (97.2%)	37,058 (97.7%)	41,569 (97.7%)	18,351 (98.2%)	86,783 (97.0%)
	Moderate	29,145 (1.9%)	26,270 (2.0%)	594 (1.6%)	526 (1.2%)	171 (0.9%)	1,584 (1.8%)
	Severe	13,457 (0.9%)	11,520 (0.9%)	281 (0.7%)	446 (1.0%)	156 (0.8%)	1,054 (1.2%)
	Unknown	127,310	104,296	10,362	2,290	2,014	8,348

^I_n (%)

Table 7.

Substance use by Time of Day and Location, among Falls Patients without Accompanying Syncope or Heat-Illness requiring Emergency Medical Services in the United States, 2019

Substance Use	Time of Day	Overall, N = 1,780,371 ^I	Indoors, N = 1,531,903 ^I	Not Recorded, N = 49,936 ^I	Indoor vs Outdoor Unclear, N = 51,307 ^I	Outdoors - not street, N = 22,732 ^I	Street or Sidewalk, N = 124,493 ^I
Alcohol							
	day	45,229 (39.2%)	31,437 (37.9%)	577 (40.4%)	2,359 (41.0%)	852 (47.7%)	10,004 (42.7%)
	evening	37,250 (32.3%)	27,560 (33.2%)	429 (30.1%)	1,876 (32.6%)	597 (33.4%)	6,788 (29.0%)
	night	32,910 (28.5%)	24,021 (28.9%)	421 (29.5%)	1,516 (26.4%)	339 (19.0%)	6,613 (28.3%)
Alcohol and drugs							
	day	2,542 (46.5%)	1,806 (46.7%)	42 (43.3%)	110 (47.8%)	61 (60.4%)	523 (44.7%)
	evening	1,477 (27.0%)	1,061 (27.4%)	26 (26.8%)	61 (26.5%)	22 (21.8%)	307 (26.2%)
	night	1,451 (26.5%)	1,004 (25.9%)	29 (29.9%)	59 (25.7%)	18 (17.8%)	341 (29.1%)
Drugs							
	day	5,731 (57.5%)	4,071 (57.7%)	78 (66.7%)	302 (61.0%)	88 (58.3%)	1,192 (55.5%)
	evening	2,038 (20.5%)	1,449 (20.5%)	15 (12.8%)	108 (21.8%)	29 (19.2%)	437 (20.3%)
	night	2,195 (22.0%)	1,533 (21.7%)	24 (20.5%)	85 (17.2%)	34 (22.5%)	519 (24.2%)
Evidence of substance use not noted							
	day	1,107,283 (67.1%)	954,451 (66.4%)	31,954 (66.2%)	33,253 (74.2%)	15,921 (76.9%)	71,704 (73.3%)
	evening	268,481 (16.3%)	234,228 (16.3%)	8,150 (16.9%)	7,342 (16.4%)	3,832 (18.5%)	14,929 (15.3%)
	night	273,784 (16.6%)	249,282 (17.3%)	8,191 (17.0%)	4,236 (9.4%)	939 (4.5%)	11,136 (11.4%)

^I_n (%)