

Promoting E-bike Safety in San Mateo County

Dr. John Maa FACS
2013 Chapter President and
ACS Governor

E-bikes: Emerging Public Health Issue - Marin Surgeons Raise Alarm

- **2020:** Increased adoption of e-bikes during the COVID pandemic
- **2021:** Marin and other jurisdictions (Encinitas, Carlsbad, etc.) see serious injuries and deaths from youth e-bike riders
- **2022:** Marin surgeons share concerns to County Public Health and elected officials, and the Marin Healthcare District Board sends a letter to the Board of Supervisors
- **2023:** Data collection
 - Using local trauma center hospital data to supplement Marin Coroner data

Marin Voice: Trauma surgeons make plea for more e-bike safety

Marin County has long been recognized as the birthplace of the modern mountain biking industry. Tourists travel to ride a bicycle across the Golden Gate Bridge and enjoy the Marin Headlands, Sausalito, Muir Woods and Mount Tamalpais.

Behind the beauty and adventure is a hidden danger. For decades, MarinHealth Medical Center has been the primary hospital treating bicyclists and motorcyclists injured across Marin, and borne witness to many accidents leading to lifelong disability and death.

In 2023, a new public health hazard is being recognized in electric-assist bikes. The closure of gyms and social distancing imposed by the COVID-19 pandemic led some to purchase e-bikes as a healthy alternative for outdoor exercise.

But along with this innovation came new perils. Over the past three years, the medical center has witnessed a dramatic increase in e-bike incidents resulting in serious injuries, some of which have resulted in fatalities. As trauma surgeons, we believe it is time to raise public awareness about the special dangers associated with e-bikes, to protect adult and youth riders.

Our analysis of the trauma registry reveals that riders in e-bike incidents were more likely to require hospital admission than regular bicyclists, with an order of magnitude higher risk of dying. The e-bike injury pattern includes pelvic fractures, which are more commonly seen in motorcycle riders than bicyclists. Our review revealed older patients were the most likely to die, as they may have been less skilled riding a bicycle. They were more likely to hit obstacles on bike paths and other fixed structures. One Sausalito pedestrian was killed after being struck by an e-bike rider.

Recently, the rapid proliferation of less-expensive, next-generation e-bikes increasingly being used by kids resulted in a dramatic rise in youth injuries. Seeing multiple unhelmeted kids on a single e-bike, traveling at a high rate of speed, is worrisome. We applaud the improved tracking of e-bike incidents by the Marin County Health and Human Services Department.





Protecting Chinese e-bike users from road injuries and deaths

Overview

Road traffic injuries are a major public health problem and a leading cause of death and injury around the world. E-bike riders represent a significant proportion of these road traffic deaths and injury in China who, with approximately 300 million e-bikes, is one of the largest e-bike markets in the world. Head injuries are the leading cause of death (75%) and severe injuries (80%) among e-bike riders in China. Beyond the immediate loss to the individual and their families, this also adds additional financial burdens to the family and loved ones, as many of the victims are in the prime income-earning years of their lives and are suddenly faced with significant income loss.

Key facts

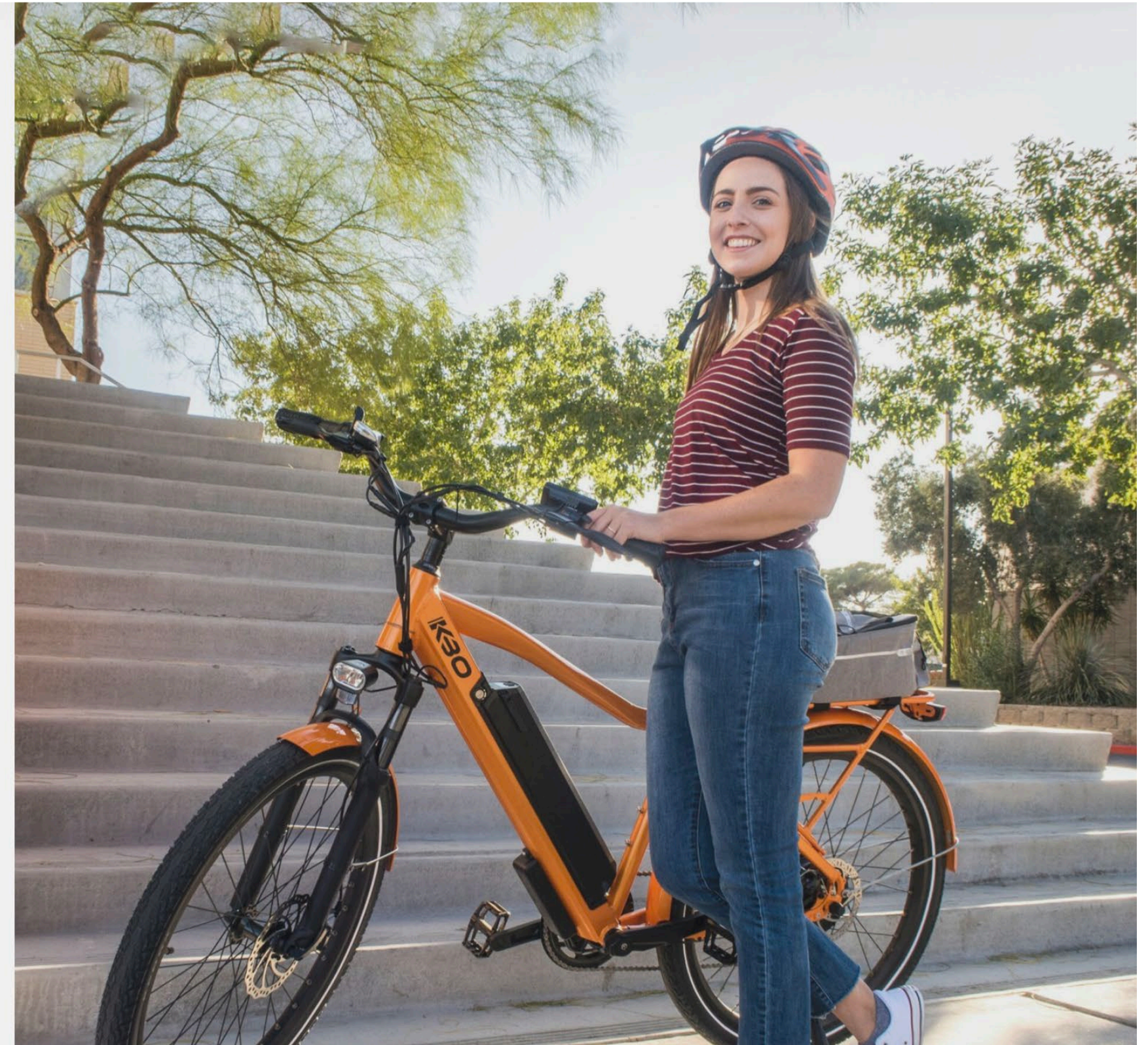
According to police data from China, e-bike riders accounted for **13.8%** of all road traffic deaths and **17.4%** of road traffic injuries in 2019.

In 2019, head injuries were the leading cause of death (**75%**) and severe injuries (**80%**) among e-bike riders, according to police data

New Rady Children's-led e-bike study addresses speed-related trauma risk for kids and teens












Published on: February 6, 2026

The study, the first to look at speed factors and e-bike injuries in children and teens, comes as e-bike-related trauma visits to pediatric emergency departments continue to sharply increase.





Electric-bicycles and speed-related trauma in pediatrics: Risk of internal injury and hospitalization

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Highlights

- This study aims to assess patterns and outcomes of e-bike injuries in children.

In 2025, the ED at Rady Children’s saw 201 such trauma patients, compared to 125 the year before.

In 2021, there was only one.

Also in 2021, falls were by far the top cause of Rady Children’s ED trauma patient visits, followed by motor vehicle collisions and car-vs.-pedestrian collisions.

In 2025, e-bike injuries surpassed all of those to become the No. 1 reason for ED trauma visits at Rady Children’s.

“We basically have kids riding vehicles that are much more like motorcycles than bicycles, and many of them have not taken a class on how to ride them safely and don’t know the rules of the road,” says study leader [Dr. Laura Goodman](#). “It’s a big problem.”

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Almost a third of the cyclists in the Netherlands use electric bikes

Publication date 15-11-2022 | 07:00



Almost a third (30%) of the Dutch cyclists aged 12 and over use electric bikes. The use of e-bikes is most common among elderly cyclists (those aged 65 and over): more than half of them only ride an e-bike. This is according to a RIVM survey of nearly 7,000 people. A vast majority of respondents (70%) said they opted for an e-bike ‘to cycle with less effort’.

	Class 1	Class 2	Class 3
 Presence of a throttle	No	Yes	No
 Helmet requirements	No	No	Yes (in certain states)
 Maximum speed	20 MPH	20 MPH	28 MPH



Injuries related to bicycle accidents: an epidemiological study in The Netherlands

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Abstract

Background This study aims to analyze the incidence and outcomes of bicycle-related injuries in hospitalized patients in The Netherlands.

Methods Bicycle accidents resulting in hospitalization in a level-I trauma center in The Netherlands between 2007 and 2017 were retrospectively identified. We subcategorized data of patients involved in a regular bicycle, race bike, off-road bike or e-bike accident. The primary outcomes were mortality rate and incidence of multitrauma. Secondary outcomes were differences between bicycle subcategories. Independent risk factors were identified using multivariable logistic regression. All variables with a p value < 0.20 in univariable analysis were entered in multivariable analysis.

Results We identified 1986 patients. The mortality rate after emergency room admission was 5.7%, and 41.0% were multitraumas. A higher age, multitrauma and cerebral haemorrhages were independent risk factors for in hospital mortality. Independent risk factors found for multitrauma were a higher age, two-sided trauma, e-bike accidents and cerebral haemorrhage.

Conclusion Bicycle accidents resulting in hospitalization have a high mortality rate. Furthermore, a high incidence of multitrauma, fractures and cerebral haemorrhages were found. Considering the increasing incidence of bicycle accident victims needing hospital admission, new and more efficient prevention strategies are essential.



Orthopaedic injuries among electric bicycle users

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Abstract

Show Outline

Introduction

The use of electric bicycles (E-bike) has dramatically increased. E-bikes offer convenient, environmental-friendly, and less expensive alternative to other forms of transport. However, E-bikes provide a new public health challenge in terms of safety and injury prevention.

This study is the first to specifically investigate the E-bike related orthopaedic injuries, based on a national trauma registry.

Methods

Data from a National Trauma Registry were reviewed for patients hospitalized following E-bike related injuries. Between Jan 2014 to Dec 2015, a total of 549 patients were reviewed. Data were analyzed according to demography, type of orthopaedic injury, associated injuries and severity, injury mechanism and treatment in the operating room.

Results

A total of 360 (65%) patients sustained orthopaedic injuries, out of them 230 (63.8%) sustained limb/pelvis/spine fractures. Lower extremity fractures were more prevalent than upper extremity fractures ($p < 0.001$). The tibia was the most fractured bone (19.2%). Patients over the age of 50 years were at the highest risk for spine (30.5%, $p = 0.001$), pelvis (15.0%, $p = 0.001$) and femoral neck

Amelia Stafford

- San Rafael resident injured after an e-bike crash
- Inspires action and a new legislative solution: AB 1778 (Connolly)

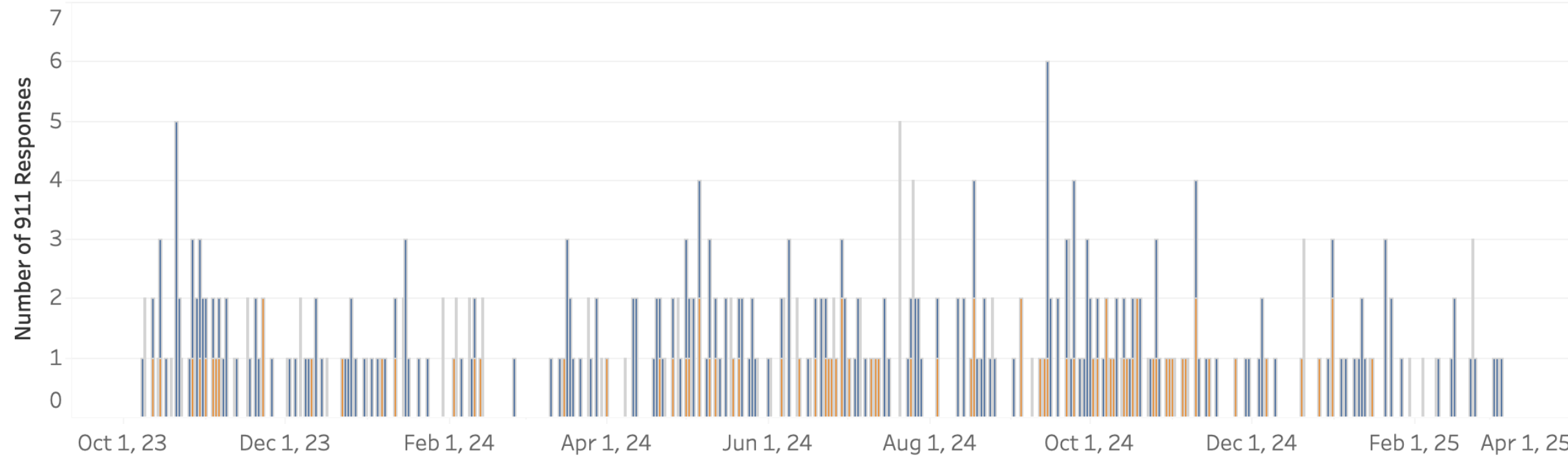


Amelia Stafford at home in Marin County, Calif., She lost her sophomore year at Terra Linda High School to a 2023 crash on an e-moto. Balazs Gardi for The New York Times

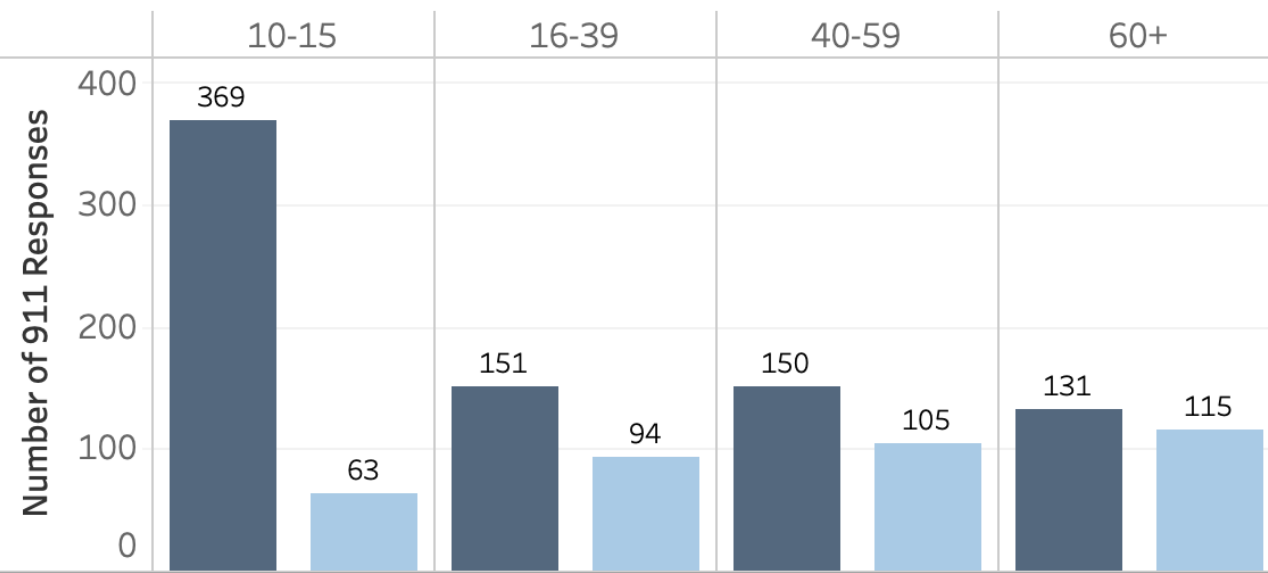
Bicycle Type
(All) ▼

Date of Accident
October 7, 2023 March 5, 2025

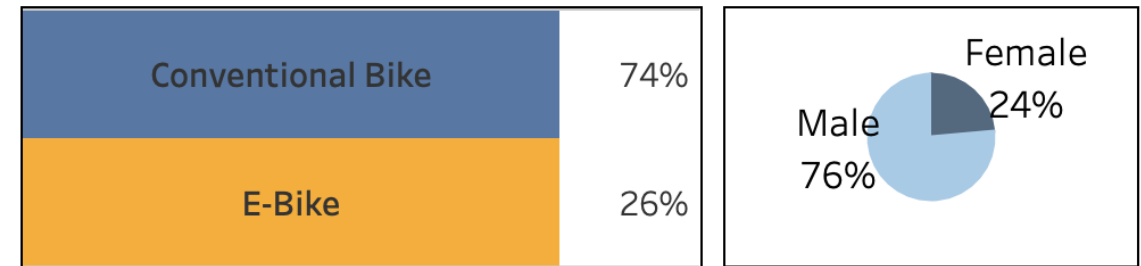
Number of Accidents, by Date



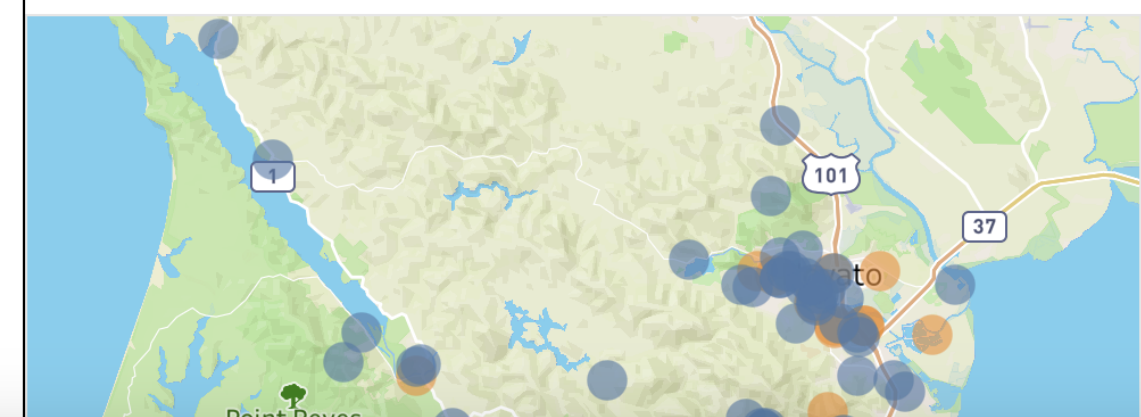
Frequency of Accident, by Age

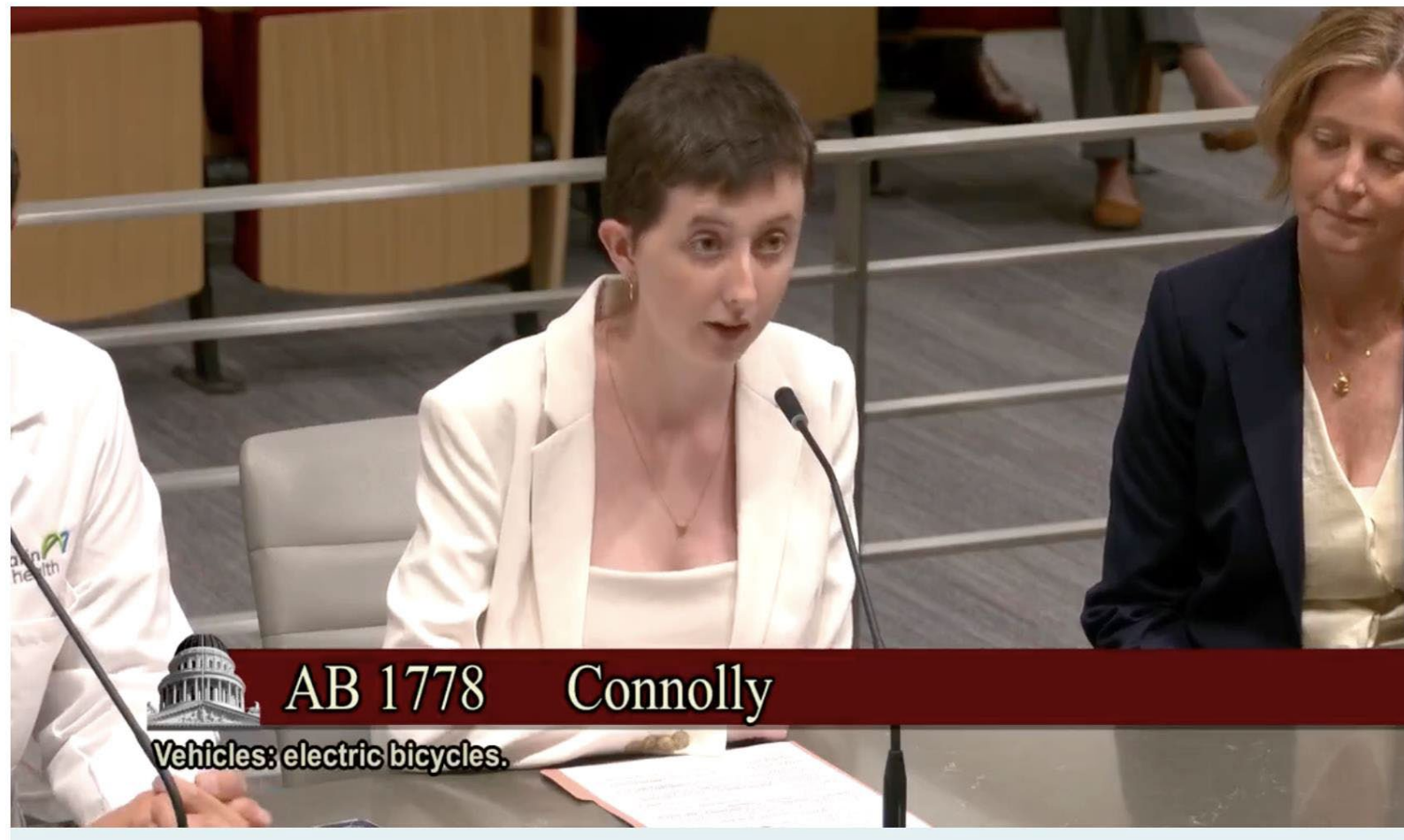


■ Accident Rate (per 100,000) ■ Number of Accidents



Location of Accidents





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STATEMENTS

Statement on Electric Bicycle Safety and Injury Prevention

June 6, 2025

5 Min

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The following statement was developed by the ACS Committee on Trauma and approved by the Board of Regents at its June 2025 meeting.

Electric bicycles are an increasingly popular mode of transportation and recreation. However, their use is associated with a growing number of serious injuries, particularly among children and adolescents. The ACS recognizes the need to address this emerging public safety problem through evidence-based policy and injury prevention strategies.

We recognize the following facts:

Newsroom

Published 5/24/2025



The Hidden Dangers of E-Bikes: Orthopaedic Surgeons Warn of Rising Injury Risks for Riders of All Ages

ROSEMONT, Ill. (May 27, 2025)—Data shows a concerning rise in bone and joint injuries tracking with the surging popularity of electric bikes (e-bikes)[1]. These high-powered vehicles, capable of 28 mph speeds, are causing injuries across all age groups—not just novice riders. The American Academy of Orthopaedic Surgeons (AAOS) encourages all riders to understand the unique physical risks these micromobility products present before taking to roads and trails.

“E-bikes can reach speeds much higher than traditional bicycles, and this increased velocity means more force during falls or collisions. This higher energy impact is causing injuries we don’t typically see in traditional bicycle falls,” said AAOS spokesperson and orthopaedic surgeon specializing in sports medicine Brian R.

Waterman, MD, FAAOS. “The risk of fractures, dislocations and head trauma increases

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POSITION STATEMENT

Neurosurgery Position Statement on Safety of Electric Bicycles and Scooters

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Position Statement on Safety of Electric Bicycles and Scooters

Background

Electric bicycles (e-bikes) and electric scooters (e-scooters), collectively referred to as electric micro-mobility, have become increasingly popular modes of transportation. The high visibility, convenience and affordability of these two-wheeled vehicles have led to widespread adoption by consumers in recent years.

Commensurate with their increasing popularity, studies have shown a significant increase in the number of emergency department visits related to e-bike and e-scooter injuries. Several case series describe a wide range of injury severity related to these accidents, some of which require neurosurgical intervention. Specifically, e-bike and e-scooter accidents have resulted in

Potential Solutions/ Next Steps

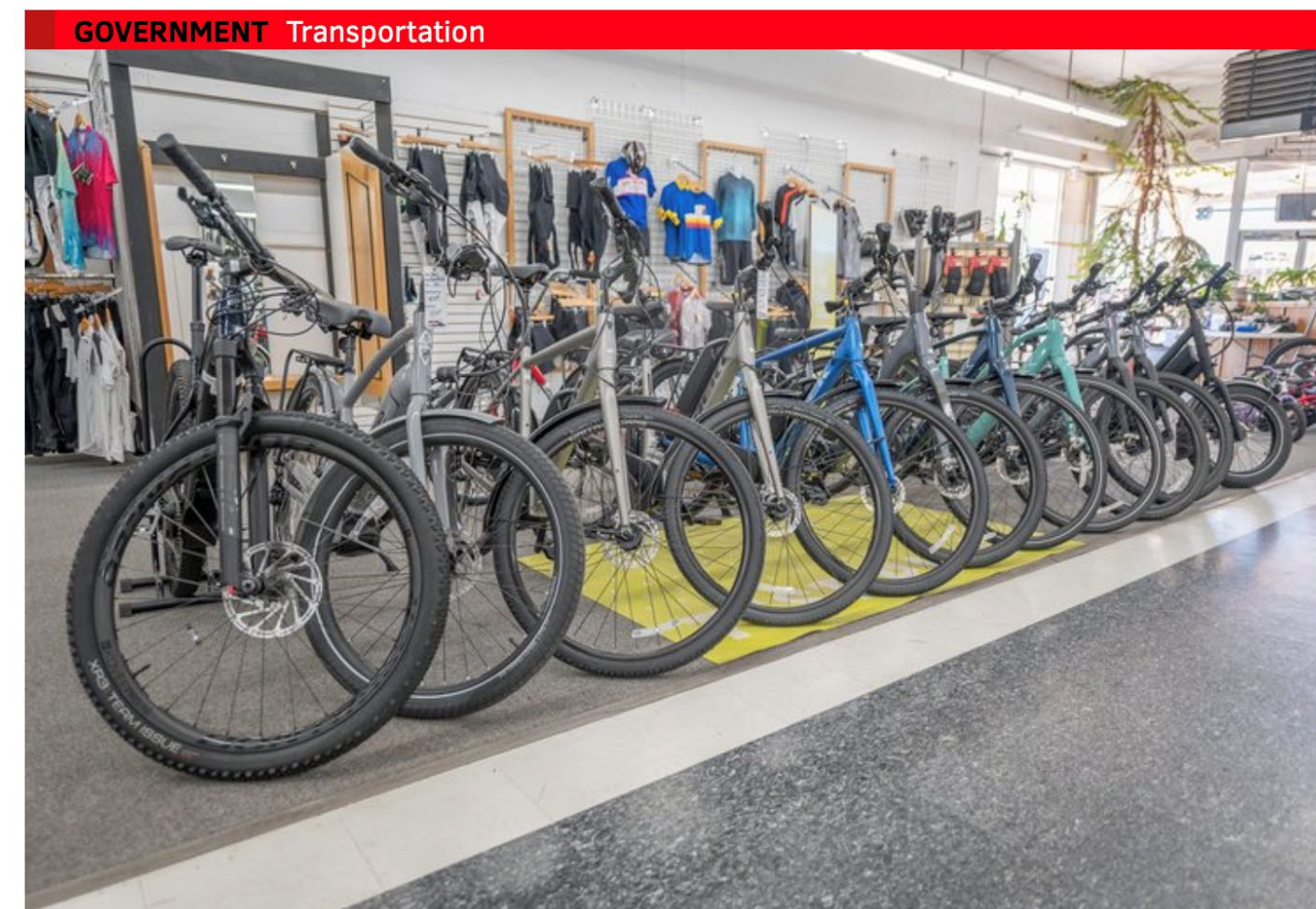
- 1) Netherlands: Must be 15 years of age, and limit to 15 mph
- 2) Transportation secretary and standardization of US laws – CPSC
- 3) Urban road design improvements
- 4) CPSC – children under 12 should not ride a vehicle than can travel over 10 mph
- 5) Licensure and registration as motorized vehicles – New Jersey repealed the 3 class system last month, and Illinois and Massachusetts considering the same

E-bike riders in New Jersey face new licensing, registration and insurance requirements

The law signed by Gov. Phil Murphy, on his last day in office, eliminates the state's three-tier system and treats all varieties of e-bike the same, drawing criticism from cycling advocates.



BY MICHAEL TANENBAUM
PhillyVoice Staff



ZACHARY ALLEN/IMAGE IMAGES

New Jersey will require all e-bike operators to be licensed and insured under a new law signed by Gov. Phil Murphy, creating some of the strictest regulations in the country amid rising fatal crashes. The file photo above shows e-bikes on display at a Colorado bike shop.



Moped or motorized bicycle

Section 406(a) CVC refers to a moped or motorized bicycle as any two or three wheeled device having fully operative pedals for propulsion by human power, or having no pedals if powered solely by electrical energy, has an automatic transmission, and a motor which produces less than 4 gross brake horsepower and is capable of propelling the device at a maximum speed of not more than 30 miles per hour on level ground.

- A driver license with an M-1 or M-2 endorsement is required.
- A DOT compliant helmet is required.
- It is unlawful to operate a moped or motorized bicycle on a roadway while under the influence of alcohol and/or drugs.