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Consumer Product Safety Commission

Non-Powered Bicycle Injuries and Fatalities, 2022-2024

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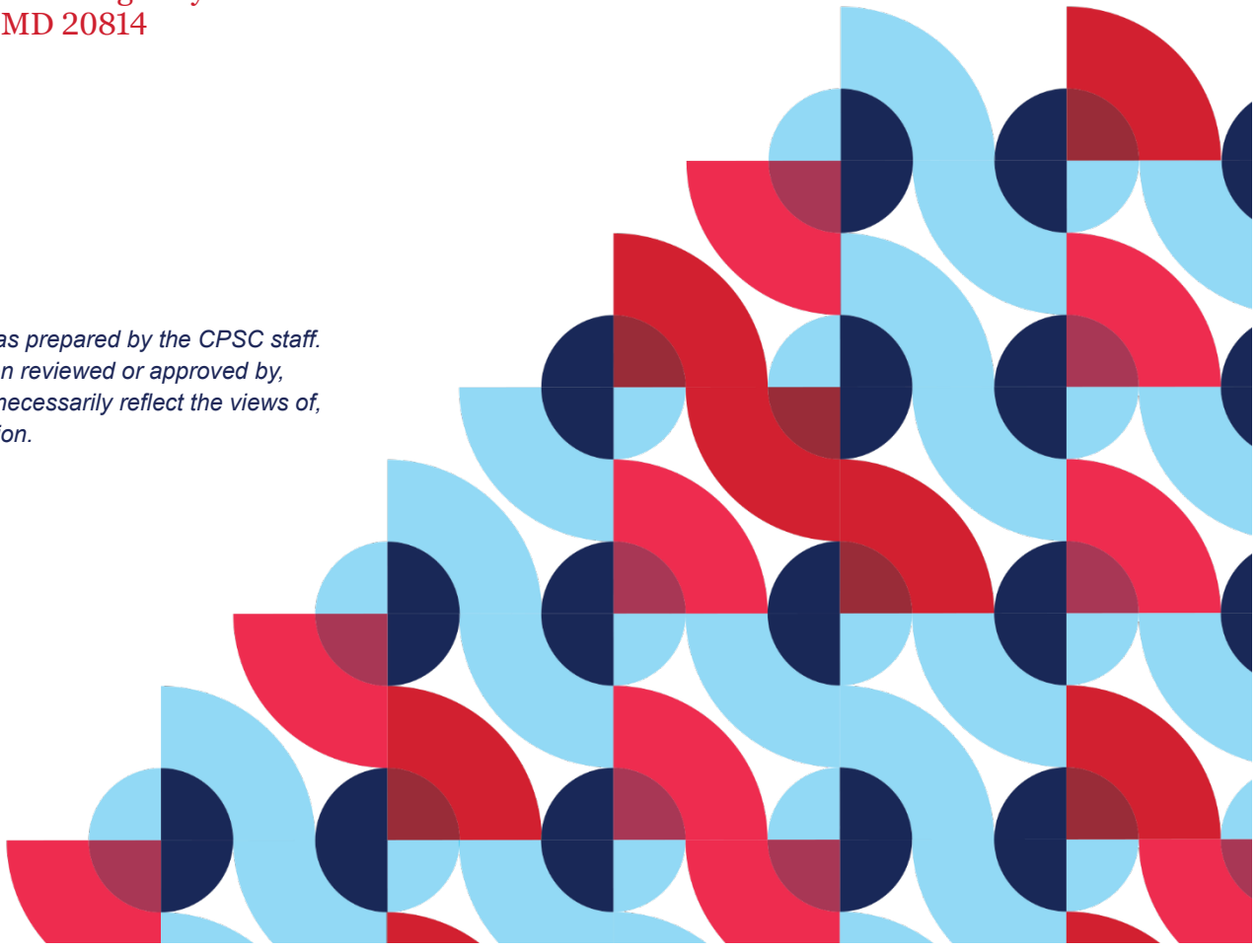

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Executive Summary

This report provides estimates of emergency department (ED) visits to treat injuries associated with non-powered bicycles or bicycle accessories reported to CPSC for 2022 through 2024, total counts of fatalities associated with bicycle riding in the U.S. in 2022 and 2023, and the findings of a special study on bicycle riding-related ED visits in 2024.[1] Findings include:

- **Emergency Department Visits Associated with Bicycles or Bicycle Accessories, 2022-2024**
  - An estimated 1,332,100 hospital ED visits were associated with bicycles or bicycle accessories. Among these, 95% (1,270,100) appeared to result from bicycle riding, 4% resulted from non-riding interactions with a bicycle, and less than 1% involved a bicycle accessory or had unknown bicycle involvement.
  - Over 77% of bicycle-riding patients were males.
  - Most patients seen in riding-related visits were adults, with 70% (883,400 of 1,270,100) of patients being over the age of 18. However, children ages 5-17 were associated with the most visits per capita, at 217 per 100,000 population.
  - The most frequently injured body parts in riding-related visits were arms (39% of patients) and legs (28% of patients). The most common diagnoses were fractures (30%) and contusions or abrasions (29%).
  - The most common hazard patterns for riding-related visits were falls (40%) and motor vehicle incidents (23%). Mountain bikes were more frequently involved in unspecified crashes, flipping over handlebars, and injuries while performing tricks or racing, compared to road bikes.[2] Road bikes were more frequently seen in falls and motor vehicle incidents than mountain bikes.
  - Motor vehicle incidents accounted for an estimated 23% (291,200 of 1,270,100) of ED visits associated with bicycle riding, with 78% (225,700 of 291,200) connoted in the ED report as primarily motor vehicle driver error.

[1] More information on e-bike-associated injuries can be found in CPSC's forthcoming report on micromobility products. Micromobility Products-Related Deaths, Injuries, and Hazard Patterns: 2017–2024

[2] In this report, mountain bikes refer to bicycles reported using NEISS product code 5033 (*Mountain or all-terrain bicycles or accessories*); road bikes refer to bicycles reported using NEISS product code 5040 (*Bicycles or accessories, excluding mountain or all-terrain bicycles*), including bicycle types designed for road use, such as racing, hybrid, trekking, touring, city, utility, commuter, comfort, cruiser, recumbent, and tandem bicycles, among other bicycles intended for paved surfaces rather than rough terrain.

- Among riding-related ED visits where helmet use was known, about half of the patients were wearing a helmet when injured. Among patients with head injuries and known helmet use status, only about 37% (32,500 out of 88,700) were wearing helmets.
- Alcohol or drug use by the bicyclist was mentioned in the ED reports of about 5% of patients with bicycle-riding injuries.
- ED visits associated with non-riding bicycle incidents involved a variety of hazard patterns. The most common hazards were pedestrians getting struck by or falling to avoid bicyclists (31% of estimated ED visits), tripping over or falling onto bicycles (16%), repairing bicycles (14%), and carrying or lifting bicycles (12%).

- **Fatalities Associated with Bicycle Riding, 2022-2023**
  - There were 1,395 fatalities associated with bicycle riding in 2022 and 1,417 in 2023.
  - About 88% of bicycle-riding fatalities were male.
  - Adults were victims of fatal bicycle-riding incidents more frequently than children, both in total count and per capita. Adults over the age of 45 showed the highest risk of fatal bicycle-riding incidents, accounting for 65% of riding-related fatalities versus their 42% share of the U.S. population at the time.
  - Motor vehicle collisions were associated with 71% of all bicycle-riding fatalities (1,984 out of 2,812).
- **Special Study on Bicycle-Related Injuries, 2024**
  - To gather more information about bicycle riding-related injuries, CPSC conducted follow-up investigations of 2,004 randomly selected ED visits that occurred between January 1, 2024, and December 31, 2024, and did not result in a fatality.
  - Staff received complete in-scope responses from 297 patients. Of these, 286 were related to bicycle riding, ten were related to bicycles but not riding, and one was only related to a bicycle rack. The weights for the riding-related survey cases were adjusted to provide national estimates (see Appendix B).
  - According to the special study, 22 percent of estimated riding-related ED visits (94,000 of 427,400) involved a motor vehicle. Among these, about 79% (74,000 of 94,000) were due to motor vehicle driver error. An additional 17% were due to the cyclist swerving to avoid a motor vehicle, which is almost three times as high as the 6% estimated in the original NEISS sample based on the information in the medical record. More than half of the estimated motor vehicle-related ED visits were associated with incidents that occurred at an intersection.
  - According to responses to the special study, 57% of riding-related ED visits involved incidents that took place on paved roads or asphalt, and another 24% on paved

sidewalks or other cement surfaces. Moreover, 84% of estimated ED visits were reported to have good visibility at the time of the incident.

- Sixty-six percent of estimated riding ED visits involved patients wearing at least one item of safety gear, such as helmets, padding, reflective vests, or lights. An estimated 47% of patients wore helmets.
- Based on responses to the special study, 22% of estimated ED visits involved patients carrying something on their person or bicycle, such as a backpack or purse on their body, or a bag hanging off their handlebars or in their bike cargo rack. Six percent involved distractions such as music from a phone or loud noises from surroundings.

Overview

Bicycles and bicycle accessories are among the most common classes of consumer products associated with injuries reported in hospital emergency departments.[3] This report explores these injuries in depth – and in particular separates incidents based on bicycle malfunction versus user error – to inform possible future bicycle standard requirements development. From 2022 through 2024, the majority of bicycle-related injuries seen in emergency departments were riding-related. Falls and motor vehicle collisions were the most common hazards. Other typical hazards included road hazards, non-powered collisions (e.g., collisions with other cyclists, skateboarders, scooter riders, pedestrians, or animals), overexertion, bicycle malfunctions, and performing tricks or participating in bicycle races. Riding-related safety factors addressed in this report include helmet usage and the involvement of alcohol or non-prescription drugs. There were also a substantial number of injuries reported by patients who were not riding bicycles, the most common of which were pedestrians struck by cyclists, people who tripped over or fell onto parked bicycles, people who injured themselves while repairing or moving bicycles, and children playing on or around bicycles. Children were more likely, per capita, to be injured in bicycle-riding incidents than adults, but adults 45 or older were more likely to be fatally injured. Bicycle-riding fatalities from 2022 through 2023 were most commonly caused by motor vehicle collisions.

[3] NEISS Data Highlights, 2022-2024 (cpsc.gov), CPSC NEISS On-Line Query System | CPSC.gov

Hospital Emergency Department Visits Associated with Bicycles or Bicycle Accessories, 2022–2024

From 2022 through 2024, an estimated 1,332,100 hospital emergency department (ED) visits were associated with bicycles or bicycle accessories.[4] This estimate is based on the 31,516 cases reported by sample hospitals to the National Electronic Injury Surveillance System (NEISS)[5] using product codes 5033 (*Mountain or all-terrain bicycles or accessories*) or 5040 (*Bicycles or accessories, excluding mountain or all-terrain bicycles*). These numbers do not match the values reported in the corresponding NEISS Data Highlights[6] because, for this report, CPSC staff reviewed incident narratives and excluded cases that did not directly involve a bicycle or bicycle accessory. For example, incidents that only involved scooters, children's toy vehicles, e-bikes, motorcycles, or other motorized vehicles, or where it was unclear whether the bicycle was motorized or not, were considered miscoded and therefore out of scope for this report. Incidents involving a driver of a car or motorcycle who hit a bicycle were also considered out of scope if the patient was not the cyclist. Finally, cases in which the patient rode a bike earlier in the day but was seen in the emergency department for an injury unrelated to a bicycle or bicycle accessories were considered out of scope and are not included in this report.

Table 1 presents the number of in-scope NEISS cases, the estimated number of ED visits they represent from 2022 through 2024, and their corresponding coefficients of variation (CV).

Table 1: Estimated Emergency Department Visits Associated with Bicycles or Accessories, 2022–2024

Year	Cases	Estimate[α]	CV
2022[β]	10,085	441,000	0.15
2023	10,627	441,900	0.13
2024	10,804	449,300	0.09

Source: NEISS Database, April 2025.

[α]Estimates are rounded to the nearest 100.

[4] In 2024 CPSC revised the NEISS sample to ensure it remains nationally representative of hospitals. To make older data comparable to 2024 estimates, adjusted weights have been applied to pre-2024 data. As such, estimates for 2022 in this report will differ from those in last year's report Non-Powered Bicycle Injuries and Fatalities, 2022.

[5] NEISS is a statistically valid, nationally representative probability sample of hospitals with emergency departments. See the Appendix for more details.

[6] NEISS Data Highlights, 2022-2024 (cpsc.gov), CPSC NEISS On-Line Query System | CPSC.gov

[6]*Estimates for 2022 were adjusted following the NEISS re-sampling in 2024, thus differ from previous reports.*

Bicycle Involvement

Table 2 presents the extent of bicycle involvement in the cases presented in Table 1. There are four categories of bicycle involvement: bicycle accessory only or bicycle involvement unknown, non-riding incident, riding incident, and presumed riding incident.

From 2022 through 2024, there were an estimated 5,300 ED visits which did not directly involve a bicycle or where bicycle involvement was unknown. Incidents were placed in this category if, for example, a person was found lying on the ground near a bicycle and no details were reported of the incident. Also included in this category are bicycle accessory-related incidents, such as those involving bicycle racks, pumps, or helmets, but no bicycle.

From 2022 through 2024, there were an estimated 56,700 non-riding ED visits. An injury was counted as non-riding if the patient was a pedestrian struck by a bicycle or was injured while interacting with a parked bicycle.

The remaining cases were categorized as either Riding incidents or Presumed Riding incidents, with a combined three-year estimate of 1,270,100 ED visits. A case was classified as "Riding" if the hospital report explicitly stated that the patient was "riding" or otherwise clearly implied that the patient was riding (e.g., "going downhill on a bike" or "crashed bike into a tree"). Incidents in which the patient was sitting on a bicycle but not moving, such as those stopped at a traffic light or mounting/dismounting a bicycle, were also categorized as riding incidents. If, for example, the narrative stated the patient "was involved in a bicycle accident," or "got leg stuck in a bike," and little to no other information was provided, then the incident was *presumed* to be riding-related.[7]

[7] The classification of the "Presumed Riding" category is stricter than in previous reports, and the 2022 data was updated with the new classification. For example, in previous years, a patient who "fell off a bike" was categorized as "Presumed Riding" if the ED report did not explicitly mention riding. In the current report, the same patient would be categorized as "Riding." Thus, the "Presumed Riding" percentage in Table 2 decreased and the "Riding" percentage increased for 2022.

Table 2: Estimated ED Visits Associated with Bicycles or Accessories by Bicycle Involvement, 2022–2024

Type of Incident	2022[α]		2023		2024	
	Estimate[β]	*Percent*	*Estimate*[β]	*Percent*	*Estimate*[β]	*Percent*
Bicycle Accessory or Bicycle Involvement Unknown	2,300	<1%	1,500	<1%	1,500	<1%
Bicycle, Non-Riding	19,400	4%	17,900	4%	19,500	4%
Bicycle, Riding	414,300	94%	414,300	94%	417,600	93%
Bicycle, Presumed Riding	5,000	1%	8,200	2%	10,700	2%
Total	***441,000***	***100%***	***441,900***	***100%***	***449,300***	***100%***

Source: NEISS Database, April 2025.

[α]Estimates for 2022 were adjusted following the NEISS re-sampling in 2024, thus differ from previous reports.

[β]Estimates are rounded to the nearest 100.

For the remainder of the analyses in this report, the Riding and Presumed Riding categories in Table 2 were grouped together and referred to as incidents associated with bicycle riding. Riding and non-riding cases were subsequently reviewed for more detailed hazard descriptions, and riding cases were further reviewed for demographics, injury types, helmet use, and alcohol or drug involvement.

Estimated Emergency Department Visits Associated with Bicycle Riding, 2022–2024

As bicycle-riding injuries are the primary concern when discussing bicycle safety, below are more detailed analyses of demographics, injury types, hazards, and safety factors associated with bicycle riding incidents reported to emergency departments in 2022 through 2024.

Sex

Seventy-seven percent (974,600 of 1,270,100) of ED patients associated with bicycle riding in 2022–2024 were male, as shown in Table 3. Similar sex disparity was also seen in roadway bicycle accidents in 2021, where 81 percent of those injured were male, according to the National Highway Traffic Safety Administration (NHTSA).[8]

[8] Bicycle Safety (nhsta.gov), 2023.

Table 3: Estimated Hospital Emergency Department Visits Associated with Bicycle Riding by Sex, 2022–2024

Sex	Cases	Estimate[αβ]	Percent	CV
Male	23,092	974,600	77%	0.12
Female	6,849	294,700	23%	0.15
Unknown	23	*	<1%	0.44
Total	***29,964***	***1,270,100***	***100%***	***0.12***

Source: NEISS Database, April 2025.

[α]Estimates are rounded to the nearest 100.

[β]Estimates include 2022 estimates which differ from previous reports.

**Does not meet criteria for publishing NEISS estimates of CV ≤ 0.33, estimate ≥ 1,200, and n ≥ 20.*

Age

Table 4 presents the estimates of ED visits associated with bicycle riding by age. Adults 18-44 accounted for the largest group of estimated ED visits. However, when considering U.S. population shares by age group, bicycle riding-related ED visits among children ages 5–17 were more common per capita than any adult population, with an estimated 217 per 100 thousand.

Table 4: Estimated Hospital Emergency Department Visits Associated with Bicycle Riding by Age, 2022–2024

Age	Cases	Estimate[αβ]	Percent	Average Annual U.S. Population[γ]	Estimated ED Visits per 100K Population Per Year[γ]	CV
<5	1,194	35,700	3%	18,479,602	64	0.18
5-17	10407	350,600	28%	53,832,487	217	0.14
18-44	9,338	437,200	34%	120,984,569	120	0.13
45-64	6,109	292,100	23%	82,188,388	118	0.14
65+	2,905	154,100	12%	59,500,175	86	0.27
Age Not Recorded	11	*	<1%	-	-	0.77
Total	***29,964***	***1,270,100***	***100%***	***334,985,221***	***126***	***0.12***

Source: NEISS Database, April 2025.

[α]Estimates are rounded to the nearest 100.

[β]Estimates include 2022 estimates which differ from previous reports.

[γ]Source: U.S. Census Population Estimates available from https://www2.census.gov/programs-surveys/popest/datasets/2020-2022/national/asrh/nc-est2022-alldata-r-file06.csv, https://www2.census.gov/programs-surveys/popest/datasets/2020-2022/national/asrh/nc-est2022-alldata-r-file08.csv, and https://www2.census.gov/programs-surveys/popest/datasets/2020-2023/national/asrh/nc-est2023-alldata-r-file10.csv.

**Does not meet criteria for publishing NEISS estimates of CV ≤ 0.33, estimate ≥ 1,200, and n ≥ 20.*

Body Parts Injured

Table 5 presents the estimated ED visits associated with bicycle riding by body part injured. In October 2018, CPSC upgraded the NEISS system, allowing ED visits to contain up to two codes for the body part injured and the diagnosis. For ED visits that involved two distinct body parts injured, staff counted both, once for each body part. The most common body parts injured were the arms, hands, and shoulders, which were involved in 39 percent of estimated ED visits (494,600 of 1,270,100).

Table 5: Estimated Hospital Emergency Department Visits Associated with Bicycle Riding by Body Part Injured, 2022–2024

Body Part Injured[α]	2022[β]		2023		2024	
	Estimate[γ]	*Percent*[δ]	*Estimate*[γ]	*Percent*[δ]	*Estimate*[γ]	*Percent*[δ]
Head	80,400	19%	78,100	18%	80,600	19%
Face/Ear	71,800	17%	75,600	18%	74,600	17%
Arm/Hand/Shoulder	158,700	38%	164,500	39%	171,400	40%
Torso	84,600	20%	85,000	20%	82,900	19%
Leg/Foot	120,200	29%	117,100	28%	119,200	28%
All/Other	26,000	6%	28,800	7%	26,400	6%
Neither Body Part Specified	6,800	2%	8,900	2%	9,400	2%

Source: NEISS Database, April 2025.

[α]In NEISS, emergency-department visits can contain up to two codes for the body part injured. If two distinct body parts were listed, staff counted both, once for each body part; if the same body part was listed twice, it was only counted once.

[β]Estimates for 2022 were adjusted following the NEISS re-sampling in 2024, thus differ from previous reports.

[γ]Estimates are rounded to the nearest 100.

[δ]Percentages were calculated based on the total for each body part divided by the total estimated riding-related ED visits. The percentages do not add to 100% due to cases with multiple body parts injured.

Diagnosis

Table 6 presents the estimated injuries associated with bicycle riding by diagnosis. As in Table 5, if there were two distinct diagnoses associated with an ED visit, staff counted both independently. The most commonly reported diagnoses were fractures and contusion/abstractions, which were involved in 30 percent and 29 percent of estimated ED visits, respectively.

Table 6: Estimated Hospital Emergency Department Visits Associated with Bicycle Riding by Diagnosis, 2022–2024

Diagnosis[α]	2022[β]		2023		2024	
	Estimate[γ]	*Percent*[δ]	*Estimate*[γ]	*Percent*[δ]	*Estimate*[γ]	*Percent*[δ]
Fracture	130,000	31%	121,900	29%	128,000	30%
Contusion/Abrasion	122,800	29%	124,800	30%	123,500	29%
Laceration	75,300	18%	72,000	17%	70,200	16%
Internal Organ Injury	60,400	14%	56,300	13%	58,300	14%
Strain/Sprain	33,400	8%	33,100	8%	32,300	8%
Concussion	12,100	3%	13,500	3%	13,700	3%
Other (Specific)[ε]	37,500	9%	37,900	9%	40,400	9%
Unspecified	83,900	20%	101,300	24%	108,000	25%

Source: NEISS Database, April 2025.

[α]In NEISS, emergency-department visits can contain up to two codes for the diagnosis. If two distinct diagnoses were listed, staff counted both, once for each diagnosis; if the same diagnosis was listed twice, it was only counted once.

[β]Estimates for 2022 were adjusted following the NEISS re-sampling in 2024, thus differ from previous reports.

[γ]Estimates are rounded to the nearest 100.

[δ]Percentages were calculated based on the total for each diagnosis divided by the total estimated riding-related ED visits. The percentages do not add to 100% due to cases with multiple diagnoses.

[ε]This "Other" category includes the following diagnoses: Amputation, Anoxia, Avulsion, Burns, Crushing, Dental Injury, Dermatitis, Dislocation, Foreign Body, Hematoma, Hemorrhage, Ingestion of Foreign Object, Nerve Damage, Poison, Puncture.

Disposition

Table 7 presents the dispositions of ED visits associated with bicycle-riding incidents. Among patients with riding injuries seen in hospital EDs, 83 percent were either treated and released or examined and released without treatment. As many bike-related fatalities occur at the scene of the accident rather than at a hospital, a more accurate representation of bike-related fatalities is available from the NCHS data presented in the Fatalities section of this report.

Table 7: Estimated Hospital Emergency Department Visits Associated with Bicycle Riding by Disposition, 2022–2024

Disposition	2022[α]		2023		2024	
	Estimate[β]	*Percent*	*Estimate*[β]	*Percent*	*Estimate*[β]	*Percent*
Left without being seen or left against medical advice	15,300	4%	13,700	3%	12,000	3%
Treated and released	348,900	83%	349,700	83%	359,700	84%
Treated and admitted for hospitalization	46,800	11%	49,500	12%	45,800	11%
Treated and transferred to another hospital	5,300	1%	7,300	2%	8,100	2%
Held for observation	*	<1%	*	<1%	*	<1%
Fatality	*	<1%	*	<1%	*	<1%
Unknown	0	0%	0	0%	*	<1%
Total	***419,300***	***100%***	***422,500***	***100%***	***428,300***	***100%***

Source: NEISS Database, April 2025.

[α]Estimates for 2022 were adjusted following the NEISS re-sampling in 2024, thus differ from previous reports.

[β]Estimates are rounded to the nearest 100.

**Does not meet criteria for publishing NEISS estimates of CV ≤ 0.33, estimate ≥ 1,200, and n ≥ 20.*

Hazard Pattern

Table 8 presents the hazard patterns involved in ED visits associated with bicycle-riding incidents according to the priority ranking list below.

1. **Bike Malfunction:** The incident was due to a bike malfunction such as the bicycle chain breaking off, the brakes failing, a flat tire, or other parts coming loose. This also includes incidents where the patient was riding a custom-built bicycle that did not yet have brakes installed and subsequently crashed.

2. **Tricks/Racing:** The rider was attempting to perform tricks or was participating in a bicycle race. Incident reports where the rider was listed as crashing at a skate park or on a specialty off-road track are included here. This also includes incidents where the rider was "riding with no hands on the handlebars" or "jumping the curb." This category also includes group riding incidents where the injury was associated with a multi-bicycle incident such as crashing into another cyclist or swerving to avoid another cyclist in the group.

3. **Road Hazard:** Road hazards here include potholes, small objects in the road, railroad tracks, manhole covers, bumps of any kind, slippery surfaces, loose gravel, etc. This category also includes incidents where the exact hazard is not listed but the bicycle wheel "caught" on something causing the rider to crash, or where the bicycle "slipped" or "skidded."

4. **Swerve/Brake:** The cyclist swerved or braked quickly, possibly to avoid a collision with a pedestrian, animal, or other cyclist, and subsequently crashed, fell, or otherwise got injured as a result. This does not include swerving or stopping to avoid a motor vehicle; those incidents are included in the "Motor Vehicle Involved" category.

5. **Motor Vehicle Involved:** The rider was hit by a motor vehicle, the rider hit a motor vehicle, the rider swerved to avoid a vehicle that pulled out, or there was a bike-versus-vehicle collision where the fault was unknown. Motor vehicles here include cars, trucks, buses, trains, motorcycles, and powered bicycles and scooters. See Table 10 for a more detailed breakdown of this category.

6. **Collision, Non-Powered:** The cyclist collided with another person who was either on a non-powered bike, skateboard, or scooter, or was on foot. This also includes collisions with animals (cat or larger).

7. **Hit Stationary Object:** The cyclist collided with a stationary object such as a tree, telephone pole, fence, wall, curb, or guard rail. This also includes incidents where the rider struck their head or outstretched hand on something while riding by.

8. **Environmental Encounter:** This includes animal encounters such as bee stings, insect bites, poison ivy rashes, dog bites and attacks, and encounters with wild animals smaller than a cat (e.g. rodents, bats, birds) while riding, as well as environmental hazards such as tree branches hitting the rider in the face or a strong gust of wind knocking the rider over. This does not include swerving to avoid large animals ("Swerve/Brake"), colliding with a large animal ("Collision, Non-Powered"), nor crashing into a tree or bush ("Hit Stationary Object").

9. **Other Interference:** This includes any other form of external interference with the rider, such as a child kicking or pulling on the bike, a pet pulling on a leash attached to the bike, a foreign object such as headphone cords or a leash getting tangled in the bike spokes, the rider being distracted by a phone, the rider carrying something large or heavy that impeded riding, or the rider's clothing getting entangled in the bicycle.

10. **Contact Injury:** This includes injuries such as the pedal hitting the patient's leg, straddle injuries, the patient getting scratched by a bike part while riding, etc. If the patient had a

contact injury followed by a fall, the hazard was assigned to this category only if the contact injury was the only injury diagnosed.

11. **Overexertion:** The injury was exercise-induced or related to a separate medical condition—for example, shortness of breath, muscle strain without crash, heat stroke, frostbite, blisters, and earlier injuries exacerbated by bike riding. This category also includes sprains and strains caused by the rider putting a foot on the ground and twisting it, as well as syncopal episodes (fainting) which caused a fall or crash.
12. **Flip Over Handlebars:** The rider flipped, flew, fell, or otherwise went over the handlebars of the bike, and no other details about the reason for the crash were reported.
13. **Fall:** The cyclist fell off the bike. This includes incidents where the rider lost control, caught a leg on the spokes and fell, fell while getting on or off the bicycle, or fell by any other mechanism that did not result from external influence. This also includes reports that read "patient fell off bike" with little to no other information.
14. **Crash/Wreck/Accident:** The incident is reported as a bike crash, wreck, or accident with no external factors mentioned in the report.
15. **Unknown/Other:** The details of the incident are unknown or unclear, such as when the rider was "thrown off" or "knocked off" the bicycle and no other information was provided. This also includes incidents where the patient was found downed near a bicycle with little to no recollection of the incident, and non-crash injuries that occurred while riding but do not fit in any other hazard category.

Incidents involving multiple hazard patterns were categorized according to the priority ranking in the list above, with noted exceptions. For example, if a cyclist's brakes failed prior to crashing into a parked car, that incident would be categorized as "Bike Malfunction" instead of "Motor Vehicle Involved." If a cyclist swerved or braked suddenly to avoid an animal and crashed into a telephone pole or parked car, that incident would be categorized as "Swerve/Brake" instead of "Hit Stationary Object" or "Motor Vehicle Involved." And so on. Exceptions to these rules are noted in the list above. In general, incidents were categorized according to the primary *cause* of the incident, and if the cause was unknown, then they were categorized according to the most severe *effect*.

The most common hazard patterns were falls and incidents where a motor vehicle was involved in some way. These two hazard types accounted for a total of 62 percent of estimated ED visits associated with bicycle riding from 2022 through 2024. Other common

hazard patterns included crashes of unspecified cause (7%), road hazards (6%), overexertion (5%), and hitting stationary objects (4%).

Table 8: Estimated Hospital Emergency Department Visits Associated with Bicycle Riding by Hazard Pattern, 2022–2024

Priority	Hazard Pattern	2022[α]		2023		2024	
		Estimate[β]	*Percent*	*Estimate*[β]	*Percent*	*Estimate*[β]	*Percent*
1	Bike Malfunction	7,800	2%	6,000	1%	7,200	2%
2	Tricks/Racing	11,200	3%	13,500	3%	15,300	4%
3	Road Hazard	25,000	6%	21,700	5%	24,500	6%
4	Swerve/Brake	3,900	<1%	5,100	1%	5,400	1%
5	Motor Vehicle Involved	93,000	22%	98,100	23%	100,100	23%
6	Collision, Non-Powered	6,000	1%	6,700	2%	6,300	1%
7	Hit Stationary Object	14,600	3%	17,000	4%	17,600	4%
8	Environmental Encounter	5,100	1%	6,100	1%	6,100	1%
9	Other Interference	5,300	1%	4,200	<1%	3,200	<1%
10	Contact Injury	12,300	3%	10,900	3%	10,200	2%
11	Overexertion	18,000	4%	20,900	5%	22,000	5%
12	Flip Over Handlebars	13,900	3%	13,100	3%	11,300	3%
13	Fall	171,200	41%	166,700	39%	163,900	38%
14	Crash/Wreck/Accident	27,200	6%	29,200	7%	31,500	7%
15	Unknown/Other	4,900	1%	3,200	<1%	3,600	<1%
	Total	***419,300***	***100%***	***422,500***	***100%***	***428,300***	***100%***

Source: NEISS Database, April 2025.

[α]Estimates for 2022 were adjusted following the NEISS re-sampling in 2024, thus differ from previous reports.

[β]Estimates are rounded to the nearest 100.

Hazard Pattern Differences Between Mountain Bicycles and Road Bicycles

Some hazard patterns had notable differences in frequency between mountain bikes and road bikes—that is, incidents associated with product code 5033 (*Mountain or all-terrain bicycles or accessories*) and those associated with product code 5040 (*Bicycles or accessories, excluding mountain or all-terrain bicycles*). Table 9 shows the differences between the percentages of estimated ED visits associated with mountain bicycles and road bicycles for each hazard pattern. Hazards where the average annual difference between mountain bikes and road bikes was more than 5 percentage points are highlighted in the table. Mountain bikes were more commonly associated with crashes, flipping over handlebars, and tricks/racing. These hazards are highlighted in blue. Road bikes were more commonly associated with motor vehicle involvement and falls with no external factors. These hazards are highlighted in red. Most of

these discrepancies align with and can likely be explained by the differences in terrain choice and level of user expertise between these types of bicycles.

Table 9: Estimated Hospital Emergency Department Visits Associated with Bicycle Riding: Hazard Pattern Differences Between Mountain Bicycles and Road Bicycles, 2022–2024

Hazard Pattern	2022[α]		2023		2024	
	Est. % of Mountain Bicycle ED Visits	*Est. % of Road Bicycle ED Visits*	*Est. % of Mountain Bicycle ED Visits*	*Est. % of Road Bicycle ED Visits*	*Est. % of Mountain Bicycle ED Visits*	*Est. % of Road Bicycle ED Visits*
Bike Malfunction	<1%	2%	<1%	1%	<1%	2%
Tricks/Racing	12%	2%	13%	3%	17%	3%
Road Hazard	8%	6%	5%	5%	12%	5%
Swerve/Brake	<1%	<1%	1%	1%	<1%	1%
Motor Vehicle Involved	1%	22%	2%	23%	<1%	25%
Collision, Non-Powered	<1%	1%	<1%	2%	2%	1%
Hit Stationary Object	4%	3%	4%	4%	2%	4%
Environmental Encounter	1%	1%	5%	1%	2%	1%
Other Interference	<1%	1%	<1%	<1%	<1%	<1%
Contact Injury	2%	3%	<1%	3%	1%	2%
Overexertion	2%	5%	2%	6%	5%	5%
Flip Over Handlebars	13%	3%	14%	3%	5%	3%
Fall	33%	43%	35%	41%	32%	39%
Crash/Wreck/Accident	19%	6%	18%	6%	20%	7%
Unknown/Other	3%	1%	<1%	<1%	<1%	<1%

Source: NEISS Database, April 2025.

[α]Percents for 2022 are based on estimates which were adjusted following the NEISS re-sampling in 2024, thus differ from previous reports.

Motor Vehicle Involvement

From 2022 through 2024, 23 percent of ED visits associated with bicycle riding were also associated with a motor vehicle (see Table 8). These are categorized in Table 10 according to the cause, mechanism, or contributory error if one was connoted in the hospital ED narrative.

Incidents in which the vehicle struck the cyclist were generally categorized as driver error, unless the cyclist clearly broke traffic laws or otherwise behaved dangerously. If the driver pulled out of a parking spot, alley way, or driveway, crossed into the bike lane or crosswalk, or otherwise “cut off” a cyclist and was struck by a bicycle, this was also considered a driver error.

If the car was parked or stationary and the bicycle crashed into it, this was a cyclist error. Incidents were also considered cyclist error if the bicycle swerved into oncoming traffic or otherwise behaved dangerously. There was one 2023 accident where a bicycle rider was struck by a train; this is classified as a cyclist error because trains are not expected to stop for traffic and pedestrians.

Incidents where cyclists struck a car door that was being opened were categorized separately. Incidents where cyclists swerved, braked suddenly, or jumped off their bicycle to avoid a car, as well as incidents where a car pulled out suddenly and it was not mentioned whether the bicycle struck the car, were categorized as a swerving incident.

Cases of unclear error include those where there was no clear error on either side, reports which listed a "bike vs. motor vehicle accident" or "bike collision with motor vehicle" with no other details, and cases where a bicycle collided with a car making a turn and it was unclear who had the right of way.

Table 10: Estimated Hospital Emergency Department Visits Associated with Bicycle vs Motor Vehicle Accidents by Reported Error, 2022–2024

Reported Error	2022[α]		2023		2024	
	Estimate[β]	*Percent*	*Estimate*[β]	*Percent*	*Estimate*[β]	*Percent*
Collision, Driver Error	71,900	77%	76,200	78%	77,600	78%
Collision, Cyclist Error	8,900	10%	9,200	9%	9,300	9%
Cyclist hit car door being opened	*	3%	*	3%	*	3%
Cyclist swerved or jumped to avoid vehicle	4,800	5%	5,400	5%	5,800	6%
Unclear	4,500	5%	4,300	4%	3,900	4%
Total	***93,000***	***100%***	***98,100***	***100%***	***100,100***	***100%***

Source: NEISS Database, April 2025.

[α]Estimates for 2022 were adjusted following the NEISS re-sampling in 2024, thus differ from previous reports.

[β]Estimates are rounded to the nearest 100.

**Does not meet criteria for publishing NEISS estimates of CV ≤ 0.33, estimate ≥ 1,200, and n ≥ 20.*

Helmet Use

From 2022–2024, among bicycle-riding patients seen in EDs, 11 percent had worn a helmet and 11 percent had not, as shown in Table 11. For the remaining ED visits, helmet use was unknown.

Table 11: Estimated Hospital Emergency Department Visits Associated with Bicycle Riding by Helmet Use, 2022–2024

Helmet Use	2022α		2023		2024	
	Estimate[β]	*Percent*	*Estimate*[β]	*Percent*	*Estimate*[β]	*Percent*
Helmet Worn	49,100	12%	47,600	11%	47,500	11%
Helmet Not Worn	44,000	10%	45,500	11%	47,000	11%
Helmet Not Mentioned or Unknown	326,200	78%	329,400	78%	333,800	78%
Total	***419,300***	***100%***	***422,500***	***100%***	***428,300***	***100%***

Source: NEISS Database, April 2025.

[α]Estimates for 2022 were adjusted following the NEISS re-sampling in 2024, thus differ from previous reports.

[β]Estimates are rounded to the nearest 100.

Proper helmet usage is particularly important for preventing or reducing the severity of head injuries among cyclists. Table 12 presents helmet usage among bicycle-riding patients with head injuries. Among such patients where helmet use was known, an estimated 63 percent (56,100 out of 88,700) had not worn helmets. Among those who were wearing helmets, there were five incidents in which the helmets were worn improperly—either the emergency department described them as "improperly" wearing the helmet, or the helmet fell off before the patient hit the ground.

Table 12: Estimated Hospital Emergency Department Visits with Reported Head Injuries Associated with Bicycle Riding by Helmet Use, 2022–2024

Helmet Use	2022[α]		2023		2024	
	Estimate[β]	*Percent*	*Estimate*[β]	*Percent*	*Estimate*[β]	*Percent*
Helmet Worn	11,100	14%	10,500	13%	10,900	14%
Helmet Not Worn	19,000	24%	18,700	24%	18,500	23%
Helmet Not Mentioned or Unknown	50,300	63%	49,000	63%	51,200	63%
Total	***80,400***	***100%***	***78,100***	***100%***	***80,600***	***100%***

Source: NEISS Database, April 2025.

[α]Estimates for 2022 were adjusted following the NEISS re-sampling in 2024, thus differ from previous reports.

[β]Estimates are rounded to the nearest 100.

Alcohol or Drug Involvement

Intoxication and other impairments pose a dangerous hazard for cyclists. Table 13 presents the estimates of ED visits associated with riding bicycles where alcohol or non-prescription drug use by the cyclist was mentioned in the ED visit report. Incidents where patients used prescription drugs as prescribed are not counted as drug use in this analysis. About five percent of estimated ED visits reported alcohol or drug involvement.

Table 13: Estimated Hospital Emergency Department Visits Associated with Bicycle Riding by Alcohol/Drug Involvement, 2022–2024

Alcohol/Drugs Reported	2022[α]		2023		2024	
	Estimate[β]	*Percent*	*Estimate*[β]	*Percent*	*Estimate*[β]	*Percent*
Alcohol Only	13,300	3%	15,500	4%	15,100	4%
Drugs Only	4,100	<1%	4,800	1%	4,300	1%
Both	*	<1%	1,600	<1%	1,700	<1%
No Drugs or Alcohol Use Mentioned	400,400	95%	400,600	95%	407,200	95%
Total	***419,300***	***100%***	***422,500***	***100%***	***428,300***	***100%***

Source: NEISS Database, April 2025.

[α]Estimates for 2022 were adjusted following the NEISS re-sampling in 2024, thus differ from previous reports.

[β]Estimates are rounded to the nearest 100.

**Does not meet criteria for publishing NEISS estimates of CV ≤ 0.33, estimate ≥ 1,200, and n ≥ 20.*

Estimated Emergency Department Visits Associated with Bicycles, Non-Riding, 2022–2024

Emergency Department visits associated with, but not riding on, bicycles stemmed from a variety of hazard patterns, as shown in Table 14. The most common hazards were pedestrians being struck by bicyclists or falling to avoid a bicycle, people tripping over bikes or falling onto them, and injuries caused by children playing with or misusing bicycles. Detailed descriptions of each hazard pattern are below:

- **Pedestrian hit by bicycle or fell avoiding bicycle:** The patient was a pedestrian struck by a cyclist or fell or jumped out of the way of a cyclist and was injured. This includes cases where the patient was using a skateboard or roller skates when struck.
- **Trip/Fall:** The patient tripped over a bicycle or fell onto a bicycle.
- **Other Contact Injury:** This includes accidental contact injuries with bicycles that did not involve the patient tripping or falling. For example, if the patient walked by and scraped a body part on a protruding bike part or kicked the bike intentionally. This also includes incidents where a bicycle fell on a patient, as well as incidents where a bicycle was in the back of a motor vehicle that slid forward and struck a backseat passenger when the vehicle suddenly stopped.

- **Bicycle repair:** The patient was injured while repairing, modifying, or adjusting a bicycle. This includes reports of patients ages 9 or older who got a finger or hand caught in a bike chain with no other information.
- **Walking bike:** The patient was walking alongside the bike and was injured in a way related to the bicycle. This includes incidents where an adult was teaching a child to ride a bike by running alongside and fell or crashed. This does not include incidents where the patient was walking a bicycle and was injured in a way unrelated to the bicycle (e.g. walking the bicycle while wearing a bicycle helmet and getting struck in the head by a thrown object; this would be included in the Bicycle Accessories category in Table 2).
- **Carrying/Lifting a bicycle:** The patient attempted to carry, lift, drag, or otherwise move a bicycle, and was injured doing so. Most commonly, patients dropped the bicycle on themselves or strained a muscle in the attempt.
- **Child play:** The patient was a child using a bicycle not as intended and got hurt, or the patient was someone else who got hurt by a child misusing a bicycle. This includes children climbing on bikes and falling, throwing a bike at someone else, ingesting a small part of a bicycle, or standing on a bicycle propped up to reach something overhead and falling. This also includes reports of children ages 8 and under getting their fingers or hands stuck in a bike chain, unless it was explicitly stated the child was trying to repair a bike.
- **Hit by Car while Walking with Bicycle:** The patient was walking a bicycle or standing next to a bicycle, usually on a sidewalk or crosswalk, when struck by a car.

Table 14: Estimated Hospital Emergency Department Visits Associated with Non-Riding Bicycle Incidents by Hazard Pattern, 2022

Hazard Pattern	2022[α]		2023		2024	
	Estimate[β]	*Percent*	*Estimate[β]*	*Percent*	*Estimate[β]*	*Percent*
Pedestrian hit by bicycle or fell avoiding bike	5,900	31%	5,400	30%	6,000	31%
Trip/Fall	3,200	17%	2,600	15%	3,000	16%
Other Contact Injury	1,700	9%	1,700	10%	1,600	8%
Bicycle Repair	2,500	13%	2,500	14%	3,100	16%
Walking with Bicycle	1,200	6%	1,400	8%	1,400	7%
Carrying/Lifting Bicycle	2,600	14%	1,900	11%	2,300	12%
Child Play	1,900	10%	1,900	10%	1,600	8%
Hit by car while walking with bicycle	*	2%	*	3%	*	2%
Total	***19,400***	***100%***	***17,900***	***100%***	***19,500***	***100%***

Source: NEISS Database, April 2025.

[α]Estimates for 2022 were adjusted following the NEISS re-sampling in 2024, thus differ from previous reports.

[β]Estimates are rounded to the nearest 100.

**Does not meet criteria for publishing NEISS estimates of CV ≤ 0.33, estimate ≥ 1,200, and n ≥ 20.*

Fatalities Associated with Bicycle Riding, 2022-2023

There were 1,395 bicycle riding-related deaths in 2022 and 1,417 in 2023, according to data from the National Center for Health Statistics (NCHS) presented in Table 15, resulting in a population-standardized rate of 4.2 deaths per one million people per year.

Table 15: Fatalities Associated with Bicycle Riding, 2022-2023

Year	Deaths	U.S. Population[α]	Deaths per 1M[α]
2022	1,395	333,287,557	4.2
2023	1,417	334,994,511	4.2

Source: NCHS Mortality Database, January 2025.

[α]Source: U.S. Census Population Estimates available from https://www2.census.gov/programs-surveys/popest/datasets/2020-2022/national/asrh/nc-est2022-alldata-r-file06.csv and https://www2.census.gov/programs-surveys/popest/datasets/2020-2022/national/asrh/nc-est2022-alldata-r-file08.csv.

Sex

Table 16 presents the combined fatality counts for 2022 and 2023 by sex. The sex disparity in fatalities associated with bicycle riding is wider than in ED visits associated with bicycle riding. While men were seen three times as often as women for bicycle-riding injuries in EDs, they were involved in fatal bicycle riding incidents seven times as often.

Table 16: Fatalities Associated with Bicycle Riding by Sex, 2022-2023

Sex	Cases	Percent
Male	2,484	88%
Female	328	12%
Total	***2,812***	***100%***

Source: NCHS Mortality Database, January 2025.

Age

Table 17 groups bicycle-riding fatalities in 2022 and 2023 by age. People ages 45 and above were the most frequently seen in fatal bicycle-riding incidents, accounting for 65 percent (1,837 out of 2,812) of reported riding-related fatalities despite being only 42% of the population. People ages 45-64 were involved in twice as many riding-related fatalities per capita as people ages 18-44 (6.7 and 3.3 per one million, respectively), despite these age groups reporting similar levels of injuries per capita (118 and 120 per 100K, respectively).

Table 17: Fatalities Associated with Bicycle Riding by Age, 2022-2023

Age	Cases	Percent	Average Annual U.S. Population[α]	Percent of Average Annual U.S. Population[α]	Deaths per 1M U.S. Population Per Year[α]
<5	14	<1%	18,500,924	6%	0.4
5-17	166	6%	53,776,720	16%	1.5
18-44	795	28%	120,861,803	36%	3.3
45-64	1,099	39%	82,287,240	25%	6.7
65+	738	26%	58,714,346	18%	6.3
Total	***2,812***	***100%***	***334,141,034***	***100%***	***4.2***

Source: NCHS Mortality Database, January 2025.

[α]Source: U.S. Census Population Estimates available from https://www2.census.gov/programs-surveys/popest/datasets/2020-2022/national/asrh/nc-est2022-alldata-r-file06.csv and https://www2.census.gov/programs-surveys/popest/datasets/2020-2022/national/asrh/nc-est2022-alldata-r-file08.csv.

Fatal Hazard

Table 18 presents the causes of bicycle-riding fatalities recorded in the NCHS database. The most common causes were collisions with cars, pick-up trucks, or vans; non-collision transport accidents; and unspecified transport accidents. Motor vehicle accidents, including heavy transport vehicles, trains, and unspecified motor vehicles, accounted for 71 percent of fatal incidents (1,984 of 2,812) across the two years.

Table 18: Fatalities Associated with Bicycle Riding by Fatal Hazard, 2022-2023

Fatal Hazard	2022		2023	
	Cases	*Percent*	*Cases*	*Percent*
Collision with pedestrian or animal	1	<1%	1	<1%
Collision with other pedal cycle	7	1%	1	<1%
Collision with two- or three-wheeled motor vehicle	10	1%	8	1%
Collision with car, pick-up truck or van	463	33%	448	32%
Collision with heavy transport vehicle or bus	49	4%	39	3%
Collision with railway train or railway vehicle	14	1%	14	1%
Collision with other nonmotor vehicle	0	0%	0	0%
Collision with fixed or stationary object	23	2%	29	2%
Non-collision transport accident	154	11%	154	11%
Collision with other or unspecified motor vehicle	445	32%	494	35%
Unspecified traffic accident	220	16%	221	16%
Unspecified non-traffic accident	9	<1%	8	<1%
Total	***1,395***	***100%***	***1,417***	***100%***

Source: NCHS Mortality Database, January 2025.

Alcohol or Drug Involvement

Table 19 presents known alcohol or drug involvement in fatalities recorded in the NCHS database. Each fatality is recorded with up to eleven associated conditions, including underlying diseases or substances posthumously found in the blood.[9] Fatalities were identified as involving alcohol if there was a condition indicating alcohol was used on the day of the fatality, such as "alcohol use" or "alcohol found in the blood." However, fatalities associated with underlying conditions such as alcohol dependency were not as involving alcohol unless another condition alcohol involvement the day of the fatality. Similarly, fatalities were identified as involving drug use if there was a condition indicating drug use on the day of the fatality but not if there was only an underlying condition such as substance dependency. Alcohol or drugs were involved in about two percent of bicycle-riding fatalities in both 2022 and 2023.

[9] The eleven condition variables in the NCHS mortality database utilize ICD-10 codes. The ICD-10 codes used to identify alcohol involvement were those starting with alphanumeric characters T51, R780, and Y90. The ICD-10 codes used to identify drug involvement were those starting with T40-T44 and R781-R785, covering narcotics, opiates, cocaine, hallucinogens, anesthetics, antiepileptic or sedative-hypnotic drugs, psychotropic drugs, drugs affecting the nervous system, and other drugs of addictive potential.

Table 19: Fatalities Associated with Bicycle Riding by Alcohol or Drug Involvement, 2022-2023

Alcohol/Drug Involvement	2022		2023	
	Cases	*Percent*	*Cases*	*Percent*
Alcohol Only	11	1%	8	1%
Drugs Only	10	1%	16	1%
Both	3	<1%	4	<1%
No Alcohol or Drug Use Mentioned	1,371	98%	1,389	98%
Total	***1,395***	***100%***	***1,417***	***100%***

Source: NCHS Mortality Database, January 2025.

Special Study on Non-Powered Bicycles, 2024

Overview

Beginning in 2024, CPSC conducted a study to investigate both powered and non-powered bicycles reported to the NEISS database. Eligible incidents (nonfatal and with known disposition) reported to be associated with road bikes, mountain bikes, and e-bikes were randomly assigned for additional screening via survey, either given by an investigator interview or self-response. This section of the report will present only those injuries associated with non-powered bicycles (i.e. road bikes and mountain bikes). More information on e-bike-associated injuries can be found in CPSC's forthcoming report on micromobility products.[10]

In 2024, a total of 2,004 eligible nonfatal ED visits involving bicycles or bicycle accessories (about 20% of those reported to NEISS) were randomly selected for further investigation as part of this special study. Of those assigned, 297 received complete responses and were determined to be in scope, and 286 were determined to be riding-related. The weights of the 286 riding incidents were adjusted to be representative of the overall NEISS sample of bicycle riding incidents based on patient demographics and hospital information. More information about the weight adjustments can be found in Appendix B.

Responses to this survey included information on primary hazard, road and environmental conditions, safety gear, distractions, and other safety factors. Notably, this survey provided more clarity on incidents where the cause of the injury was unknown. Based on the NEISS data alone, the proportion of injuries described as simply "fall", "crash", or "unknown/other" together

[10] Micromobility Products-Related Deaths, Injuries, and Hazard Patterns: 2017–2024

made up 46% of estimated injuries. Based on the survey, these categories made up only 21% of estimated injuries. Together with information on the other safety and environmental factors, this special study provides a clearer overall picture of factors impacting bicycle safety.

Riding Status

Respondents to the special study were asked whether the victim was riding the bicycle at the time of the accident. Respondents who answered "other" and gave a more specific description of the incident were categorized based on their description. For example, victims who were described as mounting or dismounting the bicycle at the time of incident were classified as "riding," consistent with the NEISS classifications in Table 2.

Table 20: Special Study Bicycle Incidents by Riding Status, 2024

Riding Status	Special Study	NEISS
	Cases	*Cases*
Riding	286	10,255[α]
Non-Riding	10	491
Bicycle Accessory or unknown bicycle involvement	1	40
Total	***297***	***10,786[β]***

Source: NEISS 2024, Special Study on Bicycles & E-Bicycles: Questions V9, A1.
[α]For the NEISS values in the Riding category in this table, Riding and Presumed Riding categories are combined to get a direct comparison with the Special Study. The Special Study had no unclear cases, making such presumptions unnecessary.
[β]The total NEISS case count presented here excludes fatal and unknown-disposition injuries and thus differs from the 2024 total count in Table 1.

Special Study Estimated Emergency Department Visits Associated with Bicycle Riding, 2024

The Special Study survey on bicycle injuries was primarily targeted towards riding injuries. In order to provide comparable estimates, a statistical method called raking was used to account for possible response bias by scaling the estimates to match the total estimated injuries based on NEISS (see Appendix B). Tables 21–25 present these adjusted estimates, broken down by various hazards and safety factors.

Riding Hazards

Respondents were asked to describe the accident in detail, including factors before, during, and just after the injury occurred. Based on these descriptions, hazard patterns were categorized according to the same system used in Table 8. Table 21 below presents these injuries. As special study responses provided additional details, estimates decreased in categories such as Crash

and Fall, which represented cases where information was limited and the cause of the crash or fall was vague, and increased in categories such as Bike Malfunctions, thus enabling CPSC to better capture the extent of injuries related to product failure rather than user behavior Relatedly, the estimates for more detailed categories Road Hazard, Tricks/Racing, and Non-Powered Collision, showed increases of five percentage points or more in the Special Study.

Table 21: Special Study ED Visits Associated with Bicycle Riding by Hazard Pattern, 2024

Hazard Pattern	Special Study			NEISS		
	Cases	*Estimate[α]*	*Percent*	*Cases*	*Estimate[α]*	*Percent*
Bike Malfunction	15	20,900	5%	148	7,200	2%
Tricks/Racing	31	37,100	9%	363	15,300	4%
Road Hazard	53	82,900	19%	554	24,500	6%
Swerve/Brake	4	*	<1%	144	5,400	1%
Motor Vehicle Involved	61	94,000	22%	2,407	99,400	23%
Collision, Non-Powered	18	27,500	6%	162	6,300	1%
Hit Stationary Object	16	27,100	6%	456	17,600	4%
Environmental Encounter	2	*	<1%	129	6,100	1%
Other Interference	7	11,500	3%	75	3,200	<1%
Contact Injury	6	8,700	2%	288	10,200	2%
Overexertion	11	18,000	4%	458	21,900	5%
Flip Over Handlebars	7	6,800	2%	298	11,300	3%
Fall	52	83,700	20%	4,064	163,800	38%
Crash/Wreck/Accident	1	*	<1%	628	31,500	7%
Unknown/Other	2	*	<1%	81	3,600	<1%
Total	***286***	***427,400***	***100%***	***10,255***	***427,400***	***100%***

Source: NEISS 2024, Special Study on Bicycles & E-Bicycles: Questions A1, A4c.

[α]Estimates are rounded to the nearest 100.

**Estimates for categories with < 5 cases are masked for the Special Study.*

Motor Vehicle-Related Injuries

Table 22a breaks down the incidents classified as Motor Vehicle Involved in the above table by whether the vehicle driver or cyclist erred in the course of the accident, or whether it was unclear who was at fault. Similar to the overall NEISS estimates, 79% of ED visits associated with motor vehicle-related injuries were associated with a reported driver error. The largest differences in estimates can be seen in cyclist errors, which were reported at less than half the rate of the overall NEISS estimate, and cyclist swerve incidents, which were reported at almost thrice the rate of the overall NEISS estimate.

Respondents were also asked directly whether a motor vehicle was involved in the accident (Question A4c). However, seven out of the nine who reported swerving out of the way of an oncoming car answered "No" to this question. The detailed narratives took priority over the questionnaire when classifying hazards.

Table 22a: Special Study ED Visits Associated with Bicycle vs Motor Vehicle Accidents by Reported Error, 2024

Reported Error	Special Study			NEISS		
	Cases	*Estimate*[α]	*Percent*	*Cases*	*Estimate*[α]	*Percent*[θ]
Collision, Driver Error	48	74,000	79%	1,862	77,000	81%
Collision, Cyclist Error	3	*	3%	220	9,300	10%
Cyclist hit car door being opened	1	*	1%	90	3,400	4%
Cyclist swerved or jumped to avoid vehicle	9	15,600	17%	132	5,800	6%
Unclear	0	0	0%	103	3,900	-
Total	***61***	***94,000***	***100%***	***2,407***	***99,400***	***100***

Source: NEISS 2024, Special Study on Bicycles & E-Bicycles: Question A1.

[α]Estimates are rounded to the nearest 100.

[θ]Percent excludes cases where fault was unclear.

**Estimates for categories with < 5 cases are masked for the Special Study.*

Respondents were asked about where the incident took place. Table 22b presents the responses about what part of the road the cyclist was using, comparing those involved in motor vehicle incidents to those involved in non-vehicle-related riding incidents.

Table 22b: Special Study Bicycle ED Visits Involving Motor Vehicles by Lane Usage of Cyclist, 2024

Lane Type	Motor Vehicle Involved			No Motor Vehicle Involved		
	Cases	*Estimate*[α]	*Percent*	*Cases*	*Estimate*[α]	*Percent*
Car Lane	14	21,600	23%	31	47,600	14%
Bike Lane	11	19,400	21%	25	38,800	12%
Shoulder	8	12,000	13%	24	33,500	10%
Other/Unknown	24	37,500	40%	79	118,000	35%
Not on a Road	4	*	4%	66	95,500	29%
Total	***61***	***94,000***	***100%***	***225***	***334,600***	***100%***

Source: NEISS 2024, Special Study on Bicycles & E-Bicycles: Question A4b.

[α]Estimates are rounded to the nearest 100.

**Estimates for categories with < 5 cases are masked for the Special Study.*

Those who indicated that a motor vehicle was involved in their bicycle-riding injury were also asked whether the accident took place at an intersection. Table 22c presents their responses.

Table 22c: Special Study Bicycle ED Visits Involving Motor Vehicles by Intersection Status

Intersection Status	Cases	Estimate[α]	Percent
Yes	30	47,900	51%
No	11	12,200	13%
Unknown[β]	20	34,000	36%
Total	***61***	***94,000***	***100%***

Source: NEISS 2024, Special Study on Bicycles & E-Bicycles: Question A4d.

[α]Estimates are rounded to the nearest 100.

[β]Respondents who answered "No" to whether a motor vehicle was involved, despite a motor vehicle being involved, are included in this count to be consistent with other tables. However, they were not asked this question in the survey.

Environmental Conditions

Respondents were asked to describe the type of surface upon which their bicycle-riding injury occurred. Their categorized responses are shown in Table 23a. The "Other" category includes one incident which took place on train tracks, one which took place inside a house and two incidents which took place on outdoor wooden boardwalks. The most commonly reported surfaces were asphalt, cement, and rough surfaces such as dirt, gravel, or sand.

Table 23a: Special Study ED Visits Associated with Bicycle Riding by Surface Type, 2024

Surface	Cases	Estimate[α]	Percent
Asphalt/Paved Road	164	243,900	57%
Cement/Paved Sidewalk	66	102,800	24%
Dirt/Gravel/Sand	20	26,000	6%
Grass	6	6,400	1%
Skate Park/Ramp/Specialty Trail	8	12,700	3%
Other	4	*	1%
Multiple	7	11,200	3%
Unknown	11	19,600	5%
Total	***286***	***427,400***	***100%***

Source: NEISS 2024, Special Study on Bicycles & E-Bicycles: Questions A3-A3a.

[α]Estimates are rounded to the nearest 100.

**Estimates for categories with < 5 cases are masked for the Special Study.*

Respondents were also asked whether it was "dark or difficult to see" at the time of their injury, as shown in Table 23b. The majority of victims reported good visibility, with only 15 percent of estimated non-fatal ED visits being associated with poor visibility. Conversely, for fatalities, the

NHTSA reported that in 2021, more than half (56%) of bicyclist fatalities occurred in dawn, dusk, or dark conditions.[11]

Table 23b: Special Study ED Visits Associated with Bicycle Riding by Visibility Conditions, 2024

Visibility	Cases	Estimate[α]	Percent
Dark or difficult to see	32	64,600	15%
Good visibility	250	357,100	84%
Unknown	4	*	1%
Total	***286***	***427,400***	***100%***

Source: NEISS 2024, Special Study on Bicycles & E-Bicycles: Question A5.

[α]Estimates are rounded to the nearest 100.

**Estimates for categories with < 5 cases are masked for the Special Study.*

Safety Gear

Tables 24a-b present the safety gear used in bicycle-riding injuries seen in the special study. Respondents were presented with a list of safety gear: helmets, padding such as knee pads, elbow pads, or gloves, and conspicuity equipment such as reflective vests, blinking lights, head lamps, or others. A combined total of 66 percent of estimated ED visits were associated with incidents where respondents reported using at least one type of safety gear. However, a similarly even split is seen in overall helmet use when compared to the estimates based on the NEISS data alone. Table 24a presents just helmet use, and Table 24b presents the usage of helmets and other safety gear in combination.

Table 24a: Special Study ED Visits Associated with Bicycle Riding by Helmet Use, 2024

Helmet Use	Special Study			NEISS		
	Cases	*Estimate[α]*	*Percent*	*Cases*	*Estimate[α]*	*Percent[β]*
Yes	132	201,900	47%	1,112	47,400	50%
No	154	225,500	53%	1,241	46,900	50%
Unknown	0	0	0%	7,902	333,100	-
Total	***286***	***427,400***	***100%***	***10,255***	***427,400***	***100%***

Source: NEISS 2024, Special Study on Bicycles & E-Bicycles: Question S10.

[α]Estimates are rounded to the nearest 100.

[β]Percent of NEISS is calculated as percent of estimates where helmet use is known.

[11] NHTSA National Center for Statistics and Analysis. (2023, June). Bicyclists and other cyclists: 2021 data (Traffic Safety Facts. Report No. DOT HS 813 484). National Highway Traffic Safety Administration.

Table 24b: Special Study ED Visits Associated with Bicycle Riding by Use of Helmets and Other Safety Gear, 2024

Safety Gear Used	Cases	Estimate[α]	Percent
Helmet and Other gear	66	111,200	26%
Only Helmet	66	90,700	21%
Only Other Gear	52	79,100	19%
No Safety Gear Listed	102	146,400	34%
Total	***286***	***427,400***	***100%***

Source: NEISS 2024, Special Study on Bicycles & E-Bicycles: Questions S10-S11.

[α]Estimates are rounded to the nearest 100.

Other Safety Factors

A benefit of this special study is the availability of details that might not otherwise be reported regarding bicycle-riding injuries but which may play a role in the incident. Respondents were asked about whether they were carrying anything on their person or bicycle at the time of the incident, and whether there were any noise distractions present such as music.

Table 25a presents the responses regarding what the victims were carrying, if anything. For those who listed multiple items, all were counted; thus, the percentages in this table may not add to 100 percent. Overall, 57 cases and 22 percent of estimated ED visits (94,000 of 427,400) had victims reportedly carrying something.

Table 25a: Special Study ED Visits Associated with Bicycle Riding by What the Victim was Carrying, 2024

Item the Victim was Carrying	Cases	Estimate[α]	Percent[β]
Backpack	36	58,700	14%
Crossbody bag or fanny pack	6	7,800	2%
Something hanging from the handlebars	7	13,200	3%
Something in rear cargo rack or front basket	3	*	1%
Something in hand	5	7,900	2%
Carrying something, did not specify where	2	*	<1%
Not Carrying Anything	220	318,600	75%
Unknown	9	14,750	3%

Source: NEISS 2024, Special Study on Bicycles & E-Bicycles: Questions A8-A9.

[α]Estimates are rounded to the nearest 100.

[6]The percentages in this table may not add to 100% due to overlap.

**Estimates for categories with < 5 cases are masked for the Special Study.*

Table 25b presents the distractions or noises reported by survey respondents. Only 13 respondents reported distracting noise. Five respondents, representing two percent of estimated ED visits, reported listening to music on their phone, either through headphones or by holding it in their hand while riding.

Table 25b: Special Study ED Visits Associated with Bicycle Riding by Type of Distractions Present, 2024

Distraction	Cases	Estimate[α]	Percent
Listening to music on personal phone	5	6,700	2%
Noise from other people or surroundings	8	15,100	4%
None	261	390,300	91%
Unspecified	12	15,300	4%
Total	***286***	***427,400***	***100%***

Source: NEISS 2024, Special Study on Bicycles & E-Bicycles: Questions 7-7a.

[α]Estimates are rounded to the nearest 100.

Appendix A: Injuries and Fatalities Methodology

Data for this report come from the National Electronic Injury Surveillance System (NEISS) and the National Center for Health Statistics (NCHS) Mortality Database.

National Electronic Injury Surveillance System (NEISS)

The estimate of hospital emergency department (ED) visits was derived from NEISS, which is a probability sample of approximately 100 U.S. hospitals having 24-hour EDs and at least six beds. Coders in each hospital code the injury data from the ED record and then transmit the data electronically to CPSC. Because NEISS is a probability sample, each case collected represents a number of cases (i.e., the case's *weight*) of the total estimate of visits in the U.S. Different hospitals carry different weights, based on stratification by their annual number of ED visits.[9] In 2024 CPSC revised the NEISS sample to ensure it remains nationally representative of hospitals. To make older data comparable to 2024 estimates, adjusted weights have been retroactively applied to pre-2024 data. As such, estimates for 2022 in this report will differ from those in last year's report. Estimates for 2023 are new to this report.

The search for this report used product codes 5033 (*Mountain or all-terrain bicycles or accessories*) and 5040 (*Bicycles or accessories, excluding mountain or all-terrain bicycles*), and treatment dates 1/1/2022 – 12/31/2024. The data were pulled in April 2025.

A coefficient of variation is the ratio of the standard error of the estimate (i.e., variability) to the estimate itself.[12] This is generally expressed as a percent. A CV of 10 percent means the standard error of the estimate equals 0.1 times the estimate. Large CVs indicate the estimate has considerable variability. This is often due to a small sample size. Estimates and confidence intervals are usually not reported unless the number of cases is 20 or more, the estimate is 1,200 or more, and the CV does not exceed 33 percent.

NCHS Mortality Database

Fatalities in the U.S. are recorded in the NCHS Multiple Cause of Death database based on death certificates provided by each U.S. county. Each death certificate includes a primary cause of death along with up to twenty additional co-occurring factors and demographic data, including

[12] Schroeder T, Ault K. *The NEISS Sample (Design and Implementation)*. U.S. Consumer Product Safety Commission. 2001.

age,sex, and year of death. Causes of death are coded with 4-digit ICD-10 codes.[13] The search for this report used ICD-10 codes starting with the first three alphanumeric characters of V10-V19, which represent causes associated with riding pedal bicycles. The NCHS Mortality data were pulled in January 2025.

Appendix B: Special Study Methodology

Methodology for Special Study Estimates

For the Special Study on Bicycles and E-Bicycles, a random sample of NEISS cases with product codes 5040 and 5033 (as well as codes for e-bikes) and with known nonfatal dispositions were randomly assigned for a follow-up survey. Due to the high level of non-response, with only 297 in-scope complete responses out of the 2,004 assigned, adjustments were made to the original weights to allow for generalized estimates to be made.

Staff used a method called raking, also known as "iterative proportional fitting," to adjust for nonresponse. This algorithm was used to iteratively adjust the NEISS weights of the completed special study responses so that the weighted marginal distribution of certain variables would more closely align with the corresponding marginal distributions observed in the population. Since the primary interest of this report is riding-related injuries, the population marginal distributions were computed from the nonfatal riding-related injuries reported in the overall NEISS sample, that is, 10,255 cases corresponding to 427,400 estimated nonfatal riding injuries. Raking for this special study was conducted using a SAS raking macro (Izrael, Hoaglin and Battaglia, 2000).

The variables selected for raking were hospital stratum and patient characteristics. This is because staff identified sufficient differences in the weighted distributions among these variables between the special study and the NEISS data. The estimate reporting criteria for the special study results differs from that of standard NEISS reporting (see Appendix A). Standard NEISS reporting criteria requires at least 20 injury cases; for the special study, due to the low number of responses, staff instead required at least 5 cases in order to report the weighted estimate. Also, the low sample size of the special study results in the adjusted weights having a high coefficient of variation (CV) that may exceed the standard maximum of 0.33. This criterion

[13] *National Center for Health Statistics: Mortality Data on CDC WONDER,* Centers for Disease Control and Prevention. 2024.

was not used when reporting special study estimates. However, consistent with the standard NEISS reporting criterion, estimates lower than 1,200 were not reported.

Special Study Survey Questions

Below is a copy of the survey presented to respondents. Supplemental instructions and follow-up clarification questions have been shortened or removed for simplicity.

Q1. CPSC collects data through the National Electronic Injury Surveillance System (NEISS) on injuries treated in hospital emergency departments. In cooperation with the NEISS hospitals, CPSC conducts a follow-up investigation on a small number of records to learn more about the circumstances of how the injury occurred. Results of the investigations will be analyzed to determine if CPSC can reduce similar injuries from occurring in the future.

Your participation in this survey is completely voluntary and your identity and answers will be strictly confidential. This survey will take between 10-15 minutes and data are used for statistical purposes only.

I1. CPSC would prefer that the person who answers this questionnaire is the actual person injured and treated in the hospital emergency department. If the injured person is under the age of 16, CPSC would prefer that a parent or guardian completes the questionnaire.
Was the injured person 16 years old or older? (Note: If you are the injured person and are under the age of 16, please ask your parent or guardian to complete this survey. If no one is available, it is okay to respond yourself.)

- ○ Yes
- ○ No

I2. According to our records from the National Electronic Injury Surveillance System the injured person was seen on {injury date} in the emergency department at {hospital name} for an injury that involved a bicycle. Is that correct?

- ○ Yes
- ○ No
- ○ Don't know

I3. What information is incorrect from the statement above?

- ☐ Different date
- ☐ Different hospital
- ☐ (I/the victim) did not receive treatment in a hospital emergency department for a bicycle injury

V1. Respondent is:

- Injured person
- Parent or guardian of injured person
- Other (specify in the next window)

V3. Was the bicycle unpowered? *Note: Powered bicycles have a power source like electric or gas.*

- Yes
- No
- Don't know

V4. Was the bicycle an electric powered bicycle?

- Yes
- No

V5. What was the wattage for the electric bicycle (electric bicycles usually range from 300 to 1000 watts)? Enter a number or "don't know."

V6. Was the bicycle a moped or motorcycle that is gas powered?

- Yes
- No

V7. Did the bicycle have pedals?

- Yes
- No

V9. You/the victim were/was:

- Riding the bicycle
- Pedestrian struck by bicycle
- Other (specify)

A1. Please describe how the accident happened. That is, what were you/the victim doing just before, during, and just after the injury occurred? Please specify the location of the accident and any environmental factors; such as weather, temperature, and anything else that may have contributed to the accident.

A3. What was the surface?

- ☐ Paved Road

- ☐ Paved Sidewalk
- ☐ Gravel
- ☐ Grass
- ☐ Driveway
- ☐ Other (specify in next window)

A4a. Were you/was the victim riding on a road?

- o Yes
- o No

A4b. Were you on the shoulder of the road, in a bike lane, or in a lane that cars use?

- o Shoulder
- o Bike Lane
- o Car Lane
- o Other

A4c. Did the accident involve a motor vehicle?

- o Yes
- o No

A4d. Did the accident happen at an intersection?

- o Yes
- o No

A4e. Did the motor vehicle run you/the victim over?

- o Yes
- o No

A5. Was it dark or difficult to see?

- o Yes
- o No

A6. Was the bicycle travelling uphill, downhill, or was it on a fairly level surface?

- o Uphill
- o Downhill
- o Fairly level

A7. Was there anything else occurring at the time of the accident such as cell phone interference or loud music?

- Yes
- No
- Don't know

A8. Were you/the victim carrying or holding something such as a bag, purse, or backpack?

- Yes
- No
- Don't know

A9. What were you carrying?

S1. Which of the following best describes the bicycle?

- Rental
- Owned by victim
- Borrowed
- Other (specify in next window)
- Don't know

S3. Who was the bicycle rented from?

S4. Do you know the brand and model names of the bicycle involved in the injury?

- Yes
- No

Q66. If you are able, please upload a photo of the bicycle.

S10. Below is a list of safety equipment that riders might wear. Please specify if the rider was wearing any of these at the time of the incident. (Select all that apply.)

- ☐ Helmet
- ☐ Padding (such as knee pads, elbow pads, or wrist pads)
- ☐ Reflective vest
- ☐ Blinking lights/Head lamp
- ☐ Other (specify in next window)
- ☐ None of the above

S12. Please estimate the speed at which the bicycle was travelling when the accident occurred in miles per hour, your best guess is OK.

S13. How tall are you/was the victim when the accident occurred (in feet and inches)? If you don't know, just provide your best estimate.

S14. What did you/did the victim weigh when the accident occurred (in pounds)? If you don't know, just provide your best estimate.

A10. Which of the following best describes how you were injured?

- Hit from the front
- Hit from the side
- Hit from behind
- Other (specify in next window)
- Don't know

A12. Was there any warning before you/the victim were/was hit? (ex. bell, shouting, or other noise)

- Yes
- No
- Don't know

C1. Is there anything else about this accident or the bicycle involved that you would like me to know?

- Yes
- No