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The State of E-Bikes in California: A review of emerging policies, programs, and crash reporting

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Abstract

This research brief explores the landscape of electric bikes (e-bikes) and ridership in California, including the evolution of e-bike policies, rider use and demographics, and features of emerging e-bike safety programs. It discusses crash data reporting and explores limitations for capturing e-bike crash data, providing insights into potential solutions with a case study on Marin County. Findings indicate that decision-making when riding e-bikes may be influenced by environmental factors, while safety courses offer avenues to engage both students and guardians in the learning experience to increase confidence and skill-building. This brief also explores ways in which hospitals and trauma centers may help alleviate data limitations with their collection of injury reporting relating to e-bikes, and how advances made in Marin County for crash data collection may provide a standard for the rest of the state.

Introduction

E-Bike Classifications

In the 21st century, micromobility has expanded to include electric devices to roll, including e-bikes and electric scooters (e-scooters). The California Department of Motor Vehicles (DMV) defines e-bikes as any “bicycle equipped with fully operable pedals and an electric motor that does not exceed 750 watts of power” (California Vehicle Code (CVC) § 312.5, 2024). E-bikes are classified into three categories: Class 1, Class 2, and Class 3. These classifications were created by PeopleForBikes in 2014 and 2015 to develop a uniform three-tier framework that would separate lower-speed e-bikes from motor vehicles like mopeds and gas-powered motorcycles (Claxton, 2024). These classifications have since been adopted by 40 states across the nation.

PeopleForBikes works to promote bipartisan legislation in order to grow biking across the United States, through a mix of “targeted legal, lobbying, and grassroots efforts” (Lovell, 2025). California adopted PeopleForBikes’ e-bike classifications in 2015 within the CVC 312.5 through Assembly Bill (AB) 1096. Under the CVC, California designates the following classifications for e-bikes:

- Class 1: Bicycle equipped with a motor that provides assistance only when the rider is pedaling, and that ceases to provide assistance when the e-bike reaches 20 mph.
- Class 2: Bicycle equipped with a throttle-actuated motor, that ceases to provide assistance when the e-bike reaches 20 mph.
- Class 3: Bicycle equipped with a motor that provides assistance only when the rider is pedaling, and that ceases to provide assistance when the e-bike reaches 28 mph.



VEHICLE TYPE	VEHICLE		USER				BIKEWAY ACCESS			
	PEDESTAL OPERATED	MAXIMUM MOTOR-ASSISTED SPEED (MPH)	MINIMUM AGE (YEARS)	DRIVER'S LICENSE	LICENSE PLATE	HELMET	CLASS 1 BIKE PATH	CLASS 2 BIKE LANE	CLASS 3 BIKE BOULEVARD	CLASS 4 PROTECTED LANE
BICYCLE	YES	N/A	N/A	NO	NO	17 AND UNDER	YES	YES	YES	YES
TYPE 1 E-BIKE	YES	20	N/A	NO	NO	17 AND UNDER	YES	YES	YES	YES
TYPE 2 E-BIKE	NO	20	N/A	NO	NO	17 AND UNDER	YES	YES	YES	YES
TYPE 3 E-BIKE	YES	28	16	NO	NO	YES	NO	YES	YES	NO
MOPED	NO	N/A	16	YES	YES	YES	NO	YES	YES	NO

peopleforbikes PeopleForBikes.org

Figure 1: California E-bike Policy: Classifications, User Requirements, and Bikeway Access. Photo source: PeopleForBikes.

Both Class 1 and Class 2 e-bikes have no minimum age restrictions and like their non-electric counterparts, they require helmet use for people age 17 and under. Class 3 e-bikes are restricted to riders that are at least 16 years old and a helmet is required regardless of age to ride in accordance with California law (CVC § 312.5, 2024). There is currently no requirement for people to register an e-bike or to have a driver's license to use any of the three classifications of e-bikes. This research brief explores the current e-bike landscape in California, including an overview of emerging safety laws and considerations for future programming and data collection.

Methodology

A review of the existing literature to understand the existing landscape of e-bike policy and practice in California was conducted. It included a review of publications, qualitative data, news releases, and program-related content. The sources range from peer-reviewed journals, federal and state entities, local governments, university research papers and briefs, local news stories, and blogs. Many sources were identified initially, but the research team narrowed down source selection based on authority, year of publication, relevancy to the research topic, and reliability of the source. Keywords were used to help filter searches when gathering sources. Keywords included e-bikes,

electric bicycles, e-bikes California, and e-bike crashes. Despite an extensive research and narrowing process, there was a limitation to the source selection process. Since e-bikes are an emerging topic, many sources identified were published by non-academic sources, such as articles written by industry members, blog posts, and local news. Additionally, some academic sources included research outside of the United States, and others may not be as recent or solely identify e-bikes when conducting research on electric micromobility.

Findings

Trip and User Demographics

E-bikes have become a popular choice of transportation for a variety of people due to their affordability, speed, and accessibility. For families, e-bikes are replacing cars, as they are easier to maintain and can still be used to conduct errands and simple, everyday tasks that don't require long distances of travel, such as picking up children from school or grocery shopping (Furio, 2025). A North American survey found that female respondents were more likely than their male counterparts to cite usage of e-bikes in order to "carry cargo or kids" or "to be able to keep up when riding with friends/family" (MacArthur et al., 2018). Additionally, young adult respondents reported they rode e-bikes to replace car trips for uses like commuting to work, while respondents ages 55 and older indicated that recreation was their main reason for their usage. These findings suggest that younger e-bike users are more likely to be utilitarian riders while older or physically limited e-bike users may find more value in their recreational purposes (MacArthur et al., 2018).

Trends discovered in the national survey indicated that exercise, recreation, and commuting are the trip types most likely to be made by e-bike, and were observed in parts of California including the San Francisco Bay Area. Bike shop owners in the Bay Area shared that their number one

customers are commuters and that their sales reflect this. One bike shop owner stated that the sales of e-bikes in his shop took off in 2020, right before the pandemic (Furio, 2025). When discussing e-bike consumer demographics, industry experts shared that they see that consumers are from all age demographics, with some noting that older adults are their main consumers of the product (Sutton, 2017). With the leading consumer age range being 45 years of age and older, and many consumers in the 65 and older age range according to some experts, e-bikes may help remove barriers and increase accessibility for older adults interested in biking (Sutton, 2017). Other industry experts noted an emerging change in consumer demographics, sharing that what was previously a market dominated by older adults is rapidly changing, with more and more people of all ages benefiting from the assistance that e-bikes provide (Sutton, 2017).

In addition, there have been attempts to make e-bikes more readily accessible for all, such as incentive programs that offer discounts or rebates on e-bikes. In Berkeley for example, residents have the opportunity to enter a monthly lottery to win a rebate of up to \$1,500 to purchase a new e-bike from one of more than the two dozen shops in the county (Lee, 2025). Further insights about the demographics of e-bike riders may be revealed through a review of e-bike crash data and crash victims. One article published by University of California, San Francisco (UCSF) provides information about the median age of e-bicyclists who have been injured while riding. According to UCSF, the median age for e-bicyclists injured in crashes is 39 years old, compared to 30 years old for those injured while riding conventional bicyclists (Fernandez, 2024). In a subsequent section, this research brief explores the limitations of e-bike data collection and future considerations.

Evolution of Legislation

In 2015, California passed Assembly Bill (AB) 1096, California's first comprehensive e-bike law. This bill revised the previous definition of a motorized bike

to define e-bikes as "a bicycle with fully operable pedals and an electric motor of less than 750 watts," and adopted the PeopleForBikes three-tier system (AB 1096, 2015). It established a statewide default framework and stated that local jurisdictions are allowed to enact local ordinances to allow or restrict e-bike usage in their area, and that their requirements may differ from the statewide default (Loguidice, 2018). For example, state code prohibits people from riding e-bikes on sidewalks, unless otherwise stated by the city. While the City of Santa Barbara's Municipal Code generally does not allow for any micromobility vehicle, including traditional bikes and e-bikes, to be ridden on sidewalks, it does make exceptions for riding on sidewalks in designated areas approved by the city (City of Santa Barbara, 2025). The city code also states that e-bikes cannot block sidewalks or pedestrian paths when parked and must follow "no-parking" signs and laws, which is specific to the City of Santa Barbara and not to state code.

Since 2015, a number of e-bike bills and laws have been introduced, some promoting them, and others discouraging their use with increasing requirements needed to own or operate e-bikes. For instance, the proposed E-Bike Accountability Act (AB 1942), introduced in 2026, would require owners of Class 2 and 3 e-bikes to register with the DMV, display license plates, and require riders to possess proof of ownership matching the e-bike's serial number. The proposed bill also directs the DMV to establish a registration process for e-bikes (AB 1942, 2025). This legislation could create a barrier of entry to e-bikes for many users due to the potential additional fees and administrative tasks required in order to own and operate an e-bike. Another proposed bill, AB 875, was passed in 2025 and allows law enforcement officers to remove Class 3 e-bikes being operated by a person under 16 years of age. Jurisdictions may adopt and implement administrative charges for removing, seizing, and storing the e-bike, and agencies may require that the violator complete an e-bike safety and training program (AB 875, 2025).

The State of New Jersey requires that riders of Class 1 or 2 e-bikes be at least 15 years-old (in addition to the 16 year-old stipulation for riders of Class 3 e-bikes), and that all e-bikes must be registered with the New Jersey Motor Vehicle Commission (State of New Jersey, 2026).

Operators of any type of e-bike must have either an e-bike license or a valid driver's license. The process to obtain an e-bike license includes studying driver, e-bike, and motorized bike/moped manuals; obtaining an initial e-bike permit; paying an examination fee; passing knowledge and vision tests; making an appointment for a road test; passing the road test; and lastly, visiting a licensing center to receive the e-bike license. These processes, including the steps needed for registering an e-bike or obtaining an e-bike license, may prevent or discourage people from using e-bikes for various reasons. Some people may face barriers due to lack of time to complete these lengthy steps, the fees associated with them, potential language barriers, administrative burden or fatigue, and/or a lack of transportation options to access testing sites or licensing centers.

Other states like Oregon have focused on promoting the use of e-bikes and removing potential barriers to access for younger riders. In March 2026, the Oregon state senate passed transportation House Bill (HB) 4007, which lowered the statewide Class 1 e-bike age requirement from 16 years-old to 14 years-old. This bill allowed e-bikes to become more accessible to a wider range of teenagers, including for most high school students. Megan Ramey, Safe Routes to School Manager for the Hood River County School District, stated that the bill, "Opens up a whole world of educational opportunities for that age group" (Saslow, 2026). In addition, the bill sets speed limits for e-bikes at 28 mph and fines shops that sell e-bikes that are able to go faster. This is a measure to prevent the sale of modified e-bikes or the sale of electric motorbikes (e-motos) under the guise of being e-bikes (Saslow, 2026). The provisions aim to improve access to e-bikes and address safety concerns surrounding them,

including preventing the introduction of illegal e-motos on local streets. As the popularity of e-bikes increases, proposed laws and policies continue to emerge each year and play a key role in encouraging or discouraging mode shifts across national and state landscapes.

Decision-Making and Behaviors

With an increase in popularity of e-bikes, perceptions of e-bike safety have drastically changed, and some discussions now center around the idea that e-bikes are hazardous due to perceptions that they promote risky behaviors from riders. It is sometimes presumed that e-bike users speed, do not wear helmets, ride where they are not supposed to, and partake in other risky behaviors. These negative perceptions are exacerbated by the ability to modify e-bikes and the availability of mopeds that are sold under the pretense of being e-bikes. Other groups, like some medical professionals, view e-bikes as a public safety hazard, citing that their higher speeds and potential for severe injuries necessitate urgent action from policymakers (Maa et al., 2024).

According to one study, e-bike and e-scooter riders were more likely to be older than their conventional counterparts, and riders were more likely to participate in risky behaviors, such as riding while under the influence or riding without a helmet (Fernandez, 2024). A literature review also found that e-bike users exhibit risky behaviors depending on different scenarios, with factors like users, vehicles, roads, the environment, traffic management, and more, all impacting their behavior (Ma et al., 2019). One of the studies analyzed in the review found that, "e-bike users were more likely to run the red light than ordinary bikes," and the probability of running the light was proportional to the waiting time (Liu & Yang, 2015). One factor that was found to influence this behavior was poor weather conditions, with a finding that e-bike riders at intersections without awnings were more likely to run red lights. Another study found that 8.4% of e-bike users used mobile phones while riding (Truong et al., 2016). Distracted driving,

including talking or texting on the phone, creates enormous potential for fatal and serious crash injuries and leads to thousands of deaths every year (NHTSA, 2026). However, there is also evidence that suggests that the differences in risky behavior between e-bike riders and conventional bike riders are minimal. A study conducted by the University of Tennessee, Knoxville, found that, “among the same population of users, e-bike riders exhibit nearly identical safety behavior as regular bike riders” (Langford et al., 2015). With diverging perceptions on e-bike safety nationwide, there may be a need to further assess perceptions across various stakeholders to identify gaps in educational, safety, and infrastructure needs.



Image 1: One study found that 8.4 percent of e-bike users used mobile phones while riding. Photo source: County of Marin.

Safety Courses

In 2022, Assemblymember Tasha Boerner’s Assembly Bill 1946 was passed. It required that the California Highway Patrol (CHP) develop a statewide safety and training program and provide it as an educational resource on how to properly operate an e-bike in the state of California. The training was created in collaboration with multiple organizations, including the California Department of Public Health (CDPH), California Office of Traffic Safety (OTS), PeopleForBikes, and others. Its

purpose is to provide evidence-based practices for e-bike users, including general riding safety, emergency maneuver skills, rules of the road, and an overview of laws pertaining to e-bikes.

Another e-bike education bill was passed and signed into law in August 2026. Assemblymember Laurie Davies’ AB 1569 requires both the Department of Education and the CHP to jointly develop a statewide program for students in grades 7-12 on how to properly operate e-bikes and follow traffic laws (abc10, 2026). The bill intends to address an increasing rate of crashes and injuries in young e-bike riders through a standardized curriculum. It encourages local parent-teacher organizations to collaborate with law enforcement to hold e-bike safety demonstrations on school campuses or at community facilities. In addition, local city and county governments are also adopting their own safety courses.

In 2025, the City of Huntington Beach announced the nation’s first police-led student e-bike program, which aims to improve rider safety through education and hands-on learning. The free program, developed by the Huntington Beach Police Department, includes instruction from officers on emergency braking, obstacle navigations, reaction-time awareness, and helmet use. Guardians are required to attend with their youth to ensure that both students and guardians are engaged in the learning experience. In the program’s 70-minute in-person sessions, a controlled environment simulates real-world traffic conditions to increase confidence and skill building (City of Huntington Beach, 2026). The program was created in response to a 1,500 percent increase in youth e-bike-related hospitalizations since 2019, which led to Huntington Beach leading the county in the highest amount of “micromobility-related trauma” hospital admissions in riders under 18 years of age (Gile & Fioresi, 2025).

E-Bike Crash Reporting

Current reporting guidelines may make it difficult to keep accurate records of e-bike crash data.

Researchers from Rimkus Consulting suggest that there is a gap in the way crash data is collected, stating that “data received from the Orange County Sheriff’s Department, which provides local law enforcement services to a number of cities in Orange County, did not distinguish between an electric and a conventional bike when they were involved in an incident” (Lean et al., 2025). The records system used by the department allows for users to filter incidents by category, including a “bicycle crash” category. However, this filtering system has no furthering distinction as to whether the vehicle involved was a conventional bike or e-bike (Lean et al., 2025). Christopher Cherry and John MacArthur, from the University of Tennessee and Portland State University, respectively, explain that vehicles involved in injury crashes are difficult to classify with the types of existing databases, and are often classified as either powered two-wheelers or conventional bikes. While the narrative of the crash report has a better description of the vehicle, it is difficult to assess e-bike crash trends at a high level (Cherry & MacArthur, 2019). Other publicly available information may help to fill these knowledge gaps. Hospitals and trauma centers may help alleviate data limitations with their collection of injuries relating to e-bikes. The patient intake information collected by hospitals can help provide a better overview as to the larger picture for the potential number of e-bike and e-scooter crashes. More information is included in the discussion below.

Discussion

Crash Reporting Considerations

Based on the collective findings of this literature review and past researchers, clearer and stricter data collection rules could be established and implemented across the state to more accurately report on and reflect e-bike crashes and usage. Agrawal and Fang from San José State University (SJSU) state that police and emergency medical services (EMS) reports concerning e-bikes should be more accurate statewide. Currently, EMS in

California are not required to collect a minimum set of information when crashes occur. Only 34 local EMS agencies establish their own data collection procedures and then choose to share it voluntarily with the California EMS Information System (CEMSIS) (Agrawal & Fang, 2025). This aligns with California’s e-bike policy landscape, which leaves much of the decision-making surrounding e-bikes to local municipalities, rather than creating a statewide standardized system of policies and data collection. It is also recommended that traffic crash reporting systems should be updated to more accurately capture this data at the site of a crash. Currently, the CHP and the California Department of Technology (CDT) are working on a California Crash Data System Modernization Program to update the template of minimum information that police must collect when creating crash reports (Agrawal & Fang, 2025). This would be an opportunity to assess and address the current gaps for e-bike crash data collection and analysis.

Anecdotally, there is a noted concern across transportation safety advocates and community members who cite a need for increased awareness and education about e-bike classification and safety. There is currently no context in crash reports for determining whether a conventional bike or e-bike was involved in a crash, so it is difficult to assess where crashes are happening or crash trends. This aligns with the literature, which reveals that departments need to choose between classifying e-bikes in crashes as conventional bikes or as motor vehicles on current crash reports, resulting in a lack of clarity on e-bike crash data (Agrawal & Fang, 2025). Additionally, changes in data definitions have made it difficult to assess crashes involving e-bikes. As of 2022, the Fatal Analysis Reporting System (FARS) data definition for fatal bike crashes includes people on bicycles powered by pedals and/or motors (NHTSA, 2025). Before 2022, e-bikes were classified as motorcycles and operators were captured as motorists. With the new data definition, crashes involving only e-bikes are no longer captured in FARS data. The lack of ways to report e-bike

crashes has resulted in data limitations, lack of information, and an inability to identify trends, including locations for where crashes occur most often and demographics of victims.

Case Study: Marin County

County-maintained websites in Marin County highlight practical tips and resources for e-bike safety. Included in these resources are tips on safe speeds, proper helmet use, rules of the road, and general e-bike safety tips (County of Marin, 2026). Braking and brake maintenance guidelines and resources are provided as well. The website for the Marin County E-Bikers Club provides a summary of new e-bike laws and a place to sign the E-Bikers Club Pledge, which encourages local riders to pledge to safe riding techniques, follow local ordinances, and to stay alert and focused while riding.



Image 2: E-Bikers Club Posters promote e-bike rules in Marin County with engaging artwork featuring characters and local landmarks. Photo source: County of Marin.

E-Bikers Club Posters, which promote e-bike rules in Marin County with engaging artwork featuring characters and local landmarks, are available to download and print. The posters can be displayed in local places of gathering, such as classrooms, local business, or outreach events.

Marin County e-bike laws highlight access to multi-use paved pathways maintained by the County (County of Marin, 2025). People riding Class 1 and 2 e-bikes are allowed on pathways as long as they abide by the 15 mph speed limit imposed for all people biking. While Class 3 e-bikes are not allowed on pathways, they are allowed to be ridden in a bike lane or bike route. The advancements in e-bike legislation in Marin County set an example for what could be implemented statewide. Because they are more defined than the current state policies, they help to provide a framework for the status of e-bikes and how they can be used in Marin County. By looking at the standards established in Marin County, California has an opportunity to improve how it tracks e-bike data and potentially pave the way for better infrastructure and safety policies for everyone.

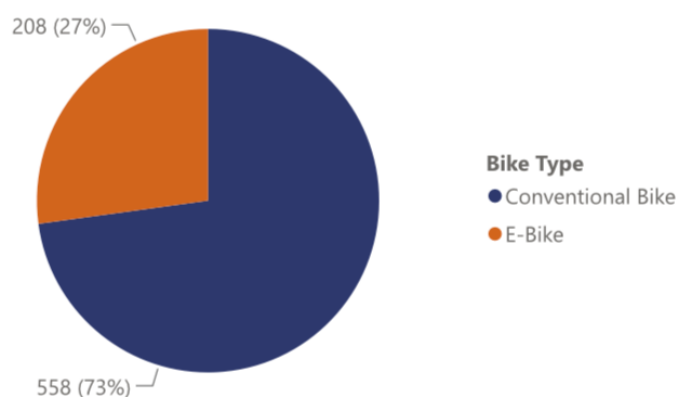


Figure 2: Bicycle Crashes in Marin County by Bike Type (Oct. 2023 to Date)

Notes: Data reflect all bicycle crashes that occurred in Marin County and were attended to by EMS. Cumulative counts and percentages Oct 2023 to date. Events may include people who are not residents of Marin County. The E-bike category includes all classes of e-bikes and e-motos.

Data source: Marin County EMS.

Because there is no standardization for e-bike crash reporting at the state level, only a small number of California counties and cities choose to collect e-bike data, and even fewer choose to share e-bike data publicly. To date, Marin County appears to have “the only public health department in California that requires EMS reports to document the involvement of an e-bike” (Agrawal & Fang, 2025). Marin County’s EMS began distinguishing e-bike related crashes from those involving conventional bikes in emergency response reports beginning in October 2023 (McLarin, et al., 2023). They have also been able to create a dashboard comparing its bike crash data, including e-bikes compared to conventional bikes. From October 2023 to July 2026, it was reported that there were 208 e-bike crashes and 558 conventional bike crashes in Marin County (Marin HHS, 2026). However, it was noted that the e-bike crash category includes both e-bikes and e-motos, as seen in the data definition in Figure 2.

Conclusion

E-bikes are an emerging topic in transportation safety and planning. Their rising popularity has raised considerations about their safety, where they can or should be ridden, and how to standardize their use statewide. Based on existing literature and research, more education and awareness is required of and for people who use e-bikes, both for riders and local jurisdictions including agencies and municipalities. Educational programs could revolve around the categorical e-bike system and e-bike safety best practices, as well as what is and is not considered an e-bike. Furthermore, the state could consider requiring that all crash reports made by emergency services and police indicate whether an e-bike was involved in a crash, following in the steps of Marin County. More research and resources are needed to continue to develop and establish a flourishing e-bike landscape in California.

About the Program

This research brief was developed as part of the CPBSP. The aim of the CPBSP is to reduce pedestrian and bicyclist fatalities and serious injuries in California. We partner with communities across California to discuss, plan, and implement safety improvements and projects. The CPBSP prioritizes working in communities that are at disproportionate risk for road traffic injuries and addressing the safety needs of people who are underserved by traditional transportation resources and planning.

For more information, visit <https://bit.ly/CPBSP> or email us at safetrec@berkeley.edu.

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