United States
Consumer Product Safety Commission

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

April 2026

James Tark

Directorate for Epidemiology

Division of Hazard Analysis

This report was prepared by the CPSC staff. It has not been reviewed or approved by, and may not necessarily reflect the views of, the Commission.

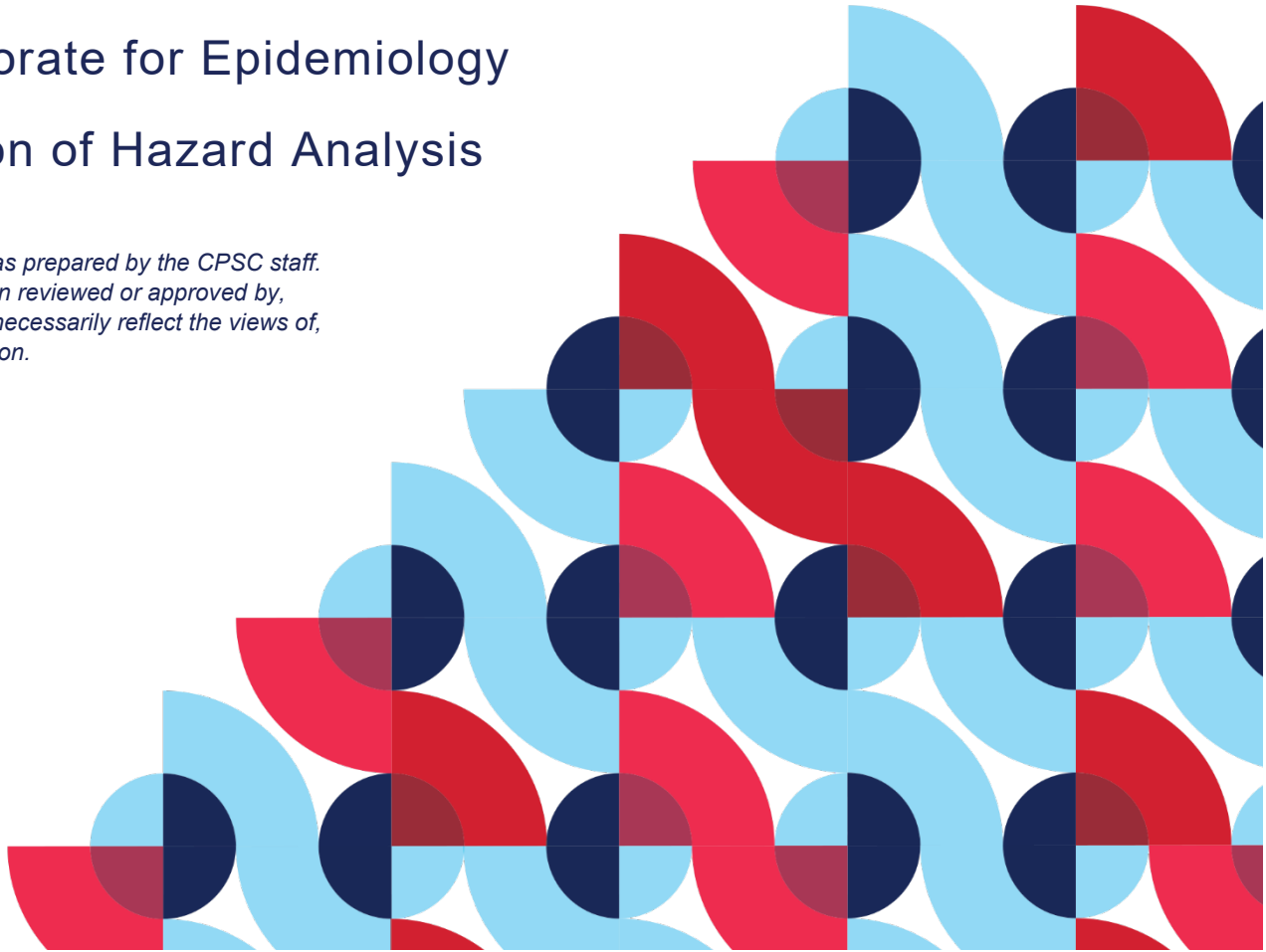


Table of Contents

Executive Summary **4**
Reported Fatalities 4
Emergency Department (ED) - Treated Injury Estimates 5
Special Study on E-scooter Injuries 5
Special Study on E-bike Injuries 6
Associated Hazard Patterns 6

Introduction **8**

I. Reported Fatalities Associated with Micromobility Products **9**
Table 1.1: Number of Reported Fatalities Associated with Micromobility Product Type and Year 10
Table 1.2: Number of Reported Fatalities Associated with Micromobility Product Type and Sex (2017–2024 Total) 10
Table 1.3: Reported Fatalities Associated with Micromobility Product Type and Age Group (2017–2024 Total) 11
Table 1.4: Reported Fatalities Associated with Micromobility Product Type and Associated Hazards (2017–2024 Total) 13

II. National Injury Estimates **13**
Figure 2.1: Estimated ED Visits Associated with Micromobility Products by Year 14
Figure 2.2: Distribution of Estimated ED Visits Associated with Micromobility by Product Type and Sex (2017–2024 Total) 15
Figure 2.3: Distribution of Estimated ED Visits Associated with Micromobility by Product Type and Age Group (2017–2024 Total) Compared to U.S. Population Age Distribution 16
Figure 2.4: Distribution of Estimated ED Visits Associated with Micromobility Product Type and Location of Injury (2017–2024 Total) 17
Figure 2.5: Distribution of Estimated ED Visits Associated with Micromobility Product Type and Month of Injury (2017–2024 Total) 18

III-A. Special Study on E-Scooter Injuries **19**
Table 3a1: Scooter Products: NEISS Product Code vs. Verified Scooter Product (2024) 20
Table 3a.2: Completed E-Scooter Investigations by Powered vs. Unspecified Scooter (2024) 20
Table 3a.3: Distribution of Estimated Injuries on Rental Status (2024) 21
Table 3a.4: Distribution of Estimated Injuries on How Victim Was Injured (2024) 21
Table 3a.5: Distribution of Estimated Injuries on Type of Riding Surface (2024) 22

Table 3a.6: Distribution of Estimated Injuries on Visibility (2024) 22
Table 3a.7: Distribution of Estimated Injuries on Rider Distraction (2024) 22
Table 3a.8: Distribution of Estimated Injuries on Rider Baggage (2024) 23
Table 3a.9: Distribution of Estimated Injuries on Safety Equipment (2024) 23

III-B. Special Study on E-bike Injuries 24
Table 3b.1: Bicycle Products: NEISS Product Code vs. Verified Bicycle Product (2024) 25
Table 3b.2: Completed E-bike Investigations on E-bike vs. Unspecified Bicycle (2024) 25
Table 3b.3: Distribution of Estimated Injuries on Rental Status (2024) 26
Table 3b.4: Distribution of Estimated Injuries on Type of Riding Surface (2024) 26
Table 3b.5: Distribution of Estimated Injuries on How Victim Was Injured (2024) 26
Table 3b.6: Distribution of Estimated Injuries on Lane Type (2024) 27
Table 3b.7: Distribution of Estimated Injuries on Motor Vehicle Accident (2024) 27
Table 3b.8: Distribution of Estimated Injuries on Accident Location at Intersection (2024) 28
Table 3b.9: Distribution of Estimated Injuries on Visibility (2024) 28
Table 3b.10: Distribution of Estimated Injuries on Surface Level (2024) 28
Table 3b.11: Distribution of Estimated Injuries on Rider Distraction (2024) 29
Table 3b.12: Distribution of Estimated Injuries on Rider Baggage (2024) 29
Table 3b.13: Distribution of Estimated Injuries on Safety Equipment (2024) 30
Table 3b.14: Distribution of Estimated Injuries on Travelling Speed (2024) 30

IV. Hazard Patterns Based on In-Depth Investigation Review 30
Table 4.1: In-Depth Investigations of Micromobility Products and Associated Hazards (2017–2024 Total) 33

References 35

Appendix A 36
Methodology 36

Appendix B 39
Summary of Annual Injury Estimates and Trend Analysis 39

Appendix C: Special Study Survey Questionnaire for E-scooters 41

Appendix D: Special Study Survey Questionnaire for E-bikes 45

Executive Summary

In this report, U.S. Consumer Product Safety Commission (CPSC) staff presents the latest available statistics on injury estimates, fatalities, and hazard patterns associated with three micromobility products: e-scooters (including rental e-scooters), self-balancing scooters (also commonly referred to as hoverboards), and e-bikes. Injury and fatality data come from CPSC's National Electronic Injury Surveillance System (NEISS) and Consumer Product Safety Risk Management System (CPSRMS). The timeframe covered is 2017 through 2024. This report includes data presented in the previous annual report, Micromobility Products-Related Deaths Injuries and Hazard Patterns 2017-2023[1] and adds the 2024 data and the findings from two 2024 special studies of e-scooter and e-bike-related injuries. For micromobility-related fatalities, staff notes that, due to delays in death certificate reporting, the number of reported fatalities may change in the future.

Key data and findings of this report are summarized below.

Reported Fatalities[2]

- All Micromobility Products
  - CPSC staff is aware of 533 fatalities from 2017 through 2024.
  - The number of fatalities has been increasing steadily from 5 in 2017 to 135 in 2024.

- E-Scooters
  - CPSC staff is aware of 206 fatalities from 2017 through 2024.
  - Motor vehicle accidents and control issues were the top hazards associated with e-scooter fatalities.
  - Out of the 206 fatalities, 15 were associated with 11 incidents of lithium-ion battery-related fires.

- Self-balancing scooters
  - CPSC staff is aware of 17 fatalities from 2017 through 2024.

[1] The report, Micromobility Products-Related Deaths Injuries and Hazard Patterns 2017-2023 can be found at: https://cpsc.gov/Research--Statistics/Sports--Recreation/Micromobility-Products-Related-Deaths-Injuries-and-Hazard-Patterns-2017%E2%80%932023

[2] Reporting for 2023-2024 is ongoing. Counts may change in future reports.

- Of the 17 fatalities, 11 were associated with 5 incidents of lithium-ion battery-related fires.

- E-Bikes
- CPSC staff is aware of 310 fatalities from 2017 through 2024.
- Motor vehicle accidents and control issues were the top hazards associated with e-bike fatalities.
- Out of the 310 fatalities, 19 were associated with 13 incidents of lithium-ion battery-related fires.

Emergency Department (ED) - Treated Injury Estimates

- All Micromobility Products: There were an estimated total of 698,500 ED visits from 2017 through 2024;
- E-Scooters: There were an estimated total of 380,000 ED visits from 2017 through 2024;
- Self-balancing scooters: There were an estimated total of 163,300 ED visits from 2017 through 2024;
- E-Bikes: There were an estimated total of 155,200 ED visits from 2017 through 2024.

Special Study on E-scooter Injuries

- CPSC staff successfully followed up on 173 e-scooter NEISS injury cases that occurred in 2024 through investigations.
- Rental e-scooters accounted for 35 percent of the e-scooter-related ED visits in the special study.
- Fifty-four percent of the injuries occurred on paved roads and 32 percent on paved sidewalks.
- Twenty percent of the victims reported that visibility issues may have contributed to the accidents; Of these 15,700 injuries where it was reportedly dark/difficult to see, 9,200 (58%) were wearing blinking lights/headlamps or reflective vests.
- Eleven percent of the victims reported that a source of distraction, such as a cell phone or loud music, while riding the e-scooter may have contributed to the accidents.
- Thirty-two percent of the injured were carrying or holding something while riding the e-scooter.

- Eighteen percent of the riders were wearing a helmet; forty-four percent reported wearing other safety equipment but not a helmet; thirty-seven percent did not report helmet use.

Special Study on E-bike Injuries

- CPSC staff successfully followed up on 88 e-bike NEISS injury cases that occurred in 2024 through investigations.
- Rental e-bikes accounted for 11 percent of the e-bike-related ED visits in the special study.
- Fifty-eight percent of the injuries occurred on paved roads.
- Twenty-four percent of the injuries were associated with motor vehicle accidents.
- Ten percent of the victims reported that visibility issues may have contributed to the accidents; of these 5,900 injuries where it was reportedly dark/difficult to see, 2,600 (44%) were wearing blinking lights/headlamps or reflective vests.
- Twenty-five percent of the injuries occurred on unlevel (uphill or downhill) surfaces.
- Three percent of the victims reported that a source of distraction, such as a cell phone or loud music, while riding the e-bike may have contributed to the accidents.
- Thirty-eight percent of the injured were carrying or holding something while riding the e-bike.
- Forty percent of the riders were wearing a helmet; forty-six percent reported wearing other safety equipment but not a helmet; fourteen percent did not report any of the safety equipment at the time of the incident.
- Fifteen percent of the riders were travelling at a speed of 20 mph or higher when the accident happened.

Associated Hazard Patterns

In addition to the 2024 special studies of e-scooter and e-bike incidents that were reported through NEISS, CPSC Field staff completed 531 follow-up in-depth investigations (IDIs) related to all micromobility products, based on reports of incidents in CPSC's Consumer Product Safety Risk Management System (CPSRMS) [3] that occurred from 2017 through 2024. Of the 531 completed investigations, 189 involved an e-scooter, 197 involved a self-balancing scooter, and 145 involved an e-bike. The investigations based on CPSRMS reports were in addition to the 2024 special studies of e-scooter and e-bike incidents that were reported through NEISS. The following summarizes highlights of the 531 IDIs:

[3] Reports in CPSRMS come from various sources, including consumer complaints, news clips, state/local authorities, medical examiners, death certificates from the states, manufacturers, and retailers, among others.

- E-Scooters
  - One hundred eighty-nine of the investigated incidents involved an e-scooter.
  - Fire hazards were the most common problem reported, accounting for 88 of the 189 investigated incidents.
  - Brake problems were associated with 40 of the investigated incidents.

- Self-balancing scooters
  - Field staff investigated 197 incidents associated with self-balancing scooters.
  - The top two most common problems reported were fire hazards with 173, followed by 21 other electrical hazards.

- E-Bikes
  - CPSC staff reviewed 145 completed investigation reports on e-bikes.
  - The top two most common problems reported were fire hazards with 106, followed by miscellaneous product-related issues with 26.

Introduction

The use of micromobility products, particularly e-scooters and e-bikes, has increased in recent years with advancements in battery technology and the growing popularity of commercial ride-sharing services. Consumers may rent commercial e-scooters and e-bikes or purchase their own micromobility products. These products are popular with consumers because they are a convenient, cost-effective mode of transportation for short-distance travel. In addition, no motor vehicle license is required to operate them.

This report summarizes the deaths, injuries, and hazards associated with the use of micromobility products, based on data from CPSC epidemiological databases from 2017 through 2024. Data from 2024 were added to the data from 2017 through 2023 previously presented in the 2024 annual report on micromobility products.[4] In addition, this report summarizes findings from two special follow-up studies of emergency department-treated injuries involving e-scooters and e-bikes in 2024. The micromobility products covered in this report are as follows:

- electric scooters (e-scooters: electric-powered, motorized standing scooters), including ride-sharing rental e-scooters;
- self-balancing scooters; and
- low-speed electric bicycles (or e-bikes), defined in section 38 of the Consumer Product Safety Act, 15 U.S.C. § 2085 as a two- or three-wheeled vehicle with fully operable pedals and an electric motor of less than 750 watts (1 h.p.), whose maximum speed on a paved, level surface, when powered solely by such a motor while ridden by an operator who weighs 170 pounds, is less than 20 mph.

Electric unicycles, three-wheeled e-scooters, non-electric kick scooters, gas-powered scooters, mobility scooters, mopeds, motorized carts, and other seated motorized scooters are not in scope for this report.

The first section of this report presents the fatalities reported to CPSC for micromobility products. This is followed by a section on the national injury estimates in the following order: overall micromobility, e-scooters, self-balancing scooters, and e-bikes. The individual injury estimates for rental e-scooters are not presented in this report due to small sample sizes, high coefficients of variation (CV), and limitations in NEISS[5] data possibly leading to undercounts because of the unavailability of sufficient information to identify the product as a rental. This is followed by a section on the special study of e-scooter-related injuries. The special study section is followed by a section on the hazard patterns, where analyses are presented for overall micromobility, e-scooters (rental e-scooter statistics in parentheses), self-balancing scooters, and e-bikes. Lastly, Appendix A describes staff's methodology, including the process for data extraction, scope determination, and discussion of the raking methodology. Appendix B

[4] As CPSC revised the NEISS sample in 2024 adjusted weights were applied to 2017-2023 data to ensure comparability. Consequently, 2017-2023 estimates reported here differ from last year's report, Micromobility Products-Related Deaths Injuries and Hazard Patterns 2017-2023, which can be found at: https://cpsc.gov/Research--Statistics/Sports--Recreation/Micromobility-Products-Related-Deaths-Injuries-and-Hazard-Patterns-2017%E2%80%932023

[5] See https://www.cpsc.gov/Research--Statistics/NEISS-Injury-Data.

presents additional details about the injury estimates. Appendices C and D list the questions used in the follow-up studies of NEISS on e-scooter and e-bike related injuries treated, respectively.

The fatality statistics, as well as the hazard pattern review staff presents in this report, are based on incidents reported to CPSC through the CPSC's Consumer Product Safety Risk Management System (CPSRMS). See Appendix A for the codes and keywords used in the database searches. Reports in CPSRMS come from various sources, including consumer complaints, news clips, state/local authorities, medical examiners, death certificates from state governments, manufacturers, and retailers, among others. Staff considers the data in CPSRMS to be anecdotal and not nationally representative. Moreover, data collection is ongoing, and staff considers the later years' data to be incomplete. Specifically, for death statistics, which rely on death certificates reported by state governments, staff observes a lag of up to two years from the time of the death to the time of reporting to the CPSC. As such, the data included in this report (especially from 2023 through 2024) are likely incomplete. Each incident report contains a product code that identifies the type of product involved as well as information about the location of the incident (state and city), the individual(s) involved or injured (age and sex), and a narrative description.

Staff's national estimates of injuries are based on injury data collected by CPSC's NEISS, which is a nationally representative stratified probability sample of hospitals in the United States and its territories. Each injury report contains a product code that identifies the type of product involved; information on the injured victim's sex, age, diagnosis, disposition, body part injured; and a brief narrative description of the injury. Each injury in the sample represents an estimated number of injuries that staff projects nationally.

CPSC staff conducted two special follow-up studies of NEISS on e-scooter and e-bike-related injuries treated in hospital emergency departments between January 1, 2024 and December 31, 2024. These investigations were completed through telephone interviews and self-administered online surveys of injured victims to learn more about how the injury occurred, the type of injury, the scooter type involved, the characteristics of the rider/victim, and the incident scenario.

I. Reported Fatalities Associated with Micromobility Products

CPSC staff is aware of 533 fatalities related to micromobility products that occurred in the United States during the 8-year timeframe, 2017 through 2024. Some of the characteristics of these reported fatalities are summarized in the tables below. Due to delays in death certificate reporting, staff expects the number of reported fatalities for these years to change in future reports. Compared to the last annual report[6], there are 160 additional fatalities—135 in 2024 and an additional 25 added retroactively for preceding years. Out of the 160 fatalities, 115 e-bikes, 44 e-scooters, and 1 self-balancing scooter-related fatalities were reported.

[6] Number of rental scooters have been amended to account for all e-scooters rented from e-scooter rental companies. In addition, one fatality involving e-scooter in 2022 have been reclassified as e-bike.

Table 1.1 shows the fatality data for micromobility products by incident year from 2017 to 2024. While data reporting is ongoing, as of the writing of this report, e-scooter-related fatalities represent 206 (14 were rental e-scooter-related) out of 533 (39 percent) total fatalities. E-bikes account for 310 (58 percent) of total fatalities, increasing substantially during the 8-year timeframe. CPSC staff is aware of 17 fatalities involving self-balancing scooters during the same period.

Table 1.1: Number of Reported Fatalities Associated with Micromobility Product Type and Year

Year	All Micromobility	E-Scooter (Rental E-scooter)	Self-balancing scooter	E-Bike
2017	5	1	4	0
2018	11	5 (2)	0	6
2019	31	25 (7)	0	6
2020	36	16 (3)	2	18
2021	83	40 (1)	8	35
2022	95	35 (1)	3	57
2023	137	46 (0)	0	91
2024	135	38 (0)	0	97
Total	**533**	**206 (14)**	**17**	**310**

Note: Reporting for 2023-2024 is ongoing. Counts may change in future reports.
Source: CPSRMS, NEISS, U.S. Consumer Product Safety Commission, 2017-2024.

Among the 533 micromobility-related fatalities, 422 were male decedents, 86 were females, and sex was unknown for the remaining 25 decedents. Male fatalities associated with e-scooters (162, including 14 rental e-scooter fatalities, out of 206), and e-bikes (254 out of 310) represented 79 and 82 percent respectively, whereas of the 17 self-balancing scooter-related fatality victims, 11 were females. The distribution of decedents by product type by sex distribution is presented in Table 1.2.

Table 1.2: Number of Reported Fatalities Associated with Micromobility Product Type and Sex (2017–2024 Total)

Sex	All Micromobility	E-Scooter (Rental E-scooter)	Self-balancing scooter	E-Bike
Male	422	162 (12)	6	254
Female	86	28 (2)	11	47
Unknown	25	16	0	9
Total	**533**	**206 (14)**	**17**	**310**

Note: Reporting for 2023-2024 is ongoing. Counts may change in future reports.
Source: CPSRMS, NEISS, U.S. Consumer Product Safety Commission, 2017-2024.

Table 1.3 presents the fatality data for micromobility by product type and age group of the deceased from 2017 to 2024, in reference to each group's average share of the U.S. population in those 8 years, 2017–2024. Four hundred seventy-two out of 533 total reported micromobility fatalities provided age information. Of these 472 fatalities, 156 (33 percent) were 25-44 years old, which was disproportionately high compared to its proportion in the general U.S. population (27 percent). Of the 156 fatalities in the 25-44 age group, 70 accidents involved e-scooters, 83

e-bikes, and 3 self-balancing scooters. Of the 92 fatalities within the 65 and older age group, 75 (82 percent) involved e-bikes.

Table 1.3: Reported Fatalities Associated with Micromobility Product Type and Age Group (2017–2024 Total)

Age Group	U.S. Population	All Micromobility	E-Scooter (Rental E-scooter)	Self-balancing scooter	E-Bike
Under 5	6%	5	2 (0)	3	0
5–14	12%	20	9 (0)	5	6
15-24	13%	71	37 (5)	2	32
25-44	27%	156	70 (5)	3	83
45-64	25%	128	41 (1)	2	85
65 and older	17%	92	15 (0)	2	75
Unknown	N/A	61	32 (3)	0	29
Total	**100%**	**533**	**206 (14)**	**17**	**310**

Note: Reporting for 2023-2024 is ongoing. Counts may change in future reports.
Source: CPSRMS, NEISS, U.S. Consumer Product Safety Commission, 2017-2024.

Table 1.4 shows the data for micromobility-related fatalities by product and hazard types. Out of the 533 fatalities reported to CPSC staff, 207 (14 rental e-scooters) deaths involved e-scooters, 17 involved self-balancing scooters, and e-bikes accounted for 311 of these deaths.

E-Scooters (Including Rental E-Scooters)

Staff's review of the 206 e-scooter related fatalities shows the following hazards:

- Motor vehicle accidents were the leading cause of death associated with e-scooters. Out of the 206 fatalities reported to CPSC staff, 140 deaths (including 13 on rental e-scooters) involved motor vehicle accidents (*e.g.*, collision with parked or moving cars, SUVs, buses, or trucks).
- Twenty (including a rental e-scooter) e-scooter fatalities were due to control issues. Control issues led to crashing into a fixed object and striking pavement or road curbs.
- Fifteen fatalities were associated with e-scooter battery-related fires. In all 15 fatalities, batteries that powered scooters sparked the fire.
- Accidents involving pedestrians resulted in 6 fatalities; all 6 decedents were struck by e-scooter riders.
- Other hazards accounted for 2 fatalities which were associated with intoxication, including one which involved a crash with a commuter train while riding the e-scooter and the other in an incident in which an intoxicated rider fell from the e-scooter.
- Unspecified falls accounted for 21 e-scooter-related fatalities; staff does not have sufficient scenario-specific information to determine what caused the falls.

Self-balancing scooters

Staff's review of the 17 self-balancing scooter-related fatalities shows the following hazards:

- Eleven fatalities were associated with self-balancing scooter-related fires, where 4 deaths involved flame eruptions while charging the self-balancing scooters, and the other 7 deaths have no information.
- Two deaths were caused by motor vehicle accidents. In separate incidents, 2 self-balancing scooter riders were struck by vehicles.
- Unknown falls accounted for 4 self-balancing scooter-related fatalities; staff does not have sufficient scenario-specific information to determine what caused the falls.

E-Bikes

Staff's review of the 310 e-bike related fatalities shows the following hazards:

- Collisions with moving or parked motor vehicles were the leading cause of death associated with e-bikes, accounting for 170 reported deaths.
- Sixty-one e-bike fatalities were due to control issues, such as crashing into other fixed objects (*i.e*., gate, sign, post, barricade, railing, dumpster, median, fence) or striking road curbs.
- Nineteen fatalities were associated with lithium-ion battery-related fires, where 7 deaths were associated with homemade battery packs or bike repair shops, 2 involved flame eruptions while charging the e-bikes, and one where the e-bike had fallen into the water; the other 8 deaths have no charging information.
- Accidents involving pedestrians resulted in 19 fatalities; 13 pedestrians were struck by e-bikes and died from blunt impact/fall, and 5 e-bike riders were killed due to blunt impact caused when they struck other bike riders or pedestrians. One e-bike passenger fell to the ground after collision with bicycle.
- Other hazards include 2 fatalities associated with bike component failures (a malfunctioning chain and a front wheel coming loose while riding) and 3 e-bike riders who were intoxicated at the time of the accident.
- One fatality was due to the rider hitting a speed bump and becoming airborne before crash-landing on the pavement.
- Unknown falls accounted for 35 e-bike-related fatalities, but staff does not have sufficient scenario-specific information to determine what caused the falls.

Table 1.4: Reported Fatalities Associated with Micromobility Product Type and Associated Hazards (2017–2024 Total)

Hazard Pattern	All Micromobility	E-Scooter (Rental E-scooter)	Self-balancing scooter	E-bike
Motor vehicle accident	312	140 (13)	2	170
Control issues	81	20 (1)	0	61
Fire hazards	45	15	11	19
Pedestrian accident	25	6	0	19
Pavement	3	2	0	1
Other	7	2	0	5
Unspecified falls	60	21	4	35
Total	**533**	**206 (14)**	**17**	**310**

Note: Reporting for 2021-2023 is ongoing. Counts may change in future reports.
Source: CPSRMS, NEISS, U.S. Consumer Product Safety Commission, 2017-2024.

II. National Injury Estimates

Staff estimates 698,500 injuries related to all micromobility products were treated in U.S. emergency departments over the 8-year period 2017 through 2024. The annual estimates for 2025 are not available until NEISS data for 2025 are finalized in the spring of 2026. The estimated ED visits associated with micromobility products increased from 37,300 in 2017 to 149,100 in 2024, which is statistically significant (p-value < 0.01).

In 2024, CPSC revised the sample for NEISS to ensure it remains a nationally representative sample of hospitals. In order to make older data comparable to 2024 estimates, adjusted weights have been retroactively applied to pre-2024 data. As such, estimates for those years presented here and in future reports will differ from those presented in reports from 2023 or earlier.

Products

Figure 2.1 shows the national annual estimates of ED-treated micromobility injuries and product types from 2017 through 2024. Staff estimates that 380,000 injuries related to **e-scooters** were treated from 2017 through 2024. The 2024 ED-treated injury estimate of 79,300 for e-scooters reflects an overall increase of 68,800 from the 2017 estimate, which is statistically significant (p-value < 0.01). For year-over-year increases, the following consecutive years were statistically significant: 2018 to 2019 (p-value: 0.02) and 2020 to 2021 (p-value: < 0.01).

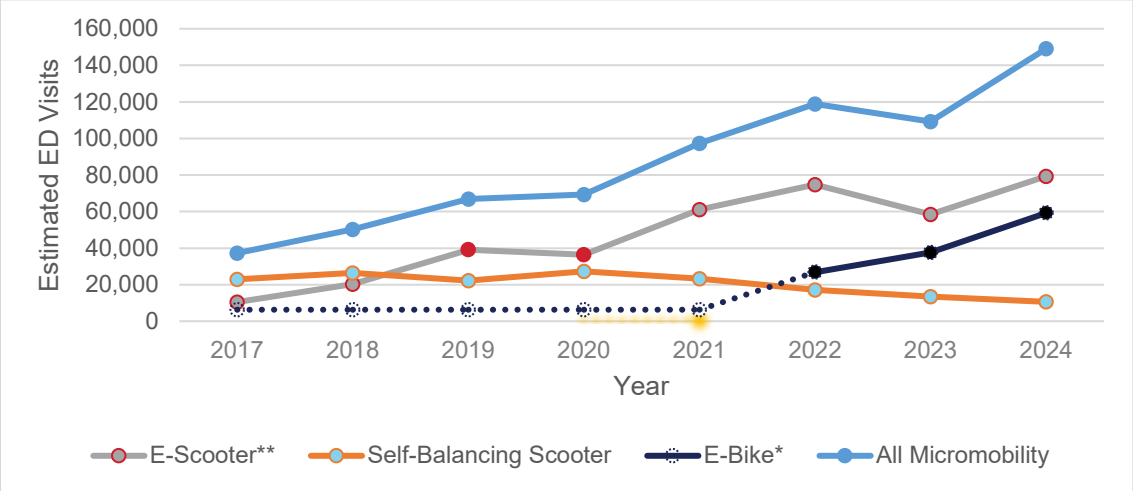
The annual estimated ED visits for rental e-scooters from 2017 through 2024 do not meet minimum requirement for reporting. Some information on rental e-scooters is provided in the special study discussed later in this report.

Staff estimates 163,300 ED-treated visits for **self-balancing scooters** from 2017 through 2024. The 2024 ED-treated injury estimate of 10,600 for self-balancing scooters reflects an overall decrease of 12,300 from the 2017 estimate, which is statistically significant (p-value: < 0.01).

For year-over-year declines, the following consecutive years were statistically significant: 2018 to 2019 (p-value: 0.04), 2020 to 2021 (p-value: 0.03) and 2021 to 2022 (p-value: < 0.01).

Staff estimates 155,200 ED-treated visits for **e-bikes** from 2017 through 2024. Of the 155,200 ED visits, the 2024 ED-treated injury estimate of 59,200 accounts for 38 percent while reflecting an increase of 52,900 ED visits from the annualized average estimate between 2017 through 2021 of 6,300, which is statistically significant (p-value < 0.01) and indicates a sharp rise in the popularity of e-bikes in recent years. For year-over-year increases, the consecutive years 2022 to 2023 were statistically significant (p-value: < 0.01). Staff determined that the annual estimated ED visits for e-bikes did not meet the reporting criteria for 2017 through 2021 due to high coefficients of variation. The 2017-2021 annualized average estimate is used to represent ED visits for e-bikes between 2017 through 2021 in Figure 2.1.

Figure 2.1: Estimated ED Visits Associated with Micromobility Products by Year

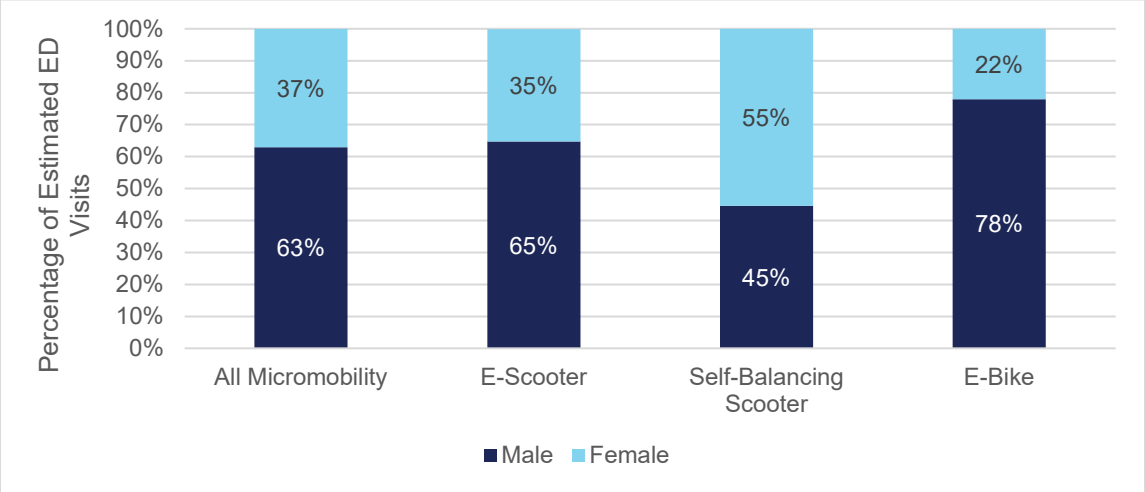


Source: NEISS, U.S. Consumer Product Safety Commission, 2017-2024.
*E-bike estimates are part of micromobility estimates. Data points for 2017 through 2021 are represented by the average for 2017-2021 as an intermediate dotted line since they do not meet the reporting criteria for NEISS.
**E-scooter data point for 2020 is included with a C.V. of 0.34.

Sex

Figure 2.2 shows the distributions of estimated micromobility-related injuries by product type and sex. Males experienced a higher percentage of micromobility-related, ED-treated injuries in e-scooters (65 percent) and e-bikes (78 percent) during the 8-year period. In contrast, females had a higher percentage (55 percent) of self-balancing scooter-related, ED-treated injuries.

Figure 2.2: Distribution of Estimated ED Visits Associated with Micromobility by Product Type and Sex (2017–2024 Total)



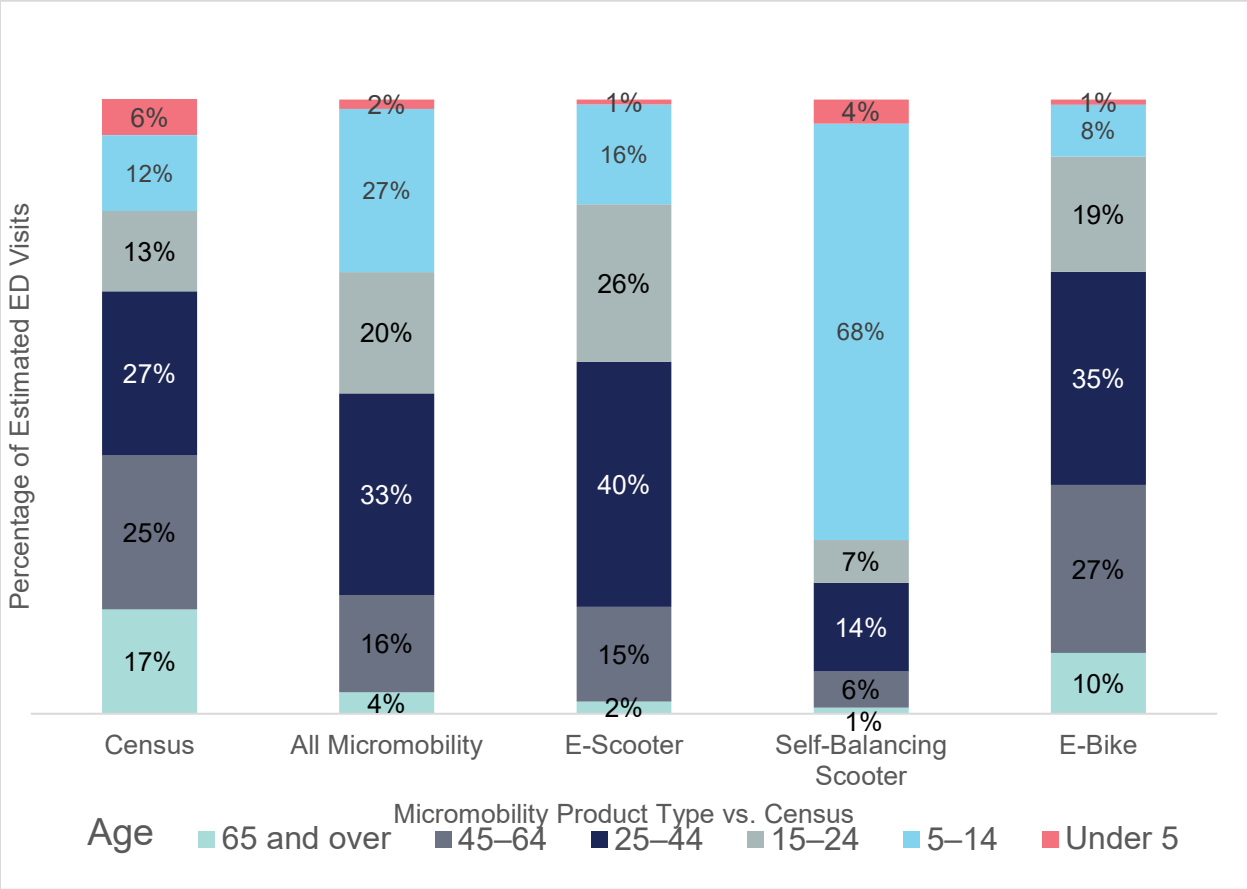
Source: NEISS, U.S. Consumer Product Safety Commission, 2017-2024.

Age Groups

Figure 2.3 shows the distribution of estimated micromobility-related injuries by age from 2017 through 2024, versus that age group's share of the U.S. population distribution during that time. Staff obtained the population by age data from the U.S. Census Bureau,[7] corresponding to the average of 8 years, 2017–2024. The distributions of estimated injuries sustained by the 15-to-24 and 25-to-44 age groups were 26 percent and 40 percent, respectively, for e-scooters. These distributions were disproportionately high compared to their proportions in the general U.S. population (13 percent and 27 percent, respectively). Similarly, the percentage of estimated self-balancing scooter-related injuries for the 5-to-14 age group (68 percent) was disproportionately high, compared to its proportion in the general U.S. population (12 percent). The percentage of estimated e-bike related injuries for the 65-and-over age group (10 percent) was disproportionately high compared to other micromobility product types (2 percent for e-scooters and 1 percent for self-balancing scooters).

[7] See Index of /programs-surveys/popest/datasets.

Figure 2.3: Distribution of Estimated ED Visits Associated with Micromobility by Product Type and Age Group (2017–2024 Total) Compared to U.S. Population Age Distribution

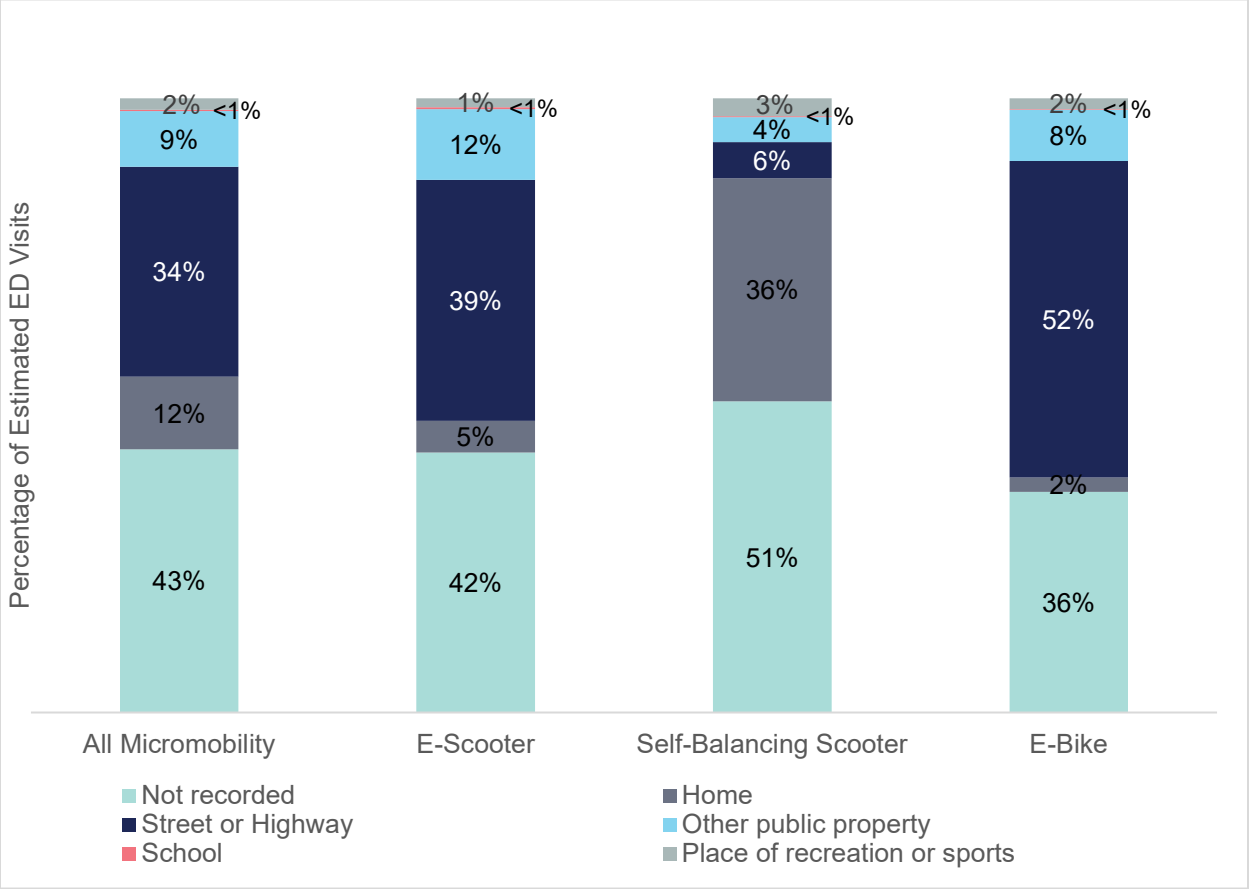


Source: NEISS, U.S. Consumer Product Safety Commission, 2017-2024.

Location of Injury

Figure 2.4 presents the proportions of injuries associated with micromobility products by product type and location of injury. A large proportion (42 percent for e-scooters, 51 percent for self-balancing scooters, 36 percent for e-bikes, and 43 percent overall) of estimated injuries occurred at unknown locations. For the known locations, the injuries associated with e-scooters and e-bikes occurred most frequently on streets or highways (39 percent and 52 percent, respectively), whereas the self-balancing scooter-related injuries occurred most frequently at home (36 percent).

Figure 2.4: Distribution of Estimated ED Visits Associated with Micromobility Product Type and Location of Injury (2017–2024 Total)



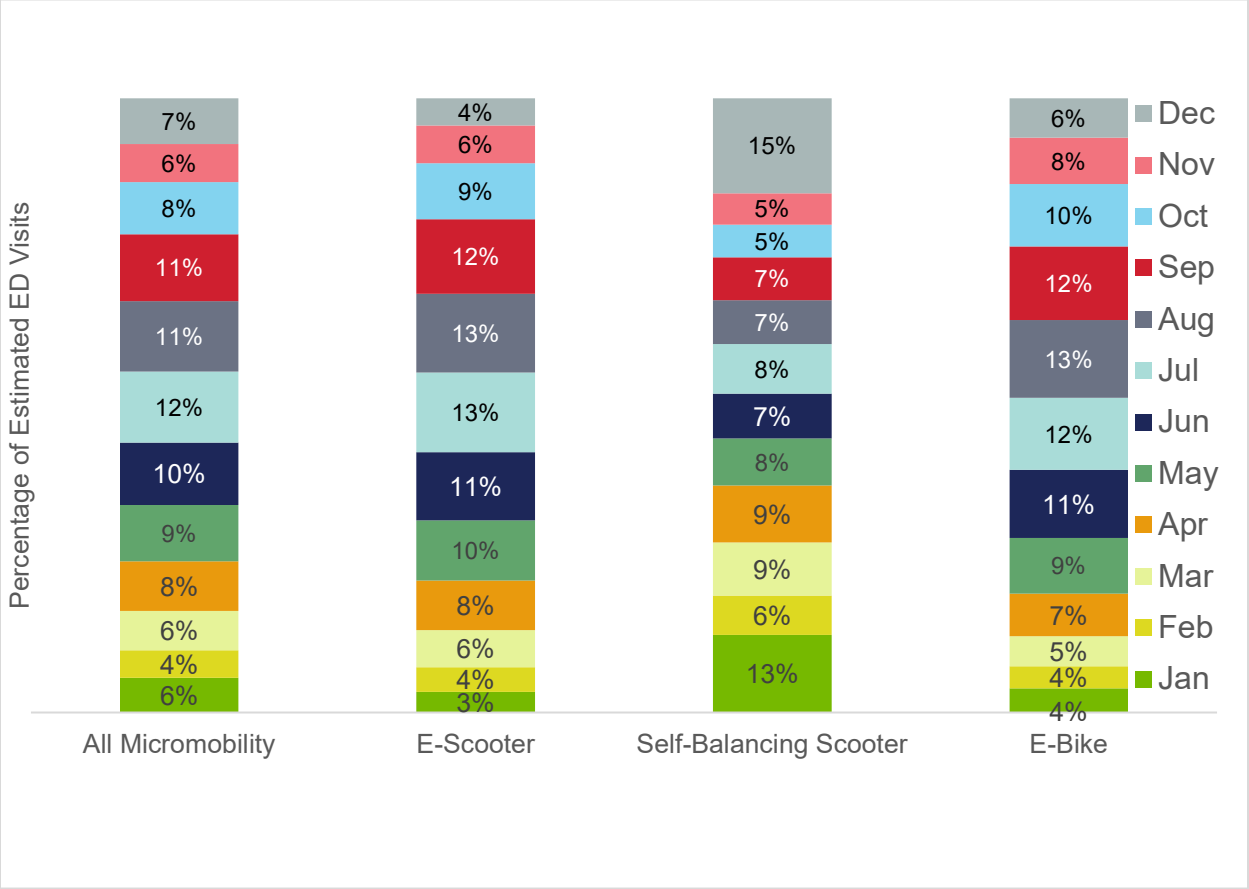
Source: NEISS, U.S. Consumer Product Safety Commission, 2017-2024.

Time of Year

Figure 2.5 illustrates the monthly percentage distribution of the estimated emergency visits by micromobility product type. If the distribution of ED visits were to follow the discrete uniform distribution,[8] the expected monthly ED visits would be around 8 percent. The months of June through September had the largest percentages for both e-scooter (11-13%) and e-bike (11-13%) ED visits whereas December and January had the largest percentages for self-balancing scooter-related ED visits (13-15%).

[8] The discrete uniform distribution is a symmetric probability distribution, where all 365 days are equally likely to be observed. Under that distribution, every month has a probability between 7.7 percent and 8.5 percent.

Figure 2.5: Distribution of Estimated ED Visits Associated with Micromobility Product Type and Month of Injury (2017–2024 Total)



Source: NEISS, U.S. Consumer Product Safety Commission, 2017-2024.

Other Characteristics

The remaining characteristics, which do not vary much by product type, are as follows:

- Fractures, followed by contusions/abrasions, are the two most common diagnoses.
- The most frequently injured body parts[9] are the upper and lower limbs, as well as the head and neck.
- Overall, 86 percent of the injured are treated and released from the EDs. About 10 percent are treated and admitted or transferred to another hospital. Disposition of the remaining 4 percent of injuries included "left without being seen," "held for observation," or resulted in fatalities.

[9] Body parts were grouped. For example, all body parts that would generally be considered a part of the lower limb (*e.g.,* toe, foot, ankle, knee, and leg) were grouped as "lower limb."

III-A. Special Study on E-Scooter Injuries

In response to the changing characteristics of markets for micromobility devices, CPSC revised the set of product codes used to describe scooters and powered self-balancing scooters beginning in 2020. Previously, two product codes 1329 (Scooters, unpowered) and 5042 (Scooters/skateboards, powered) were used to capture scooters and powered skateboards. However, this pair of codes created confusion for coding incidents and emergency department visits that only described a "scooter" without indicating whether the scooter was powered or unpowered. In 2020, the set was replaced with 5022 (Scooters, powered), 5023 (Scooters, unpowered), 5024 (Scooters, unspecified), and 5025 (Self-balancing scooters, and powered skateboards). To obtain more detailed information about the scooters associated with emergency department visits, CPSC staff initiated a series of special studies of scooter-related injuries, which continued through 2024.

This section focuses on the special study results for incidents from January 1, 2024 through December 31, 2024. More than 2,451 injury cases, coded as 5022 (Scooters, Powered) and 5024 (Scooters, Unspecified) were followed up on through a survey questionnaire to obtain additional information on the scooter type involved, how the injury occurred, the type of injury, the characteristics of the rider/victim, and the incident scenario. Of the 2,451 cases contacted, 173 responses were deemed in-scope as e-scooters. These 173 e-scooter-related injuries from the special study were included as part of the 2024 estimate of 79,300 e-scooter injuries seen in emergency departments. In the investigations, information was requested directly from the victim (or the victim's parent, if the victim was a minor) about the type of scooter involved, where the scooter was obtained, and how the injury occurred. Importantly, the results showed 16 of the 31 incidents identified as 'Scooters, unspecified' were powered scooters that otherwise would have been excluded from product code 5022. Recalibrating the weights for these cases (by taking the sample distribution into account), the 16 injury cases were added to all completed survey responses for injuries under product code 5022 (Scooters, powered).

Scooter Types

Table 3a.1 shows the number of respondents by verified scooter type and the corresponding NEISS product code in the special study. The respondents were asked a series of questions related to scooter type and different components. They were asked to provide information on the power source, whether it was an assisted mobility scooter, moped, motorcycle, or scooter that requires a registration or license. In addition, the respondents were asked if their scooter had steering handles and side-by-side wheels, as opposed to wheels that are one in front of the other. Of the 225 completed follow-up investigations on scooter-related incidents, 77 percent were e-scooters (173 out of 225), 9 percent were related to kick scooters, and the remaining 14 percent were other types of micromobility products. Of the 173 follow-up, e-scooter-related incidents, 91 percent were originally coded as powered scooters (157 out of 173), and 9 percent were coded as unspecified scooters (16 out of 173).[10]

[10] The 16 unspecified scooters have been included in the calculation of national injury estimates.

Table 3a1: Scooter Products: NEISS Product Code vs. Verified Scooter Product (2024)

Verified Product	Overall	Powered Scooter (5022)	Unspecified Scooter (5024)	Other Product Codes
Kick (unpowered) Scooter	20	7	13	0
Mobility Scooter	7	7	0	0
Moped	4	3	1	0
Self-balancing scooter	1	0	0	1
E-Scooter	**173**	**157**	**16**	**0**
Gas powered scooter	2	2	0	0
Other/missing	18	15	1	2
Total	225	191	31	3

Source: NEISS, U.S. Consumer Product Safety Commission, 2024.
Based on responses from the special study survey questions V3 – V8. See Appendix C for details.

Table 3a.2 shows the response rate for e-scooter investigations by Overall, Powered, and Unspecified Scooter. Staff selected 2,451 cases from 2024 for investigation, of which 173 were completed and determined to be in scope, and 2,278 were either incomplete or out of scope. For the findings to be generalizable to all those injured, raking ratio estimation was implemented to create adjusted weights for e-scooters to reduce non-response bias in the sample distributions due to response-rate differences by sex, stratum (hospital size), and age. These benchmarked weights were used to produce the national estimates from the special study survey. See Appendix A for additional details.

Table 3a.2: Completed E-Scooter Investigations by Powered vs. Unspecified Scooter (2024)

Investigation	Overall	Percent	Powered Scooter (5022)	Percent	Unspecified Scooter (5024)	Percent
Completed Investigation	173	7%	157	12%	16	64%
Incomplete/Out of Scope	2,278	93%	1,137	88%	9	36%
Total Assigned	**2,451**	**100%**	**1,294**	**100%**	**25**	**100%**

Source: NEISS, U.S. Consumer Product Safety Commission, 2024.

Estimated Injuries - Scenario-Specific Characteristics

In the remainder of this section, staff summarizes the 173 e-scooter cases from the follow-up investigations. They are descriptive of the portion that participated in the special study. Additionally, respondents did not respond to every question posed to them; as such, in the tables below, the “Unspecified” row was included to base all percentages on the total of 79,300 estimated injuries in 2024.

Table 3a.3 shows the distribution of the estimated ED injuries based on the rental status of the e-scooter. Rental e-scooters accounted for 35 percent of the estimated injuries, while non-rental and unspecified e-scooters accounted for 65 percent.

Table 3a.3: Distribution of Estimated Injuries on Rental Status (2024)

Rental vs Non-rental	N	Estimated ED-treated Injuries+	Percent
Rental	54	27,400	35%
Non-rental/Unspecified	119	51,800	65%
Total	**173**	**79,300**	**100%**

Source: NEISS, U.S. Consumer Product Safety Commission, 2024.
Based on the responses from special study survey question: *S1 Which of the following best describes the scooter? Rental, Owned by victim, Borrowed, Other, Don't know.*
+Injury estimates are rounded to the nearest 100 and may not sum to totals due to rounding. Percentages are calculated from the unrounded estimates.

Table 3a.4 shows the distribution of the estimated ED injuries while the victim was either riding an e-scooter or was struck by an e-scooter. Ninety-three percent of the injuries occurred to e-scooter riders.

Table 3a.4: Distribution of Estimated Injuries on How Victim Was Injured (2024)

Riding/Struck by Scooter	N	Estimated ED-treated Injuries+	Percent
Riding the scooter	161	73,600	93%
Struck by scooter	4	*	*
Other/Unspecified	8	4,600	6%
Total	**173**	**79,300**	**100%**

Source: NEISS, U.S. Consumer Product Safety Commission, 2024.
Based on the responses from special study survey question: *V10 You/the victim were/was: Riding the scooter; Struck by scooter; Other.*
+Injury estimates are rounded to the nearest 100 and may not sum to totals due to rounding. Percentages are calculated from the unrounded estimates.
*The reporting criteria for NEISS require that the estimated number of injuries be 1,200 or higher.

Table 3a.5 shows the distribution of the ED visits based on the type of surface. Paved roads accounted for 54 percent of the estimated injuries and paved sidewalks accounted for 32 percent.

Table 3a.5: Distribution of Estimated Injuries on Type of Riding Surface (2024)

Type of Surface	N	Estimated ED-treated Injuries+	Percent
Paved road	95	43,000	54%
Paved sidewalk	56	25,300	32%
Driveway	2	*	*
Other	18	9,300	12%
Unspecified	5	2,200	3%
Total	**173**	**79,300**	**100%**

Source: NEISS, U.S. Consumer Product Safety Commission, 2024.
Based on the special study survey question: *A3 What type of surface were you/the victim on?*
+Injury estimates are rounded to the nearest 100 and may not sum to totals due to rounding. Percentages are calculated from the unrounded estimates; column values may not add up to column totals due to rounding or because some riders may have ridden e-scooter on more than one surface type.
*The reporting criteria for NEISS require that the estimated number of injuries be 1,200 or higher.

Table 3a.6 shows the distribution of the injuries by responses on visibility (whether it was dark or difficult to see while riding the scooter). Twenty percent of the victims responded that it was dark or difficult to see.

Table 3a.6: Distribution of Estimated Injuries on Visibility (2024)

Visibility Issues	N	Estimated ED-treated Injuries+	Percent
Yes	31	15,700	20%
No	138	61,900	78%
Unspecified	4	1,700	2%
Total	**173**	**79,300**	**100%**

Source: NEISS, U.S. Consumer Product Safety Commission, 2024.
Based on the special study survey question: *A5 Was it dark or difficult to see?*
+Injury estimates are rounded to the nearest 100 and may not sum to totals due to rounding. Percentages are calculated from the unrounded estimates.

Table 3a.7 shows the percentage breakout of the ED-treated injuries based on source of distraction, such as cell phones or loud music, while riding the scooter. A source of distraction accounted for 11 percent of total injuries.

Table 3a.7: Distribution of Estimated Injuries on Rider Distraction (2024)

Distraction	N	Estimated ED-treated Injuries+	Percent
Yes	13	8,600	11%
No	154	68,200	86%
Unspecified	6	2,500	3%
Total	**173**	**79,300**	**100%**

Source: NEISS, U.S. Consumer Product Safety Commission, 2024.
Based on responses to the special study survey question: *A6 Was there anything else occurring at the time of the accident such as music, cell phone interference, or loud music?*
+Injury estimates are rounded to the nearest 100 and may not sum to totals due to rounding. Percentages are calculated from the unrounded estimates.

Table 3a.8 shows the percentage of ED-treated injuries based on whether the rider was carrying/holding something (*e.g.*, bag, purse, or backpack) in their hands while riding the scooter. Of the 79,300 estimated injuries, 32 percent of the injured were carrying or holding something while riding the scooter.

Table 3a.8: Distribution of Estimated Injuries on Rider Baggage (2024)

Carrying/holding something	N	Estimated ED-treated Injuries+	Percent
Yes	55	25,400	32%
No	103	45,900	58%
Unspecified	15	8,000	10%
Total	**173**	**79,300**	**100%**

Source: NEISS, U.S. Consumer Product Safety Commission, 2024.
Based on responses to the special study survey question: *A8 Were/was you/the victim carrying or holding something such as a bag, purse, or backpack (in your hands)?*
+Injury estimates are rounded to the nearest 100 and may not sum to totals due to rounding. Percentages are calculated from the unrounded estimates.

Table 3a.9 shows the percentage of ED-treated injuries by usage of safety equipment such as a helmet, blinking lights, head lamp, knee pads, elbow pads, or reflective vest while riding the scooter. Because riders may use more than one type of safety equipment, these rows do not add up to the total. Of the 79,300 estimated injuries, the rider was wearing a helmet while riding the e-scooter 18 percent of the time, had blinking lights or head lamp 49 percent of the time, was wearing knee/elbow pads 2 percent of the time, and none of the above/unspecified represented 37 percent of responses. Out of 15,700 injuries due to "It was dark/difficult to see," 9,200 (58%) were wearing blinking lights/headlamps or reflective vests.

Table 3a.9: Distribution of Estimated Injuries on Safety Equipment (2024)

Safety Equipment	N	Estimated ED-treated Injuries+	Percent
Helmet	36	14,800	18%
Blinking Lights/Head lamp	84	39,000	49%
Reflective vest	7	2,900	3%
Knee/elbow/wrist pads	3	1,900	2%
Other	7	3,400	4%
None of the above/ Unspecified	64	28,900	37%
Total	**173**	**79,300**	**100%**

Source: NEISS, U.S. Consumer Product Safety Commission, 2024.
Based on responses from the special study survey question: *S10/12 I'm going to read a list of safety equipment that riders might wear. Please tell me if the rider was wearing any of these at the time of the incident.*
Riders may use more than one type of safety equipment; as such, columns may exceed the total.
+Injury estimates are rounded to the nearest 100. Percentages are calculated from the unrounded estimates.

III-B. Special Study on E-bike Injuries

In response to the changing characteristics of markets for e-bike, CPSC revised the set of product codes used to describe bikes and powered bikes beginning in 2024. Previously the product code 3215 (powered bicycles) was used to capture e-bikes and mopeds. However, this product code created a conundrum for incidents and emergency department visits that only described an "unspecified bicycle" or a "motorized bicycle" without indicating whether the bicycle was battery powered. In 2024, the set was replaced with 5045 (e-bikes) and 5046 (bicycles, powered). To obtain more detailed information about bicycles associated with emergency department visits, CPSC staff initiated a series of special studies of bike-related injuries, which continued through 2024.

This section focuses on the special study results for incidents from January 1, 2024 through December 31, 2024. More than 2,010 injury cases, coded as 5045 (Bicycles, Powered) and 5040 (Bicycles) were followed up via questionnaire to obtain additional information on the bicycle type involved, how the injury occurred, the type of injury, the characteristics of the rider/victim, and the incident scenario. Of the 2,010 cases contacted, 88 responses were deemed in-scope as e-bikes. Of these 88 e-bike cases, 53 were originally coded as non-powered bicycles but were, in fact, e-bikes. Recalibrating the weights for these cases (by taking the survey response rate into account), the 53 injury cases were added to all completed survey responses for injuries under product code 5045 (Bicycles, powered). The e-bike-related injuries (sample size = 88) from the special study, which otherwise would have been excluded from product code 5045, were included as part of the 2024 estimate of 59,200 e-scooter injuries seen in emergency departments. In the investigations, information was requested directly from the victim (or the victim's parent, if the victim was a minor) about the type of bicycle involved, where the bicycle was obtained, and how the injury occurred.

Bicycle Types

Table 3b.1 shows the number of respondents by verified bicycle type and the corresponding NEISS product code in the special study. The respondents were asked a series of questions related to bicycle type and different components. They were asked to provide information on the power source, whether it was a moped, a motorcycle, or a gas-powered bicycle. In addition, the respondents were asked if their bicycle had pedals. Of the 435 completed follow-up investigations on bicycle-related incidents, 20 percent were e-bikes (88 out of 435), 70 percent were related to unpowered bicycles (304 out of 435), 1 percent were related to moped/gas-powered motorcycles (6 out of 435), and the remaining 9 percent were unspecified. Of the 88 follow-up, e-bike-related incidents, 40 percent were originally coded as powered e-bikes (35 out of 88), and 60 percent were coded as unspecified bicycles (53 out of 88).[11]

[11] The 53 unspecified bicycles have been included in the calculation of national injury estimates.

Table 3b.1: Bicycle Products: NEISS Product Code vs. Verified Bicycle Product (2024)

Verified Product	Overall	Powered Bicycle (5045)	Unspecified Bicycle (5040)	Other Product Codes
E-bike	88	35	53	0
Unpowered bicycle	304	1	287	16
Moped/Gas-powered motorcycle	6	1	5	0
Unspecified	37	0	33	4
Total	**435**	**37**	**378**	**20**

Source: NEISS, U.S. Consumer Product Safety Commission, 2024.
Based on responses from the special study survey questions V3 – V7. See Appendix C for details.

Table 3b.2 shows the response rate for e-bike investigations by Overall, E-bike (5045), and Bicycles (5040). Staff selected 2,010 cases from 2023 for investigation, of which 88 were completed and determined to be in scope, and 1,922 were either incomplete or out of scope. For the findings to be generalizable to all those injured, raking ratio estimation was implemented to create adjusted weights to reduce non-response bias in the sample distributions due to response-rate differences in sex, stratum (hospital size), and age. These benchmarked weights were used to produce the national estimates from the special study survey. See Appendix A for additional details.

Table 3b.2: Completed E-bike Investigations on E-bike vs. Unspecified Bicycle (2024)

Investigation	Overall	Percent	E-bike (5045)	Percent	Bicycles (5040)	Percent
Completed Investigation	88	4%	35	95%	53	14%
Incomplete/Out of Scope	1,922	96%	2	5%	325	86%
Total Assigned	**2,010**	**100%**	**37**	**100%**	**378**	**100%**

Source: NEISS, U.S. Consumer Product Safety Commission, 2024.

Estimated Injuries - Scenario-Specific Characteristics

In the remainder of this section, staff summarizes the 88 e-bike cases from the follow-up investigations. They are descriptive of the portion that participated in the special study. Additionally, respondents did not respond to every question posed to them; as such, in the tables below, the “Unspecified” row was included to base all percentages on the total of 59,200 estimated injuries in 2024.

Table 3b.3 shows the distribution of the estimated ED injuries based on the rental status of the e-bike. Rental e-bikes accounted for 11 percent, while non-rental e-bikes and unspecified rental status combined accounted for 89 percent.

Table 3b.3: Distribution of Estimated Injuries on Rental Status (2024)

Rental vs Non-rental	N	Estimated ED-treated Injuries+	Percent
Rental	9	6,300	11%
Non-rental/Unspecified	79	52,900	89%
Total	**88**	**59,200**	**100%**

Source: NEISS, U.S. Consumer Product Safety Commission, 2024.
Based on the responses from special study survey question: *S1 Which of the following best describes the bicycle? Rental, Owned by victim, Borrowed, Other, Don't know.*
+Injury estimates are rounded to the nearest 100 and may not sum to totals due to rounding. Percentages are calculated from the unrounded estimates.

Table 3b.4 shows the distribution of the ED visits based on the type of surface. Paved roads accounted for 58 percent and paved sidewalks for 19 percent.

Table 3b.4: Distribution of Estimated Injuries on Type of Riding Surface (2024)

Type of Surface	N	Estimated ED-treated Injuries+	Percent
Paved road	49	34,300	58%
Paved sidewalk	18	11,400	19%
Other	9	5,800	10%
Unspecified	12	7,800	13%
Total	**88**	**59,200**	**100%**

Source: NEISS, U.S. Consumer Product Safety Commission, 2024.
Based on the special study survey question: *A3 What type of surface were you/the victim on?*
+Injury estimates are rounded to the nearest 100 and may not sum to totals due to rounding. Percentages are calculated from the unrounded estimates; column values may not add up to column totals due to rounding or because some riders may have ridden e-bike on more than one surface type.

Table 3b.5 shows the distribution of the estimated ED injuries while the victim was either riding the e-bike or was struck by the e-bike. Fifty-two percent of the injuries occurred to riders of the e-bike.

Table 3b.5: Distribution of Estimated Injuries on How Victim Was Injured (2024)

Riding/Struck by Scooter	N	Estimated ED-treated Injuries+	Percent
Riding the bicycle	45	31,100	52%
Struck by bicycle	13	9,000	15%
Other/Unspecified	30	19,100	32%
Total	**88**	**59,200**	**100%**

Source: NEISS, U.S. Consumer Product Safety Commission, 2024.
Based on the responses from special study survey question: *A4a Were you or was the victim riding on a road? Yes, No.*
+Injury estimates are rounded to the nearest 100 and may not sum to totals due to rounding. Percentages are calculated from the unrounded estimates.

Table 3b.6 shows the distribution of the estimated ED injuries while the victim was on the shoulder of the road, in a bike lane, or in a lane that cars use. Eighteen percent of the injuries occurred on the car lane.

Table 3b.6: Distribution of Estimated Injuries on Lane Type (2024)

Lane type	N	Estimated ED-treated Injuries+	Percent
Shoulder	10	8,400	14%
Bike lane	14	8,600	14%
Car lane	16	10,400	18%
Unspecified	43	28,100	48%
Other	5	3,800	6%
Total	**88**	**59,200**	**100%**

Source: NEISS, U.S. Consumer Product Safety Commission, 2024.
Based on the responses from special study survey question: *A4b Were you on the shoulder of the road, in a bike lane, or in a lane that cars use? Shoulder, Bike lane, Car lane.*
+Injury estimates are rounded to the nearest 100 and may not sum to totals due to rounding. Percentages are calculated from the unrounded estimates.

Table 3b.7 shows the distribution of the estimated ED injuries by responses whether the accident involved a motor vehicle. Twenty-four percent of the victims responded that the accident involved a motor vehicle.

Table 3b.7: Distribution of Estimated Injuries on Motor Vehicle Accident (2024)

Motor vehicle accident	N	Estimated ED-treated Injuries+	Percent
Yes	21	14,300	24%
No	37	25,800	44%
Unspecified	30	19,100	32%
Total	**88**	**59,200**	**100%**

Source: NEISS, U.S. Consumer Product Safety Commission, 2024.
Based on the special study survey question: *A4c Did the accident involve a motor vehicle?*
+Injury estimates are rounded to the nearest 100 and may not sum to totals due to rounding. Percentages are calculated from the unrounded estimates.

Table 3b.8 shows the distribution of the estimated ED injuries where the accident happened at an intersection. Seventeen percent of the victims responded that the accident happened at an intersection.

Table 3b.8: Distribution of Estimated Injuries on Accident Location at Intersection (2024)

Intersection	N	Estimated ED-treated Injuries+	Percent
Yes	15	10,200	17%
No	6	4,100	7%
Unspecified	67	45,000	76%
Total	**88**	**59,200**	**100%**

Source: NEISS, U.S. Consumer Product Safety Commission, 2024.
Based on the special study survey question: *A4d Did the accident happen at an intersection?*
+Injury estimates are rounded to the nearest 100 and may not sum to totals due to rounding. Percentages are calculated from the unrounded estimates.

Table 3b.9 shows the distribution of the estimated ED injuries by responses to whether the accident involved visibility issues. Ten percent of the victims responded that the accident occurred when visibility was an issue, such as being dark or difficult to see.

Table 3b.9: Distribution of Estimated Injuries on Visibility (2024)

Visibility Issues	N	Estimated ED-treated Injuries+	Percent
Yes	10	5,900	10%
No	67	46,600	79%
Unspecified	11	6,800	11%
Total	**88**	**59,200**	**100%**

Source: NEISS, U.S. Consumer Product Safety Commission, 2024.
Based on the special study survey question: *A5 Was it dark or difficult to see?*
+Injury estimates are rounded to the nearest 100 and may not sum to totals due to rounding. Percentages are calculated from the unrounded estimates.

Table 3b.10 shows the percentage breakout of the ED-treated injuries based on different surface levels, such as uphill, downhill, or on a fairly level surface, while riding the e-bike. Riding uphill or downhill accounted for 5 and 20 percent of total injuries, respectively.

Table 3b.10: Distribution of Estimated Injuries on Surface Level (2024)

Surface level	N	Estimated ED-treated Injuries+	Percent
Uphill	4	2,900	5%
Downhill	16	12,000	20%
Fairly level surface	57	37,600	64%
Unspecified	11	6,800	11%
Total	**88**	**59,200**	**100%**

Source: NEISS, U.S. Consumer Product Safety Commission, 2024.
Based on responses to the special study survey question: *A6 Was the bicycle travelling uphill, downhill, or was it on a fairly level surface?*
+Injury estimates are rounded to the nearest 100 and may not sum to totals due to rounding. Percentages are calculated from the unrounded estimates.

Table 3b.11 shows the percentage of ED-treated injuries based on whether the rider was dealing with distractions at the time of the accident, such as a cell phone or loud music. Of the 59,200 estimated injuries with a response to this question, 3 percent of the injured involved rider distraction while riding the scooter.

Table 3b.11: Distribution of Estimated Injuries on Rider Distraction (2024)

Distraction	N	Estimated ED-treated Injuries+	Percent
Yes	3	1,700	3%
No	71	48,600	82%
Unspecified	14	8,900	15%
Total	**88**	**59,200**	**100%**

Source: NEISS, U.S. Consumer Product Safety Commission, 2024.
Based on responses to the special study survey question: *A7 Was there anything else occurring at the time of the accident such as cell phone interference or loud music?*
+Injury estimates are rounded to the nearest 100 and may not sum to totals due to rounding. Percentages are calculated from the unrounded estimates.

Table 3b.12 shows the percentage of ED-treated injuries based on whether the rider was carrying/holding something (*e.g.*, bag, purse, or backpack) in their hands while riding the e-bike. Of the 59,200 estimated injuries with a response to this question, 38 percent of the injured were carrying or holding something while riding the e-bike.

Table 3b.12: Distribution of Estimated Injuries on Rider Baggage (2024)

Carrying/holding something	N	Estimated ED-treated Injuries+	Percent
Yes	33	22,600	38%
No	44	29,900	50%
Unspecified	11	6,800	11%
Total	**88**	**59,200**	**100%**

Source: NEISS, U.S. Consumer Product Safety Commission, 2024.
Based on responses to the special study survey question: *A8 Were/was you/the victim carrying or holding something such as a bag, purse, or backpack (in your hands)?*
+Injury estimates are rounded to the nearest 100 and may not sum to totals due to rounding. Percentages are calculated from the unrounded estimates.

Table 3b.13 shows the percentage of ED-treated injuries by usage of safety equipment such as a helmet, blinking lights, head lamp, knee pads, elbow pads, or reflective vest while riding the scooter. Because riders may use more than one type of safety equipment these rows do not add up to the total. Of the 59,200 estimated injuries, the rider was wearing a helmet while riding the e-bike 40 percent of the time, had blinking lights or head lamp 75 percent of the time, was wearing a reflective vest 16 percent of the time, and none of the above/unspecified represented

14 percent of responses. Out of 5,900 injuries due to "It was dark/difficult to see," 2,600 (44%) were wearing blinking lights/headlamps.

Table 3b.13: Distribution of Estimated Injuries on Safety Equipment (2024)

Safety Equipment	N	Estimated ED-treated Injuries+	Percent
Helmet	34	23,600	40%
Blinking Lights/Head lamp	64	44,700	75%
Reflective vest	10	9,200	16%
Other	5	3,600	6%
None of the above/ Unspecified	16	8,500	14%
Total	**88**	**59,200**	**100%**

Source: NEISS, U.S. Consumer Product Safety Commission, 2024.
Based on responses from the special study survey question: *S10 I'm going to read a list of safety equipment that riders might wear. Please tell me if the rider was wearing any of these at the time of the incident.*
Riders may use more than one type of safety equipment; as such, columns may exceed the total.
+Injury estimates are rounded to the nearest 100. Percentages are calculated from the unrounded estimates.
*The reporting criteria for NEISS require that the estimated number of injuries be 1,200 or higher.

Table 3b.14 shows the percentage of ED-treated injuries based on the speed at which the e-bike was travelling when the accident happened. Of the 59,200 estimated injuries, 47 percent of the injured were travelling under 20 mph, 15 percent were travelling at 20 mph or more, and the remaining 38 percent did not specify their travelling speed when the accident happened.

Table 3b.14: Distribution of Estimated Injuries on Travelling Speed (2024)

Travelling speed	N	Estimated ED-treated Injuries+	Percent
Under 20 mph	40	27,900	47%
20 mph or more	15	8,600	15%
Unspecified	33	22,800	38%
Total	**88**	**59,200**	**100%**

Source: NEISS, U.S. Consumer Product Safety Commission, 2024.
Based on responses to the special study survey question: *S12 The speed at which the bicycle was travelling when the accident occurred in miles per hour.*
+Injury estimates are rounded to the nearest 100 and may not sum to totals due to rounding. Percentages are calculated from the unrounded estimates.

IV. Hazard Patterns Based on In-Depth Investigation Review

Given that the narratives available in NEISS focus on the injury sustained rather than on the circumstances leading to the injury, and the death reports only cover the fatalities reported, CPSC staff evaluated the available in-depth investigations for a more comprehensive look at how incidents happened. Based on reports of incidents in CPSRMS that occurred between

2017 and 2024, CPSC field staff completed 531 follow-up in-depth investigations related to all micromobility products. The 531 follow-up in-depth investigations includes the 48 fatalities that have been discussed in the fatality section above. Of the 531 completed investigations, 189 involved an e-scooter (33 of the 189 were rental e-scooters); 197 involved a self-balancing scooter; and 145 involved an e-bike (including 2 incidents at bike shops). This does not necessarily reflect the current prevalence of incidents related to micromobility products in the CPSRMS database. Staff initiated many more in-depth investigations that could not be completed due to product unavailability or unwillingness of consumers to cooperate and provide product and injury information. Data collection is ongoing, and staff expects the numbers to change in future reports. Staff discusses the types of products and the reported hazards associated with each of the 531 investigations below.

E-Scooters (Including Rental E-Scooters)

Of the 189 e-scooter-related incidents that were investigated, at least 33 were rental e-scooters. Staff's review of the 189 in-depth investigations shows the following hazards:

- **Fire hazard** was reported in 88 of the 189 incidents, which mostly occurred while charging or just after charging the e-scooter completed (51 out of 88) and was accompanied by popping sounds, burning smells, battery sparks, explosions, or fires; in 16 separate incidents, the e-scooter battery sparked and caught spontaneous fire while the product was in a resting, non-charging state; an additional 5 incidents occurred while riding the e-scooter, with victims observing the battery emitting smoke, melting, catching on fire, or sparking; 3 incidents were associated with having issues with the scooter and then opening it up to expose the battery connections for a possible fix via battery reset or replacement; in 2 cases, hazards were related to faulty electrical wiring or the e-scooter had been plugged into an extension cord; in 1 case, a victim powered on the e-scooter and it caught fire; in another case, the e-scooter was submerged in water, causing battery cells to explode; and no other hazard information is available for the remaining 9 incidents.
- **Brake problems** were associated with 40 of the reported incidents. The investigations show that brakes not engaging at all, sporadically engaging, or engaging excessively following a delay resulted in 37 of the 40 reported incidents. In one other case, the complainant reported that the brake cable was not properly attached to the adjustment bracket on the handlebar grip. The remaining 2 incidents happened to the same consumer; other than an email message indicating mechanical brake failures, the consumer did not share any additional scenario-specific detail.
- **Multiple product-related issues** such as brakes malfunctioning, throttles getting stuck, control panels catching fire, wobbliness, and sudden acceleration were reported in 9 incidents. In one of these 9 incidents, the rider went over a bump, which seemed to mark the onset of throttle and brake problems.
- **Loss of Control, environmental factors, and unknown factors** played a role in 9 incidents. The users lost control of the e-scooters in 5 cases after hitting a pothole, hitting/coming off a curb, or while being chased by an aggressive dog. In one incident, the user hydroplaned, lost control, and crashed. Staff has insufficient

information to determine why the users in the remaining 3 incidents went through an intersection against a red light or a stop sign, causing a collision with other motor vehicles that had the right-of-way.
- **Miscellaneous product-related issues** such as the footboard breaking or the handlebar, steering column, or front wheel detaching at the bottom part of the bar were reported in 28 incidents.
- **Unexpected power loss** caused the rider(s) to tip over or get thrown off in 9 reported incidents. In one of the 9 incidents the rider was going downhill, and the e-scooter lost power when it went over a curb.
- **Other electrical issues** were associated with 6 incidents. In one incident, a wheel began spinning on its own while the e-scooter was unattended. In 3 separate incidents, the accelerator of an e-scooter apparently got stuck in the acceleration position.

Self-balancing scooters

A review of the 197 in-depth investigations of self-balancing scooters showed the following hazards:

- **Fire** was the most common hazard identified with self-balancing scooters, accounting for 173 of the 197 reports. The reports describe fire (sometimes after an explosion), smoke, or sparks emanating from the product; some reports describe the product overheating or melting. One hundred five of the 173 fire/thermal incidents occurred when the self-balancing scooter was being charged or had just completed charging; an additional 20 reported that the incidents occurred during use; another 17 self-balancing scooter incidents occurred while the battery was in a resting, non-charging state; aftermarket battery chargers were reported in at least 10 of the incidents; 8 of the incidents transpired shortly after the product was powered on; in 6 different self-balancing scooter incidents, victims reported sparks or fire when the consumer attempted to reset, remove, or replace the battery because it was not charging. Staff had no scenario-specific information for the 7 remaining incidents.
- **Other electrical hazards** were identified in 21 of the 191 investigated incidents. These included the self-balancing scooter spinning out of control at high speed; spinning in circles/one side; or failing to shut off, causing riders to jump off device, be thrown off, or crash into fixed objects.
- **Miscellaneous product-related issues** resulted in 3 of the 191 investigated incidents. In all 3 cases, the self-balancing scooter vibrated excessively, throwing off the rider. Uneven weight distribution may have contributed to at least 2 of these incidents.

E-Bikes

CPSC staff reviewed 145 completed investigation reports for e-bikes.

- **Fire hazard** was identified in 106 of the 145 e-bike incidents. Sixty-two out of 106 reports describe fires that started while the e-bike was charging (including at least 4 incidents reporting aftermarket battery packs/chargers); an additional 13 incidents occurred while the battery was in an idle, non-charging state; another 4 incidents happened during use; 5 incidents (including 2 incidents at bike shops) were associated with product maintenance such as removing and replacing the battery; in 3 reports, incidents transpired shortly after the product was powered on; in 5 other cases, hazards were related to faulty electrical wiring or overloading an extension cord; and, lastly, staff has insufficient information to determine whether the lithium-ion battery was being charged or being removed from the e-bike for the remaining 14 incidents.
- **Miscellaneous product-related issues,** such as pedals, tires, wheels, and other structural integrity/design defect issues, were reported in 26 cases. Out of the 26, 11 reports were associated with pedals suddenly coming loose/separating from the crank of the e-bike while riding; 7 out of 26 cases reported tire issues, such as ruptured tires, exploded/blown out tires, or cracked tires; an additional 5 of the 26 cases reported the front wheel detached or suddenly stopped without warning. In the other 3 cases, at least one of the following issues were reported: the frame collapsed, white powder formed around the battery terminals, the bike was shaky and wobblily, or the pin in the handlebars prevented making a left turn.
- **Brake issues** were reported in 5 incidents. Reports describe brakes malfunctioned/stopped working in 4 of the cases; the fifth report describes the owner of the e-bike needing to “tighten” the brakes repeatedly until, on the day of the incident, the brakes failed completely.
- **Multiple product-related issues** were identified in 3 incidents as the consumers stated that they experienced multiple component issues, missing, or defective parts such as chains, throttles, battery charger, or lights; tire deflation; or brake cables causing falls or potential risk of injuries.
- **Other electrical hazards** were reported in 4 incidents. For example, 1 report describes the rear wheel suddenly engaging and the e-bike starting to move without notice.

Table 4.1 summarizes the hazards associated with the use of the various micromobility products as determined by the accidents investigated.

Table 4.1: In-Depth Investigations of Micromobility Products and Associated Hazards (2017–2024 Total)

Hazard	All Micromobility	E-Scooter (Rental E-scooter)	Self-balancing scooter	E-Bike
Fire Hazard	367	88 (2)	173	106
Brake Problem	45	40 (16)	0	5
Unexpected Power Loss	9	9 (5)	0	0
Other Electrical Hazard	31	6 (0)	21	4

Misc. Product-Related Issues	57	28 (3)	3	26
Control/Environmental/Unknown Factor	10	9 (4)	0	1
Multiple Product-Related Issues	12	9 (3)	0	3
Total	**531**	**189 (33)**	**197**	**145**

Source: CPSC In-Depth Investigation File from CPSRMS, 2017-2024.

References

Izreal, D., Hoaglin, D. C., & Battaglia, M. P. (n.d.). A SAS Macro for Balancing a Weighted Sample. Retrieved October 2010, from Abt Associates Inc.: https://www.abtassociates.com.

Lee, Douglas, "Safety Concerns Associated with Micromobility Products" U.S. Consumer Product Safety Commission, March 2020. Online at https://www.cpsc.gov/s3fs-public/Report-on-Micromobility-Products_FINAL-to-Commission.pdf?THHIorYXAZ.KiZnobh1o7.7.lN9nNCLo.

NEISS sample design: https://www.cpsc.gov/Research--Statistics/NEISS-Injury-Data.

Schellong, Daniel, Sadek, Philipp, Schaetzberger, Carsten, and Barrack, Tyler, "The Promise and Pitfalls of E-Scooter Sharing", May 2019. Online at: https://www.bcg.com/publications/2019/promise-pitfalls-e-scooter-sharing.aspx.

Schroeder, Tom, "Trend Analysis of NEISS Data", U.S. Consumer Product Safety Commission, February 2000.

Schroeder, Tom, and Ault, Kimberly (2001), "The NEISS Sample (Design and Implementation), 1997 to Present" U.S. Consumer Product Safety Commission, June 2001. Online at: https://www.cpsc.gov/s3fs-public/pdfs/blk_media_2001d011-6b6.pdf.

Tark, James, "Micromobility Products-Related Deaths, Injuries, and Hazard Patterns 2017-2023" U.S. Consumer Product Safety Commission, October 2024. Online at https://cpsc.gov/Research--Statistics/Sports--Recreation/Micromobility-Products-Related-Deaths-Injuries-and-Hazard-Patterns-2017%E2%80%932023

U.S. Census Bureau https://www.census.gov/
The Monthly Postcensal Resident Population counts can be found at:
Index of /programs-surveys/popest/datasets

Appendix A

Methodology

CPSC staff queried epidemiology data from NEISS and CPSRMS. Staff reviewed query results to include only the incidents related to micromobility products.

Date of Data Extraction: 5/6/2025

Incident Dates or Treatment Dates: 1/1/17-12/31/24

Product codes and narrative descriptions

E-scooter:

- Product codes: 5042 (Scooters/skateboards, powered) in 2017-2019, 5022 (Scooters, Powered) from 2020 onwards, and 5024 (Scooters, Unspecified) as part of the 2020 through 2024 Special studies.
- For the years: 2020 through 2024, 200 injury cases, originally coded as 5024 were identified to be e-scooters following investigations through the special study. These 200 cases were added to all injury cases coded under 5022.
- Narrative/Text contains any of the following: “electric scooter,” “e-scooter,” “stand up scooter,” “standup scooter,” “motorized scooter,” “power scooter,” “dockless scooter,” “rental scooter,” “scooter sharing,” any brand known to be rental e-scooters and other variant spellings.
- For CPSRMS data, searched brand and manufacturer fields when their information were available to identify in-scope products.

Self-balancing scooter:

- Product code: 5042 (Scooters/skateboards, powered) in 2017-2019 and 5025 (Self-balancing scooters and powered skateboards) from 2020 onwards.
- Narrative/Text contains any of the following: “self-balancing scooter,” “self-balancing scooter,” and other varied spellings.
- For CPSRMS data, searched brand and manufacturer fields when their information were available to identify in-scope products.

E-bike:

- Product code: 3215 (Mopeds or power-assisted cycles) in 2017-2024 and 5045 (Electric power-assisted pedal bicycles) from 2024 onwards, 5040 (Bicycles) as part of the 2024 Special study.
- For the year: 2024, 53 injury cases, originally coded as 5040 were identified to be e-bikes following investigations through the special study. These 53 cases were added to all injury cases coded under 5045.

- Narrative/Text contains any of the following: “electric bike,” “e-bike,” “electric bicycle,” “e-bicycle,” “power (assisted) bike,” “power (assisted) bicycle,” “battery-operated bike,” “battery-operated bicycle,” and other varied spellings.
- For CPSRMS data, searched brands and manufacturer fields when their information was available to identify in-scope products.

For this report, an incident was deemed out of scope if any of the following criteria were satisfied:

- not electric or battery-powered
- not two-wheeled
- seated scooters
- mopeds, motorcycle
- mobility scooter/wheelchair
- powered skateboards
- any brand names that are not associated with micromobility products
- incidents occurred outside of the U.S.

For CPSRMS data, CPSC staff consolidated multiple reports that pertain to a single incident as one incident prior to analysis.

Raking Methodology and Raked Injury Estimate

This section summarizes the techniques implemented in this study to handle nonresponse and to generate estimates of injuries. A unit nonresponse occurs when an assigned (sampled) subject cannot be reached or refuses to participate. In this case, no information is collected from the subject. In calculating the number of emergency department-treated, e-scooter-related injuries based on the results of this study, the biggest area of concern is unit nonresponse.

A popular method of dealing with unit nonresponse is raking, also known as "raking ratio estimation" or "sample balancing." This method uses an iterative proportional fitting algorithm to adjust weights to known population marginal totals to handle unit nonresponse within the survey. Further information can be found in Tu and Garland (2012).

From January 1, 2024, to December 31, 2024, CPSC staff conducted two sets of special study for injuries related to the E-scooters (NEISS product codes 5022 [Scooters, powered] and 5024 [Scooters, unspecified]) and E-bikes (NEISS product codes 5045 [Electric power-assisted pedal bicycles] and 5040 [Bicycles or accessories]). The product code 5022 (5045 for E-bikes) is used when an emergency department-treated injury is reported to have been associated with an e-scooter/e-bike, whereas the product code 5024 (5040 for bicycles) is used when a specific type of scooter/bicycle is unknown. Any injury in the specified timeframe that had a corresponding product code of either 5022 or 5024 for scooters and 5045 or 5040 for bicycles were assigned for a follow-up survey. Many surveys were not completed due to missing contact information for the victim, inability to contact a victim that had contact information available, or a victim's refusal to participate. Raking was implemented to handle this type of nonresponse. The weights recorded for nonresponding subjects are distributed among the subjects with completed

surveys. That is, raking adjusts the weights of the completed surveys to compensate for the nonresponse.

To handle the nonresponse in this study via raking, sample distributions for e-scooters and e-bikes were adjusted by demographic variables such as sex, hospital size (stratum), and age (i.e. raking the sample against the marginal totals). The following variables had multiple-level responses and had to be collapsed into categories to limit the number of possible combinations to a manageable number: age, and stratum. Age was split into two age groups: “13 years old or younger” and “Over 13 years old”; and Stratum was grouped into “Very large and Children’s hospitals” and “Other hospitals.” Estimates for e-scooter-related, emergency department-treated injuries can be determined based on the information collected for each completed survey. Raking uses the population marginal totals for all the aforementioned variables. For this study, the population marginal totals were generated through the NEISS database using the data known for all assigned cases for this special study survey. Using the corresponding weights, the population marginal totals can be obtained. The survey weights within the study were raked (adjusted) to match the population marginal totals for each variable. The raking macro (Izreal, Hoaglin, & Battaglia) was used to generate the raked weights.

Appendix B

Summary of Annual Injury Estimates and Trend Analysis

Statistically significant year-to-year estimated ED visits:

All Micromobility Products

- For 2024, estimated ED visits were significantly higher than for any of the following years: 2017 (p-value: < 0.01), 2018 (p-value: < 0.01), 2019 (p-value: < 0.01), and 2020 (p-value: 0.01).
- For 2023, estimated ED visits were significantly higher than for any of the following years: 2017 (p-value: < 0.01), 2018 (p-value: < 0.01), 2019 (p-value: < 0.01), and 2020 (p-value: < 0.01).
- For 2022, estimated ED visits were significantly higher than for any of the following years: 2017 (p-value: < 0.01), 2018 (p-value: < 0.01), 2019 (p-value: < 0.01), 2020 (p-value: < 0.01), and 2021 (p-value: 0.02).
- For 2021, estimated ED visits were significantly higher than for any of the following years: 2017 (p-value: < 0.01), 2018 (p-value: < 0.01), 2019 (p-value: 0.03), and 2020 (p-value: < 0.01).
- For 2020, estimated ED visits were significantly higher than for any of the following years: 2017 (p-value: < 0.01), 2018 (p-value: 0.05).
- For 2019, estimated ED visits were significantly higher than for any of the following years: 2017 (p-value: 0.01) and 2018 (p-value: 0.05).
- For 2018, estimated ED visits were significantly higher than for 2017 (p-value: 0.01).

E-Scooters

- For 2024, estimated ED visits were significantly higher than for any of the following years: 2017: (p-value: < 0.01) and 2018 (p-value: 0.01).
- For 2023, estimated ED visits were significantly higher than for any of the following years: 2017: (p-value: < 0.01), 2018 (p-value: < 0.01). In addition, estimated ED visits were significantly lower than for 2022 (p-value: 0.03).
- For 2022, estimated ED visits were significantly higher than for any of the following years: 2017 (p-value: < 0.01), 2018 (p-value: < 0.01), 2019 (p-value: 0.01), and 2020 (p-value: < 0.01).
- For 2021, estimated ED visits were significantly higher than for any of the following years: 2017 (p-value: < 0.01), 2018 (p-value: 0.01), and 2020 (p-value: < 0.01).
- For 2020, estimated ED visits were significantly higher than for 2017 (p-value: 0.01).
- For 2019, estimated ED visits were significantly higher than for any of following years: 2017 (p-value: 0.02) and 2018 (p-value: 0.02).

Self-balancing scooters

- For 2024, estimated ED visits were significantly lower than for any of the following years: 2017 (p-value: < 0.01), 2018 (p-value: < 0.01), 2019 (p-value: < 0.01), 2020 (p-value: < 0.01), and 2021 (p-value: < 0.01).
- For 2023, estimated ED visits were significantly lower than for any of the following years: 2017 (p-value: < 0.01), 2018 (p-value: < 0.01), 2019 (p-value: < 0.01), 2020 (p-value: < 0.01), and 2021 (p-value: < 0.01).
- For 2022, estimated ED visits were significantly lower than for any of the following years: 2017 (p-value: 0.04), 2018 (p-value: < 0.01), 2019 (p-value: 0.01), 2020 (p-value: < 0.01), and 2021 (p-value: < 0.01).
- For 2021, estimated ED visits were significantly lower than for 2020 (p-value: 0.04).
- For 2020, estimated ED visits were significantly higher than for 2019 (p-value: 0.02).
- For 2019, estimated ED visits were significantly lower than for 2018 (p-value: 0.04).

E-bikes

- For 2024, estimated ED visits were significantly higher than any of the following years: 2017 (p-value: < 0.01), 2018 (p-value: < 0.01), 2019 (p-value: < 0.01), 2020 (p-value: < 0.01), 2021 (p-value: < 0.01), and 2022 (p-value: < 0.01).
- For 2023, estimated ED visits were significantly higher than any of the following years: 2017 (p-value: < 0.01), 2018 (p-value: < 0.01), 2019 (p-value: < 0.01), 2020 (p-value: < 0.01), 2021 (p-value: < 0.01), and 2022 (p-value: < 0.01).
- For 2022, estimated ED visits were significantly higher than any of the following years: 2017 (p-value: < 0.01), 2018 (p-value: < 0.01), 2019 (p-value: < 0.01), 2020 (p-value: < 0.01), and 2021 (p-value: < 0.01).
- For 2021, estimated ED visits were significantly higher than any of the following years: 2017 (p-value: < 0.01), 2018 (p-value: < 0.01), 2019 (p-value: < 0.01), and 2020 (p-value: < 0.01).
- For 2020, estimated ED visits were significantly higher than for 2018 (p-value: 0.04).
- For 2019, estimated ED visits were significantly higher than for 2018 (p-value: 0.02).

Annual Injury Estimates, Corresponding Sample Sizes, and Coefficients of Variation by Product Type, 2017-2024

Year	All Micromobility			E-Scooter			Self-balancing scooter			E-Bike		
	N	Est. ED Visits	C.V.	N	Est. ED Visits	C.V.	N	Est. ED Visits	C.V.	N	Est. ED Visits	C.V.
2017	935	37,300	0.15	185	10,600	0.25	683	22,900	0.14	67	*	0.334
2018	1,149	50,200	0.16	369	20,300	0.31	714	26,400	0.16	66	*	0.49
2019	1,561	66,900	0.19	761	39,100	0.33	664	22,200	0.18	136	*	0.37
2020	1,690	69,300	0.20	652	*	0.34	922	27,300	0.17	116	*	0.43
2021	2,030	97,500	0.21	946	61,200	0.30	794	23,300	0.21	290	*	0.37
2022	2,440	118,800	0.19	1,413	74,800	0.25	490	17,200	0.23	537	26,800	0.29
2023	2,506	109,400	0.18	1,308	58,400	0.25	374	13,400	0.18	824	37,600	0.23
2024	3,466	149,100	0.19	1,869	79,300	0.29	324	10,600	0.12	1,273	59,200	0.15
Total	**15,777**	**698,500**	**0.15**	**7,503**	**380,000**	**0.22**	**4,965**	**163,300**	**0.16**	**3,309**	**155,200**	**0.19**

Source: NEISS, U.S. Consumer Product Safety Commission, 2017-2024.
Due to weighting adjustments following a NEISS sampling change in 2024, estimates from 2023 rearward may differ from previous reports. Grey shaded cells in the table do not meet the NEISS reportability criteria. Reporting criteria for NEISS require that the estimated number of injuries be 1,200 or higher, the sample size be 20 or larger, and the coefficient of variation be less than 33 percent (C.V. less than 0.33 in table).

Appendix C: Special Study Survey Questionnaire for E-scooters

Q1 The U.S. Consumer Product Safety Commission (CPSC) collects data through the National Electronic Injury Surveillance System (NEISS) on injuries treated in hospital emergency departments. CPSC conducts follow-up investigations with a small number of people to learn more about how the injury occurred. The results of these investigations will be used to determine if similar injuries can be prevented 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.

You should have received a letter with the following information needed to continue:
1. Investigation Task Number
2. Randomly generated password

To continue, you will have to enter the task number correctly below:

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 16, please ask your parent or guardian to complete the survey. If no one is available, it is okay to respond yourself.
o Yes (1)
o No (2)

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 scooter. Is that correct?
o Yes (1)
o No (2)
o Don't know (3)

I3 What information is incorrect from the statement above?
- Different date (1)
- Different hospital (2)
- (I/the victim) did not receive treatment in a hospital emergency department for a scooter injury (3)

I4 What is the correct date?

I5 Where did you/the victim receive treatment for your/their injury?

V1 Are you the:
o Injured person (1)
o Parent or guardian of injured person (2)
o Other (specify in next window) (3)

V2 Specify relationship:

V3 Was the scooter unpowered (e.g., a kick scooter or push scooter)?
Note: Powered scooters have a power source like electric or gas.
o Yes (1)
o No (2)
o Don't know (4)

V4 Was the scooter an assisted mobility scooter to help people with physical limitations?
o Yes (1)
o No (2)

V5 Was the scooter a moped, motorcycle, or scooter that requires a registration or license?
o Yes (1)
o No (2)

V6 Did the scooter have handles for steering?
Note: Handles for steering are distinct from handles used for balancing purposes.
o Yes (8)
o No (9)

V7 If your scooter had only two wheels, were those wheels side-by-side?

Note: side-by-side wheels are distinct from wheels that are one in front of the other. Below is an example of side-by-side wheels.
o Yes (1)
o No (2)

V8 What kind of power did the scooter run on?
o Gas (1)
o Electric (2)
o Other (specify in next window) (3)

V9 Specify.

V10 You/the victim were/was:
Interviewer instruction: If two scooters collided select "Riding the scooter."
o Riding the scooter (1) o Struck by scooter (2) o Other (specify) (3)

V11 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.

A2 The following are specific questions about the incident that you may have already described. Please bear with us as you fill out the next set of questions.

A3 What type of surface were you/the victim on?
- ○ Paved Road (1)
- ○ Paved Sidewalk (2)
- ○ Gravel (3)
- ○ Grass (4)
- ○ Driveway (5)
- ○ Other (specify in next window) (6)
- ○ Don't know (7)

A4 Specify.

A5 Was it dark or difficult to see?
o Yes (1)
o No (2)
o Don't know (3)

A6 Was there anything else occurring at the time of the accident such as music, cell phone interference, or loud music?
o Yes (1)
o No (2)
o Don't know (3)

A7 Please specify the additional factors.

A8 Were/was you/the victim carrying or holding something such as a bag, purse, or backpack?
o Yes (1)
o No (2)
o Don't know (3)

A9 What were/was you/the victim carrying?

A10 Which of the following best describes how you were injured?
o Hit from the front (1)
o Hit from the side (2)

o Hit from behind (3)
o Other (specify in next window) (4)
o Don't know (5)

A11 Specify.

A12 Was there any warning before you/the victim were/was hit? (ex. bell, shouting, or other noise)
o Yes (1)
o No (2)
o Don't know (3)

S1 Which of the following best describes the scooter?
o Rental (1)
o Owned by victim (2)
o Borrowed (3)
o Other (specify in next window) (4)
o Don't know (5)

S2 Specify.

S3 Who was the scooter rented from?

S4 Do you know the brand and model names of the scooter or have a photo of the scooter involved in the injury?
o Yes (1)
o No (2)

S5 Specify brand

S6 Specify model
Note: if brand is known but model is not, enter unknown below

S7 If you are able, please upload a photo of the scooter.

S8 It is very important for us to know what brands are involved in these injuries. Would you be willing to go look at the scooter and record the brand name, model name, and take a photo of the scooter?

Note: You may also upload a pre-existing photo of the scooter if you have one. Select 'Yes' if you have a pre-existing photo.
o Yes (1)
o No (2)

S9 Specify brand

S10 Specify model

Note: if brand is known but model is not, enter unknown below

S11 If you are able, please upload a photo of the scooter.

S12 Were/was you/the victim wearing any of these at the time of the incident. (Select all that apply)
- Helmet (1)
- Knee pads (2)
- Elbow pads (3)

- Wrist pads (4)
- Reflective vest (5)
- Blinking lights/Head lamp (6)
- Other (specify in next window) (7)
- None of the above (8)

S13 Specify.

C1 Is there anything else about this accident or the scooter involved that you would like to share?
o Yes (1)
o No (2)

C2 Explain.

C7 We may be interested in sending a CPSC investigator to your home to gather more information about how the accident occurred and take more detailed pictures of the scooter. This investigation would be set up at your convenience. May we have an investigator contact you by phone to setup a visit?
o Yes (1)
o No (2)

C8 Please supply your phone number.

C9 When is a good time to call? (Check all that apply.)
- Morning (1)
- Afternoon (2)
- Evening (3)

Appendix D: Special Study Survey Questionnaire for E-bikes

Q1 The U.S. Consumer Product Safety Commission (CPSC) collects data through the National Electronic Injury Surveillance System (NEISS) on injuries treated in hospital emergency departments. CPSC conducts follow-up investigations with a small number of people to learn more about how the injury occurred. The results of these investigations will be used to determine if similar injuries can be prevented 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.

You should have received a letter with the following information needed to continue:
1. Investigation Task Number
2. Randomly generated password

To continue, you will have to enter the task number correctly below:

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 16, please ask your parent or guardian to complete the survey. If no one is available, it is okay to respond yourself.
o Yes (1)
o No (2)

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 scooter. Is that correct?
o Yes (1)
o No (2)
o Don't know (3)

I3 What information is incorrect from the statement above?
- Different date (1)
- Different hospital (2)
- (I/the victim) did not receive treatment in a hospital emergency department for a scooter injury (3)

I4 What is the correct date?

I5 Where did you/the victim receive treatment for your/their injury?

V1 Are you the:
o Injured person (1)
o Parent or guardian of injured person (2)
o Other (specify in next window) (3)

V2 Specify relationship:

V3 Was the bicycle unpowered?
Interviewer instruction: Powered bicycles have a power source like electric or gas
o Yes (1)
o No (2)
o Don't know (4)

V4 Was the bicycle an electric powered bicycle?
o Yes (1)
o No (2)

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."
o Yes (1)
o No (2)

V6 Was the bicycle a moped or motorcycle that is gas powered?
o Yes (8)
o No (9)

V7 Did the bicycle have pedals?

o Yes (1)
o No (2)

V9 You/the victim were/was:
o Riding the bicycle (1)
o Pedestrian struck by bicycle (2)
o Other (specify) (3)

Q21 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.

A2 Next, I am going to ask some specific questions about the incident that you may have already described. Please bear with us as we collect this information from you.

A3 What type of surface were you/the victim on?
- ○ Paved Road (1)
- ○ Paved Sidewalk (2)
- ○ Gravel (3)
- ○ Grass (4)
- ○ Driveway (5)
- ○ Other (specify in next window) (6)

A3a Specify.

A4a Were you/was the victim riding on a road?
o Yes (1)
o No (2)

A4b Were you on the shoulder of the road, in a bike lane, or in a lane that cars use?
o Shoulder (1)
o Bike Lane (2)
o Car lane (3)
o Other (4)

A4c Did the accident involve a motor vehicle?
o Yes (1)
o No (2)

A4d Did the accident happen at an intersection?
o Yes (1)
o No (2)

A4e Did the motor vehicle run you/the victim over?
o Yes (1)
o No (2)

A5 Was it dark or difficult to see?
o Yes (1)
o No (2)

A6 Was the bicycle travelling uphill, downhill, or was it on a fairly level surface?
o Uphill (1)
o Downhill (2)
o Fairly level (3)

A7 Was there anything else occurring at the time of the accident such as cell phone interference or loud music?
o Yes (1)
o No (2)
o Don’t know (3)

A7a Please specify the additional factors?

A8 Were you/the victim carrying or holding something such as a bag, purse, or backpack?
o Yes (1)
o No (2)
o Don’t know (3)

A9 What were you carrying.

S1 Which of the following best describes the scooter?
o Rental (1)
o Owned by victim (2)
o Borrowed (3)
o Other (specify in next window) (4)
o Don't know (5)

S2 Specify.

S3 Who was the bicycle rented from?

S4 Do you know the brand and model names of the bicycle involved in the injury?
o Yes (1)
o No (2)

S5 Specify brand

S6 Specify model
Note: if brand is known but model is not, enter unknown below

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

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 (1)
- ○ Padding (such as knee pads, elbow pads, or wrist pads) (2)
- ○ Reflective vest (3)
- ○ Blinking lights/Head lamp (4)
- ○ Other (specify in next window) (5)
- ○ None of the above (6)

S11 Specify

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?
o Hit from the front (1)
o Hit from the side (2)
o Hit from the behind (3)
o Other (specify in next window) (4)
o Don't know (5)

S11 Specify

A12 Was there any warning before you/the victim were/was hit? (ex. bell, shouting, or other noise)?
o Yes (1)
o No (2)
o Don't know (3)

C1 Is there anything else about this accident or the bicycle involved that you would like me to know?
o Yes (1)
o No (2)

C2 Explain

C7 We may be interested in sending a CPSC investigator to your home to gather more information about how the accident occurred and take more detailed pictures of the scooter. This investigation would be set up at your convenience. May we have an investigator contact you by phone to setup a visit?
o Yes (1)
o No (2)

C8 Please supply your phone number.

C9 When is a good time to call? (Check all that apply.)
- ○ Morning (1)
- ○ Afternoon (2)
- ○ Evening (3)