

SPR RESEARCH PROGRAM

SECOND-STAGE PROPOSAL SUMMARY

PROBLEM NUMBER AND TITLE

27-43: Analyzing Trends in Micromobility Safety to Inform ODOT's Safety Programming

PROBLEM SUMMARY

The use of electric micromobility devices, including e-bikes, e-scooters, e-unicycles, and other emerging devices, has been steadily increasing as modes of transportation in Oregon over the past several years, generating many questions about how best to integrate these devices into our transportation system. Safety concerns, as the rate of injuries sustained while riding an electric micromobility devices that necessitated an ER visit or hospitalization has significantly increased between 2021 and 2024, rising from 414 potential injuries in 2021 to 1,229 in 2024, according to Oregon Health Authority (OHA) data. These numbers probably underrepresent total crashes. ODOT's Transportation Safety Office (TSO) oversees safety education and training programs, including bicycle and motorcycle safety, but they currently do not have a clear picture of the crash data and magnitude of risk associated with e-micromobility devices given the relative nascency of the mode. Analyzing the available sources of data and developing a deeper understanding of the safety concerns of local agencies and community organizations are critical first steps. This research will help the agency and their transportation safety partners to be data driven in their development of e-micromobility safety materials, safety training programs, strategic project planning and funding investment decisions to reduce the crash and injury risk related to these devices.

ODOT OBJECTIVES

This research will help answer the following questions:

- What's the extent and magnitude of injuries? What's the rate of injury for youth compared to adults?
- Through a safe system approach, what are the primary causes or factors of crashes involving people riding e-micromobility devices?
- What types of devices are most involved in crashes?
- What are the current concerns for transportation partners and law enforcement related to e-micromobility safety and how are these concerns compared to what is seeing in the data?

BENEFITS

The findings of this important research project will help ODOT identify the core strategies to better tailor ODOT safety programming and partnerships. The results will also be used to educate policymakers, interested partners, and the public. ODOT is seeking a deeper understanding of safety issues and concerns related to the emerging field of small devices that have varying amounts of assisted power beyond human propulsion, such as e-bikes, e-scooters, and e-unicycles. While usage of these devices has emerged in the last decade—and in higher numbers in the last five years—safety research and recommendations have been slow to catch up. Analyzing the available data will help inform the development of data-driven strategies and investments within ODOT, as well as the external partners we work with.

SCHEDULE, BUDGET AND AGENCY SUPPORT

Estimated Project Length: 16 months.

Estimated Project Budget: \$70,000

ODOT Support: Heidi Manlove, Oregon Safe Routes to School Program Manager / Pedestrian and Bicycle Safety Program Manager, and Amanda Howell, Innovative Mobility Program Manager

For additional detail, please see the complete STAGE 2 RESEARCH PROBLEM STATEMENT online at:

<https://www.oregon.gov/odot/Programs/ResearchDocuments/27-43.pdf>

SPR RESEARCH PROGRAM

SECOND-STAGE PROBLEM STATEMENT

FY 2027

PROBLEM NUMBER AND TITLE

27-43: Analyzing Trends in Micromobility Safety to Inform ODOT's Safety Programming

RESEARCH PROBLEM STATEMENT

The use of electric micromobility devices, including e-bikes, e-scooters, e-unicycles, and other emerging devices, has been steadily increasing as modes of transportation in Oregon over the past several years, generating many questions about how best to integrate these devices into our transportation system. In addition, there has been a rise in the use "e-moto" devices on roadways in Oregon which are not in vehicle code. E-Motos are electric devices that look like an e-bike or a hybrid of e-bike, mini-motorcycle or dirtbike. They are either bought or augmented after purchase, with potential operating speeds in the range of 20-40+ mph and are often marketed as e-bikes but do not meet the requirements of any of the Oregon adopted classes of e-bikes (Class 1,2, and 3). Safety concerns, as the rate of injuries sustained while riding an electric micromobility devices that necessitated an ER visit or hospitalization has significantly increased between 2021 and 2024, rising from 414 potential injuries in 2021 to 1,229 in 2024, according to Oregon Health Authority (OHA) data. These numbers probably underrepresent total crashes. There have also been some tragic crashes involving youths under 16 on electric micromobility devices, even though, under current Oregon law, a person must be at least 16 to ride e-bikes, e-scooters, and other e-devices. Recognizing that current regulations have not kept pace with changes in the industry, advocacy organizations have been working with state legislators since 2023 to enact updated rules, many of which are centered on safety education efforts.

Though e-micromobility devices attract new riders and encourage more riding, there is a growing body of research on the safety of micromobility devices (Mehranfar & Jones, 2024; Sexton et al, 2023; Ghanbari, Agrawal & Fang, 2025). Safety issues described in the e-scooter literature include excessive speeds in pedestrian areas, traveling against traffic, lack of helmet use, illegal devices, underaged riding, and riding under the influence (Mehranfar & Jones, 2024). In a review of more than 200 articles, Ghanbari, Agrawal, & Fang (2025) found that e-bike safety studies do not sufficiently take into account the effects of e-bike class on crash severity. Furthermore, crash reports rarely provide information on e-bike class or enough detail about the device for researchers to be able to compare crash severity by class. Both studies contend that there is not enough data on e-micromobility usage to put into context the rising rate of crashes. In other words, the rise in crashes may be merely a result of increased popularity rather than an indication of greater risk with riding. There is little evidence about the environmental and behavioral factors that increase crash risk. Such information is needed to inform safety policy. Ghanbari, Agrawal & Fang (2025) highlight the importance of determining the major causes of e-bike injuries and fatalities in pursuing better policy.

ODOT's Transportation Safety Office (TSO) oversees safety education and training programs, including bicycle and motorcycle safety, but they currently do not have a clear picture of the crash data and magnitude of risk associated with e-micromobility devices given the relative nascency of the mode. Analyzing the available sources of data and developing a deeper understanding of the safety concerns of local agencies and community organizations are critical first steps.

This research will help the agency and their transportation safety partners to be data driven in their development of e-micromobility safety materials, safety training programs, strategic project planning and funding investment decisions to reduce the crash and injury risk related to these devices.

RESEARCH OBJECTIVES

ODOT and other partnering local agencies need information that will provide a clearer understanding of safety issues and education needs related to e-micromobility as an evolving mode of transportation in Oregon. This research will help answer the following questions:

- What's the extent and magnitude of injuries? What's the rate of injury for youth compared to adults?
- Through a safe system approach, what are the primary causes or factors of crashes involving people riding e-micromobility devices? What factors may be contributing to the severity of the injuries sustained, such as, impairment, helmet use, and single vs. double riders disregarding traffic laws and traffic control devices?
- What types of devices are most involved in crashes? (The line between an e-bike and e-moto can be blurry, so the extent to which we can better understand what types of devices people are riding when they are injured will be especially helpful.)
- What are the current concerns for transportation partners and law enforcement related to e-micromobility safety and how are these concerns compared to what is seeing in the data?

WORK TASKS, COST ESTIMATE AND DURATION

The project will consist of the following 4 phases:

- The first phase will be the understanding the of a state of micromobility of devices in Oregon with a special focus on safety concerns and risks. This phase will be comprised of the following tasks: an in-depth safety focused topical literature review, a state regulatory policy review, definitions of devices, and a description of current e-micromobility devices.
- The second phase will explore available Oregon crash and injury data. The phase will not only review crash reports to understand the causes of crashes and the types of injuries but will also highlight the data gaps and needs for better reporting.
- The third phase of the project will focus on understanding the safety concerns of various types of transportation partners such as ODOT, other local transportation agencies, law enforcement, safety advocates and other types of interested parties. This will be accomplished through a survey and a series of focus groups. The focus groups will explore questions related to concerns, challenges, and needs to ensure safe use of these devices in communities around the state.
- The fourth phase will be synthesizing findings from the first three phases and delivering a final report, accompanying infographic sheets and a Power Point Presentation that summarizes the research and findings.

Key Deliverables: The key deliverables of this research project will be a final research report with a detailed analysis of available data along with a suggested framework for annual data collection and reporting, and a qualitative analysis of the survey and focus groups outcomes. Infographic sheets and a Power Point presentation will be created to summarize the report findings to be used to present to interested parties internally and external from ODOT.

Estimated Project Length: 16 months.

Estimated Project Budget: \$70,000

EXPECTED ODOT IMPLEMENTATION ACTIONS

The findings of this important research project will develop a research report and public presentation products that will help ODOT identify the core strategies to better tailor ODOT safety programming and partnerships. The results will also be used to educate policymakers, interested partners, and the public. The research findings will help specifically guide TSO's work on the pedestrian, bicycle and motorcycle safety and vehicle equipment programs which include funding for instructor-based safety training, and public education outreach efforts such as public service announcements on billboards, radio, video streaming services, social media ads, safety videos, brochures, presentations and more. Having a better understanding of the key safety risks will help ODOT staff tailor messaging and strategic investments across ODOT divisions. Research

findings will also inform updates to the Safe Routes to School Education programming including K-12 safety training curriculum, which is overseen by TSO along with external partners.

POTENTIAL BENEFITS

ODOT is seeking a deeper understanding of safety issues and concerns related to the emerging field of small devices that have varying amounts of assisted power beyond human propulsion, such as e-bikes, e-scooters, and e-unicycles. While usage of these devices has emerged in the last decade—and in higher numbers in the last five years—safety research and recommendations have been slow to catch up. Given this, there is a lack of clear policy, rules, and safety recommendations. Analyzing the available data will help inform the development of data-driven strategies and investments within ODOT, as well as the external partners we work with. In addition to safety, the project aligns with climate and equity goals identified in the OTP. The adoption and use of e-micromobility devices support the reduction of vehicle miles traveled and single occupancy vehicle travel, as well as the transition to zero emission vehicles, which expanding affordable mobility access to key destinations. The devices are becoming more popular with youth, but there are many concerns about safety. ODOT wants to be able to maximize the benefits of these devices and support further adoption while limiting the risks as much as we can, which means having a better understanding of how we can promote safe use.

PEOPLE

ODOT champion(s): Heidi Manlove, Oregon Safe Routes to School Program Manager / Pedestrian and Bicycle Safety Program Manager, and Amanda Howell, Innovative Mobility Program Manager

Problem Statement Contributors: Heidi Manlove, Oregon Safe Routes to School Program Manager / Pedestrian and Bicycle Safety Program Manager; Amanda Howell, Innovative Mobility Program Manager; Jeff Greiner Motorcycle Safety, Program Manager; Colleen O’Hogan, Vehicle Safety Equipment Program Manager; Bridgette Bottinelli, Innovative Mobility, Program Coordinator, and John MacArthur, Sustainable Transportation Program Manager, Portland State University

REFERENCES

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STAFF REVIEW PAGE

LITERATURE CHECK

TRID&RIP

A review of TRID & RIP databases found no existing research that answers the research question

This research aims to fill a gap in the research on micromobility in Oregon so no relevant literature exists on this topic within the geography needed.

ODOT DECISION LENSES

Climate: Light weight electric vehicles are a part of ODOT's climate strategy offering mobility options with low or zero emissions. Barriers to mass adoption exist including important questions on the safety performance of micromobility which this research will help to inform.

Equity: Micromobility options offer low cost travel options presenting an opportunity for disadvantaged populations to access jobs and key services without the high cost of automobility. The transportation system is not yet prepared for widespread adoption of micromobility devices and basic questions about traffic safety need to be answered which this research will help inform.

Safety: Preliminary health data suggests an emerging traffic safety problem with micromobility devices, especially e-motorcycles. The purpose of this research project is to address an apparent traffic safety issue though a crucial element of this research aims to diagnose the magnitude of the safety issue by analyzing health related data that presents better information compared to traditional crash reports.

TECHNOLOGY & DATA ASSESSMENT

No Identified T&D output

At the end of this project, the implementing unit(s) within ODOT will need to coordinate the adoption of new technology or data in order to realize the full potential of this research.

CROSS-AGENCY IMPACTS

- List ODOT partners or impacted units. This research would work with county and city officials to which are seeking better information to share with the public and law enforcement about the safety implications of micromobility.
- Identify any issues of concern raised by an ODOT partners. Note expected mitigation that addresses these concerns.