

Micromobility Regulation Best Practices Review

September 2023 | Final Report



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Abstract

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Introduction

As rented and shared micromobility options, e-scooters are new and potentially transformative app-based modes that promise to alleviate first mile/last mile mobility issues, congestion, and more. However, their safe deployment has not yet been systematically understood or standardized by users, cities, or operators. From 2017–2021, 267,700 people were treated for injuries in emergency departments and 129 were killed in micromobility products-related crashes, the largest proportion involving e-scooters. These devices are not yet regulated as vehicles by the National Highway Transportation Safety Administration (NHTSA), and are most similar in definition to e-bikes, and so would be regulated by the Consumer Product Safety Commission (CPSC). However, they are differently defined at local levels [1], and therefore their uses are not uniformly regulated at that level. Some jurisdictions impose strict regulations across a region, regardless of density levels or urban design, while others impose no rules at all. Without further understanding what constitutes effective local regulation, safe operation of these devices may not improve. This project explores the types of regulations municipalities and regions are imposing in an effort to address the safe deployment of these micromobility options.

Background

As noted in the introduction, e-scooters are new and potentially transformative app-based modes that promise to alleviate first mile/last mile mobility issues, congestion, and more. However, safe e-scooter deployment is only beginning to be systematically understood or standardized. As of December 2019, in the U.S., 1,500 people had been injured and 8 killed in e-scooter crashes [2]. By 2021, estimated emergency room visits for e-scooter-related injuries had risen to 117,600, and fatalities to 68 (14 from dockless, rented scooters). [3] Because these modes are relatively new, there has been little comprehensive data on the reasons for crash and injury. One 2019 study cites failure to use a helmet and lack of rider experience as two likely contributing reasons for scooter-related injuries. [4] Other circumstances surrounding crashes in this and other studies include vehicle speed, rider levels of intoxication, crash location, infrastructure condition of, and suitability of infrastructure for scooter use. By 2021, motor vehicle crash and user-control issues were listed as main hazards associated with e-scooter deaths. Brake problems were also cited as an issue in incidents overall [3]. E-scooters are not defined and regulated as motor vehicles by NHTSA, and most easily fit into the CPSC definition (and thus fall under their jurisdiction) of e-bikes [1, 5]. Neither is their use uniformly regulated at the municipal level. Strict regulations are imposed across some regions, regardless of density levels or urban design; others jurisdictions impose none at all. [6] Better understanding of what comprises effective local regulation is needed to improve the safe operation of these devices. [7] This project explores the types of safety regulations municipalities have created in an effort to improve the safe deployment of these micromobility options, and examines whether users understand and follow any imposed regulations.

Research Questions

Researchers addressed the following questions in an effort to understand the relationship between e-scooter safety and e-scooter regulation.

1. What are the safety issues associated with e-scooters?
2. What are the safety issues that regulators have addressed in new or existing e-scooter safety regulations?
3. Are there state laws in place that restrict or otherwise affect a municipality's ability to regulate e-scooters?
4. What types of regulations are municipalities and regions using to address these matters? For example, do their regulations address:
 - a. Rider education and licensing?
 - b. Traffic law requirements including helmet laws, drunk driving laws, and/or geofencing for restricted areas?
 - c. Standards compliance of the e-scooters themselves?
 - d. Street and infrastructure design?
5. Were new or existing regulations communicated to e-scooter users? If so, how?
6. What experience do jurisdictions report regarding enforcement of their regulations?
7. Do regulators believe their regulations have had an effect on e-scooter safety in their jurisdiction?

Method

The research methodologies, described in detail below, include a literature review and legal and regulatory analysis. Though the original project scope was larger and included more tasks, the project suffered several COVID-19-related delays, resulting in cancelation of certain tasks.

Literature Review

The literature review was designed to identify the safety regulations that municipalities and regions have imposed on micromobility options. The review was national in scope, and the literature under review included published works and articles. Researchers anticipated that safety risks could fall into several categories, including e-scooter design/manufacture, operator knowledge and ability, effective traffic laws that are effectively communicated to the traveling public, and safe infrastructure design and maintenance. Researchers planned to identify what regulatory strategies are available to address these categories and whose responsibility it may be (a user, a municipality, or a service provider) to address and ensure compliance with those safety issues. This task also explored definitions of “safe deployment” to determine what safety goals, if any, cities are working towards.

Jurisdiction Selection

The purpose of this task was to identify examples of different regulatory approaches that jurisdictions have taken to address e-scooter safety. Researchers identified seven jurisdictions on which to focus: Los Angeles, Portland, San Francisco, Chicago, Dallas, Miami, and Bellevue (Washington). Selection was based on several sets of factors, enumerated below. These selections represent a range of

regulatory approaches. Some jurisdictions have taken a very restrictive approach, while others have been more permissive; some have been reactive and others more proactive.

Legal and Regulatory Analysis

During this task, researchers analyzed the regulations of each chosen jurisdiction, identifying and categorizing the components of each set of regulations to create a typology of regulatory terms and approaches. Researchers analyzed these regulations to identify how safety has been addressed in each specific jurisdiction and where regulators have delegated responsibility for safe operation. Researchers also examined the efforts of each jurisdiction to inform citizens of new or existing e-scooter laws. In some jurisdictions, vendors inform users of relevant e-scooter traffic safety laws in-app. In other jurisdictions, users may be expected to know the law without any targeted efforts to inform them. Where relevant, researchers examined the terms of the permits issued to service providers, the terms of use that users agree to, and what levels of design immunity the jurisdiction is afforded in its local or state laws.

Results

See [Appendix A](#) for the detailed results of the initial literature review and recent safety data reports.

The term micromobility was first used in 2016 to describe the wide and growing array of personal mobility devices that include bicycles, electric bikes, skates, self-balancing vehicles, kick scooters and electric scooters, among others [7]. Since 2016, use of micromobility products has increased dramatically in parallel with advancements in battery technology and the rapid rise of commercial shared mobility services (e.g., ride hailing, car sharing, and public station-based bikeshare systems). While this surge in micromobility use promises to solve many transportation issues, such as first and last mile gaps in transit systems, congestion from single-occupancy vehicles, and air pollution from carbon-based fuel emissions, it has surprised many urban transportation agencies who had neither assessed the safety risks of these devices nor developed deployment plans to integrate them into their various ecosystems or regulations [8]. Municipalities typically implement new mobility options through the planning, procurement, and/or right-of-way/public space permitting processes. However, many micromobility options materialized overnight, deposited on public rights-of-way around cities by private operators without prior notice. This created safety and regulatory issues that put users and municipalities at risk. At the same time, it left cities with little time to develop meaningful goals, policies, and regulations for these programs to smoothly integrate the devices into their specific communities. One reporter described this as the “Scoot first/Regulate later” approach [9].

The findings of the literature review performed for this research project document the most pressing micromobility safety issues and the types of regulations that can be used to address those issues. This report focuses on shared-use models where the fleet is maintained by an operator and accessed by users who pay a fee at the beginning of a trip [10].

Literature Review

While at the start of this project in 2020, safety data had been unreliably and scarcely reported, by the close of 2022 several reports were published that provided useful information. Therefore, unlike the

initial literature review performed for this report, the recent safety data findings below summarize injury and fatality findings primarily from the newly available reports. These reports include U.S. CPSC’s 2022 report on *Micromobility Products – Related Deaths, Injuries, and Hazard Patterns: 2017-2022* [3]; *E-Scooter Safety: Issues and Solutions*, published in 2022 by the Behavioral Traffic Safety Cooperative Research Program (BTSCRCP)/National Academies of Sciences, Engineering, and Medicine [11]; and from the Insurance Institute for Highway Safety (IIHS), *Severity of e-Scooter Rider Injuries Associated with Trip Characteristics* (Feb. 2021) [12].

Injuries

The U.S. CPSC’s 2022 report summarizes the injuries, deaths, and hazards associated with the use of micromobility products based on data from the CPSC epidemiological databases from 2017 through 2021. Devices covered in their data were e-scooters, hoverboards, and e-bikes. The report estimates that U.S. emergency departments (EDs) treated 267,700 injuries related to micromobility products from 2017 to 2021, rising 127% from 34,000 ED visits in 2017 to 77,200 ED visits in 2021. Of these ED visits, the largest share was from e-scooter-related incidents, with 117,600 injuries treated from 2017 through 2021. From 2020 to 2021, ED-treated injuries from e-scooters increased by 66%.

The CPSC found that most of these micromobility-related injuries were attributable to unspecified falls with other notable hazards leading to injuries, including loss of control, collisions with vehicles, and pavement issues. Findings from a 2019 study provide further insights into the causes of micromobility-related injuries, citing failure to use a helmet and lack of rider experience as two likely contributing factors [4]. Other contributing circumstances in older studies (preceding the 2022 CPSC study) included vehicle speed; rider intoxication; condition of infrastructure and suitability of infrastructure for scooter use [4]; collisions with pedestrians, bicyclists, or another scooter; swerving, stopping, or jumping off the scooter to avoid a collision; being “doored” by a vehicle; falling off the device due to road hazards (e.g., potholes or uneven pavement); and falling off the vehicle due to defective or malfunctioning devices [13].

The 2022 BTSCRCP study found that the literature reports a large proportion of e-scooter injuries result from single-vehicle crashes and falling off on roadways, sidewalks, and bike lanes. Infrastructure (roadway and sidewalk) surface conditions were commonly cited as crash factors. Hardware failure or malfunction was found to be an additional contributor to e-scooter-related injuries, as was rider inexperience. E-scooter crashes with pedestrians made up a small percentage of incidents and may be attributed to conflicts created by sidewalk riding or the lack of safe alternatives to e-scooter travel [11].

Finally, the literature is consistent regarding the most common types of micromobility-related injuries—lower extremity and head injuries were more common among e-scooter riders than among cyclists. This is likely due to the finding that e-scooter riders are less likely to wear helmets.

Fatalities

The 2022 CPSC study found a total of 129 fatalities associated with micromobility devices from 2017 to 2021. Fatalities involving e-scooters made up 53% of this figure, with most occurring in the last 3 years of the analysis (2019–2021). Of the 129 micromobility-related fatalities, 103 (80%) were male and 79 (61%) were in the 18–59 age group. The leading cause of death associated with micromobility products were crashes with motor vehicles, making up 78 (or 60%) of all fatalities. Of the 68 fatalities

associated with e-scooters, 49 (72%) were due to motor vehicle crashes. Nine fatalities were due to user-control issues that led to crashing into fixed objects/trees, colliding with other riders, striking road curbs, and/or getting thrown into oncoming traffic. Two fatalities were associated with e-scooter-related fires started while charging. Two fatalities resulted from pedestrians who were struck by e-scooter riders. One fatality was associated with intoxication, and another involved a crash with a commuter train [3]. The 2022 CPSC report linked product-related hazards with 48 of the 68 fatalities associated with e-scooters. These hazards included brake problems, fire hazards while charging, and unexpected power loss causing riders to tip over or get thrown off.

Helmet Use

The 2022 BTSCRIP study found that helmet usage was consistently low across the studies it examined. This may be due to the lack of advanced planning for many scooter trips and the fact that many riders do not own helmets. A survey of Portland e-scooter riders reported that 20% usually or always wear a helmet, and only 10% sometimes wear a helmet. A similar survey of Baltimore e-scooter riders found that 80% do not wear a helmet. During the e-scooter pilot program in Santa Monica (California), 61% of citations were given to people under age 16 who were not wearing a helmet.

These statistics suggest a correlation between regulation and injury, raising questions about whether some of these injuries and fatalities might be avoided if the circumstances and conditions that caused them were more strictly regulated. For example, would helmet requirements reduce head injuries? Would enforced product safety standards prevent death and injuries from product defects? Would restrictions on where scooters are allowed help riders avoid crashes with other vehicles? The next section examines how legal responsibility for these and other activities is distributed among users, operators and governing bodies, and how consistent that distribution is.

Federal, State, and Local Roles in Regulating Micromobility Safety

Federal

Micromobility devices are not considered motor vehicles subject to NHTSA regulatory requirements. Rather they most closely resemble “low-speed electric bicycles,” which are regulated by the CPSC and must meet product and safety standards [14]. However, to date, the CPSC has not released any mandatory or voluntary safety standards or guidelines that states and municipalities can refer to when determining the types of e-scooter devices to allow in their communities.

State

While there is no clear guidance at the federal level to clarify safety standards and provide legal conformity, state laws relating to micromobility are at best inconsistent and, more often, nonexistent. Some state codes present problems for local regulation of micromobility devices by creating a conflict within the very statute intended to regulate the devices or a conflict with local laws or regulations [11].

Generally, state traffic laws and vehicle codes govern the operation of micromobility devices on streets, trails, and bikeways within a state. This is typically done by authorizing local governments to regulate the devices through permits that allow them on the public right-of-way (ROW) within their jurisdiction. Local governments may also have the authority to differentiate among the types of available devices and establish definitions for devices. Some states give explicit authority to local governments to

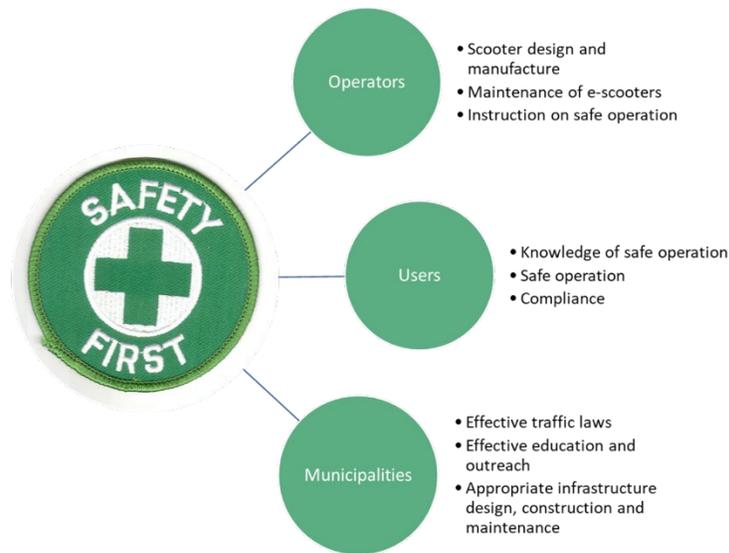
regulate micromobility operations, shared systems, or both. Others, such as Colorado, have had to reclassify micromobility devices statutorily from one type of product (toy) to another (vehicle) in order to subject them to state local vehicle codes [15].

Local

In the literature on micromobility regulation, local governments and their agencies are identified as directly responsible for ensuring the safety of shared micromobility program users because, unlike federal or state governments, they generally have jurisdiction over management of the public ROW within their geographic boundaries where micromobility devices are used. Local governments, in the form of counties and municipalities, are generally provided authority under state law for regulating the use of micromobility devices and, in most cases, own and manage the infrastructure where the devices are used, parked, and accessed. In these cases, municipalities and operators reach agreements on the terms of deployment before e-scooters are placed within public ROW in an area. This can be accomplished through a ROW permitting scheme or as part of a pilot or demonstration program [16].

Permitting is an existing regulatory process that allows cities to set standards for micromobility equipment, including model features (e.g., motor wattage, maximum speed, maximum weight, battery limits) and safety equipment (e.g., lights and reflectors, acoustic devices, and identification plates). Permits can also be revoked and renewed fairly easily by cities. Typically, local governments require private shared micromobility companies to obtain a license or an administrative permit for use of the public ROW in the same way utility companies acquire permits to build and maintain utility infrastructure in the ROW.

Two other parties are identified in the literature as responsible for ensuring the safety of micromobility riders together with local governments: (1) *Operators*, or businesses that have deployed e-scooters in a region; and (2) *Users*, or customers who have paid to use e-scooters. Figure 1 illustrates the relationships between these three parties with regard to safe operation of micromobility devices, and e-scooters in particular.



Source: TTI

Figure 1. Relationship to safety between operators, users and municipalities.

Though the parties may share responsibilities for safe operations of e-scooters, each party has separate functions and responsibilities over safety issues. For example, operators are generally responsible for providing safe devices; road users are responsible for safe device operation and compliance with traffic laws; and municipalities must develop effective traffic regulations, communicate those regulations to road users, and provide safe and appropriate infrastructure upon which they allow e-scooters to travel.

Cities and operators tend to anticipate most of these responsibilities, and express their agreements regarding such in legal agreements. Municipalities and operators agree to these responsibilities through right-of-way/public space permits, pilot program agreements, or Memoranda of Understanding. Users agree to some of their responsibilities in the Terms of Use between users and operators.

E-Scooter Equipment Safety

Equipment Design and Manufacture

Equipment safety issues are considerations of e-scooter design and manufacture. Because the federal government has not regulated e-scooter design and manufacturing, cities must consider what vehicle standards operators are required to adhere to. Although many operators purchase their e-scooters from the same Chinese company, Xiaomi/Ninebot/Segway, the scooters have different design specifications, including wattage, maximum speed, mile range, lock-to technology (a mechanism designed to secure parked devices to bicycle racks, signposts or other infrastructure), handlebar adjustment, gyroscope sensor (to sense and maintain direction), and accelerometer sensor (to measure acceleration).

Efforts to classify micromobility devices are predicated on vehicle characteristics. SAE International published the J3194™ Standard, defining micromobility equipment as a category that can be classified according to four main criteria [7]:

- Vehicle weight of up to 500 lbs.
- Vehicle width of up to 5 feet
- Top speed of 30 mph
- Power source by electric motor or combustion engine

Other safety equipment for e-scooters includes front lights, GPS, and identification stickers. In light of the variety of available e-scooter safety features, municipalities have taken it upon themselves to require mandatory equipment, such as lock-to mechanisms in the District of Columbia and Chicago. Other safety equipment categories for e-scooters that could or should be considered for regulation falls into the following categories. Further detailed descriptions are provided in [Appendix A](#).

- Vehicle stability
- Braking
- Turn indicators and handlebars
- Weight
- Batteries
- Seats
- Visibility
- Acoustic alerting devices
- Identification plates

Equipment Maintenance

E-scooters are susceptible to rapid deterioration due to heavy use, weather conditions, and vandalism. Regular maintenance and inspection are important responsibilities of operators. To assist with maintenance, some operators allow users to communicate issues via the app that is used to access the vehicle. Users can report maintenance issues before, during or after their ride. In fact, some operators prompt users to enter this information.

Existing Policies and Practices Related to Equipment

Under public ROW permitting structures, cities can mandate maintenance and inspection schedules and record-keeping requirements. For example, Seattle’s monthly maintenance record requirements mandate that operators send them service histories, information on product recalls, user reports of unsafe or damaged vehicles, and tallies of vehicles taken out of service for repair. Cities can also adopt permitting terms that call for

- e-scooter replacement after normal wear and tear and in the case of vandalism or other atypical events,
- random inspections by city staff,
- submission of maintenance and inspection reports on a certain schedule, and
- removal of damaged equipment under certain time requirements.

Operators are advised, in the literature, to pay special attention to maintenance of equipment before and after special events that may attract many first-time users. Likewise, operators should develop plans for emergency management of the fleet due to severe weather [16].

Without specific vehicle standards, cities are advised to consider creating minimum equipment safety standards and/or require accreditation of equipment by a national organization. Additionally, cities may want to consider requiring vehicles to be certified to operate under an applicable standard by the Underwriters Laboratories or an equivalent safety rating agency [16].

Regulating Micromobility Safety

Safety issues surrounding the safe operation and regulation of e-scooters can be addressed by cities through regulation of who can ride e-scooters, and how and where they can be ridden. This encompasses regulations such as age limits, license requirements, helmet requirements, and traffic and parking requirements. Cities regulate users through local ordinances, though some issues such as operating while intoxicated, may already fall under existing state laws. For example, in Texas, the law

pertaining to driving while intoxicated (DWI) uses a broad definition of motorized vehicles and encompasses drunk scooting.

Age Limit/License Requirement

Some cities have enacted minimum age limits for e-scooter use while others require a valid driver's license for operation or have both an age and license requirement. Requiring users to have a valid driver's license presumes users have a basic understanding of the rules of the road, but licensure may not include knowledge of safe e-scooter operation. Age limits and license requirements can also discourage use of e-scooters as an alternative to driving. Some cities and states that require users to be a certain age also have an exception for circumstances where a parent/guardian supervises the user. This can make enforcement murky, as police must first determine whether the user is underage. If so, they must next decide whether they believe a parent/guardian is present. Operators also face enforcement difficulties, as they have little means of checking the presence of a parent/guardian, other than requiring users to submit a picture of a valid driver's license before an e-scooter can be rented.

Helmet Requirements

While helmets are known to protect riders from injuries, the 2022 BTSCRIP study found that helmet usage was consistently low across existing studies. E-scooters are often used without advanced planning for the majority of trips, which lowers the likelihood of helmet use. State-level helmet laws vary widely across the country. Most states require helmets for human-powered bicycles under a certain age, while others have helmet requirements based on age specifically for e-bike or e-scooter riders, or have no laws for general helmet use. Local laws also have helmet requirements, especially for younger riders. Helmet laws may not be the most effective approach to usage, however. There is little evidence that helmet laws increase actual helmet use. Furthermore studies have indicated that helmet laws can be enforced in a discriminatory manner. Thus, other, less punitive approaches to encourage helmet wearing may be more effective than mandates, citations, and criminal liability. This includes safety messaging and requiring e-scooter service providers to give away helmets as a component of public education and engagement [11].

Traffic and Parking Laws

Without traffic and parking requirements for e-scooters, the devices often end up concentrated in major transit hubs, creating urban clutter on bicycle lanes and sidewalks. To mitigate risk of dockless bikes and scooters blocking and obstructing sidewalks, often causing trip hazards or obstructions for other cycle lane and sidewalk users, some micromobility programs require e-scooters to be parked outside of the pedestrian zone (e.g., sidewalk) in the furniture zone where signs, trees, benches, etc. are located. Existing literature recommends repurposing on- and off-street vehicle parking and establishing parking maximums for vehicles to make more space for e-scooter parking [11]. A simple approach has been to enact lock-to policies designed to reduce improper parking of micromobility devices, which are required to be locked to a fixed object (e.g., bike racks) to maintain an unobstructed walkway [1].

In 2021, the IIHS found that policies vary widely among cities regarding allowing e-scooters on roads, sidewalks, bike lanes, and multiuse trails, and no research evidence is available to guide these decisions [12]. In the absence of such evidence, many state and local laws ban the use of e-scooters on sidewalks, treating them differently than other micromobility modes. For example, Texas law allows e-scooters

to operate on bike paths, sidewalks, and streets or highways with a speed limit of 35 mph or less. However, a local government can prohibit sidewalk riding under its laws. E-bikes, on the other hand, are generally allowed on all streets and bike paths unless otherwise posted in Texas [1].

Non-Regulatory Measures to Promote Micromobility Safety

The safety of e-scooter riders can also be addressed by states and local governments through non-regulatory measures. This encompasses designing and installing infrastructure that incentivize safe, compliant e-scooter operations and parking, as well as public outreach and education to riders and drivers.

Infrastructure Design and Condition

The 2022 BTSCRCP study notes that the literature points to infrastructure-related concerns as a barrier to e-scooter usage. Studies show that e-scooter users and industry consistently request bicycle infrastructure or low-speed and low-volume streets for safe on-street e-scooter riding. This is consistent with e-scooter users' preference to ride in bicycle lanes and with concerns from pedestrians that e-scooter not be ridden on sidewalks. Thus, roadway design and pavement condition are important non-regulatory measures for cities to consider. [11]

To address street and sidewalk clutter of unused e-scooters, jurisdictions have experimented with third-party parking and charging infrastructure “hubs,” on-street parking zones, on-street or sidewalk parking signage, geofence technology to prevent parking in certain locations, and rider photo verification of parking. Local regulators have also allocated dedicated parking areas for e-scooters or installed parking corrals, widened sidewalks, and established no-scooter zones to ensure that transit station access points and pedestrian pathways are cleared, which has proven important for ensuring unobstructed access for the disabled [17].

Outreach

Among non-regulatory safety measures local governments take to promote micromobility safety, commonly reported practices include outreach and public engagement. This includes informational safety messaging, partnering with operators to deliver messages, and hosting community events.

Outreach and public engagement of micromobility safety messages is generally conducted by the public agency and the private operator. Few, however, have studied the reach, equity impacts, or general effectiveness of these efforts. Most local governments require operators to post rules on shared micromobility devices and share information on regulations with users through their smartphone app. Some cities emphasize in-person training events as a key component of their outreach and engagement efforts, including educating law enforcement officers. Very little to none of the available literature provides insights into providing mapped safe routes for e-scooter riding; reinforcing positive riding behavior; promoting a safety culture; messaging to increase driver awareness of e-scooter users; equity-based messaging that considers the socio-economic, cultural, and language differences of disadvantaged or minority populations; or using technology to improve communications to riders (e.g., through text messages and auditory and haptic cues) [11].

Government Liability

Because micromobility-related injuries and fatalities have occurred and will remain a problem, public agencies should consider the issue of how liability is assigned in cases of accidents involving shared micromobility devices. State and local transportation agencies are generally responsible for notifying the public of and repairing roadways with defects (e.g., potholes), so these agencies may be potentially liable if they fail to remedy a known hazard.

The duty of care and legal responsibilities among parties involved in shared micromobility programs are not clear at this time, so the literature advises governments to explore the roles of government agencies, e-scooter manufacturers, shared mobility providers, and individual riders in order to install mechanisms—including insurance, indemnity, and liability waivers—that can ensure that liability claims for micromobility-related accidents are managed fairly, equitably, and in a timely manner [17].

Insurance

E-scooter riders are typically not insured for injuries and damages they may cause to people and property. While their health insurance could cover their own injuries from a crash, their auto insurance policies will likely not cover injuries to others involved in the crash because they exclude micromobility devices as not within the definition of a covered vehicle within the policy. In addition, standard rental agreements for shared micromobility operators do not provide insurance coverage. They may be silent on insurance or simply inform users that their auto insurance policies may not provide coverage for accidents involving or damage to the scooter. Thus, the literature advises local governments considering deployment of shared micromobility in their jurisdictions to explore insurance requirements that may be appropriate for use of the public ROW by micromobility users.

Because mandating that micromobility carry insurance could make micromobility an infeasible, cost-prohibitive option, many cities (e.g., San Francisco and Santa Monica, California) require shared micromobility operators operating under pilot programs or permits to carry insurance with general liability and premises and operations coverage for injuries to persons and/or damages to property caused by their users [1].

Indemnity and Liability Waivers

Rental agreements for shared micromobility operators typically deal with liability by including language that limits or releases the city where the scooter is operated from any liability to the fullest extent permitted by law. Such rental agreements often limit riders' legal rights and remedies by including provisions that affirm the rider's assumption of the risk of riding the vehicle, waive or limit liability, and agree to binding arbitration. The rental agreements also generally require the rider to fully release, indemnify, and hold harmless the micromobility operator, the technology company that provides the app, and, to the extent permitted by law, any municipality in which the rider operates the device, from liability for all claims except for those based on gross negligence or willful misconduct. In the same way, local government contracts with shared micromobility providers typically require the companies to indemnify the city [1]. This could reduce the likelihood of a successful personal injury claim against the government, along with other legal tools available to some state and local agencies, including governmental or sovereign immunity, which generally limits the liability of governmental entities to personal injury and property damage caused by the negligence of a government employee

or defect in government property, and caps on damages, both of which exist for governmental entities in Texas, but not in California.

Generally, liability waivers will only shield against injuries proximately caused by the ordinary negligence of the e-scooter user (i.e., their failure to act as a reasonably prudent person). In many states, however, liability waivers do not apply to gross negligence, recklessness, intentional torts, or illegal acts, which presents a higher bar for personal injury lawsuits than ordinary negligence. For example, in Texas, pre-accident waivers of gross negligence, defined as “conduct that poses an extreme risk of harm to others and an actor that proceeds with conscious indifference to the rights, safety, or welfare of others,” have been held by the courts as against public policy and are thus void [18].

A pedestrian could seek damages from a shared micromobility operator for injuries caused by their e-scooter because the pedestrian is not party to the rental agreement. However, rental agreements typically indemnify the operator and limit their liability. So, although the e-scooter user may be legally responsible for injuries or property damage, they are unlikely to be a source of actual recovery of damages due to a lack of insurance. This results in a policy problem (i.e., how can the pedestrian recover for the costs of injury damages) that has yet to be addressed.

Jurisdiction Selection

See [Appendix B](#) for a detailed description of the attributes and prioritization processes.

The study team had a large number of potential municipalities to review in further detail, which resulted in the development of a process to prioritize seven (7) municipalities that would be the focus of a review of regulations and policies. Shared micromobility programs are located throughout urban areas in the U.S. with varying levels of ridership, fleet size, regulatory restrictions, available data, and maturity. While most station-based bike share trips are concentrated in a small number of cities (the San Francisco Bay Area, Greater Boston, Chicago, Honolulu, New York City, and the Washington, D.C. Metropolitan Area), ridership is more widely distributed among e-scooter share systems [19].

Based on reports from the literature review of specific municipalities that are addressing and incorporating scooters into their transportation ecosystems, the study team created a list of municipalities that would be the focus of a review of regulations and policies. The team then developed selection criteria based on attributes that surfaced in the literature characterizing the programmatic and regulatory approaches cities were taking in incorporating scooters. For each attribute there is a range of statuses, listed as sub-attributes in bullets beneath each. The goal was to select cities such that between all of the municipalities, all of the sub-attributes would be represented.

The final list of cities that were selected for further analysis include:

- Los Angeles, CA
- Chicago, IL
- Dallas, TX
- Bellevue, WA
- San Francisco, CA
- Portland, OR
- Miami, FL

Legal and Regulatory Analysis

See [Appendix C](#) for detailed descriptions of the state statutes, local ordinances and regulation examined for this project.

This section provides a summary of state and local regulations, as well as other policies (e.g., permit conditions) from each of the seven chosen jurisdictions. The components of each set of regulations were identified and categorized to create a typology of regulatory terms and approaches.

State Statutes

Below is a summary of state laws governing micromobility in California, Illinois, Oregon, Texas, Florida, and Washington. The information provided in Table 4, located in Appendix C, shows the diverse range of detail and scope included in certain state's laws with some providing more comprehensive definitions, delegation of authority, and requirements related to parking, riding, speed limits, age, valid driver's license, helmet use, restricted areas, and insurance, while others are relatively sparse. The following is a high-level overview of that information.

- **Definitions** – All but Illinois and Texas define micromobility devices in state statutes, with California, Oregon, and Florida law defining e-scooters.
- **Delegation of Authority** – Only California and Florida state statutes provide authority for local governments to adopt their own ordinances to regulate micromobility programs. This may be due to the different powers vested in local governments under the varying state constitutions, and the jurisdiction local governments in those states have over streets, roads, and highways within their borders.
- **Traffic/Parking Laws, Speed Limits** – All but Illinois and Washington state statutes provide traffic and parking laws that micromobility users and operators must adhere to. Some (California and Oregon) restrict the speed limit of e-scooters to 15 mph, while another sets the limit at 35 mph (Texas). One state requires e-scooters to yield to pedestrians and prohibits carrying passengers or freight (Oregon) and another grants the same rights to e-scooter users under the law that it provides to bicyclists (Florida).
- **Helmet, Age, License, and other Safety Requirements** – Only California and Oregon require helmets while operating e-scooters. California and Oregon law includes age limits, while Texas law expressly allows micromobility use without a driver's license. California law also includes lighting requirements, noise limits, and motor disengagement requirements.
- **Restricted Areas** – Half of the states (California, Oregon, and Texas) provide prohibitions on where micromobility devices can be operated. Texas and Oregon prohibit riding e-scooters on sidewalks. California prohibits e-scooters from blocking sidewalks when parked and restricts local governments from banning them from bike paths, trails, and bikeways.
- **Liability** – Only California provides state statutes that impose liability insurance requirements for providers of micromobility services.

Local Ordinances and Regulations

Table 5 through Table 16 (located in Appendix C) provide a summary of local laws, rules, regulations, and other official policies governing micromobility in the cities of Los Angeles, San Francisco, Chicago, Portland, Dallas, Miami, and Bellevue. The information provided in the tables shows the

diverse range of scope and local authority for regulating micromobility, which can be found in the following sources:

- **Los Angeles** – The Los Angeles Municipal Code outlines definitions and permitting authority for the city’s department of transportation to make further rules for motorized scooters (rather than specifying them within the Municipal Code). The Code also names locations and types of places where scooters are not allowed to operate and provides information on fees and violation processes for scooter companies. In addition to local law, further scooter regulations fall outside of local ordinances and within the Los Angeles Department of Transportation’s (LADOT) On-Demand Mobility Rules and Guidelines that were promulgated in 2021.
- **San Francisco** – Article 900 of Division II of the San Francisco Transportation Code provides definitions and permitting authority for the San Francisco Municipal Transportation Agency (SFMTA). The provisions in Article 900 encompass permitting for temporary obstructions to traffic, temporary exclusive use of parking meters, the residential parking permit program, contractors, vanpool parking, bicycle racks, on-street shared vehicle parking, press vehicles, food trucks, commuter shuttles, and micromobility programs. This includes stationless bicycle sharing, shared electric mopeds, and powered scooter sharing programs. The Code defines the fee schedule, permit requirements, application requirements, permit privileges, permit issuance and revocation procedures, citations and due process, and interagency coordination. In addition to local law, further micromobility guidelines were promulgated in 2021.
- **Chicago** – The Municipal Code of Chicago has a chapter specifically focused on scooter sharing within its overall title for Vehicles, Traffic, and Rail Transportation. This chapter describes relevant definitions, licensing and processes, insurance requirements, vehicles standards, number of vehicles allowed, data sharing, and violations and enforcement.
- **Portland** – Administrative Rule TRN-15.01 establishes the Portland Bureau of Transportation’s (PBOT’s) Shared Electric Scooter policy, regulations, and permit requirements. Revisions to the Rule are currently under consideration.
- **Dallas** – The first proposed Director Rules were presented on October 7, 2020. In fall 2021, a Micromobility Working Group was formed to identify areas of the Shared Dockless Vehicle Program for improvement, which was followed by changes to dockless vehicle regulations in the Dallas City Code approved by the City Council on June 22, 2022. New Program Rules were adopted and went into effect on August 1, 2022. Sec. 28.41.1.1 of the Dallas City Code contains regulations on riding and parking electric and motor-assisted scooters and bicycles. Chapter 43, Article X of the City Code contains regulations on shared dockless vehicle operators. The Program Rules govern the shared dockless vehicle operating permit.
- **Miami** – Chapter 8 of the City of Miami’s Code of Ordinances governs bicycles, skateboards, scooters, and “other similar devices”. Section 8-8 provides the policy statement and purpose for Chapter 8, expressing that it is “supplemental to the general laws of the State of Florida, including F.S. ch. 316” and incorporates “all definitions from F.S. §§ 316.003 and 316.2128...including the definitions of ‘bicycle’ and ‘motorized scooter.’”

The intent of the law is “to govern the operation of motorized scooters and motorized scooter services within the city to ensure that they are consistent with the safety and well-being of all bicyclists, pedestrians, and other users of the public rights-of-way.” Section 8-8 further provides that the pilot program “shall apply to the area of the city within city commission district 2” and not in any other area of the city. The Code currently provides a sunset for the pilot program to automatically terminate on January 1, 2020, but allows for extensions of the pilot by Commission resolution. Resolutions have been passed by the Commission to continue to extend the pilot through the date of this report.

- **Bellevue** – The City of Bellevue City Code 11.48.210 Section B 1 provides regulations and restrictions upon the use of motorized foot scooters within the city limits in addition to those imposed under state law.

Definitions

As shown in Table 5, each of the seven jurisdictions defines micromobility devices and service providers that they permit or license in their shared micromobility programs. Interestingly, the City of Bellevue’s local ordinances include a definition for e-scooters even though their micromobility program does not include them.

The definitions for scooters and bicycles in shared mobility programs are generally consistent with state statutory definitions where they are available. Some elaborate on the state statutory definition. For example, the City of Miami’s local ordinances definition of “motorized scooter” is the same as defined in state statute, but goes further, providing that it is a device with an electric motor, designed to transport only one person, exclusively or in combination with the application of human power, which cannot attain a speed of more than 15 mph in bike lanes or streets without the application of human power on a level surface; or more than 7 mph on any sidewalk, baywalk, or in parks.

Permitting, Licensing, and Caps

As shown in Table 6, local laws in the seven jurisdictions authorize a city agent or agency to carry out a permitting program for shared micromobility, enabling promulgation of regulations and permit guidelines by the agent or agency. The local ordinances also require operators to obtain a permit before deploying devices in the public ROW and provide the city agent or agency authority to suspend or revoke permits for violating the law. Some specify the permit term (e.g., Chicago) and caps on permitted fleet size of micromobility devices (e.g., Miami and Chicago).

The laws vary in the degree to which they prescribe the criteria by which permit applications are reviewed, with the most prescriptive provisions in San Francisco and Chicago. In the latter, applications must be reviewed based on a set of scoring criteria, which include safety criteria, that are outlined in the Municipal Code. Only Miami’s local laws govern a pilot program.

Fees

As shown in Table 7, all jurisdictions require an initial permit application fee, as well as a permit renewal fee. The fee varies from a low of \$500 in Dallas to a high of \$50,000 in Miami. Other fees are also imposed, including per-trip or per-device fees, which, for the most part, are intended to be used to cover maintenance, enforcement, or other costs associated with relocating or removing devices blocking the ROW or installing infrastructure improvements.

Insurance

As shown in Table 8, all jurisdictions require that operators prove that they carry commercial general liability insurance when they apply for a permit. Most also require worker’s compensation liability insurance, auto insurance, an umbrella policy, and/or employer’s liability insurance. Only Dallas requires cyber/technology network liability and risk insurance.

Some, but not all, jurisdictions require that permittees hold a performance bond or otherwise pay for repair of public property damaged by vehicles or costs incurred in addressing violations of permit conditions, including removing and storing improperly parked devices (e.g., Bellevue, Los Angeles, Dallas, Chicago). Others require that operators agree to indemnify the city for claims related to the permittee’s operations (e.g., San Francisco, Chicago, Portland).

Vehicle Requirements

As shown in Table 9, all seven jurisdictions require vehicles to be outfitted with some degree of hardware. Most (Los Angeles, San Francisco, Chicago, Portland, and Dallas) require a visible unique identification number, as well as visible contact information for the public to call to report device or safety issues. Three (Los Angeles, Chicago, Dallas) require lighting and only one (Miami) requires a noise-making device to notify other roadway users of their presence.

Technical Requirements

As shown in Table 10, technical requirements for shared micromobility devices vary between the jurisdictions. Three (San Francisco, Dallas, and Bellevue) require the vehicles to be GPS-equipped to provide real-time location data to the city. Three others (Los Angeles, Portland, Miami) require that they be designed to not exceed 15 mph. San Francisco, Chicago, and Bellevue also require technology that allows for photo validation, geofencing, sidewalk riding detection, “slow and no ride zone” detection, and notification.

Customer Education

As shown in Table 11, all jurisdictions except Dallas include customer education requirements in their local ordinances and regulations. These education requirements generally entail informing customers of safe operating and parking operations, as well as state and local laws related to riding on sidewalks or other prohibited areas, yielding to pedestrians, and helmet use. In their applications for Los Angeles and San Francisco’s micromobility programs, permittees are required to submit plans describing their anticipated education efforts. Miami goes so far as to require that every motorized scooter user pass a motorized scooter safety education training provided by the operator.

Violations

As shown in Table 12, laws in each of the seven jurisdictions define operator and user actions that constitute a violation and the agency responsible for enforcing the law. In all the jurisdictions, the city agent or agency responsible for carrying out the micromobility program has the power to fine, suspend, or revoke permits as penalties for violating local rules or permit conditions.

Banned Areas

As shown in Table 13, all jurisdictions except for San Francisco ban micromobility devices in certain areas. Most local laws prohibit sidewalk riding (Chicago, Portland, Dallas, Bellevue). Miami's local laws limit e-scooters to one City Commission District.

Operation and Parking

As shown in Table 14, all seven jurisdictions include extensive operating and parking restrictions and permissions in their local codes, regulations, and documented policies. This is not surprising given the volume of complaints cities have had to deal with related to devices blocking the public ROW and unsafe riding behavior. Los Angeles, Chicago, and San Francisco's rules require operators to remedy violations within a specific timeframe after notification. Miami and Bellevue require the companies to provide contact information for local personnel who can respond to and remedy complaints.

Equity and Opportunity Zones

As shown in Table 15, all but two of the cities (Chicago and Miami) include equity requirements as a condition of their shared micromobility permits. Los Angeles, San Francisco, and Dallas have established certain geographic areas as Equity-Focus Mobility Development Districts, Communities of Concern, and Equity Opportunity Zones, respectively, where a certain portion of a provider's fleet must be deployed.

Data Requirements

As shown in Table 16, all seven jurisdictions require permittees to submit data in compliance with the city's Mobility Data Specification (MDS). While the regularity with which the data is to be submitted and the type of data to be submitted varies, most require device location data in real-time. Some laws allow raw data to be held in confidence, but not aggregated data, which must be submitted to the city for publication.

City Information

Other sources of information were reviewed by the research team to gain more insight into the mechanics of the shared micromobility programs in Los Angeles, San Francisco, Chicago, Portland, Dallas, Miami, and Bellevue. The information presented in Table 17 through Table 28 are sourced primarily from the various city mobility program websites, as well as from terms and conditions provided in permits and permit applications.

Table 17 provides the history and current status of the shared micromobility programs in the seven cities. Bellevue's program consists only of dockless bikes, while Chicago's consists only of shared scooters. In Los Angeles, San Francisco, Portland, and Dallas, the micromobility programs involve both. Miami has an established station-based bikeshare program, but the focus of this analysis was on its shared e-scooter pilot program.

Violations and Enforcement

As shown in Table 18, each of the city's micromobility websites provides operating rules for users, with some providing the state or local law related to riding devices. Some provide the amount of the fine that will be imposed for violating the law. Permit applications and rules provide the fees that operators will be subject to for violating permit conditions.

Targets and Benchmarks

As shown in Table 19, targets and benchmarks vary by jurisdiction. Los Angeles provides general “key takeaways” by which its micromobility program will be evaluated, while San Francisco’s permit terms and conditions provide the key metrics by which operators will be evaluated. The other cities track trip data (Chicago), require a minimum number of vehicles (Bellvue), address measurement in law but not on their website (Portland) or are silent on the issue (Dallas, Miami).

Accessible Scooters

As shown in Table 20, only San Francisco and Chicago’s micromobility programs include accessible scooter requirements. Each city requires that adaptive, accessible scooters for riders with disabilities compose 5% of the operator’s fleet.

Parking Guidelines and Requirements

As shown in Table 21, each jurisdiction provides parking guidelines and requirements on websites and permit documents. Each of the city’s micromobility websites provides parking rules for users. Some provide the amount of the fine that will be imposed for improper parking.

Data Sources

As shown in Table 22, all jurisdictions except for Miami and Bellevue include data-related information on their websites or permit documents. Some (San Francisco and Portland) expressly indicate that operator data is offered to the public through dashboard visualizations.

Community Engagement

As shown in Table 23, each jurisdiction except for Miami and Bellevue includes community engagement requirements for operators in their permit documents. The engagement is primarily focused on educating users on the law, safe operation and parking of devices, and reporting issues to the operator.

Principles

As shown in Table 24, the Los Angeles, San Francisco, Chicago, and Portland micromobility programs provide a set of goals and/or objectives that serve as principles guiding delivery, management, and enforcement of the programs. Dallas, Miami, and Bellevue do not provide such principles on their websites or permit documents.

Permits and Fees

As shown in Table 25, permit and permit fee information is detailed on websites or permit rules or applications for each city except for Bellevue.

Pilots and Services

As shown in Table 26, each of the seven jurisdictions conducted or are conducting pilots for their micromobility programs. Miami is the only jurisdiction currently in the pilot stage. Los Angeles, San Francisco, Chicago, and Dallas have deployed permanent programs based on findings from their pilots.

Equity

As shown in Table 27, each of the jurisdictions except for Miami has made efforts to promote equity in their micromobility programs. For the most part, these have included actions by operators to provide

shared micromobility services to low-income, unbanked, and underserved populations, as well as the disabled population and those with limited English proficiency.

Safety Analysis

As shown in Table 28, most of the cities that have completed pilot programs have published studies assessing injuries and fatalities from the pilots (Los Angeles, San Francisco, Chicago, and Portland). These studies provided consistent findings related to the prevalence of scooter-related injuries and low helmet use.

Discussion

Since the initial period of chaos when e-scooters were introduced into U.S. urban environments, cities have responded with their own pilot and permitting programs, resulting in local policies and practice guidelines. Some have also begun studying e-scooter safety in their jurisdictions. E-scooter usage has increased, and municipalities are hopeful that the e-scooter can be a viable and safe contributor to the transportation eco-system.

E-scooter safety data, though scarce at the beginning of this project, has begun to be more available than before. New studies have provided valuable new data on many aspects affecting e-scooter safety. General causal information about injuries and fatalities is now available. We are learning demographic information about which users suffer the most harm from incidents. We know which parts of the body are likely to suffer most from an e-scooter crash. Yet more specific crash and injury/fatality data are still needed to address e-scooter safety. For example, recent studies indicate that most e-scooter injuries and fatalities are attributable to crashes with motor vehicles or fixed objects (as opposed to battery fires or other equipment failure or some other potential occurrence.) However, the causes of and responsibilities for the crashes are still not clear or widely understood. For example, in collisions with motor vehicles, were scooter users at fault because they were riding in a restricted area? Was the city at fault because the pavement was defective? Or was the operator or manufacturer at fault because the vehicle failed at a critical moment? Without knowing the exact causes of these incidents, and the reasons that the parties acted or failed to act as they did, it is impossible to know where safety officials and regulators can best direct their efforts to improve e-scooter safety.

Another area that could provide guidance about what to address and how is the assignment of liability, and how it motivates or disincentivizes parties to take action. If liability is ultimately passed on to the user through governmental immunities and indemnification clauses, are cities and operators sufficiently motivated to address the areas of safety that they are responsible for and can most affect? And what about the injured pedestrian who was not a party to the final rental agreement? If the e-scooter user with whom the pedestrian collides has no insurance, from whom could the pedestrian seek damages?

Finally, more data about user knowledge and understanding of the laws governing scooter use is needed to understand whether regulations are effective and effectively communicated. City officials and operators who create the agreements presumably understand them and can be reached for comment.

Users are harder to reach and we can only speculate about their knowledge and understanding of regulations and responsibilities without further, systematic research to capture their experiences.

Conclusions and Recommendations

Conclusions

To best focus regulatory attention on e-scooter safety, more research is warranted in the following areas:

- Detailed data on exact causes of crashes and injury/fatalities to understand whose act or failure to act were the actual cause of the incident, and what can be done—and by whom—to prevent those acts or omissions in the future.
- Filed lawsuits involving e-scooters to learn 1) how many suits were settled or went to trial and 2) if tried, how the issue of liability was adjudicated and whether the assignment of liability amongst the parties was found to be equitable.
- Exploration of insurance requirements that may be appropriate for use of the public ROW by micromobility users.
- Effect of acceptance of terms of use on assignment of liability.
- Exploration of user knowledge of safe e-scooter operation and the safety regulations that govern user usage.

Recommendations

To gather the above-listed data on e-scooter safety and liability, the following future research is recommended:

- **Guided discussions with city officials and operators** in the selected jurisdictions to gain their perspectives on the need for and effects of the safety regulations in their cities.
- **Nationwide scan of lawsuits filed** and their dispositions to discover what legal outcomes or conflicts have come of the assignment of liability amongst the three parties involved in e-scooter agreements.
- **Guided discussions with insurance providers** to explore whether and how the assignment of liability affects a party's motivation to be responsible for safety issues in general, and with regard to micromobility.
- **Focus groups with e-scooter users** to gain and understanding of their awareness and understanding of regulations governing their safe operation of e-scooters.
- **Guided discussions with federal regulators and infrastructure designers** to determine whether product design and safety standards should evolve in coordination with appropriate infrastructure design and Manual on Uniform Traffic Control Devices updates.

Additional Products

Education and Workforce Development Products

Due to Covid 19-related issues, the team was unable to continue its work with Texas A&M School of Law and law students.

Data Products

All underlying data for this project is included as appendices attached to this report.

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Appendix A

Literature Review Findings

The term micromobility was first used in 2016 to describe the wide and growing array of personal mobility devices that include bicycles, electric bikes, skates, self-balancing vehicles, kick scooters and electric scooters, among others [1]. Micromobility does not include solely human-powered vehicles. According to SAE International, micromobility includes powered skateboards, skates, and self-balancing devices (also called hoverboards or balance wheels), sharing three common characteristics:

- Fully or partially-powered;
- Low speed, with a top speed of 30 mph; and
- Small, with a maximum curb weight of 500 lb., typically weighing less than 100 pounds and fitting within a standard bike lane [2].

Since 2016, use of micromobility products has increased dramatically in parallel with advancements in battery technology and the rapid rise of commercial shared mobility services (e.g., ride hailing, car sharing, and public station-based bikeshare systems). By the time dockless electric scooters (e-scooters) and electric bicycles (e-bikes) first entered the U.S. market in Fall 2017, their use was adopted immediately, increasing in use dramatically [3] because they offered the traveling public cheap, convenient, and climate-friendly ways to quickly make short first- and last-mile trips [4].

While this surge in micromobility use promises to solve many transportation issues, such as first and last mile gaps in transit systems, highway congestion from single-occupancy vehicles, and air pollution from carbon-based fuel emissions, it has surprised many urban transportation agencies who had neither assessed the safety risks of these devices nor developed plans to integrate them into their various ecosystems or regulations for their deployment [3]. Municipalities typically implement new mobility options through the planning, procurement, and/or right-of-way/public space permitting processes. However, many micromobility options materialized overnight, deposited on public rights-of-way around cities by private operators without prior notice. This created safety and regulatory issues that put users and municipalities at risk. At the same time, it left cities with little time to develop meaningful goals, policies, and regulations for these programs to smoothly integrate the devices into their specific communities. One reporter described this as the “Scoot first/Regulate later” approach [5].

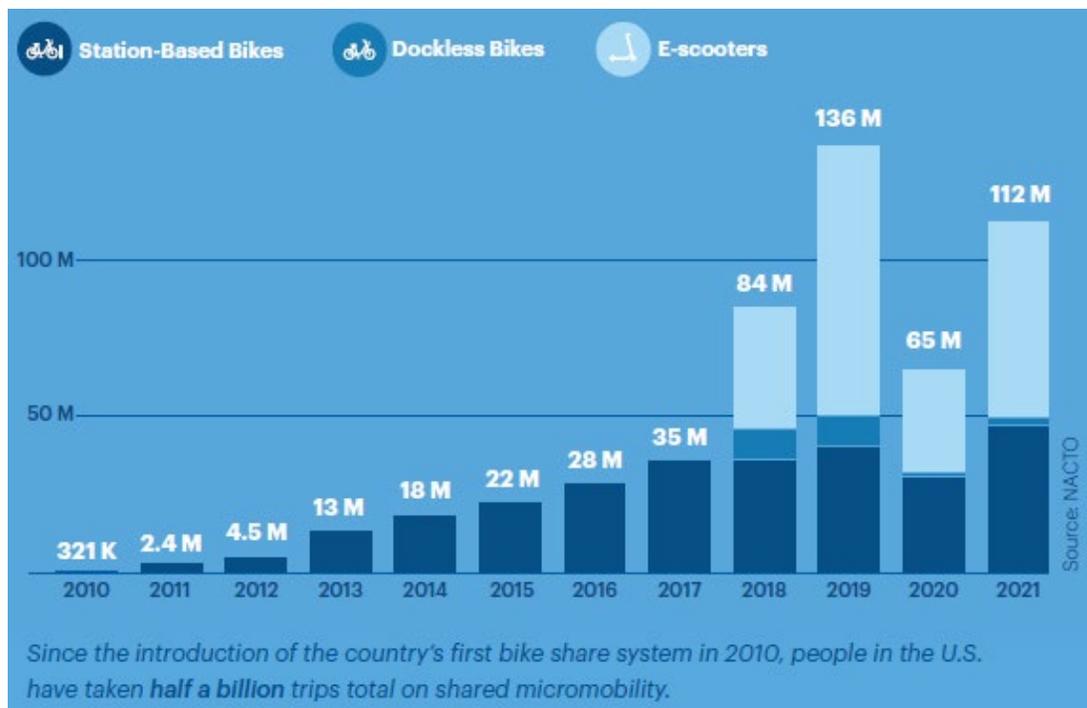
The findings of the literature review performed for this research project document the most pressing micromobility safety issues and the types of regulations that can be used to address those issues. One should note, however, that the research team made certain assumptions and points of emphasis to focus the research on the most pertinent regulatory issues related to micromobility. These include the following:

- While micromobility vehicles can be privately owned, the literature review (and this report) focuses on a model of shared-use with a fleet maintained by an organization or business and accessed by users paying a fee at the beginning of a trip [6].

- This research project focused on e-scooters as the primary micromobility option in need of regulatory analysis, examining who is responsible for compliance with safety rules and regulation and what cities mean by “safe deployment”.
- “Micromobility” and “e-scooter” are used interchangeably because this project focuses on e-scooters as the primary micromobility option lacking a consistent regulatory approach. Unlike bicycles, e-scooters are a relatively new mode to transportation agencies, many of which have prior experience operating or permitting station-based bikeshare systems.
- “City” and “municipality” are used interchangeably to represent a local government entity with jurisdiction to enact ordinances, rules, and regulations over its streets, sidewalks, and other public rights-of-way. However, the authors recognize that other entities (e.g., a university) may have the authority to regulate e-scooters within a certain geographic territory.
- Micromobility “products,” “options,” “vehicles,” “devices,” and “equipment” are used interchangeably to refer generally to bicycles, electric scooters, electric bicycles, and self-balancing scooters, and specifically to e-scooters, as defined by the regulating entity.

Ridership

The use of micromobility devices under municipal “sharing” systems has skyrocketed over the past decade. The National Association of City Transportation Officials (NACTO) reports that between 2010 and 2021, there were 520 million trips taken on shared micromobility systems (i.e., station-based bikes, dockless bikes, and e-scooters) across the U.S. In 2019, this number was 136 million trips, decreasing by 70% to 65 million trips in 2020, and rising back to pre-COVID-19 pandemic levels to 112 million trips in 2021 (Figure 2) [7].



Source: NACTO

Figure 2. Shared micromobility ridership in the U.S. from 2010–2021.

As Figure 2 shows, ridership on station-based bikeshare systems, which are typically operated and managed by local governments (through private service providers), was relatively stable through the COVID-19 pandemic from 2019 through 2021 in comparison with other micromobility modes, dropping from 40 million trips in 2019 to 30.5 million trips in 2020 and rebounding to 47 million trips in 2021. E-scooters and bikes, which are typically operated and managed by private companies but regulated by local governments through permits, saw more dramatic swings in ridership over this same period, falling by 64% from 2019 to 2020. Even so, e-scooters have represented the majority of micromobility trips with 86 million trips in 2019, 33 million trips in 2020, and 62.5 million trips in 2021.

In September 2022, the Behavioral Traffic Safety Cooperative Research Program (BTSCRCP) published results from Phase I of BTSCRCP Project BTS-10, “E-Scooter Safety: Issues and Solutions”, drawing from published literature, existing travel survey data, and a web-based survey to identify emerging behavioral safety issues and summarize how communities are working to prevent and mitigate injuries from e-scooters. The study cited the same figure of 86 million trips taken on shared e-scooters in 2019, noting it as a 123% increase from 2018.

Micromobility trips can be divided into those taken by members who purchase annual or monthly passes and casual riders who purchase pay-per-ride and day passes. The 2022 BTSCRCP study concluded from the literature that e-scooter trips tend to follow fairly consistent patterns, with peak weekday ridership between noon and the afternoon commute hour (5:00 or 6:00 p.m.) and peak weekend ridership between 11:00 a.m. and 6:00 p.m., and seasonal ridership peaking in the summer months. However, NACTO found that in 2020 and 2021, micromobility trips shifted away from rush hour peaks towards increased trips throughout the day. The share of trips made by casual riders increased significantly over the 2021-2022 period increasing by 54%, compared to trips made by members, which decreased by 16%. This may be due to the disruption of work locations and schedules from the COVID-19 pandemic and subsequent shifts in trip patterns, purposes, and frequencies.

The distance riders travel on micromobility devices has remained consistent, serving those looking to make relatively short, quick trips in urban areas. The 2022 BTSCRCP study summarized the literature, providing that average distance and duration of e-scooter trips are relatively stable across cities, at about 1 mile and 10–15 minutes per trip. Similarly, NACTO found that the average e-scooter, dockless e-bikes, and station-based bikeshare member trip length in 2021 was 11-14 minutes and 1.2-1.4 miles, while casual station-based bikeshare riders took longer trips of 27 minutes and 2.7 miles in 2021 (Figure 3).



Source: NACTO

Figure 3. Average trip distance and duration, 2018 and 2021

Figure 3 shows that, while transit ridership and vehicle miles traveled (VMT) on roadways plummeted (transit trips decreasing by 81% and car trips decreasing by 40%) across the nation as millions sheltered in place in 2020 and 2021, micromobility trips remained relatively stable and shared micromobility continued to be used as a tool for socializing and exercise, replacing closed gyms and recreational facilities and allowing people to exercise and safely spend time with others outdoors.

The 2022 BTSCRIP study found from its surveys that e-scooter riders were predominantly male, White, in the 18–34 age group, and middle income, although ridership demographics varies significantly by location. NACTO does not provide similar demographic information for micromobility users, but one may infer similar characteristics for those taking micromobility trips from its 2022 report. For example, micromobility riders are likely middle income due to higher trip prices since 2018 (more than doubling from an average of \$3.50 in 2018 to \$7 in 2021).

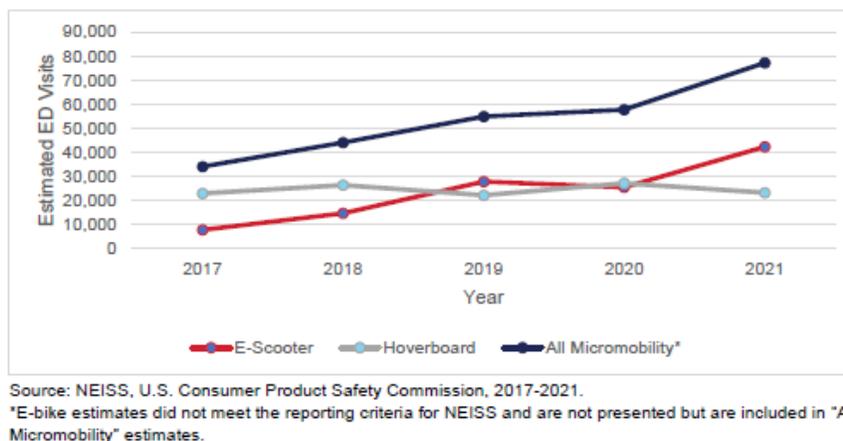
Safety Data

While at the start of this project in 2020 safety data had been unreliably and scarcely reported, by the close of 2022 several reports were published that provided useful information. Therefore, unlike the literature review performed for this report, the findings below summarize injury and fatality findings primarily from the newly-available reports.

Injuries

The U.S. CPSC’s 2022 report on *Micromobility Products – Related Deaths, Injuries, and Hazard Patterns: 2017-2022* summarizes the injuries, deaths, and hazards associated with the use of micromobility products based on data from the CPSC epidemiological databases from 2017 through 2021. Devices covered in their data were e-scooters, hoverboards, and e-bikes. The report estimates

that U.S. emergency departments (ED) treated 267,700 injuries related to micromobility products from 2017 to 2021, rising 127% from 34,000 ED visits in 2017 to 77,200 ED visits in 2021 (Figure 4).



Source: CPSC

Figure 4. Estimated emergency department visits associated with micromobility products, 2017–2021.

Of these ED visits, the largest share was from e-scooter-related incidents with 117,600 injuries treated from 2017 through 2021. From 2020 to 2021, ED-treated injuries from e-scooters increased by 66%.

The 2022 BTSCRCP study found that injury demographics appear consistent with ridership data. Most studies it incorporated into its analysis reported that a greater proportion of injured patients were males and disproportionately White. The 2022 CPSC report’s safety data provides further insights into the gender, age, and ethnicity of micromobility-related injuries, finding that

- Males experienced a higher percentage of e-scooter-related injuries (64%).
- Riders in the 15-to-24 and 25-to-44 age groups made up a disproportionately high (25% and 39%, respectively) share of e-scooter-related injuries compared to their proportions in the general U.S. population.
- Black e-scooter riders made up 31% of all micromobility injuries and 37% for e-scooter injuries, a disproportionately high figure compared to the proportion in the general U.S. population.

The Insurance Institute for Highway Safety (IIHS) found that e-scooter riders suffered injuries more frequently per mile traveled than bicyclists, a trend that will persist as the number of new e-scooter users continues to increase over time. Compared to bicycling injuries, e-scooter incidents less frequently involved moving vehicles or occurred on roads.

The CPSC found that most of these micromobility-related injuries are attributable to unspecified falls with other notable hazards leading to injuries including loss of control, collisions with vehicles, and pavement issues. Findings from a 2019 study provide further insights into the causes of micromobility-related injuries, citing failure to use a helmet and lack of rider experience as two likely contributing reasons [8]. Other contributing circumstances in older studies (preceding the 2022 CPSC study) included vehicle speed, rider intoxication, condition of infrastructure and suitability of infrastructure

for scooter use [8], collisions with pedestrians, bicyclists, or another scooter, swerving, stopping, or jumping off the scooter to avoid a collision, being “doored” by a vehicle, falling off the device due to road hazards (e.g., potholes or uneven pavement), and falling off the vehicle due to defective or malfunctioning devices [9].

The CPSC also found that, while a large proportion (37% for e-scooters and 41% overall) of injuries occurred at unknown locations, of the known locations, injuries associated with e-scooters occurred most frequently on streets or highways (41%). In a separate report, the Insurance Institute for Highway Safety (IIHS) found that the most common locations of e-scooter injuries were sidewalks (58%). While roads made up 23% of locations where e-scooter injuries occurred, those injuries were greater in severity than sidewalk-related injuries likely due to higher speeds on roads [10].

The 2022 BTSCRCP study found that the literature reports a large proportion of e-scooter injuries resulting from single-vehicle crashes and falling off on roadways, sidewalks, and bike lanes. Infrastructure (roadway and sidewalk) surface conditions were commonly attributed as crash factors. Hardware failure or malfunction was found to be an additional contributor to e-scooter-related injuries, as well as rider inexperience. E-scooter crashes with pedestrians made up a small percentage of incidents may be attributed to conflicts created by sidewalk riding or the lack of safe alternatives [11].

Finally, the literature is consistent regarding the most common types of micromobility-related injuries. In 2021, the IIHS found that lower extremity injuries were more common among e-scooter riders than bicyclists, and injuries to upper extremities or the chest, abdomen, and spine were less common. However, head injury rates for e-scooter injuries were similar to bicycle-related injuries. In addition, e-scooter riders more often experienced concussions with loss of consciousness likely due to the finding that they were far less likely to wear helmets [12]. Similarly, the 2022 BTSCRCP study found that head and upper extremity injuries were prevalent, and bone fractures and lacerations were common types of injuries, and the CPSC study reported that fractures, followed by contusions/abrasions, are the two most common diagnoses of micromobility-related injuries with the most frequently injured body parts consisting of the upper and lower limbs, as well as the head and neck.

Fatalities

The 2022 CPSC study found a total of 129 fatalities associated with micromobility devices from 2017 to 2021 (Figure 5). Fatalities involving e-scooters made up 68% of this figure with most occurring in the last three years of the analysis (2019-2021).

Year	All Micromobility	E-Scooter (Dockless/rental)	Hoverboard	E-Bike
2017	5	1 (0)	4	0
2018	11	5 (2)	0	6
2019	31	25 (7)	0	6
2020	34	14 (2)	2	18
2021	48	23 (3)	2	23
Total	129	68 (14)	8	53

Note: Reporting for 2020-2021 is ongoing. Counts may change in future reports.
Source: CPSRMS, NEISS, U.S. Consumer Product Safety Commission, 2017-2021.

Source: CPSC

Figure 5. Reported fatalities associated with micromobility products, 2017–2021.

Of the 129 micromobility-related fatalities, 103 (80%) were male and 79 (61%) were in the 18-59 age group. The leading cause of death associated with micromobility products were crashes with motor vehicles, making up 78 incidents or 60% of all fatalities (Figure 6).

Hazard Pattern	All Micromobility	E-Scooter (Dockless/rental)	Hoverboard	E-bike
Motor vehicle accident	78	49 (12)	2	27
User-control	21	9 (2)	0	12
Fire hazards	6	2	4	0
Pedestrian accident	8	2	0	6
Pavement	1	0	0	1
Other	2	2	0	0
Unspecified falls	13	4	2	7
Total	129	68 (14)	8	53

Note: Reporting for 2020-2021 is ongoing. Counts may change in future reports.
 Source: CPSC, NEISS, U.S. Consumer Product Safety Commission, 2017-2021.

Source: CPSC

Figure 6. Hazards associated with micromobility product-related fatalities, 2017–2021.

Of the 68 fatalities associated with e-scooters, 49 (72%) were due to motor vehicle crashes. Nine fatalities were due to user-control issues that led to crashing into fixed objects/trees, colliding with other riders, striking road curbs, and/or getting thrown into oncoming traffic. Two fatalities were associated with e-scooter-related fires started while charging. Two fatalities resulted from pedestrians who were struck by e-scooter riders. One fatality was associated with intoxication, and another involved a crash with a commuter train [13].

The 2022 CPSC report linked product-related hazards with 48 of the 68 fatalities associated with e-scooters. These hazards included brake problems, fire hazards while charging, and unexpected power loss causing riders to tip over or get thrown off.

Perceptions of Safety

The 2022 BTSCR study found that perceptions of e-scooter safety differ by gender, age, ethnicity, and disability. Women were less likely to perceive e-scooter use as safe compared to men, and more likely to identify safety concerns such as fear of hitting someone or being hit and feeling unsteady or falling, irrespective of past e-scooter use. Men were more likely to report having ridden on the street for their most recent e-scooter trip than women, who were more likely to have used the sidewalk for riding.

Nearly three-quarters (74%) of survey respondents identified the need for bike lanes and other infrastructure improvements to encourage riding on the street. However, residents of Black communities indicated that they are most concerned about racial profiling and harassment, rather than helmet use, safe spaces to learn to ride, and safe bicycle infrastructure. People with disabilities are concerned about being hit by vehicles, troubles with balance and vision, and encountering parked or moving e-scooters on sidewalks.

Helmet Use

The 2022 BTSCR study found that helmet usage is consistently low across the studies it examined. This may likely be due to the lack of advanced planning for many scooter trips and the fact that many

riders do not own helmets. A survey of Portland e-scooter riders reported that 20% usually or always wear a helmet, and only 10% sometimes wear a helmet. A similar survey of Baltimore e-scooter riders found that 80% do not wear a helmet. During the e-scooter pilot program in Santa Monica (California), 61% of citations were given to people under age 16 who were not wearing a helmet.

Federal, State, and Local Roles in Regulating Micromobility Safety

Federal

Micromobility devices are not considered motor vehicles subject to NHTSA regulatory requirements. In federal law, (49 U.S.C. 30102), a “motor vehicle” is defined as a “vehicle driven or drawn by mechanical power and manufactured primarily for use on public streets, roads, and highways, but does not include a vehicle operated only on a rail line.” A 2002 federal bill (HB 727, codified as 15 U.S.C. 2085) was enacted to authorize the CPSC to create a special category of “low-speed electric bicycles,” which were defined as “two- or three-wheeled vehicle[s] with fully operable pedals and electric motor of less than 750 watts (1 HP), 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.”

In a draft notice of interpretation addressing low-speed two and three-wheeled vehicles, NHTSA provided a method to distinguish vehicles that fall under the statutory definition of motor vehicles from other vehicles. NHTSA “tentatively concluded that if a two- or three-wheeled vehicle were to have a maximum speed capability of less than 20 mph (32 km/h), regardless of on-road capabilities, it would not be a motor vehicle, except in very limited circumstances.” Thus, e-bikes and e-scooters that meet this definition are regulated by the CPSC and must meet product and safety standards [14]. However, to date the CPSC has not released any mandatory or voluntary safety standards or guidelines that states and municipalities can refer to when determining the types of e-scooter devices to allow in their communities.

State

In the absence of clear guidance at the federal level to better understand safety standards and provide legal conformity, state laws relating to micromobility are inconsistent or nonexistent. Certain state codes present problems for local regulation of micromobility devices by creating a conflict within the very statute intended to regulate the devices or a conflict with local laws or regulations [11].

Generally, state traffic laws and vehicle codes govern the operation of micromobility devices on streets, trails, and bikeways within the state. This is typically done by authorizing local governments to regulate the devices through permits that allow them on the public right-of-way (ROW) within their jurisdiction, as well as differentiating among the types of available devices and establishing definitions for them. Some states give explicit authority to local governments to regulate micromobility operations, shared systems, or both. For example, New York allows e-scooters to operate in the state, but reserves the right for cities to regulate or ban e-scooters and shared e-scooters systems [15]. Some re-classify e-scooters, determining whether they are allowed to travel in the driving lane, bike lanes, or sidewalks. For example, Denver was unable to regulate e-scooters due to a Colorado state law whose definitions of toy vehicles included e-scooters. In May 2019, the Colorado governor signed HB19-1221 into law. This statute recategorized e-scooters as motor vehicles and allows cities the same authority to regulate them as other motor vehicles [16].

Local

In the literature on micromobility regulation, local governments and their agencies are identified as directly responsible for ensuring the safety of users of shared micromobility programs because, unlike the federal or state governments, they generally have jurisdiction over management of the public ROW within their geographic boundaries where micromobility devices are used. Local governments, in the form of counties and municipalities, are generally provided authority under state law for regulating the use of micromobility devices and, in most cases, own and manage the infrastructure where the devices are used, parked, and accessed. In these cases, municipalities and operators reach agreement on the terms of deployment before e-scooters are placed within public ROW in an area. This can be accomplished through a ROW permitting scheme or as part of a pilot or demonstration program [17].

Permitting is an existing regulatory process that allows cities to set standards for micromobility equipment, including model features (e.g., motor wattage, maximum speed, maximum weight, battery limits) and safety equipment (e.g., lights and reflectors, acoustic devices, and identification plates). Permits can also be revoked and renewed fairly easily by cities. Typically, local governments require private shared micromobility company to obtain a license or an administrative permit for use of the public ROW in the same way utility companies acquire permits to build and maintain utility infrastructure in the ROW.

NACTO recommends that permits be limited to a specific time period and require re-application for renewal [17]. This allows issues to be addressed as a condition of renewal. NACTO also recommends that permits require operators to give notice before ceasing operations [17].

An alternate approach is to establish a pilot program to gather information before adopting regulations [1]. Pilot and demonstration programs allow for the temporary operation of e-scooters under short-term rules in the absence of data that can inform the regulatory environment. After the pilot period, a municipality can assess the data collected and stakeholder feedback to develop policy objectives and a regulatory scheme. A pilot or demonstration program can also identify areas that will require regulation that were not addressed in the original agreement.

For example, in 2018, Portland (Oregon) launched a pilot e-scooter program that required participating companies to provide data on starting points and destinations, real-time availability, routes taken, and accidents. Through the pilot, the city decided to continue the program based on evidence that the e-scooters were helping to reduce vehicular traffic. The city also learned what infrastructure improvements were needed to reduce e-scooter-related injuries, illegal sidewalk riding, improper parking, and damage to city park trails [4].

Because of the lack of mandatory or voluntary safety standards or guidelines for micromobility devices at the federal level, and the inconsistency of state laws governing the regulation of micromobility devices, their use is not uniformly regulated at the municipal level [18]. Some jurisdictions are imposing strict regulations across a region regardless of density levels or urban design, while others have not imposed any rules at all [19]. For example, the lack of consistent guidelines and safety standards for e-scooters has resulted in the use of e-scooters in a manner for which they were not designed. Most e-scooters were not designed to integrate into complex urban transportation ecosystems where roads are shared with many other vehicles. In some cases, e-scooters lack alerting devices, such

as bells, reflectors, turn signals and other components, which are designed to signal their presence to other road users. To address this, certain cities have imposed regulations or permit provisions that require e-scooters to have alerting devices. Other cities are silent on the devices. Without further understanding of what constitutes effective local regulation, the safe operation of these devices may not improve [1].

Two other parties are identified in the literature as responsible for ensuring safety of micromobility riders together with local governments: (1) *Operators*, or businesses that have deployed e-scooters in a region; and (2) *Users*, or customers that have paid to use e-scooters. Figure 1 illustrates the relationships between these three parties with regard to safe operation of micromobility devices, and e-scooters in particular.

Though the parties may share responsibilities for safe operations of e-scooters, each party has separate functions and responsibilities over safety issues. For example, operators are generally responsible for providing safe devices; road users are responsible for safe device operation and compliance with traffic laws; and municipalities must develop effective traffic regulation, communicate those regulations to road users, and provide safe and appropriate infrastructure upon which they allow e-scooters to travel.

Most of these responsibilities tend to be anticipated by cities and operators, and expressed in the legal agreements between them. Municipalities and operators agree to these responsibilities through right-of-way/public space permits, pilot program agreements, or Memoranda of Understanding. Users agree to some of their responsibilities in the Terms of Use between users and operators.

E-Scooter Equipment Safety

Equipment safety issues concern the design and manufacture of e-scooter vehicles. Because the federal government has not regulated e-scooter design and manufacturing, cities must consider under what vehicle standards operators are required to adhere. Although most scooter operators purchase their e-scooters from the same Chinese company, Xiaomi/Ninebot/Segway, the scooters have different design specifications, including wattage, maximum speed, mile range, lock-to technology (a mechanism designed to secure parked devices to bicycle racks, signposts or other infrastructure), handlebar adjustment, gyroscope sensor (a device used to sense and maintain direction), and accelerometer sensor (to measure acceleration).

Efforts to classify micromobility devices are predicated on vehicle characteristics. SAE International published the J3194™ Standard defining micromobility equipment as a category that can be classified according to four main criteria:

- Vehicle weight of up to 500 lbs.,
- Vehicle width of up to 5 feet,
- Top speed of 30 mph,
- Power source by electric motor or combustion engine [1].

Other safety equipment for e-scooters include front lights, global position systems (GPS), and identification stickers. In light of the variety of available safety features of e-scooters, municipalities

have taken it upon themselves to require mandatory equipment, such as lock-to mechanisms in the District of Columbia and Chicago.

Safety equipment for e-scooters is necessary in consideration of unique features of e-scooters, including the following:

1. Vehicle Stability

Vehicle stability affects a user's ability to maintain their stance on the e-scooter and safely progress forward. Stability-related injuries caused by e-scooters are mainly due to users falling off the scooter [1]. Vehicle stability is affected by the device's wheel size, tire design, frame geometry, weight distribution, and the presence, or absence, of a seat or handlebar. In fact, Paine found that scooters, both motorized and human-powered, are more susceptible to irregularities in roadway condition than automobiles [20], providing that "there do not appear to be any ways to significantly improve the design of scooters to increase their stability at higher speeds." With regard to wheels and tires, size may not be a significant factor in the safety of an e-scooter. Industry experts prefer pneumatic tires over solid tires because they offer a better road grip.

2. Weight

The weight of an e-scooter and the speed with which it travels affect the severity of injuries for both the user and any by-stander that may be involved in a collision. The heavier the device, the greater the likelihood of injury. This is an important consideration as new models of e-scooters tend to be heavier to withstand repeated outdoor use and/or carry larger batteries.

3. Visibility

E-scooters that are operated in mixed traffic with other motor vehicles may be difficult for drivers to see. E-scooters are also quieter than motorized scooters and motorbikes which help other road users know that these vehicles are in the vicinity. Likewise, if micromobility devices are operated at night, they may need lights and/or reflectors. Santacreu's report for the International Transport Forum (ITF) provides that a significant portion of rider deaths occur in nighttime crashes [1]. Guidance or regulations concerning visibility can be aimed at the equipment or the user or both. It is worth noting that lights and reflectors are mandatory of pedal cycles in most countries, including the United States [1]. Visibility can be enhanced by users wearing reflective clothing or lamps or lights when riding e-scooters. Municipalities have considered visibility requirements for e-scooters and users. For example, the City of Chicago's municipal code requires e-scooters to have front and rear lights.

4. Braking

Braking affects a user's ability to respond quickly and safely to potentially dangerous situations. Braking systems should allow a user to quickly react while maintaining vehicle stability and should be regularly inspected by operators with safeguards taken to reduce or eliminate tampering. NACTO recommends the use of fully enclosed and tamper-proof brake cables [21]. The weight of the e-scooter and its maximum speed will affect braking efficiency and may be a consideration in equipment requirements. Likewise, regional topography and climate will impact braking systems. Rather than prescribing specific braking systems, municipalities may identify performance standards, such as average deceleration based on load, speed, and gradient conditions. In addition, municipalities may

require testing and calibration to be performed as part of the vehicle approval and certification processes.

5. Batteries

There are two battery-related safety issues associated with current e-scooter designs. First, e-scooters may not have sufficient battery charge left to complete a user's entire trip. If the e-scooter runs out of battery power during the middle of a ride, the vehicle may potentially put the user at risk depending on where the e-scooter runs out of power. Second, because most e-scooter batteries are built-in to the device and not removable, the entire e-scooter has to be retrieved and recharged at an electrical outlet. The current practice for recharging e-scooters involves contractors "rebalancing" the devices, i.e., retrieving the e-scooters, re-charging them, and then redistributing them. This process of collecting and redistributing may create safety risks because of stopped collection vehicles in the right-of-way, which can be a safety risk for other road users.

6. Acoustic Alerting Device

The presence of an acoustic alerting device, such as a horn or bell, can improve safety by allowing the user to warn others, especially pedestrians, of the vehicle's presence or quick approach. Since e-scooters have handlebars, adding an acoustic device can be easily accommodated. The maintenance of acoustic alerting devices requires regular inspections, which can be accomplished as part of inspections of other safety systems. However, the placement of the device on the handlebar and without other protective coverings may increase the likelihood of damage during the rebalancing process. The literature suggests replacing a mechanical device such as a bell with an electronic sound activated by a button on the handlebars [22].

7. Turn Indicators and Handlebars

Turn indicators on e-scooter handlebars, as shown in Figure 7, can improve safety by allowing users to keep their hands on the vehicle while signaling their intention to turn to pedestrians and other road users. Indicators on the vehicle also relieve the user from knowing and using appropriate hand signals.



Source: DHgate Wholesale

Figure 7. Turn signal indicator for handlebars.

The comprehensive ITF report on Safe Micromobility posits several hypotheses to research the impact of handlebars on safety:

- Handlebars may facilitate emergency braking
- Handlebars may allow users to become more familiar with equipment more quickly
- Handlebars may impede the use of hand signals
- Handlebars may contribute to injuries of the face and elbows in falls where hands could have absorbed the crash landing [1].

8. Seats

E-scooters can be equipped with or without seats. Most models for shared use in micromobility do not have seats though newer versions feature seats. Seating lowers a user's center of gravity which aids in stability.

9. Identification Plates

Identification plates or stickers on scooters in a city is important for assisting pedestrians and officers in reporting misuse. Cities can institute a process for providing city-issued plates or stickers and can require providers to display the identification plate or sticker on every scooter.

Equipment Maintenance

E-scooters are susceptible to rapid deterioration due to heavy use, weather conditions, and vandalism. Regular maintenance and inspection are important responsibilities of operators. To assist with maintenance, some operators allow users to communicate issues via the app that is used to access the vehicle. Users can report maintenance issues before, during or after their ride. In fact, some operators prompt users to enter this information.

Existing Policies and Practices Related to Equipment

Under public ROW permitting structures, cities can mandate maintenance and inspection schedules and record-keeping requirements. For example, Seattle's monthly maintenance record requirements mandate that operators send them service histories, information on product recalls, user reports of unsafe or damaged vehicles, and tallies of vehicles taken out of service for repair.

Cities can also adopt permitting terms that call for:

- E-scooter replacement after normal wear and tear and in the case of vandalism or other atypical events
- Random inspections by city staff
- Submission of maintenance and inspection reports on a certain schedule
- Removal of damaged equipment under certain time requirements

Operators are advised in the literature to pay special attention to maintenance of equipment before and after special events that may attract many first-time users. Likewise, operators should develop plans for emergency management of the fleet due to severe weather [17].

Emerging/Unaddressed Challenges Related to Equipment

Vehicle operators may change models at any time. Table 1, as adapted, shows various e-scooter vehicle specifications by vendor, as of January 2019.

Table 1. Equipment Specification by Vendor [23]

Vendor	Motor Wattage	Max Speed (mph)	Range (miles)	Lock-to	Adjustable Handlebar Height	Gyroscope	Accelerometer
Bird	250	15	15	No	No	No	No
Lime	250	18	35	No	No	-	-
Spin	250	15	19	No	No	No	No
Skip	350	18	30	Yes	Yes	Yes	Yes
GOAT	-	-	-	No	No	No	No
Ofo	250	15	19	No	No	No	No
JUMP	350	-	-	No	No	Yes	Yes
Hopr	300	15	12	Yes	No	No	No
Scoot	350	15	-	Yes	Yes	No	No
Lyft	250	16	18	No	No	Yes	Yes
Razor	-	-	-	No	No	No	No
Ridecell	-	-	-	No	No	No	No
Uscooters	350	18	-	No	Yes	No	No

Since 2019, operators have been acquired or are no longer in business, and their e-scooter fleet have largely changed to newer models. The top three shared micromobility service providers in the U.S. today – Bird, Lime, and Spin – each feature new e-scooter models (as of January 2023) on their websites, claiming that the devices contain hardware and software improvements, as shown in Table 2 and Figure 8.

Table 2. New Bird, Lime, and Spin E-Scooter Features

Bird Three	Lime Gen4	Spin 6
<ul style="list-style-type: none"> • Battery: High-capacity battery with real-time diagnostic monitoring and IP68-rated protection to provide more miles traveled on a single charge. Capacity for swappable, smart batteries up to 1kWh. • Lights: New, high-powered, German K-mark certified automatic LED headlight and taillight. • Sensors/Status Indicator: Highly-visible status indicator light to convey the health and charge of a vehicle. 200+ diagnostic sensors monitor each component in real time. • Tires: Automotive grade, self-sealing, pneumatic tires to ensure a softer ride without requiring complicated suspension systems that are prone to safety issues. • Operating System: Updated Bird 	<ul style="list-style-type: none"> • Battery: Interchangeable swappable batteries to reduce the frequency of charging and rebalancing. • Stability: Wider footboard and a lower center of gravity to provide better control. 	<ul style="list-style-type: none"> • Turn Signals: New and enhanced with audio feedback to users to help them avoid accidental turn indications to increase rider safety and ensure safe turning in all conditions. • Stability: Larger wheels, an improved hydraulic suspension, and wider base board. • Durability: Coated brake cables and battery connectors, and features that cannot be repaired in older models to improve the vehicle lifespan. • Phone Mount: New phone mount with wireless charging positioned in line of sight when using a navigation app on a phone to ensure riders are better informed about the rules like approaching a

Bird Three	Lime Gen4	Spin 6
<p>OS enforces strict adherence to speed limits, no ride and low speed zones in cities, including improved sidewalk detection.</p> <ul style="list-style-type: none"> • Stability: A longer wheelbase to provide increased stability on all terrains. 		<p>no ride zone.</p> <ul style="list-style-type: none"> • Compliance Alerts: Voice alerts and visual alerts on the built-in e-scooter display sent to users when they enter a restricted area in the city (e.g., slow zones, no parking zones, no ride zones).



Source: Bird, Lime, Spin

Figure 8. Bird Three, Lime Gen4, and Spin 6 E-Scooters.

Without specific vehicle standards, cities are advised to consider creating minimum equipment safety standards and/or require accreditation of equipment by a national organization. Additionally, cities may want to consider requiring vehicles to be certified to operate under an applicable standard by the Underwriters Laboratories or an equivalent safety rating agency [17].

Regulating Micromobility Safety

Safety issues surrounding the safe operation and regulation of e-scooters can be addressed by cities through regulation of who can ride e-scooters, and how and where they can ride them. This encompasses regulations such as age limits, license requirements, helmet requirements, and traffic and parking requirements. Cities regulate users through local ordinances, though some issues such as operating while intoxicated, may already fall under existing state laws. For example, in Texas, the law pertaining to driving while intoxicated (DWI) uses a broad definition of motorized vehicles and encompasses drunk scooting.

Age Limit/License Requirement

Some cities have enacted minimum age limits for e-scooter use while others require a valid driver's license for operation or both. Requiring users to have a valid driver's license presumes that users have a basic understanding of the rules of the road, but it may not assume that a user has knowledge of safe e-scooter operation. Age limits and license requirements can also discourage use of e-scooters as an alternative to driving.

For example, in Los Angeles, users must be 18 years or older and hold a valid driver's license. Some cities and states that require users to be a certain age also have an exception for circumstances where

a parent or guardian supervises the user. This can make enforcement murky because police must first examine whether the user is underage. If so, they must next examine whether they believe a parent or guardian is present. Operators also face enforcement difficulties, as they have little means of checking the presence of a parent or guardian, other than requiring users to submit a picture of their driver's license before an e-scooter can be rented.

Helmet Requirements

While helmets are known to protect riders from injuries, the 2022 BTSCRIP study found that helmet usage is consistently low across existing studies. E-scooters are often used without advanced planning for the majority of trips, which lowers the likelihood of helmet use. For example, in Portland, 20% of survey respondents reported usually or always wearing a helmet and only ten% reported sometimes wearing a helmet. In Baltimore, a survey found that 80% of e-scooter riders did not wear a helmet. During Santa Monica's e-scooter pilot program, 61% of the citations given to riders between 2017 and 2019 were due to being under the age of 16 and not wearing a helmet.

State-level helmet laws vary widely across the country. Most states require helmets for human-powered bicycles under a certain age, while others have helmet requirements based on age specifically for e-bike or e-scooter riders or have no laws for general helmet use. California law requires a helmet for riders under the age of 18.

Local laws also have helmet requirements, especially for younger riders. For example, Charlotte, North Carolina, prohibits anyone under the age of 16 to operate an e-scooter without a helmet. The parent can also receive a penalty for allowing a child to do so.

There is little evidence that helmet laws increase actual helmet use, but studies have indicated that helmet laws can be enforced in a discriminatory manner and lead to police violence. For example, an independent review of bicycle infraction data in Seattle, Washington where all riders are required to wear a helmet, found that police issued helmet-related citations to Black cyclists at 3.8 times the rate they issued them to White cyclists, even though Black cyclists made up less than five% of Seattle's cycling population. Thus, other, less punitive approaches to encourage helmet wearing may be more effective than mandates, citations, and criminal liability. This includes safety messaging and requiring e-scooter service providers to give away helmets as a component of public education and engagement. For example, the District of Columbia's micromobility program requires operators to provide users with a free helmet on request within 20 days [11].

Traffic and Parking Laws

Without traffic and parking requirements for e-scooters, the devices often end up concentrated in major transit hubs, creating urban clutter on bicycle lanes and sidewalks. To mitigate risk of dockless bikes and scooters blocking and obstructing sidewalks, some micromobility programs require e-scooters to be parked outside of the pedestrian zone (e.g., sidewalk) in the furniture zone where signs, trees, benches, and bus shelters are located. Existing literature recommend repurposing on- and off-street vehicle parking and establishing parking maximums for vehicles to make more space for e-scooter parking [11]. A simple approach has been to enact lock-to policies designed to reduce improper parking of micromobility devices, which are required to be locked to a fixed object (e.g., bike racks) while maintaining an unobstructed walkway [15].

In 2021, the IIHS found that policies vary widely among cities regarding allowing e-scooters on roads, sidewalks, bike lanes, and multiuse trails, and no research evidence is available to guide these decisions [10]. In the absence of such evidence, many state and local laws ban the use of e-scooters on sidewalks, treating them differently than other micromobility modes. For example, Texas law allows e-scooters to operate on bike paths, sidewalks, and streets or highways with a speed limit of 35 mph or less. However, a local government can prohibit sidewalk riding under its laws. E-bikes, on the other hand, are generally allowed on all streets and bike paths unless otherwise posted in Texas [15].

Non-Regulatory Measures to Promote Micromobility Safety

The safety of e-scooter riders can also be addressed by states and local governments through non-regulatory measures. This encompasses designing and installing infrastructure that incentivize safe, compliant e-scooter operations and parking, as well as public outreach and education to riders and drivers.

Infrastructure Design and Condition

The 2022 BTSCRCP study notes that the literature points to infrastructure-related concerns as a barrier to e-scooter usage. Studies show that e-scooter users and industry consistently request bicycle infrastructure or low-speed and low-volume streets for safe on-street e-scooter riding, which is consistent with e-scooter users' preference to ride in bicycle lanes and concerns from pedestrians that e-scooter users not ride on sidewalks. Thus, roadway design and pavement condition are important non-regulatory measures for cities to consider [11].

To address street and sidewalk clutter of unused e-scooters, jurisdictions have experimented with third-party parking and charging infrastructure “hubs”, on-street parking zones, on-street or sidewalk parking signage, geofence technology to prevent parking in certain locations, and rider photo verification of parking. Local regulators have also allocated dedicated parking areas for e-scooters or installed parking corrals (Figure 9), widened sidewalks, and established no-scooter zones to ensure that transit station access points and pedestrian pathways are cleared, which proven important for ensuring unobstructed access for the disabled [4].



Source: Austin DOT via Flickr

Figure 9. Designated parking for shared micromobility.

The 2022 BTSCRCP study found that no studies reported on practices related to pavement management, hazard detection, or traffic control treatments specific to e-scooters. Though the current Manual on

Uniform Traffic Control Devices (MUTCD) does not have any content related specifically to e-scooters, cities have gone ahead and evaluated experimental signage, pavement markings, and signal treatments. Practices that are used infrequently or not at all include providing incentives for safety performance or helmet use, funding dedicated staff positions, funding helmet distribution, and applying e-scooter permitting and licensing fees to pay for infrastructure improvements. Without staffing and funding to address safety needs for e-scooter riders, the risk of e-scooter crashes and injuries is likely to continue [11].

Outreach

Among the non-regulatory safety measures local governments take to promote micromobility safety, commonly-reported practices include outreach and public engagement efforts. This includes informational safety messaging, partnering with operators to deliver messages, and hosting community events.

Outreach and public engagement of micromobility safety messages is generally conducted by the public agency and the private operator. Few, however, have studied the reach, equity impacts, or general effectiveness of these efforts. Most local governments require operators to post rules on shared micromobility devices (Figure 10) and share information on regulations with users through their smartphone app. Some cities emphasize in-person training events as a key component of their outreach and engagement efforts, including educating law enforcement officers. Very little to none of the available literature provides insights into providing mapped safe routes for e-scooter riding, reinforcing positive riding behavior, promoting a safety culture, messaging to increase driver awareness of e-scooter users, equity-based messaging that considers the socio-economic, cultural, and language differences of disadvantaged or minority populations, or using technology to improve communications to riders (e.g., through text messages and auditory and haptic cues) [11].



Source: TTI

Figure 10. Rules Posted on an E-Scooter in Los Angeles, CA

Government Liability

Because micromobility-related injuries and fatalities have occurred and will remain a problem, public agencies should consider the issue of how liability is assigned in cases of accidents involving shared micromobility devices. State and local transportation agencies are generally responsible for notifying the public of and repairing roadways with defects (e.g., potholes), so they may be potentially liable if they fail to remedy a known hazard.

The duty of care and legal responsibilities of the parties involved in shared micromobility programs are not clear at this time, so the literature advises governments to explore the roles of government agencies, e-scooter manufacturers, shared mobility providers, and individual riders so that they can install mechanisms, including insurance, indemnity, and liability waivers, that can ensure that liability claims for micromobility-related accidents are managed fairly, equitably, and in a timely manner [4].

Insurance

E-scooter riders are typically not insured for injuries and damages they may cause to people and property. While their health insurance could cover their own injuries from a crash, their auto insurance policies will likely not cover injuries to others involved in the crash because they exclude micromobility devices as not within the definition of a covered vehicle within the policy. In addition, standard rental agreements for shared micromobility operators do not provide insurance coverage. They may be silent on insurance or simply inform users that their auto insurance policies may not provide coverage for accidents involving or damage to the scooter. Thus, the literature advises local governments considering deployment of shared micromobility in their jurisdictions to explore insurance requirements that may be appropriate for use of the public ROW by micromobility users.

Because mandating micromobility users to carry insurance could make micromobility an infeasible, cost-prohibitive option, many cities (e.g., San Francisco and Santa Monica, California) require shared micromobility operators operating under pilot programs or permits to carry insurance with general liability and premises and operations coverage for injuries to persons and/or damages to property caused by their users [15].

Indemnity and Liability Waivers

Rental agreements for shared micromobility operators typically deal with liability by including language that limits or releases the city where the scooter is operated from any liability to the fullest extent permitted by law. Such rental agreements often limits riders' legal rights and remedies by including provisions that affirm the rider's assumption of the risk of riding the vehicle, waive or limit liability, and agree to binding arbitration. The rental agreements also generally require the rider to fully release, indemnify, and hold harmless the micromobility operator, the technology company that provides the app, and, to the extent permitted by law, any municipality in which the rider operates the device from liability for all claims except for those based on gross negligence or willful misconduct. In the same way, local government contracts with shared micromobility providers typically require the companies to indemnify the city [15]. This could reduce the likelihood of a successful personal injury claim against the government, along with other legal tools available to some state and local agencies, including governmental or sovereign immunity, which generally limits the liability of governmental entities to personal injury and property damage caused by the negligence of a government employee

or defect in government property, and caps on damages, both of which exist for governmental entities in Texas, but not in California.

Generally, liability waivers will only generally shield against injuries proximately caused by the ordinary negligence of the e-scooter user (i.e., their failure to act as a reasonably prudent person). In many states, however, liability waivers do not apply to gross negligence, recklessness, intentional torts, or illegal acts, which presents a higher bar for personal injury lawsuits than ordinary negligence. For example, in Texas, pre-accident waivers of gross negligence, defined as “conduct that poses an extreme risk of harm to others and an actor that proceeds with conscious indifference to the rights, safety, or welfare of others”, have been held by the courts as against public policy and are thus, void [24].

A pedestrian could seek damages from a shared micromobility operator for injuries caused by their e-scooter because the pedestrian is not party to the rental agreement. However, rental agreements typically indemnify the operator and limit their liability. So, although the e-scooter user may be legally responsible for injuries or property damage, they are unlikely to be a source of actual recovery of damages due to a lack of insurance. This results in a policy problem (i.e., how can the pedestrian recover for the costs of injury damages) that has yet to be addressed.

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Appendix A. Jurisdiction Selection

The study team had a large number of potential municipalities to review in further detail, which resulted in the development of a process to prioritize seven (7) that would be the focus of a review of regulations and policies. As shown in Figure 11, shared micromobility programs are located throughout urban areas in the U.S. with varying levels of ridership, fleet size, regulatory restrictions, available data, and maturity. While most station-based bike share trips are concentrated in a small number of cities (the San Francisco Bay Area, Greater Boston, Chicago, Honolulu, New York City, and the Washington, D.C. Metropolitan Area), ridership is more widely distributed among e-scooter share systems [1].

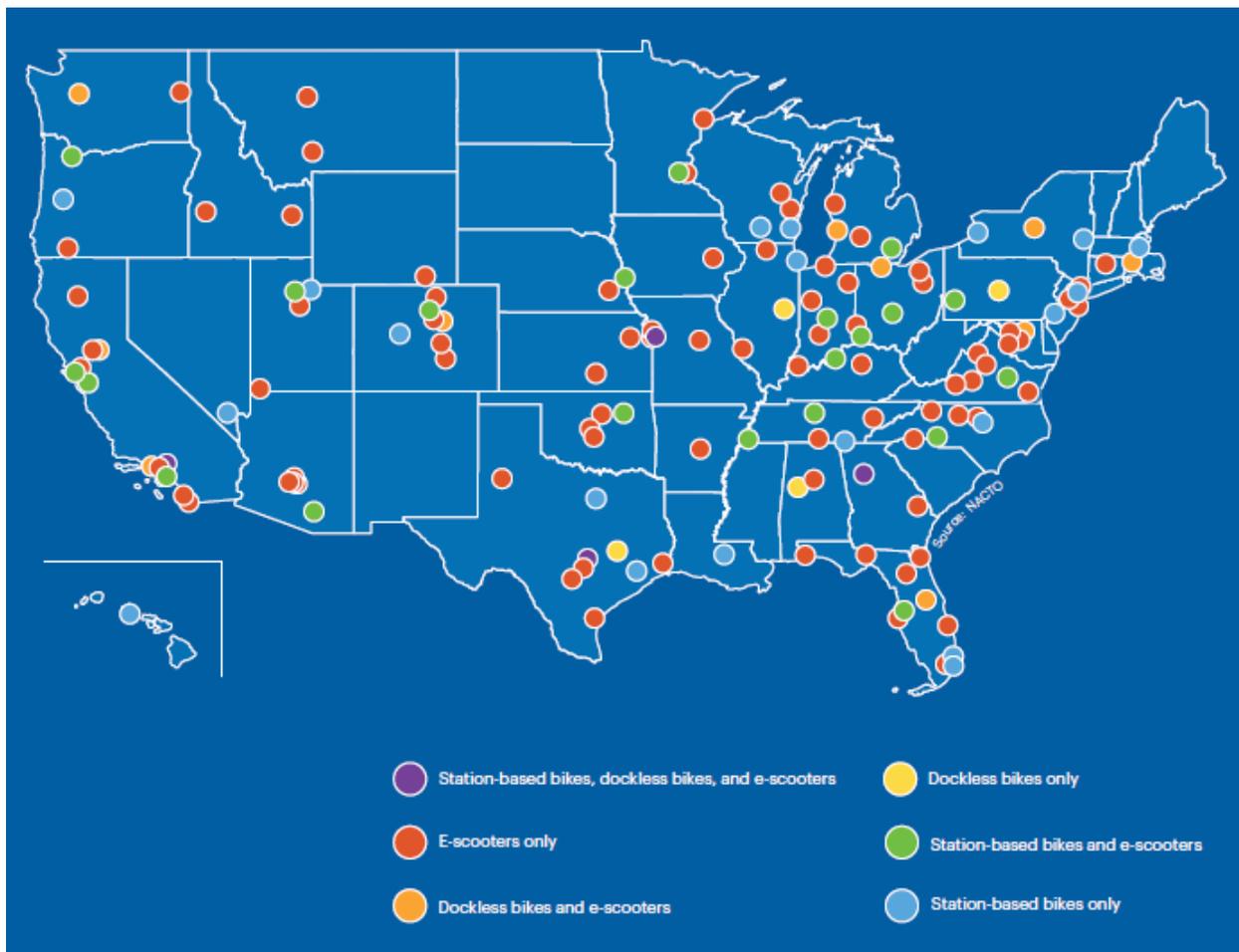


Figure 11. Shared micromobility programs in the U.S.

Based on reports from the literature review of specific municipalities who are addressing and incorporating scooters into their transportation ecosystems, the study team created a list of municipalities that would be the focus of a review of regulations and policies. They then developed selection criteria based on attributes that surfaced in the literature characterizing the programmatic and regulatory approaches cities were taking in incorporating scooters. For each attribute there is a range

of statuses, listed as sub-attributes in bullets beneath each. The goal was to select cities such that between all of the municipalities, all of the sub-attributes would be represented.

Attributes

Table 3 lists the selection criteria and sub-attributes in bullets beneath each criterion. These were identified and used to select cities that represented a diverse range of sub-attributes for further analysis.

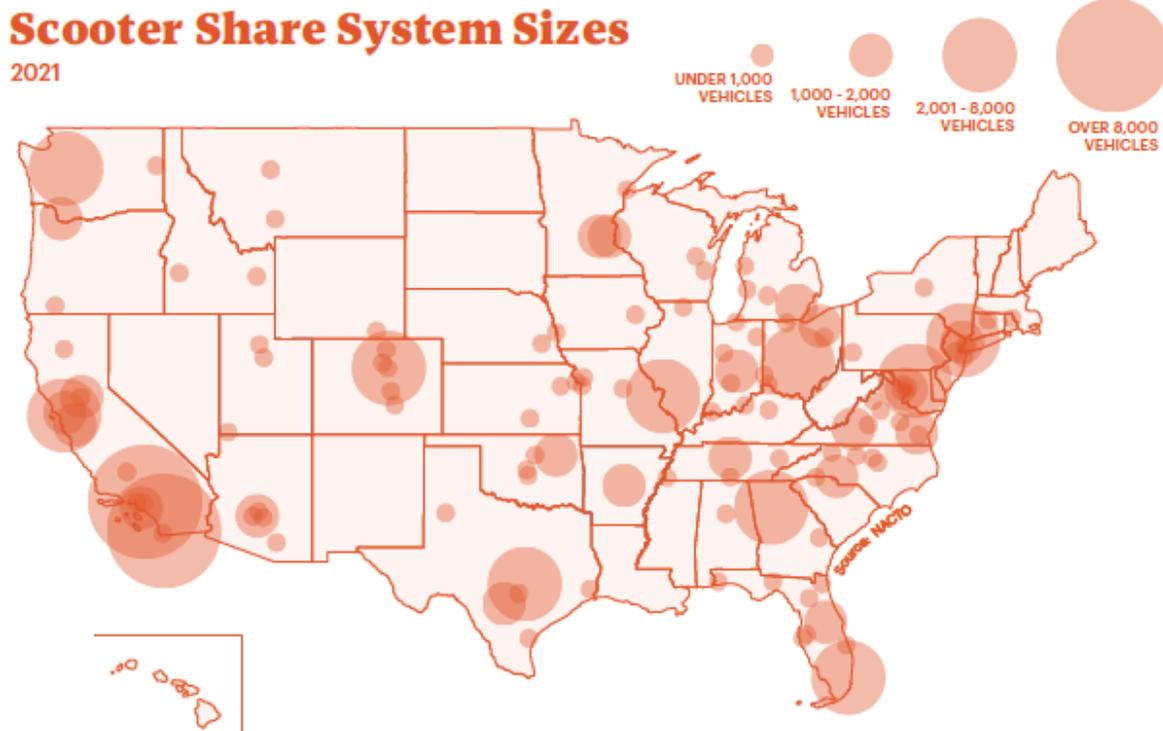
Table 3. Attributes and Sub-Attributes for Selecting Jurisdictions for Review

Attributes	Sub-Attributes
<u>Levels of restriction</u>	<ul style="list-style-type: none"> No or very little restrictions No state statutes No municipal statutes County restrictions Many restrictions
<u>Geographic</u>	<ul style="list-style-type: none"> Rural/Small urban College/Suburban Urban Regions Mid-Atlantic/Northeast Midwest/Southeast North/Northwest West/Southwest
<u>Pilot Phase</u>	<ul style="list-style-type: none"> Pilot in the beginning phase Pilot ended/continued service Ongoing pilot Ongoing service
<u>Ban/Restricted Areas</u>	<ul style="list-style-type: none"> One-time/continued ban following pilot Geofenced zone for service area Geofenced zone for restricted area Priority neighborhoods for marginalized populations Service through the city
<u>Permits/Caps</u>	<ul style="list-style-type: none"> No fees/caps No caps on vehicles No/limited fees for permits Permits and vehicle caps
<u>Data</u>	<ul style="list-style-type: none"> Static reports MDS/GBFS None specified
<u>Safety Analyses</u>	<ul style="list-style-type: none"> None externally available Performance report with safety Ongoing crash/injury data Performance targets specified
<u>Special Programs</u>	<ul style="list-style-type: none"> With Transit agencies With community organizations Others as relevant

Prioritization

The team then created a matrix (attached as Appendix A) for the candidate cities and analyzed them based on these attributes as well as other information. From there, the team rated each city, on a scale of 1 to 5 (based on the number of attributes they embodied), as best candidates for further study. The

chosen cities represent a geographic bias towards the Southwest, West and Northwest. However, this correlates with the 2021 map from NACTO of shared e-scooter program sizes, as shown in Figure 12.



Source: NACTO

Figure 12. Shared e-scooter systems and relative sizes of programs in the U.S., 2021.

Selected Cities

The final list of cities that were selected for further analysis include:

1. Los Angeles, CA
2. San Francisco, CA
3. Chicago, IL
4. Portland, OR
5. Dallas, TX
6. Miami, FL
7. Bellevue, WA

References (Appendix B)

1. National Association of City Transportation Officials. Half a Billion Trips on Shared Micromobility Since 2010. November 2022. https://nacto.org/wp-content/uploads/2022/12/2020-2021_shared_micro_snapshot_Dec7_2022.pdf.

Appendix B. Legal and Regulatory Analysis

This section provides a detailed description of the state statutes, local ordinances and regulations, and city information, as well as other policies (e.g., permit conditions) from each of the seven chosen jurisdictions. The components of each set of regulations were identified and categorized to create a typology of regulatory terms and approaches.

State Statutes

Table 4 provides a summary of state laws governing micromobility in California, Illinois, Oregon, Texas, Florida, and Washington. The information provided in the matrix shows the diverse range of detail and scope included in certain state's laws with some providing more comprehensive definitions, delegation of authority, and requirements related to parking, riding, speed limits, age, valid driver's license, helmet use, restricted areas, and insurance, while others are relatively sparse. Table 4 reveals the following:

- **Definitions** – All but Illinois and Texas define micromobility devices in state statutes with California, Oregon, and Florida law defining e-scooters.
- **Delegation of Authority** – Only California and Florida state statutes provide authority for local governments to adopt their own ordinances to regulate micromobility programs. This may be due to the different powers vested in local governments under the varying state constitutions, and the jurisdiction local governments in those states have over streets, roads, and highways within their borders.
- **Traffic/Parking Laws, Speed Limits** – All but Illinois and Washington state statutes provide traffic and parking laws that micromobility users and operators must adhere to. Some (California and Oregon) restrict the speed limit of e-scooters to 15 MPH, while another sets it at 35 MPH (Texas). One state requires e-scooters to yield to pedestrians and prohibit carrying passengers or freight (Oregon) and another grants the same rights to e-scooter users under the law that it provides to bicyclists (Florida).
- **Helmet, Age, License, and other Safety Requirements** – Only California and Oregon require helmets while operating e-scooters. California and Oregon law include age limits, while Texas law expressly allows micromobility use without a driver's license. California law also includes lighting requirements, noise limits, and motor disengagement requirements.
- **Restricted Areas** – Half of the states (California, Oregon, and Texas) provide prohibitions on where micromobility devices can be operated. Texas and Oregon prohibit riding e-scooters on sidewalks. California prohibits e-scooters from blocking sidewalks when parked and restricts local governments from banning them from bike paths, trails, and bikeways.
- **Liability** – Only California provides state statutes that impose liability insurance requirements for providers of micromobility services.

Table 4. Matrix of State Micromobility Laws

	CA	IL	OR	TX	FL	WA
Definitions	<ul style="list-style-type: none"> Defines a “electrically motorized board” (EMB) as a wheeled device with a floorboard that is stood upon while riding by a single person at a speed not exceeding 20 miles per hour (MPH) Defines a “motorized scooter” as a two-wheeled device with handlebars and a floorboard that is designed to be stood upon when riding or sat upon (on a seat), and is powered by an electric motor or by a source other than electric power 	None	Defines e-scooters as "Motor Assisted Scooters" subject to the same provisions applicable to any other vehicle.	None	<ul style="list-style-type: none"> Defines a “Micromobility Device” as a “motorized transportation device made available for private use by reservation through an online application, website, or software for point-to-point trips and which is not capable of traveling at a speed greater than 20 miles per hour on level ground”. “Micromobility Device” encompasses both “motorized scooters” and “bicycles”. Defines a “Motorized Scooter” as “any vehicle or micromobility device that is powered by a motor with or without a seat or saddle for the use of the rider” and “designed to travel on not more than three wheels”. They do not include devices “capable of propelling the vehicle at a speed greater than 20 miles per hour on level ground” and specifically exclude electric bicycles. Defines a “Bicycle” as “every vehicle propelled solely by human power, having two tandem wheels, and including any device generally 	Defines an “electric-assisted bicycle” as a “bicycle with two or three wheels, a saddle, fully operative pedals for human propulsion, and electric motor.” The electric-assisted bicycle’s motor is limited to a power output no greater than 750 watts and must meet the requirements of one of three classifications.

	CA	IL	OR	TX	FL	WA
					recognized as a bicycle though equipped with two front or two rear wheels”, and excludes scooters or similar devices.	
Delegation of Authority	<ul style="list-style-type: none"> Expands existing authority provided to transit development boards, public agencies, and local authorities to adopt ordinances, rules, or regulations to restrict, or specify the conditions for, the use of EMBs as they currently do for bicycles, motorized bicycles, skateboards, and roller skates on property under the control of, or any portion of property used by, the board, or on public property, highways, sidewalks, or roadways under the jurisdiction of the agency. Expands existing authority provided to the California Department of Transportation (Caltrans) and local authorities to prohibit or restrict the use of EMBs upon freeways or expressways as they currently do for bicycles, motorized bicycles, and motorized scooters. Allows local authorities to regulate registration of motorized scooters, 	None	None	None	Local governments have authority to adopt ordinances governing the operation of micromobility devices and motorized scooters on streets, highways, sidewalks, and sidewalk areas under the local government’s jurisdiction.	None

	CA	IL	OR	TX	FL	WA
	parking, or operation through their own ordinances.					
Traffic/Parking Laws, Speed Limits	<ul style="list-style-type: none"> Prohibits the operation of an EMB upon a highway while under the influence of an alcoholic beverage or any drug, or under the combined influence of an alcoholic beverage and any drug. Restricts the operating speed of EMBs of 15 MPH. Local jurisdictions must adopt rules for operation, parking, and maintenance of shared mobility devices before allowing local operation of such vehicles. Applies the existing maximum 15 MPH speed limit for the operation of a motorized scooter regardless of a higher speed limit applicable to the highway. Allows local authorities to authorize the operation of a motorized scooter on a highway with a speed limit of up to 35 MPH or highways with a higher speed limit if the motorized scooter is operated within a Class IV bikeway. 	None	<ul style="list-style-type: none"> People using an electric scooter are required to yield to pedestrians. Prohibits carrying passengers or a load (a package, bundle or other article) that prohibits the operator from controlling the scooter. Sets a speed limit of 15 MPH and prohibits scooter use on roadways with speed limits of more than 25 MPH. 	<ul style="list-style-type: none"> Allows a county or municipality to prohibit operation of e-scooters on streets, highways or sidewalks if necessary in the interest of safety. Sets a speed limit of 35 MPH. 	<ul style="list-style-type: none"> Provides that operators of motorized scooters or micromobility devices have all of the rights and duties applicable to the rider of a bicycle under the Florida Statutes. Operators who offer motorized scooters or micromobility devices for hire are responsible for securing all devices located in any area of the state where an active tropical storm or hurricane warning has been issued by the National Weather Service. 	None

	CA	IL	OR	TX	FL	WA
Helmet, Age, License, and other Safety Requirements	<ul style="list-style-type: none"> Requires that operators be at least 16 years of age in order to operate an EMB. Requires that operators of EMBs wear a helmet while operating an electrically motorized board upon a highway, bikeway, or any other public bicycle path, sidewalk, or trail. Requires the operator of a motorized scooter to wear a helmet only if the operator is under 18 years of age. EMBs and motor scooters are required to be equipped with a white light in front, a red rear reflector, and white or yellow side reflectors. In lieu of this equipment, operators could attach to themselves a white front light, rear red reflector, and side reflectors. Motorized scooters cannot produce a maximum noise level exceeding 80 dbA at a distance of 50 feet from the centerline of travel when tested in accordance with Society of Automotive Engineers (SAE) Recommended Practice J331 JAN00. Motorized scooters must 	None	<ul style="list-style-type: none"> People using electric scooters are required to wear a bicycle helmet. Youth under age 16 are prohibited from riding electric scooters. 	None	Riders of motorized scooters and micromobility devices do not need to have a driver license to operate them.	None

	CA	IL	OR	TX	FL	WA
	be equipped with motor disengagement functions.					
Restricted Areas	<ul style="list-style-type: none"> Provides an exception for EMBs from existing law that makes it a crime to operate a motorized skateboard on any sidewalk, roadway, or any other part of a highway or on any bikeway, bicycle path or trail, equestrian trail, or hiking or recreational trail Prohibits motorized scooters from blocking the sidewalk for pedestrians when parked/not in operation. Prohibits local ordinances from banning motorized scooters from operating on bicycle paths, trails, or bikeways. 	None	Prohibits using an electric scooter on the sidewalk and in crosswalks. People using electric scooters are allowed on Portland city streets, multi-use paths and in bike lanes.	Prohibits e-scooters from operating in areas other than low speed roadways and bike paths.	None	None
Liability	<ul style="list-style-type: none"> Providers must maintain commercial general liability insurance in a user agreement before distributing a shared mobility device within a jurisdiction. Prohibits the insurance from excluding coverage for injuries or damages caused by the shared mobility service provider to the shared mobility device user. 	None	None	None	None	None

Local Ordinances and Regulations

Table 5 through Table 16 provides a summary of local laws, rules, regulations, and other official policies governing micromobility in the cities of Los Angeles, California, Chicago, Portland, Dallas, Miami, and Bellevue. The information provided in the tables show the diverse range of scope and local authority for regulating micromobility, which can be found in the following sources:

- **Los Angeles** – The Los Angeles Municipal Code outlines definitions and permitting authority for the city’s department of transportation to make further rules for motorized scooters (rather than specifying them within the Municipal Code). The Code also names locations and types of places where scooters are not allowed to operate and provides information on fees and violation processes for scooter companies. In addition to local law, further scooter regulations fall outside of local ordinances and within the Los Angeles Department of Transportation’s (LADOT) On-Demand Mobility Rules and Guidelines that were promulgated in 2021.
- **San Francisco** – Article 900 of Division II of the San Francisco Transportation Code provides definitions and permitting authority for the San Francisco Municipal Transportation Agency (SFMTA). The provisions in Article 900 encompass permitting for temporary obstructions to traffic, temporary exclusive use of parking meters, the residential parking permit program, contractors, vanpool parking, bicycle racks, on-street shared vehicle parking, press vehicles, food trucks, commuter shuttles, and micromobility programs. This includes stationless bicycle sharing, shared electric moped, and powered scooter sharing programs. The Code defines the fee schedule, permit requirements, application requirements, permit privileges, permit issuance and revocation procedures, citations and due process, and interagency coordination. In addition to local law, further micromobility guidelines were promulgated in 2021.
- **Chicago** – The Municipal Code of Chicago has a chapter specifically focused on scooter sharing within its overall title for Vehicles, Traffic, and Rail Transportation. This chapter details information on relevant definitions, licensing and processes, insurance requirements, vehicles standards, number of vehicles allowed, data sharing, and violations and enforcement.
- **Portland** – Administrative Rule TRN-15.01 establishes the PBOT’s Shared Electric Scooter policy, regulations, and permit requirements. Revisions to the Rule are currently under consideration.
- **Dallas** – The first proposed Directors Rules were presented on October 7, 2020. In fall 2021, a Micromobility Working Group was formed to identify areas of the Shared Dockless Vehicle Program that could be improved, which was followed by changes to dockless vehicle regulations in the Dallas City Code approved by the City Council on June 22, 2022. New Program Rules were adopted and went into effect on August 1, 2022. Sec. 28.41.1.1 of the Dallas City Code contains regulations on riding and parking electric and motor-assisted scooters and bicycles. Chapter 43, Article X of the City Code contains regulations on shared dockless vehicle operators. The Program Rules govern the shared dockless vehicle operating permit.
- **Miami** – Chapter 8 of the City of Miami’s Code of Ordinances governs bicycles, skateboards, scooters, and “other similar devices”. Section 8-8 provides the policy statement and purpose for Chapter 8, expressing that it is “supplemental to the general laws of the State of Florida, including F.S. ch. 316” and incorporates “all definitions from F.S. §§ 316.003 and 316.2128 ...

including the definitions of ‘bicycle’ and ‘motorized scooter.’” The intent of the law is “to govern the operation of motorized scooters and motorized scooter services within the city to ensure that they are consistent with the safety and well-being of all bicyclists, pedestrians, and other users of the public rights-of-way”. Section 8-8 further provides that the pilot program “shall apply to the area of the city within city commission district 2” and not in any other area of the city. The Code currently provides a sunset for the pilot program to automatically terminate on January 1, 2020, but allowing for extensions of the pilot by Commission resolution. Resolutions have been passed by the Commission to continue to extend the pilot through today.

- **Bellevue** – The City of Bellevue City Code 11.48.210 Section B 1 provides regulations and restrictions upon use of motorized foot scooters within the city limits in addition to those imposed under State law.

Definitions

As shown in Table 5, each of the seven jurisdictions define micromobility devices and service providers that they permit or license in their shared micromobility programs. Interestingly, the City of Bellevue’s local ordinances include a definition for e-scooters even though their micromobility program does not include them.

The definitions for scooters and bicycles in the shared mobility programs are generally consistent with state statutory definitions where they are available. Some elaborate on the state statutory definition. For example, the City of Miami’s definition of “motorized scooter” in its local ordinances define it as how it is defined in state statute, but goes further, providing that it is a device with an electric motor, designed to transport only one person, exclusively or in combination with the application of human power, which cannot attain a speed of more than 15 miles per hour in bike lanes or streets without the application of human power on a level surface; or more than seven miles per hour on any sidewalk, baywalk, or in parks.

Table 5. Definitions in Local Ordinances and Regulations

City	Definitions
Los Angeles	<ul style="list-style-type: none"> • Defines e-scooters consistent with state statutes. • A “shared mobility device” includes an EMB or a motorized scooter (as well as electric bicycles, bicycles, or “similar personal transportation device[s]”). • Defines a “shared mobility device provider” as an entity that offers these devices through a digital application or other electronic or digital platform.
San Francisco	<ul style="list-style-type: none"> • Defines “Powered Scooters” as any device that has two or more wheels, handlebars, a floorboard that is designed to be stood upon when riding, and is powered by an electric motor or other power source. They are allowed to have a driver seat that does not interfere with the ability of the rider to stand and ride and be powered by human propulsion. • Defines “Stationless Shared Bicycles”, as a bicycle designed to be locked or secured from unauthorized use without being required to be locked or secured to a bike rack, bikeshare station, or other object. • Defines a “Powered Scooter Share Operator” as an individual or a public, private, or non-profit entity that manages a “Powered Scooter Share Program”, which is defined as a system of self-service Powered Scooters for hire in the City and County of San Francisco that offers to users at least 10 self-service Powered Scooters for use in the public ROW or

City	Definitions
	<p>on public property in the City and County of San Francisco, Alameda County, Contra Costa County, Marin County, San Mateo County, or Santa Clara County.</p> <ul style="list-style-type: none"> • Defines a “Stationless Bicycle Share Operator” as a public, private, or non-profit entity or individual that manages or operates a Stationless Bicycle Share Program, which is defined as a system of self-service bicycles for hire that does not require either a bike rack or bikeshare station permit and offers to customers at least 10 self-service Stationless Shared Bicycles for use in the public ROW or on public property in the City and County of San Francisco.
Chicago	<ul style="list-style-type: none"> • Defines a “scooter” as a low-speed electric mobility device, which is defined as a device with no operable pedals, is less than 100 pounds, powered by an electric motor, and travels no more than 15 MPH. • Defines a “scooter sharing business” as one that rents scooters available to the general public and occurring in public ROW, and a “scooter user” as an individual that rents a scooter from such a business. • A “scooter trip” begins when the scooter is unlocked by the scooter user and ends when the scooter is locked after use. • Defines a “lock-to scooter” as a type of scooter with a mechanism to be locked to a fixed physical object.
Portland	<ul style="list-style-type: none"> • Defines a “Shared Electric Scooter (Shared Scooter)” as a vehicle that: (1) has handlebars and a floorboard that is designed to be stood upon when riding, or may have a seat; (2) can be propelled by an electric motor or human propulsion; and (3) employs a digital application or platform to make the vehicle available for commercial use. • Defines a “Target” as a quantifiable level of performance or condition, as a value for a measure, to be achieved within a time period.
Dallas	<ul style="list-style-type: none"> • Defines e-scooters as they are defined in the state code as Motor Assisted Scooters. • Subjects scooter riders to the same requirements imposed on vehicle drivers as in state code.
Miami	<ul style="list-style-type: none"> • Defines "bicycle" and "motorized scooter" in accordance with state statutes. • Defines "Scooters" as any vehicle not having a seat or saddle for the use of the rider, designed for travel by human propulsion. • Defines "Other similar devises" as any vehicle or apparatus intended to propel a person by either human power or an electrical, mechanical or other power source. • Defines “motorized scooter” as a device with an electric motor, designed to transport only one person, exclusively or in combination with the application of human power, which cannot attain a speed of more than 15 mph in bike lanes or streets without the application of human power on a level surface; or more than 7 mph on any sidewalk, baywalk, or in parks. • Defines “Operator” as an individual or company that has been issued a license and/or pursuant to any procurement process, if approved by the City Commission.
Bellevue	<ul style="list-style-type: none"> • Defines a “Shared Micromobility Vehicle” as a class of fully or partially powered, light-to mid-weight (approximately 200 pounds or less), low- to medium speed (up to 30 miles per hour) vehicles primarily designed for use by one person, most commonly including but not limited to electric-assisted bicycles, motorized foot scooters, and powered seated scooters. • Defines an “Electric-Assisted Bicycle” according to State Stature. • Defines a “motorized foot scooter” as a device with no more than two 10-inch or smaller diameter wheels that has handlebars, is designed to be stood or sat upon by the operator, and is powered by an internal combustion engine or electric motor that is capable of propelling the device with or without human propulsion.

Permitting, Licensing, and Caps

As shown in Table 6, local laws in the seven jurisdictions authorize a city agent or agency to carry out a permitting program for shared micromobility, enabling promulgation of regulations and permit guidelines by the agent or agency. The local ordinances also require operators to obtain a permit before deploying devices in the public right-of-way (ROW) and provide the city agent or agency authority to suspend or revoke permits for violating the law. Some specify the permit term (e.g., Chicago) and caps on permitted fleet size of micromobility devices (e.g., Miami and Chicago).

The laws vary in the degree to which they prescribe the criteria by which permit applications are reviewed with the most prescriptive provisions in San Francisco and Chicago. In the latter, applications must be reviewed based on a set of scoring criteria that are outlined in the Municipal Code, which include safety criteria. Only Miami’s local laws govern a pilot program.

Table 6. Permitting, Licensing, and Caps Provisions in Local Ordinances and Regulations

City	Permitting, Licensing, and Caps Provision
Los Angeles	<ul style="list-style-type: none"> • Grants permitting authority for LADOT to make further rules for motorized scooters (rather than specifying them within the Code). • Grants authority to LADOT and its General Manager to make changes needed to implement the City’s Shared Mobility Device Permit Program by updating permit application procedures, standards, and conditions, and operating standards for public safety, data sharing, data privacy, fleet size, and maintenance of shared mobility devices. • Requires shared mobility device service providers to obtain a permit from the LADOT and be subject to all permit terms and conditions, the LADOT’s Rules and Guidelines (Rules), the Code, and state and federal law. Failure to comply with these laws and regulations may result in: (1) suspension or revocation of the Provider’s permit; (2) penalties as listed in the Rules; (3) reduction in the Provider’s authorized fleet size in the City; and (4) criminal prosecution for a violation of state or federal law. • No caps on devices provided in the law.
San Francisco	<ul style="list-style-type: none"> • Grants permitting authority to SFMTA to issue permits for the operation of shared scooters and bicycles in the public ROW under the jurisdiction of SFMTA or the San Francisco Department of Public Works. SFMTA has discretion to require any information of the applicant that it deems necessary to carry out the program and establish renewal procedures. • Requires operators to submit permit applications on a form supplied by the SFMTA along with all required application and any other fees, which must be paid before a permit may be issued. • Conditions permit issuance or renewal on compliance with all local rules and regulations, as well as permit provisions, with revocation authority provided to the SFMTA Director of Transportation for violations of the law. • While the Director of Transportation, in evaluating Stationless Bicycle Share Permits, must consider the proposed location and design of bicycle sharing station, availability of parking, and the anticipated effects of the proposed bicycle sharing station on transit, pedestrian and vehicular traffic, and access to or from residences and businesses, the Director of Transportation is given discretionary authority to determine criteria for evaluation of Powered Scooter Sharing Permit applications. • For Powered Scooter Sharing Permit applications, the Director may consider the operator’s capacity to meet permit terms based on past experience, including prior compliance with laws and efforts to ensure compliance by users. • Caps the number of shared Stationless Bicycles allowed in the City, but not scooters in the Powered Scooter Sharing Program. The Director of Transportation is required to determine the maximum number of scooters and permittees authorized under the

City	Permitting, Licensing, and Caps Provision
	<p>program.</p> <ul style="list-style-type: none"> Requires SFMTA to coordinate with the City’s Department of Public Works before issuing any Powered Scooter Share and Stationless Bicycle Sharing permit.
Chicago	<ul style="list-style-type: none"> Requires that scooter sharing businesses have a license to operate in the city, and specifies that the City Commissioner may only issue licenses to a maximum of three businesses. Each license is issued for a two-year period, following an approved application from the business to the Chicago Department of Transportation (CDOT). The City Commissioner reserves the right to rescind a license issued to a business. The City Commissioner and the Commissioner of Transportation rank applications received from scooter sharing businesses based on a set of scoring criteria that are outlined in the Municipal Code, including safety criteria weighing the applicant's ability to reduce danger and inconvenience to non-riders caused by scooters and rider behavior, including, but not limited to, the applicant's ability to deploy lock-to scooters and to implement a sidewalk riding detection technology on their entire fleet. Scooter sharing businesses are permitted to deploy up to 6,000 total scooters per day as part of their license . The city commissioner and commissioner of transportation work together to determine the number of permitted scooters for the business as part of their application review process. The total number of scooters which may be deployed in the city across all licensed businesses is 12,500.
Portland	<ul style="list-style-type: none"> Authorizes the Portland Bureau of Transportation (PBOT) to issue permits to operators that complete applications, pay an application fee of \$500.00, and satisfy the eligibility requirements (e.g., a data sharing agreement, a tested and operable scooter, submission of fees and proof of insurance, plans for maintenance, operations, cleaning, repair and disposal of scooters, an energy consumption and VMT plan, communications and outreach plans for educating customers).
Dallas	<ul style="list-style-type: none"> Permits are required to operate e-scooters in Dallas. They are issued by the Dallas Department of Transportation (DDOT) The Shared Dockless Vehicle Operating Authority Permit allows permitted Operators to operate a shared dockless vehicle service in the public right-of-way in the City of Dallas to rent, lease, or sell shared dockless vehicles for the purpose of transportation or conveyance.
Miami	<ul style="list-style-type: none"> Provides authority to the city manager, or his or her designee, to administratively issue, promulgate and establish additional rules and regulations, which must be made available on the city's website. A valid pilot program license is required to operate or permit the operation of a motorized scooter service for the duration of the pilot program. Pilot program licenses expire at the conclusion of the applicable pilot program, but can be renewed if the program is reinstated by the City Commission and follows the same process set forth in the law. Scooter pilot program operators are allowed a maximum initial fleet of 100 motorized scooters. Each operators’ fleet size can be increased by the city on a monthly basis by a maximum of 25% if the operator's usage data demonstrates that their fleet provides, on average, more than three rides per motorized scooter per day. The city can require operators to reduce their fleet size on a monthly basis by 25% if the operator's usage data demonstrates that their fleet provides, on average, less than two rides per motorized scooter per day.
Bellevue	<ul style="list-style-type: none"> Shared mobility operators must apply for and receive permits from the City for use of the public ROW. The permit allows the City to regulate activities within the ROW in the interest of public

City	Permitting, Licensing, and Caps Provision
	<p>health, safety and welfare and to provide for the fees, charges, warranties, and procedures required to administer the permit process.</p> <ul style="list-style-type: none"> Permits currently allow for operation of bike hub parking facilities, as well as systems using locking, charging, or helmet-dispensation stations or other fixed objects within the ROW.

Fees

As shown in Table 7, all jurisdictions require an initial permit application fee, as well as a permit renewal fee. The fee varies from a low of \$500 in Dallas and a high of \$50,000 in Miami. Other fees are also imposed, including per-trip or per-device fees, which, for the most part, are intended to be used to cover maintenance, enforcement, or other costs associated with relocating or removing devices blocking the ROW or installing infrastructure improvements.

Table 7. Fee Provisions in Local Ordinances and Regulations

City	Fee Provision
Los Angeles	<ul style="list-style-type: none"> Prior to permit issuance, shared mobility device providers are required to submit an application to the LADOT along with an initial non-refundable permit administration fee of \$20,000. Upon permit renewal every year, the provider is to pay another \$20,000 fee. Upon approval of the application and deployment of mobility devices on the City’s ROW, providers are required to pay a fee per trip which is calculated based on the geographic zone of vehicle operation. Failure to pay any delinquent payment within 30 days is cause for suspension of the permit. Providers may be subject to fees arising from the need for City crews to relocate or remove vehicles from any location where a mobility device is prohibited equal to the hourly rate of the City laborers plus any additional storage/impound fees. Only the City Council has the authority to approve, add, or modify the fee structure, as well as the geographic zone boundaries.
San Francisco	<ul style="list-style-type: none"> Requires operators to pay a fee before the SFMTA issues or renews any permit. Applicants are required to provide sufficient evidence to demonstrate payment of any penalties for violations of the law or terms in any existing or previously City-issued permits. Permittees must agree to pay the SFMTA for addressing or abating any violations, including repair or maintenance of public property. Stationless Bicycle Share Operators (but not Powered Scooter Share Operators) must pay the SFMTA a public property repair and maintenance endowment totaling \$25,000 to ensure adequate funds are available to reimburse the City for future public property repair and maintenance costs.
Chicago	<ul style="list-style-type: none"> License fees are calculated by the city using a rate of \$1 per day for each scooter deployed by the business. The city also may impose or collect other taxes for leasing, use, or operation of scooters in addition to the license fee.
Portland	<ul style="list-style-type: none"> Requires permittees to pay an initial application fee of \$500.00 and a \$20.00/per scooter fee, followed by a series of minor surcharges depending on the actual uses and trips taken. Fees and surcharges are subject to change by the Director of PBOT at any time.
Dallas	<ul style="list-style-type: none"> Requires an initial application fee of \$2,000 and a renewal fee of \$1,000, as well as a vehicle fee of \$35 for each permitted shared dockless vehicle with \$5 from the annual vehicle fee dedicated to equity programs, and a ROW rental fee of \$0.20 for each ride a customer takes on a shared dockless vehicle.

City	Fee Provision
	<ul style="list-style-type: none"> The city may establish a program to rebate or waive fees under in order to encourage equity in the distribution of shared dockless vehicles throughout the city.
Miami	<ul style="list-style-type: none"> Licensees must pay a nonrefundable \$50,000 licensing fee for all new applications, as well as extensions, renewals, or reinstatements. This fee must be used to offset any costs to the city and/or Miami Parking Authority related to enforcement, as well as sidewalk and/or street improvements within the pilot program area. Licensees must pay a motorized scooter fee of \$1 per motorized scooter per day. This fee must be calculated monthly based on the number of scooters authorized by the city for the current period. During the duration of the pilot program, this fee must be used for sidewalk and/or street improvements within the pilot program area. Licensees may be charged a fee not to exceed \$25.00 per scooter for removal and storage of visibly damaged or non-functional scooters that are blocking the public right-of-way, or located outside the pilot program area.
Bellevue	<ul style="list-style-type: none"> Initial permit application, review and inspection fees follow standard ROW permit procedures and the prescribed fee schedule for the given year. Operators are also subject to an annual shared Micromobility Lease Fee of \$6,560, paid prior to issuance of a permit, that allows for use of up to 1,700 square feet of public ROW. For operators who agree to commit to up to 11 operational enhancements, the City provides an incentive (either a 10% increase in the permitted maximum deployed fleet size or a compounding reduction of 10% in the Shared Micromobility Lease Fee for each commitment).

Insurance

As shown in Table 8, all jurisdictions require that operators prove that they carry commercial general liability insurance when they apply for a permit. Most also require worker’s compensation liability insurance, auto insurance, an umbrella policy, and/or employer’s liability insurance. Only Dallas requires cyber/technology network liability and risk insurance.

Some, but not all, require that permittees hold a performance bond or otherwise pay for repair of public property damaged by vehicles or costs incurred in addressing violations of permit conditions, including removing and storing improperly parked devices (e.g., Bellevue, Los Angeles, Dallas, Chicago). Others require that operators agree to indemnify the city for claims related to the permittee’s operations (e.g., San Francisco, Chicago, Portland).

Table 8. Insurance Provisions in Local Ordinances and Regulations

City	Insurance Provision
Los Angeles	<ul style="list-style-type: none"> Requires four types of insurance that providers must obtain: Commercial General Liability insurance; Workers' Compensation insurance; an umbrella insurance policy; and automobile insurance. A performance bond of \$80/Vehicle that must be accessible to the City for costs that may be incurred for removing and storing improperly parked devices and if a provider fails to remove the devices when its permit is terminated.
San Francisco	<ul style="list-style-type: none"> Requires that Powered Scooter Share Program and Stationless Bicycle Share Operators to possess “adequate insurance” that lists the City and County of San Francisco as an additional insured. The insurance must cover each scooter or bicycle ridden, parked, or left standing or unattended on any sidewalk, Street, or public ROW under the jurisdiction of the SFMTA or DPW, as well as users using the scooter or bicycle during the period of use. Permittees must indemnify and hold the City and County of San Francisco, its

City	Insurance Provision
	departments, commissions, boards, officers, employees, and agents harmless from and against any and all claims, demands, actions, or causes of action for the recovery of damages for the injury to or death of any person or persons or for the damage to any property resulting directly or indirectly from the activity authorized by the permit.
Chicago	<ul style="list-style-type: none"> • Scooter sharing businesses must obtain commercial general liability insurance. • The licensed business must indemnify the city against any additional third party claims caused directly or indirectly by the business’ operations, and cover costs for any damage to public right-of-way or city property as a result of their scooters
Portland	<ul style="list-style-type: none"> • Requires permittees to secure and maintain a primary commercial general liability policy for covered claims arising out of, but not limited to, bodily injury and property damage in the course of the Permittee’s operations under its permit. • Requires permittees to agree to indemnify, defend, and hold the City of Portland and its elected officials, officers, employees, and agents harmless from and against all claims, arising from, in whole or in part, the Permittee’s operations under its permit, including but not limited to claims against the City for negligent design, maintenance, or management of the ROW in connection with Permittee’s operations under its permit.
Dallas	<ul style="list-style-type: none"> • Operators are required to maintain commercial general liability insurance, auto insurance, worker’s compensation insurance, employer’s liability insurance, and cyber/technology network liability and risk insurance. • Operators are required to provide a performance bond or an irrevocable letter of credit of at least \$10,000.
Miami	<ul style="list-style-type: none"> • Licensees must carry commercial general liability insurance, automobile/motorcycle liability insurance, workers compensation insurance, and additional insurance coverage required by the city in connection with the activities performed by the operator as determined by the city risk management director, considering the size of the fleet and other liability insurance related factors.
Bellevue	<ul style="list-style-type: none"> • Operators deploying electric-assisted bicycles are required to continuously maintain throughout the entire term of the permit, at no expense to the City, Commercial General Liability insurance, umbrella or Excess Liability ‘follow form’ insurance, auto insurance, worker’s compensation insurance, and employer’s liability insurance. • Permittees are required to hold in effect at the time of issuance a performance bond of \$10,000 for their vehicle fleet for repair or maintenance of public property damaged by Permittee’s vehicles or agents, and to recover any costs incurred to the City to address or abate any violations of permit requirements.

Vehicle Requirements

As shown in Table 9, all seven jurisdictions require vehicles to be outfitted with some degree of hardware. Most (Los Angeles, San Francisco, Chicago, Portland, and Dallas) require a visible unique identification number, as well as visible contact information for the public to call to report device or safety issues. Three (Los Angeles, Chicago, Dallas) require lighting and only one (Miami) require a noise-making device to notify other roadway users of their presence.

Table 9. Vehicle Requirements Provisions in Local Ordinances and Regulations

City	Vehicle Requirements Provision
Los Angeles	<ul style="list-style-type: none"> • Requires a unique identifier that is readily visible to customers or any member of the public, as well as easily visible contact information for customers or members of the public to make relocation requests or report other issues. • Requires always-on front and back lights that are visible from a distance of at least 300 feet under normal atmospheric conditions at night. Front and rear lights must stay illuminated for at least 90 seconds after the vehicle has stopped during a trip. • Requires technology that prevents users from ending a ride if the vehicle is not standing

City	Vehicle Requirements Provision
	upright.
San Francisco	<ul style="list-style-type: none"> Requires that permitted shared scooters and bicycles have the name and contact information for the operator prominently displayed on them. Shared scooters and bicycles must be “sturdily built and with tamper-resistant hardware to accommodate a range of users”, comply with state law, be able to “withstand the rigors of outdoor storage and constant use”, possess integrated lock-to capabilities, and adhere to standard certifications determined by the SFMTA. Permittees must make available two sample vehicles for inspection and evaluation by the SFMTA. Stationless Bicycle Share Operators must submit to SFMTA the make and model of each bicycle made available to customers and a corresponding unique identification number.
Chicago	<ul style="list-style-type: none"> Only allows “lock-to scooters” to be deployed by the business. Scooters must have warning bells, front and rear lights, and hand and foot brakes (or functional equivalents). Requires scooter sharing businesses to have unique identifiers for each vehicle, contact information on the vehicle.
Portland	<ul style="list-style-type: none"> Permittees must provide a certification to the City that each of the Permittee’s Shared Scooters has met all conditions of the City’s certification requirements, state law, and any federal safety requirements. Shared Scooters must have visible language that provides the following information: <ul style="list-style-type: none"> A unique identification number; The name of the Permittee; The Permittee’s customer service information in a font size that meets or exceeds ADA standards; A notice to the User that helmets must be worn while riding a Shared Scooter; A notice to the User that Shared Scooter Users are prohibited from riding on the sidewalk, as well as riding and parking in Portland parks; and A notice to the User that Shared Scooters must be parked close to the curb, so as not impede pedestrian or vehicle travel (or alternatively, if the Shared Scooter uses a locking mechanism, then Shared Scooters may also be parked at a bike rack in the ROW).
Dallas	<ul style="list-style-type: none"> E-scooters must be equipped with a front light that creates visibility for the scooter up to 500 feet and a red reflector of the rear visible from 600 feet away. E-scooters must display required information, including the company logo, unique identification number, “No Sidewalk Riding” information, and information on how to submit complaints about the vehicle to the operator.
Miami	<ul style="list-style-type: none"> Bicycles (but not scooters) must be equipped with a bell or device capable of giving a signal audible for a distance of at least 100 feet, but cannot use sirens or whistles.
Bellevue	<ul style="list-style-type: none"> Permits issued by the City of Bellevue for the 2020 permit period were applicable to any class of electric-assisted bicycle (defined under state statute). Permittees wishing to deploy another type of vehicle were required to seek written approval. The 2020 permit period did not provide for implementation of motorized foot scooters, presumably due to restrictions governing the use of such devices on public ROW.

Technical Requirements

As shown in Table 10, technical requirements for shared micromobility devices vary between the jurisdictions. Three (San Francisco, Dallas, and Bellevue) require the vehicles to be GPS-equipped to provide real-time location data to the city. Three others (Los Angeles, Portland, Miami) require that they be designed to not exceed 15 mph. San Francisco, Chicago, and Bellevue also require technology

that allow for photo validation, geofencing, sidewalk riding detection, “slow and no ride zone” detection and notification.

Table 10. Technical Requirements Provisions in Local Ordinances and Regulations

City	Technical Requirements Provision
Los Angeles	<ul style="list-style-type: none"> Requires e-scooters to be incapable of reaching a top speed of greater than 15 mph and be zero emission.
San Francisco	<ul style="list-style-type: none"> Requires Powered Scooters and Stationless Bicycles to be equipped with an on-board GPS device capable of providing real-time location data to the SFMTA.
Chicago	<ul style="list-style-type: none"> Requires scooter sharing businesses to have photo validation and geo-fencing technology, and sidewalk riding detection capability
Portland	<ul style="list-style-type: none"> Shared Scooters must have a maximum motor-assisted speed of 15 mph.
Dallas	<ul style="list-style-type: none"> Vehicles should be equipped with GPS technology to provide real-time location data, “slow and no ride zone” detection and notification technology, and multiple rider detection technology.
Miami	<ul style="list-style-type: none"> Motorized scooters must be designed to transport only one person and must not be able to attain a speed of more than 15 mph in bike lanes or streets without the application of human power on a level surface or more than 7 mph on any sidewalk, baywalk, or in parks.
Bellevue	<ul style="list-style-type: none"> All vehicles are required to be equipped with a GPS device to allow for real-time tracking of a vehicle’s location at all times and record of trip data, as well as geofencing technology to virtually designate geographic policy areas.

Customer Education

As shown in Table 11, all jurisdictions except Dallas include customer education requirements in their local ordinances and regulations. These education requirements generally entail informing customers of safe operating and parking operations, as well as state and local laws related to riding on sidewalks or other prohibited areas, yielding to pedestrians, and helmet use. In their applications for Los Angeles and San Francisco’s micromobility programs, permittees are required to submit plans describing their anticipated education efforts. Miami goes so far as to require that every motorized scooter user pass a motorized scooter safety education training provided by the operator.

Table 11. Customer Education Provisions in Local Ordinances and Regulations

City	Customer Education Provision
Los Angeles	<ul style="list-style-type: none"> Requires vehicles to have visible language that notifies the user that (1) helmet use is encouraged while riding a bicycle; (2) riders shall yield to pedestrians; (3) when riding on-street, follow the rules of the road, following all motor-vehicle laws and ordinances in the City of Los Angeles; (4) “No Riding On Sidewalks” (minimum 48-point font) located on the platform of every scooter; and (5) customers must be a minimum of 18 years old with a driver’s license to operate a vehicle. Makes providers responsible for informing customers how to park vehicles correctly by providing a Parking Plan on how they will incentivize customers to park safely and correctly, and pass on fees and disincentives for vehicles parked illegally outside of the “furniture zone” and “geo-fenced areas”. Requires providers to ensure that their devices are parked in the landscape/furniture zone of the sidewalk, preferably to a bicycle rack or in another area specifically designated for bicycle parking.
San Francisco	<ul style="list-style-type: none"> Requires Powered Scooter Share Program Operators to use best efforts to ensure that users comply with all applicable laws, which, at minimum, involves providing each user a summary of state and local laws governing the use of Powered Scooters. This summary

City	Customer Education Provision
	<p>must include, at minimum, statutory requirements for licensing, helmets, travel on highways, parking, and use of sidewalks.</p> <ul style="list-style-type: none"> • Users must acknowledge having read these requirements before operating a permitted scooter. • Powered Scooter Share Program Operators must submit a plan for educating users on proper scooter parking, pay a fee to SFMTA to cover the cost of SFMTA’s installation of bicycle racks, report collisions to the SFMTA, and every quarter, offer customers not less than one safety training class. • Stationless Bicycle Share Operators must provide a plan for educating users on proper bicycle parking, pay a fee to SFMTA to cover the cost of SFMTA’s installation of bicycle racks to insure adequate bicycle parking, and offer to customers a minimum of one safety training class every other quarter.
Chicago	<ul style="list-style-type: none"> • Requires each licensed scooter sharing business to communicate and educate all legal scooter operations to scooter users, and implement customer compliance policies to encourage proper scooter operations, with specific programs for first-time customers. • Requires businesses to conduct a public information campaign focused on safety, responsible riding, and parking compliance.
Portland	<ul style="list-style-type: none"> • Permittees must agree that the City of Portland is not responsible for educating Users regarding helmet requirements, how or where to ride or operate a Shared Scooter, and other applicable laws. • Permittees must educate Users regarding laws applicable to riding and operating a Shared Scooter in the City of Portland and to instruct Users on the safe operation of a Shared Scooter, with PBOT-approved language. • Permittees must educate Users to wear helmets, how or where to ride or operate a Shared Scooter, and other laws applicable to riding and operating a Shared Scooter in the City of Portland (e.g., age requirements, prohibitions on sidewalk riding, riding within Portland parks, helmet requirements, and parking requirements). • Permittees must educate Users to maintain focus and the ability to control the Shared Scooter at all times and only operate and park the Shared Scooter in areas where Shared Scooter use is permissible. • Permittees are required to incorporate interactive safety messaging, such as quizzes, on the User application, a minimum of once per five rentals. • Permittees must use best efforts to ensure that Users comply with all applicable laws, including, at minimum, distributing notifications, warnings, and fines and suspend Users’ accounts for repeated occurrences of non-compliant behavior.
Dallas	None
Miami	<ul style="list-style-type: none"> • Requires that operators educate persons operating motorized scooters regarding the rules, regulations, and laws applicable to riding, operating, and parking a motorized scooter, as well as safe, prudent, defensive, and courteous operation. • Requires operators, during the duration of the pilot program, to designate two local operational staff who will be responsible for: fielding complaints; addressing technical difficulties; coordinating the rebalancing and removal of scooters parked illegally; and providing public education. • Requires operator's mobile application to provide information notifying a motorized scooter user that: (1) motorized scooters may be operated on bike paths, bike lanes, including those within city parks, and the baywalk, streets, or sidewalks/sidewalk areas in a manner similar to bicycles; (2) motorized scooters are to be operated at a person's own risk, and that no representation is being made by the city as to the condition of any sidewalk, street, road, bike path, lane, baywalk, or sidewalk area; (3) motorized scooter users shall at all times yield to pedestrians and shall give an audible signal before overtaking and passing such pedestrian; (4) the use of helmets while operating a motorized scooter is strongly encouraged. • Requires operators to require that every motorized scooter user: (1) pass a motorized

City	Customer Education Provision
	scooter safety education training as is provided by the operator; (2) show or scan a photographic identification, which must indicate that every motorized scooter user is at least 18 years old; and (3) be shown a clear and legible map of the mandated geofenced areas within the city.
Bellevue	<ul style="list-style-type: none"> Operators are required to acknowledge that the City was not responsible for educating users about vehicle operation (riding on sidewalks and multi-use paths), helmet use, and other applicable laws and permit conditions (reporting vehicle maintenance and safety concerns, and reporting collisions and hazardous incidents to the Permittee and police department). Operators are required to agree to educate users on the use of their service and vehicles, parking in accordance with permit conditions, and all laws and regulations applicable to operating the vehicles in the City. Permitted Operators are to develop and submit a plan describing their rider education efforts. Permittees are required to participate in education and encouragement events hosted by the City, and to propose a plan for distributing helmets to registered users of the service.

Violations

As shown in Table 12, laws in each of the seven jurisdictions define operator and user actions that constitute a violation and the agency responsible for enforcing the law. In all the jurisdictions, the city agent or agency responsible for carrying out the micromobility program has the power to fine, suspend, or revoke permits as penalties for violating local rules or permit conditions.

Table 12. Violations Provisions in Local Ordinances and Regulations

City	Violations Provision
Los Angeles	<ul style="list-style-type: none"> LADOT may issue a notice of violation (NOV) to a shared mobility vehicle provider within 6 months of either a rules or permit condition violation. The NOV can impose penalties or corrective actions. No points are issued for violations that are correctable if the vehicle is removed or repaired in the prescribed time frame. For violations that have not been corrected within the appropriate time frame, or are uncorrectable, points will issue and accumulate throughout the permit year. All violations and fines are appealable. Each violation is assigned points assessed on a monthly basis. “Major” violations are assessed 10 points each and “Safety” violations are assessed 25 points each. The points are associated with penalty fees issued to the company each month based upon a penalty assessment schedule. They are also used to impose suspensions of portions of device fleets or revoke permits.
San Francisco	<ul style="list-style-type: none"> Permittees are required to comply with all micromobility program rules, regulations, and permit conditions for issuance or renewal of permits. Violations of micromobility rules, regulations, and permit conditions can result in summary suspension (for scooter share operators) or revocation (for scooter and bicycle share operators) of permits. Summary suspension is a remedy available to SFMTA against non-compliant scooter share operators if they determine that an alleged permit violation poses an imminent or ongoing risk to public health or safety. In such cases, the SFMTA has discretion to summarily suspend the scooter share permit pending the outcome of a hearing. Revocation of scooter or bicycle share program permits must be for “good cause”, which includes failure to pay a fine imposed by the SFMTA within 30 days of the date due; failure to pay a permit fee within 30 days following notice of nonpayment, violation of any statute or ordinance governing the operation of Powered Scooters or Stationless

City	Violations Provision
	<p>Bicycles regulated by the SFMTA, and violation of a permit condition.</p> <ul style="list-style-type: none"> • Scooter and bicycle share permittees are allowed to request review of the SFMTA’s decision to revoke or suspend a permit by a neutral hearing officer. • Permitted operators of shared scooters and bicycles are subject to citations and administrative penalties if they operate shared mobility device services without a permit, agreement, or authorization from the SFMTA, park, leave standing, or leave unattended a shared mobility device on any sidewalk, street, or public ROW without a permit, agreement, or other authorization, or violate one or more permit conditions.
Chicago	<ul style="list-style-type: none"> • The city commissioner reserves the right to impose penalties such as fines, suspensions or revocations against scooter sharing businesses. • Fines may be issued by the commissioner to scooter sharing businesses between the range of \$500 and \$10,000 for each violation. • For parking violations that result in the city removing scooters, licensed businesses must reimburse \$100 for each removed scooter.
Portland	<ul style="list-style-type: none"> • Authorizes the Director of PBOT to suspend or revoke permits, or assess civil penalties if a company is in violation of the City Code provisions, the administrative rule, or other permit conditions. • The City of Portland’s Administrative Rules and Procedures provide that transportation officers are authorized to carry out and enforce micromobility rules and laws. • Under the Administrative Rules and Procedures, permit applications must include a User enforcement plan, which includes, at minimum, how the company will deliver notifications, warnings, fines, and suspend Users’ accounts; how each penalty relates to actions taken by Users; and how each penalty relates to the number of documented instances of User behavior. • Under the Administrative Rules and Procedures, each permittee’s employees and contractors must comply with all applicable federal, state, and local laws. If PBOT in its sole discretion determines that a Permittee’s scooter distribution or collection activities are being performed in an unsafe manner or in violation of applicable parking and traffic laws, this determination shall be grounds for permit revocation. • Failure to comply with safety rules may result in the PBOT Director reducing the number of permitted Shared Scooters allowed to operate in the city, and penalties.
Dallas	<ul style="list-style-type: none"> • Peace officers have the authority to enforce traffic violations, while parking enforcement officers have the authority to enforce parking violations. • Fines are not to exceed \$200.
Miami	<ul style="list-style-type: none"> • Violations involving public health, safety or general welfare, failure to maintain the required insurance or bonding, or for other good and sufficient cause are subject to the cancellation of any license by the city. • If operators repeatedly fail to timely rebalance or remove micromobility vehicles blocking the ROW or provide timely responses to complaints received by the city, the city can require them to reduce their fleet size, impose a cap on fleet size or on the number of operators, or cease operations. • If operators fail to maintain required insurance coverage, the city is authorized to immediately cancel their license.
Bellevue	<ul style="list-style-type: none"> • Failure to comply with the conditions of the permit may result in temporary, indefinite, or conditional reduction in the Permittee’s permitted maximum deployed fleet size and/or fleet bonuses, reimbursement to the city of direct or indirect costs and/or Shared Micromobility Lease Fee reductions, or suspension or revocation of the permit. • The City Transportation Department would regard unpermitted shared mobility vehicles occupying ROW as a nuisance so that the City may attach notice to the object stating that it may be taken into custody and stored if it is not removed within 24 hours of the date and time stated on the notice, and that the object may be summarily removed by the City if deemed a hazard to public safety.

Banned Areas

As shown in Table 13, all jurisdictions except for San Francisco ban micromobility devices in certain areas. Most local laws prohibit sidewalk riding (Chicago, Portland, Dallas, Bellevue). Miami’s local laws limit e-scooters to one City Commission District.

Table 13. Banned Area Provisions in Local Ordinances and Regulations

City	Banned Area Provision
Los Angeles	<ul style="list-style-type: none"> • Scooters are not allowed to operate on decks surrounding swimming pools and tennis courts, fishing piers, skateboard facilities, a designated pedestrian walkway in Lake Balboa Park, and any boardwalk, sidewalk, or bike path north of Washington Boulevard up to the city’s border with the City of Santa Monica.
San Francisco	<ul style="list-style-type: none"> • No specific banned areas. However, applications require Powered Scooter Share and Stationless Bicycle Share Operators to provide to SFMTA a proposed service area meeting SFMTA’s distribution guidelines, and furnish a map of the service area. If issuing a permit would lead to an over-concentration of shared scooters or bicycles in the ROW, cause an imbalance in the geographic distribution of scooters or bicycles, or otherwise not be in the public interest, SFMTA has the authority to deny the permit.
Chicago	<ul style="list-style-type: none"> • Scooters cannot be operated on sidewalks in the city. • Scooters are also banned from being operated on the Lakefront Trail, the 606/Bloomington Trail, the Chicago Riverwalk, or O’Hare Airport.
Portland	<ul style="list-style-type: none"> • Scooters cannot be operated on sidewalks in the city. • Motorized wheeled devices are prohibited in parks, except on Park roads, or in designated vehicle parking areas, or by permit.
Dallas	<ul style="list-style-type: none"> • E-scooters are banned from sidewalks and from the State Fair Grounds of Texas.
Miami	<ul style="list-style-type: none"> • E-scooters are only authorized in City Commission District 2, which includes Coconut Grove, Brickell, Downtown Miami, Midtown, Edgewater, Morningside, and Wynwood (east side of N. Miami Avenue and east only). • Bicycles, mopeds, motorized scooters, scooters, skateboards, vehicles, or other similar devices are prohibited from being operated on the sidewalks of Southwest 8th Street between 4th Avenue and Tamiami Canal Road.
Bellevue	<ul style="list-style-type: none"> • Shared mobility vehicles cannot be parked in a manner that blocks access to transit vehicles, shelters, fare machines, or bus lanes/layover areas, entrances/doorways, sidewalk cafes, waste receptacles, wayfinding kiosks, and benches. They also cannot be in overhead sky bridges tunnels, or other easements internal to buildings within the ROW. • Permittees are required to use geofencing to identify areas within the City where parking of Shared Micromobility Vehicles was prohibited. • Motorized foot scooters may not be used on sidewalks, within city parks, or on unauthorized trail systems, nor on public rights-of-way with speed limits of greater than 25 miles per hour.

Operation and Parking

As shown in Table 14, all seven jurisdictions include extensive operating and parking restrictions and permissions in their local codes, regulations, and documented policies. This is not surprising given the volume of complaints cities have had to deal with related to devices blocking the public ROW and unsafe riding behavior. Los Angeles, Chicago, and San Francisco’s rules require operators to remedy violations within a specific timeframe after notification. Miami and Bellevue require the companies to provide contact information for local personnel who can respond to and remedy complaints.

Table 14. Operation and Parking Provisions in Local Ordinances and Regulations

City	Operation and Parking Provision
<p>Los Angeles</p>	<ul style="list-style-type: none"> • Providers must provide a mechanism for customers to notify them of safety or maintenance issues with devices and have a staffed operations center in the City and a 24-hour contact person available for emergency removals. • Devices that are parked incorrectly or inoperable must be remedied within two hours of being notified by the City between 7am and 10pm. • Shared mobility devices cannot be parked in a way that impedes the regular flow of travel in the public way, or in a way that impedes the clearance on sidewalks needed for ADA compliance. • Vehicles cannot be parked at the corners of sidewalks nor at any crosswalk, curb ramp, or within any feature that serves as an accessible element such as landings, areas of refuge, detectable warning surfaces, or any other physical feature that may be required for mobility. • Vehicles cannot be parked on blocks where the landscape/furniture zone is less than three feet wide, or where there is no landscape/furniture zone. • On blocks without sidewalks, vehicles may be parked if the travel lane(s) and 6-foot pedestrian clear zone are not impeded. • Vehicles can only be parked on hard surfaces within the landscape/furniture zone (e.g. concrete, asphalt). • Any Vehicle that is parked in one location for more than 5 consecutive days without moving may be removed by the City. • Vehicles cannot be parked in the landscape/furniture zone adjacent to or within parklets, transit zones, loading zones, disabled parking zones, locked to street furniture that requires pedestrian access, curb ramps, red curb zones, entryways, and driveways. • Vehicles must be upright when parked.
<p>San Francisco</p>	<ul style="list-style-type: none"> • Requires permitted Powered Scooter Share Program and Stationless Bicycle Share Operators to: make Powered Scooters and Stationless Bicycles available to customers only on an hourly basis or in smaller intervals; vary rates by duration of usage or of usage and distance, and clearly and understandably communicate the rates to the customer prior to use; and submit maintenance, cleaning, staffing, and repair plans for the scooters and bicycles for SFMTA and DPW approval. • If a Powered Scooter or Stationless Bicycle is improperly parked, left standing, or unattended on any sidewalk, Street, or public ROW or without a permit, the operator of the vehicle has 2 hours to remove the scooter or bicycle following notification. • Stationless Bicycle Share Operators must make bicycles available for pick-up and drop-off by customers on a 24-hour, seven days per week basis, provide adequate bicycle parking, provide a plan for educating users on proper bicycle parking, and pay a fee to SFMTA to cover the cost of SFMTA’s installation of bicycle racks to insure adequate bicycle parking.
<p>Chicago</p>	<ul style="list-style-type: none"> • Scooters are only permitted to operate in bike lanes or bike paths (unless they are not available), and not operated on sidewalks. • Scooters cannot be parked in a manner to obstruct vehicle or pedestrian traffic. • Scooters must be parked upright with at least 6 feet clearance between the scooter and public ROW, cannot be parked along building facades or block marked access points, and locked against fixed physical objects when parked. • The list of eligible physical fixed objects for locking scooters to include racks, retired parking meters, street signs, or light poles (cannot include bus stops). • Licensed businesses must take all necessary steps to ensure parking compliance is met; within two hours of notification, the businesses must remedy any issues with unlawful parking.
<p>Portland</p>	<ul style="list-style-type: none"> • Allows PBOT to specify areas for geofencing which permittees must then display for users on their websites and mobile apps. Geofences must be used to prevent users from ending a trip in a no parking zone if they are attempting to do so, or that they have

City	Operation and Parking Provision
	<p>entered into a no-ride zone.</p> <ul style="list-style-type: none"> Shared scooters are allowed to park in spots within the Furnishings Zone of the Sidewalk Corridor, within a designated scooter parking area, or properly oriented and locked to a bike rack. They may not be parked on or by an enumerated list of 24 street elements whose function would be impaired by the presence of a scooter (e.g., bridges, traffic medians, on sidewalks with narrow or no Furnishings Zones, within 5 feet of a crosswalk, fire hydrant, drinking fountain, and other functions whose access must remain unimpeded).
Dallas	<ul style="list-style-type: none"> Riders under the age of 17 must wear helmets. Scooters may not be ridden on any city sidewalk, or operate at speeds faster than 20 MPH, the designated speed in a low speed ride zone, or the posted speed on a public street or trail. Scooter riders may park scooters in upright positions, on non-porous surfaces, fastened to lockable bike racks, or in other spaces designated by the city. Scooters may not be parked in parking spaces, sidewalks, intersections, transit shelters, and other public spaces in a way that restricts the use those spaces for their intended purposes.
Miami	<ul style="list-style-type: none"> Persons under 18 years of age cannot be users or passengers on motorized scooters. More than one person cannot ride a motorized scooter at any one time. Operators at all times must maintain a staffed operations center within the city and a 24-hour customer service phone number. Operators must provide the city with the contact information for someone who can rebalance, remove, and/or relocate motorized scooter(s), and notify the city within 24 hours of a change in contact information. Operators must rebalance, remove, and/or relocate a motorized scooter(s) within two hours of receiving notification from the city. The city may, without prior notice to the operator or motorized scooter user, remove any motorized scooter(s) that is/are visibly damaged or non-functional, or blocking the public ROW, or located outside the pilot program area, and take it to a city facility for storage, at the sole expense of an operator. Motorized scooters must be parked: on a sidewalk or other hard surface, beside a bicycle rack, or at a city-owned location; on private property only with the permission of the property owner; at bicycle docking stations; upright; in a manner that is ADA-compliant; and re-parked, removed and/or relocated within two hours of receiving notification from the city. Motorized scooters cannot be parked in a manner that would: impede normal and reasonable pedestrian access on a sidewalk or in any manner that would reduce the minimum clear width of a sidewalk to less than three feet; impede vehicular traffic; impose a threat to public safety or security; place them on a block where the sidewalk is at any point less than six feet in width, or on a block that does not have sidewalks; in a visibility triangle; or in a way that blocks fire hydrants call boxes or other emergency facilities, transit facilities, loading spaces or zones, passenger loading spaces or zones, or valet parking service areas, railroad tracks or crossings, disabled or prohibited parking zones, street furniture that requires pedestrian access (for example, benches, parking pay stations, or bicycle/news racks), window displays, building entryways, or vehicular driveways.
Bellevue	<ul style="list-style-type: none"> Users are prohibited from using motorized foot scooters on sidewalks or within city parks or unauthorized trail systems, or on public ROW with speed limits greater than 25 miles per hour. They also cannot carry other passengers or operate the scooters between the hours of one-half hour after sunset and one-half hour before sunrise. Motorized scooter users must be at least 14 years old and wear a helmet. Permittees are required to utilize preferred parking areas (“bike hubs”) approved by the

City	Operation and Parking Provision
	<p>City's Transportation Department.</p> <ul style="list-style-type: none"> • Vehicles could be parked only on paved or other non-vegetated surfaces in the Public ROW, sidewalk easements, and other preferred areas identified by the City as Preferred Parking Areas. • Vehicles must be parked upright and not impact, obstruct, or block pedestrians and provide at least 4 feet of clearance for pedestrian circulation, and cannot be parked where the City determines they would represent a safety hazard. • Permittees are required to relocate incorrectly parked vehicles following notice according to circumstances and the City's response time limits. • Permittees are required to take steps deemed necessary to achieve a monthly minimum Bike Hub Parking Target, a defined percentage of user trips ending at or near a bike hubs, or risk a penalty, invoiced quarterly, at the rate of \$1 per trip for all trips exceeding the Bike Hub Parking Target and \$1 per vehicle per 24 hours for all vehicles left idle in in No Parking Areas in excess of the response time limits. • Permittees are required to provide local personnel to respond to issues identified by the City, private property owners, or others. Permittees are to assume primary responsibility for customer service and take steps to clearly communicate contact information to the public. • Permittees are required to provide the City with direct points of contact for personnel assigned to areas of responsibility regarding policy, permit compliance, and legal matters; local fleet operations; data collection and reporting; and public engagement activities. • Permittees with a weekly average of 100 or more vehicles deployed are required to rebalance the fleet to service areas according to the City's targets for each type. • Permittees must relocate any vehicle parked in one location not within or near a bike hub for six consecutive days to a bike hub by 6:00 AM the following day. A vehicle parked in this manner for more than seven consecutive days could be considered a nuisance and stored by the City for a period of 70 days, and then disposed of. • Permittees are to remove from the ROW any vehicles deemed inoperable or unsafe within 24 hours of notice given by any means by the City, an individual, or another entity. They are to remove or relocate within 24 hours any vehicle deemed to be failing to comply with the terms and provisions of the permit if notified by the City.

Equity and Opportunity Zones

As shown in Table 15, all but two of the cities (Chicago and Miami) include equity requirements as a condition of their shared micromobility permits. Los Angeles, San Francisco, and Dallas have established certain geographic areas as Equity-Focus Mobility Development Districts, Communities of Concern, and Equity Opportunity Zones, respectively, where a certain portion of a provider's fleet must be deployed.

Table 15. Equity and Opportunity Zones Provisions in Local Ordinances and Regulations

City	Equity and Opportunity Zones Provision
<p>Los Angeles</p>	<ul style="list-style-type: none"> • Providers must attend meetings with City's Business Improvement Districts, Neighborhood Councils, Council Districts, surrounding municipalities, Transportation Management Organizations/Associations, Disability Rights Organizations/Centers for Independent Living, and any other community-based organization as stipulated by the City to introduce the providers to them and make these communities aware of the Program and how it may affect the communities. • Providers are required to partner with a Community Based Organization (CBO) approved by LADOT for the duration of their permit. • Providers are required to have a non-smart phone option and non-credit card option for customers to use the shared mobility system. • Providers must offer a one-year low-income customer plan that waives any applicable

City	Equity and Opportunity Zones Provision
	<p>bicycle/e-scooter deposit and offers an affordable cash payment option and unlimited trips under 30 minutes to any customer with an income level at or below 200% of the federal poverty guidelines.</p> <ul style="list-style-type: none"> • Providers must provide customer service, outreach, and advertising materials in multiple languages including but not limited to Spanish, and conduct, submit, or respond to surveys as requested by the LADOT including but not limited to surveys related to job creation and community outreach. • Requires providers to deploy devices in Equity-Focus Mobility Development Districts (where people on average travel short periods of time, have access to comfortable bicycle infrastructure and high-frequency transit, and have a lower rate of crashes, while also experiencing economic hardship based on a high concentration of households living in poverty, overcrowded housing, high rates of unemployment, and low educational attainment) where no per trip fee is imposed on providers.
San Francisco	<ul style="list-style-type: none"> • Permitted operators are required to develop a targeted community outreach plan that includes a strategy to partner with advocacy and community benefit organizations, a culturally relevant and multilingual communications plan, and an equitable scooter or bicycle share implementation plan. • Operators are required to promote the use of their scooter or bicycle sharing system citywide among low-income communities, implement their community outreach plan at their own cost, and keep a record of any public feedback received. • In distributing shared scooters and bicycles across the city, operators must comply with SFMTA’s availability requirements in specific neighborhoods classified as Communities of Concern. • Requires operators to consider equity with regard to user fees by submitting low-income user plans that waive deposits and offer a minimum 50% discount off rental fees or unlimited trips under 30 minutes, and a cash payment option, to users whose income levels are at or below 200% of federal poverty guidelines. • Operators must provide a multilingual website in languages determined by the SFMTA. • Operator websites and mobile applications must accommodate visual and hearing-disabled users by meeting the requirements of Section 508 of the Rehabilitation Act and Section 255 of the Communications Act.
Chicago	<ul style="list-style-type: none"> • No equity or opportunity zones, but the program requires that businesses have an operational protocol to distribute scooters evenly in the city based on population. • Authorizes the commissioner to create geographic areas for redistribution for the purpose of equity goals. • Requires that licensees provide information and mechanisms for users to access scooters without using a smartphone, such as through text or phone call (required at minimum), in order to help users overcome any digital barriers.
Portland	<ul style="list-style-type: none"> • Permittees must submit, and PBOT must approve, a User equity plan that includes, at minimum, discounted pricing for people on low incomes, non-smartphone access options, and multiple languages for printed materials. • The plans should detail any additional efforts to reduce barriers and increase access to Shared Scooters for historically underserved communities, including people with low incomes, people of color, and people with disabilities. • Permittees must submit, and PBOT must approve, an economic opportunity plan for hiring and contracting with individuals from historically underserved communities including people with low-incomes, people of color, and people with disabilities, and provide details of existing partnerships with workforce development agencies in Portland.
Dallas	<ul style="list-style-type: none"> • Operators are required to rebalance their deployed shared dockless vehicle units so that a minimum of 15% of an operator’s total number of deployed shared dockless vehicle units shall be deployed in Equity Opportunity Zones.

City	Equity and Opportunity Zones Provision
Miami	<ul style="list-style-type: none"> No equity or opportunity zones, but operators must implement marketing and targeted community outreach plans, at their own expense, and to the satisfaction of the city, to promote the use of motorized scooters, particularly in low-income communities.
Bellevue	<ul style="list-style-type: none"> Permittees are encouraged to commit to rebalancing a minimum of 10% of their operational fleet to within 660 feet of properties with affordable multi-family housing units. Permittees must submit with their permit application a plan for facilitating provision of affordable and accessible service for low-income, unbanked, and underserved populations. Permittees must provide a process allowing individuals to register for and add funds to their shared micromobility account in person by visiting the Service First desk at Bellevue City Hall and/or a staffed customer service center within Bellevue City Limits. Permittees must provide for navigation of their mobile application, service terms of use and privacy policy, and information about pricing structure, rates, fees, and surcharges in the following languages: English, Spanish, Chinese, Korean, Vietnamese, and Russian.

Data Requirements

As shown in Table 16, all seven jurisdictions require permittees to submit data in compliance with the city’s MDS. While the regularity with which the data is to be submitted and the type of data to be submitted varies, most require device location data in real-time. Some laws allow raw data to be held in confidence, but not aggregated data, which must be submitted to the city for publication.

Table 16. Data Requirements Provisions in Local Ordinances and Regulations

City	Data Requirements Provision
Los Angeles	<ul style="list-style-type: none"> Requires providers to comply with LADOT’s Mobility Data Specification (MDS), which provides a consistent standard for the transfer, use, and protection of vehicle data from operators to LADOT. Requires raw data to be held confidentially between the City and the provider to the extent that is permitted by law. However, summaries, program utilization data, and trend data may be made public. Personally Identifiable Information on customers collected by providers may not be transmitted to, processed or stored at a destination outside of the United States.
San Francisco	<ul style="list-style-type: none"> Requires operators to provide aggregate user demographic data to the SFMTA on a periodic basis. The data must not identify individual users, payment methods, or their individual trip history, but use anonymized keys. Requires operators to submit a privacy policy consistent with SFMTA guidelines that safeguards users’ personal, financial, and travel information and usage.
Chicago	<ul style="list-style-type: none"> Requires businesses to provide a quarterly report to the city on utilization and operations information, provide full access and interfacing to their MDS API, create a GBFS API available to the general public, and provided other data sets related to scooter sharing on request.
Portland	<ul style="list-style-type: none"> Permittees must provide the City or a City-identified third-party researcher or contractor access to data in accordance with the requirements specified in the City’s MDS. Permittees must maintain publicly available APIs in accordance with the requirements specified in the City’s MDS. If the City receives an open records request for any confidential information or is sued in order to obtain the disclosure of such information, the City is required to promptly notify the permittee upon receipt of such a request or lawsuit so as to afford Permittee the opportunity to take steps to prevent disclosure. In the event the City is ordered by a court to disclose a portion or all of the information or disclosure is otherwise required by law, the City is required to provide the permittee prompt notice before complying with the court order or law, so that the permittee may

City	Data Requirements Provision
	take appropriate actions, including seeking an injunction, appeal and stay of the court order or otherwise challenge the law.
Dallas	<ul style="list-style-type: none"> In July 2022, the City repealed the data sharing agreements that had been in place requiring operators to comply with the MDS and cooperate with the city in the collection and analysis of aggregated data about its operations. Operators were also relieved of the requirement to supply other reports at the city’s request. In its place, the City released permit rules requiring operators to provide real-time and historical information for their entire fleet through a documented web-based API.
Miami	<ul style="list-style-type: none"> Operators must cooperate with the city in the collection and analysis of aggregated data concerning its operations and furnish data. Operators must provide the city with real-time information on all motorized scooters operating within its boundaries through a documented API. Operators must publish to the API: (1) the point location; and (2) identification number for each motorized scooter. The city must be allowed to display real-time data provided via the API and publish real-time motorized scooter availability data to the public. Operators must provide anonymized data for each trip record through the API. Operators must provide the city with well-developed data through the MDS in two different feeds: (1) real-time/current information; and (2) historical information. Operators must provide scooter availability in real-time for enforcement purposes.
Bellevue	<ul style="list-style-type: none"> The City requires Permittees to submit data on Bicycle Maintenance (requests for maintenance), Parking Relocation Requests and Response, and Collisions.

City Information

Other sources of information were reviewed by the research team to gain more insight into the mechanics of the shared micromobility programs in Los Angeles, San Francisco, Chicago, Portland, Dallas, Miami, and Bellevue. The information presented in Table 17 through Table 28 below are sourced primarily from the various city mobility program websites, as well as terms and conditions provided in permits and permit applications.

Table 17 provides the history and current status of the shared micromobility programs in the seven cities. Bellevue’s program consists only of dockless bikes, while Chicago’s consists only of shared scooters. In Los Angeles, San Francisco, Portland, and Dallas, the micromobility programs involve both. Miami has an established station-based bikeshare program, but the focus of this analysis was on its shared e-scooter pilot program.

Table 17. Scope of Micromobility Programs Provided in City Sources

City	Scope of Micromobility Programs
Los Angeles	<ul style="list-style-type: none"> Micromobility program consists of on-demand e-scooter and bike sharing services. As of August 2022, five vehicle providers are listed on the LADOT’s Micromobility website: Bird, Lime, Lyft, Spin, and Wheels.
San Francisco	<ul style="list-style-type: none"> SFMTA’s micromobility programs include a Shared Electric Moped Parking Permit Program, a Bikeshare Program, and a Powered Scooter Share Permit Program. The SFMTA’s website shows that the agency has granted three powered scooter share permits for the 2022 permit cycle to Lime, Bird (Scoot), and Spin. Statutorily, permits can be effective for up to two years, so permits are for a one-year term with the option to extend for another year. The three current permittees can operate up to 5,500 scooters (Lime up to 2,000; Spin up to 2,000; and Bird up to 1,500).
Chicago	<ul style="list-style-type: none"> The City of Chicago’s program includes scooter sharing but not dockless bikeshare. The program is overseen by the Chicago Department of Transportation (CDOT) and the

City	Scope of Micromobility Programs
	Department of Business Affairs and Consumer Protection (BACP).
Portland	<ul style="list-style-type: none"> • PBOT’s Micromobility Program includes an E-Scooter Program and Bikeshare Program. • BIKETOWN is PBOT’s bike-share program operated by Lyft and sponsored by NIKE, Inc. The program includes Adaptive BIKETOWN rentals for people with disabilities, and a BIKETOWN for All initiative that provides affordable options for people living on low incomes. • Current e-scooter companies are Bird, Bolt, Lime and Spin. Portland is currently transitioning to a long-term E-Scooter Program after piloting it from April 2019 to June 2023. In Fall 2020, the Portland City Council directed PBOT to conduct additional outreach and start the transition from a pilot program that issued permits to shared e-scooter companies to a long-term program. The new program, expected to launch by July 1, 2023, will have PBOT partner with the e-scooter industry, by hiring one to two companies to be operators, more like the bureau's relationship with BIKETOWN.
Dallas	<ul style="list-style-type: none"> • Dockless bike share launched summer 2017 and shared electric scooters launched summer 2018. The Shared Dockless Vehicle Program was put on hold in fall 2020. • In December 2022, three companies were selected through a competitive process to offer shared dockless vehicle services in Dallas for the 2022-2023 annual operating permit cycle: Bird, Lime, and Superpedestrian. Each company will be allowed to deploy up to 500 devices at any given time when services launch, with opportunities to incrementally increase that number by meeting benchmarks for ridership and complaint statistics. It is currently anticipated that services will launch in mid-February 2023, to provide the three companies with sufficient time to establish their Dallas operations.
Miami	<ul style="list-style-type: none"> • Miami’s micromobility program is still in the pilot phase. As of October 2022, the pilot program allows nine private operators to offer motorized e-scooter rentals in Miami’s urban core and surrounding neighborhoods. • The pilot program has had a tumultuous history since the City of Miami’s Commissioners established it in October 2018. The program was extended several times before being suspended in November 2021. It was reinstated in January 2022 and a proposal is being considered now by the City Commission to codify safety measures for the pilot program and establish a permanent program. • There are currently 3,957 e-scooters permitted in the Sooter Pilot Program that are owned and maintained by 9 vendors participating in the pilot: Baus; Bird; Bolt; Helbiz; Jump; Lime; Lyft; Spin; and Wheels.
Bellevue	<ul style="list-style-type: none"> • The City established a special permitting process to encourage private vendors to provide Shared Micromobility (dockless bicycles) services within the city to encourage and provide alternatives to private automobile trips. The permit provided for development of parking locations (“Bike Hubs”) within public ROW near activity centers, transit stops, and neighborhoods. • The first permit period extended for one year from July 31, 2018. One vendor, Lime, was permitted to operate Shared Micromobility service by offering e-bikes for use by customers. • The 2018 permit period provided for a fleet size of about 400 vehicles, divided equally among all permitted operators, with a minimum cumulative active fleet size of 100 by the end of the fourth week of service. The total number of bikes available in Bellevue varied over the pilot period, with a weekly average ranging from 54 to 284 bikes available at 7:00 AM daily. • Electric scooters are not permitted for use in Bellevue. A special permit was offered again for 2020, but no vendors responded to the offer. Vendors indicated that they were not at that time prepared to offer Shared Micromobility service that did not include scooters. The City has stated publicly that it will be looking into addressing restrictions on electric scooters and moving forward with another special permit opportunity in the future.

Violations and Enforcement

As shown in Table 18, each of the city’s micromobility websites provides operating rules for users with some providing the state or local law related to riding devices. Some provide the amount of the fine that will be imposed for violating the law. Permit applications and rules provide the fees that operators will be subject to for violating permit conditions.

Table 18. Violations and Enforcement Information Provided in City Sources

City	Violations and Enforcement Information
Los Angeles	<ul style="list-style-type: none"> LADOT’s website provides notice of violations that users may be subject to, as well as contact information for the Los Angeles Police Department (LAPD), which is responsible for enforcing traffic laws. The website provides that state law prohibits riding e-scooters on sidewalks and the fine for sidewalk riding is \$197, enforced by LAPD traffic divisions. Violations for parking are also listed on LADOT’s website, but no associated fee for users are provided with those requirements. Vehicles parked in the same location for more than five consecutive days may be removed by the LA DPW Sanitation and Environment Bureau.
San Francisco	<ul style="list-style-type: none"> SFMTA’s website provides notice to the public of enforcement of city parking requirements. Operators are warned that SFMTA deploys Investigators to respond to 311 and other constituent complaints about scooters. The Investigators are authorized to issue \$100 parking citations to scooter share companies per device not parked according to the parking requirements. The SFMTA’s 2022-2023 Scooter Permit Terms and Conditions provide the enforcement process for parking violations. Upon citation issuance, the SFMTA issues a removal notice to the operator that its scooter is improperly parked on a sidewalk, street, or public right-of-way under the jurisdiction of the SFMTA or DPW, and that the operator must remove the scooter within two hours. Scooters that are not removed by the operator may be removed by SFMTA and taken to a city facility for storage at the operator’s expense and may be subject to additional citations. Operators are subject to administrative citations, which can cost up to \$500 per infraction for failure to comply with permit terms and conditions. SFMTA provides information about shared scooter-related complaints, citations issued, and citations paid on Shared Mobility Dashboards on its website. Each operator must maintain a Complaints Database containing all public complaints and comments related to poor user behavior (e.g., sidewalk riding) and tracking case status through complaint resolution. The database must be shared with SFMTA and provide documentation of enforcement for unsafe and/or illegal rider behavior, including evidence that the operator is investigating and taking all complaints seriously, and following the penalty structure defined in their permit application. Operators must maintain and update this database, to the SFMTA’s satisfaction, prior to the SFMTA granting a fleet size increase or permit term extension.
Chicago	<ul style="list-style-type: none"> Requires vendors to remedy any reported scooter issues within 2 hours. Vendors must reimburse the city costs to remove improperly parked scooters at a cost of \$100 per vehicle. BACP will issue citations to vendors for any violations of permit terms, which are tracked either through MDS data or by spot checks on the street. Performance aspects tracked through MDS data include scooter rebalancing, number of permitted vehicles, hours of operation, geofence zones and boundary adherence, and response time to reported incidents. Other aspects tracked by spot checks include device requirements, display of contact information, case payment access, and parking requirements. BACP also tests the functionality of information privacy, opt-in policies, and

City	Violations and Enforcement Information
	<p>communication of safety regulations and messaging to customers.</p> <ul style="list-style-type: none"> • Vendors must reimburse the city costs to remove improperly parked scooters at a cost of \$100 per vehicle. • Vendors are required to conduct maintenance checks for several aspects of the scooter at least once a month for each scooter; vendors also must keep records of maintenance conducted and make them available to the City upon request.
Portland	<ul style="list-style-type: none"> • PBOT provides contact information for Bird, Bolt, Lime and Spin, as well as a form on its website for the public to report e-scooter safety incidents, such as an improperly parked scooter in the Portland area. These issues are submitted to both PBOT and the associated e-scooter companies for resolution.
Dallas	<ul style="list-style-type: none"> • The City of Dallas’ Shared Dockless Vehicle Program website provides information on “Riding Restrictions” and a list of “Do’s and Don’ts”, including: <ul style="list-style-type: none"> ○ Scooters (rented and privately owned) may not be ridden on or in: sidewalks, trails, parks, plazas, on roads with a speed limit of 35 MPH or higher, and in other designated No-Ride Zones. Riders must dismount and walk their device through these areas. ○ There is a city-wide speed limit of 20 MPH for scooters and e-bikes. ○ In Slow-Ride Zones, riders must slow to 10 MPH. ○ Operating hours for rented scooters are limited to 5am - 9pm. ○ Scooters and e-bikes may not be rented to people under 16 years of age. • The website warns that riders that do not comply with these rules can be issued fines of up to \$200 (Section 28-41.1.1(k) of the Dallas City Code).
Miami	<ul style="list-style-type: none"> • At the top of the City of Miami’s Scooter Pilot Program website, the city provides an email address and phone number to report underage (under 18 years old) riders, unsafe rider behavior, improper parking or any other issue related to the pilot program. • The website asks “What laws apply to riding an e-scooter?” and provides that: (1) Users must be 18 years of age or older and have a valid driver’s license, state identification, or passport which must be scanned or provided to vendors as proof of age; (2) Parents may not allow minor children to use scooters; (3) Users are not required to wear a helmet on e-scooters, but helmet use is strongly recommended; (4) Only one person at a time may ride an e-scooter; and (5) E-scooters cannot exceed 15 miles per hour on streets and bike lanes and 7 miles per hour on sidewalks. • The website asks “Where can I ride an e-scooter?” and provides: “Users can ride on sidewalks or streets and are encouraged to ride in bike paths and bike lanes where available. E-scooters are only authorized in City Commission District 2”. • The website asks “How do I report underage riders, unsafe rider behavior, parking violations or abandoned vehicles?” and provides: the public should report underage riders, double riders, or unsafe behavior by sending a picture of the rider(s) showing serial number on the scooter to scooters@miamigov.com; providers are responsible for engaging with violators and collecting applicable fines; the public can report issues related to improper parking of dockless scooters to scooters@miamigov.com or by calling the Miami Parking Authority (MPA) at (305) 579-4900; and providers have 1 hour to respond to a request and must have a team available 24 hours a day or vehicles will be confiscated. • The website asks “Who is enforcing State and City rules?”, providing that the Miami Parking Authority (MPA) will ensure that Dockless Mobility Providers follow regulations outlined in their permit, and that MPA will issue a \$25.00 ticket and impound any scooters parked improperly on the sidewalks, roads, or private property or creating a safety hazard. riders. Anyone who knowingly allows underage riders or passengers to ride scooters may be banned from using scooters in the future.”
Bellevue	<ul style="list-style-type: none"> • The city’s Bikeshare website provides that, although there are currently no bikeshare operators permitted in Bellevue, people who use micromobility services in neighboring communities may sometimes ride shared bicycles or scooters here. The website request that those users remember to park them responsibly by parking bikes in designated areas,

City	Violations and Enforcement Information
	<p>at bike racks, and along sidewalks next to curbs. When visiting city parks, please leave bikes outside the park entrance. The site also provides that bikes should not be parked in a way that blocks walkways or travel lanes, bus doors, or sidewalk corners and wheelchair ramps.</p> <ul style="list-style-type: none"> The website provides that e-scooters are not permitted to be ridden in Bellevue on sidewalks or on streets with speed limits over 25 mph.

Targets and Benchmarks

As shown in Table 19, targets and benchmarks vary by jurisdiction. Los Angeles provides general “key takeaways” by which its micromobility program will be evaluated, while San Francisco’s permit terms and conditions provide the key metrics by which operators will be evaluated.

Table 19. Targets and Benchmark Information Provided in City Sources

City	Targets and Benchmark Information
Los Angeles	<ul style="list-style-type: none"> Key Takeaways by which the program is evaluated: (1) Expanded Mobility; (2) Responsible Data Use; (3) Efficient Management and Enforcement; (4) Innovation and Testing.
San Francisco	<ul style="list-style-type: none"> Operators are subject to data reporting requirements of key metrics, including number of unique users, number of trips, revenue hours, collisions, safety training, user compliance, complaints, low-income participation, distribution and access, adaptive scooters, accessibility, VMT, energy use, maintenance, paid citations and fees, fair pay and local hire, and outreach. SFMTA’s scooter permit terms and conditions provide two key metrics that guide operational distribution of scooters in San Francisco: (1) service coverage; and (2) trips per scooter per day. The Service coverage requirement considers distribution across area and time so that scooters are distributed to provide most of the city (percent of area) with easy access (~5-minute walk) to a scooter for most of the day (percent of time). For system monitoring, the SFMTA will regularly measure trips/scooter/day in order to assess whether fleet size appropriately matches demand and usage. As part of its permit, SFMTA advises permittees to maintain a certain target for low-income plan participation. The initial target is one low-income plan subscription per every two permitted scooters. Requires permittees to have fewer than 0.5 citations per scooter for quarters 2 and 3 of the permit term in order to be considered eligible for permit term extension.
Chicago	The city tracks ridership, trip origins and destinations, trip distances and durations, 311 reports, and violations and notices to vendors.
Portland	Provided in the law, but not on the PBOT website.
Dallas	None
Miami	None
Bellevue	The permit provides that the permitted operator maintain an active fleet of 100 bicycles by the 60th day of launch. There were 13 weeks during the 2018 permit period where the permitted operator did not meet this target.

Accessible Scooters

As shown in Table 20, only San Francisco and Chicago’s micromobility programs include accessible scooter requirements. Each city requires that adaptive, accessible scooters for riders with disabilities compose 5% of the operator’s fleet.

Table 20. Accessible Scooters Information Provided in City Sources

City	Accessible Scooters Information
Los Angeles	None
San Francisco	<ul style="list-style-type: none"> SFMTA’s Adaptive Scooter Program is intended to expand access to riders with disabilities, requiring permittees to provide adaptive scooters such that they make up at least 5% of the on-street fleet and make them available through the company’s mobile application and website. SFMTA’s Adaptive Bikeshare Pilot in 2021 continued the original pilot in 2019. As part of this pilot, adaptive bikes were made available throughout the summer at Golden Gate Park on Sundays from 11 a.m. to 4 p.m. through a partnership between BORP Adaptive Sports, Lyft, San Francisco Recreation and Parks Department, and the SFMTA.
Chicago	<ul style="list-style-type: none"> Requires that vendors provide accessible scooters with a seated option for riders. These vehicle types must compose at least 5% of the total fleet for that vendor.
Portland	None
Dallas	None
Miami	None
Bellevue	None

Parking Guidelines and Requirements

As shown in Table 21, each jurisdiction provides parking guidelines and requirements on websites and permit documents. Each of the city’s micromobility websites provide parking rules for users. Some provide the amount of the fine that will be imposed for improper parking.

Table 21. Parking Guidelines and Requirements Information Provided in City Sources

City	Parking Guidelines and Requirements Information
Los Angeles	<ul style="list-style-type: none"> LADOT developed parking zones that are not required but strongly encouraged for e-scooter parking. The zones can be viewed on an embedded Google map on the website, and dockless mobility providers also have these parking zone locations listed in their apps. Users are required to leave at least four feet of sidewalk space for pedestrians when parking their vehicle. The annual permit application requires providers to submit a parking plan for strategies to promote safe and legal parking of micromobility vehicles which are compliant with the Los Angeles Dockless On-Demand Mobility Rules and Guidelines (2021). The plan must include strategies for user incentives and disincentives, fees for illegally parked vehicles, training for staff and contractors, geofencing capabilities, detection and reparking of improperly parked vehicles, inspection of vehicles, and encouraging riders to park safely and report any concerns to operators.
San Francisco	<ul style="list-style-type: none"> The SFMTA’s 2022-2023 Scooter Permit Terms and Conditions provide 11 general requirements for Mobility Device parking that operators must communicate to users and staff and for which the operators will be responsible for violations by users. SFMTA’s scooter sharing website provides email addresses and phone numbers for Lime, Bird, and Spin to report improper riding or parking. It also provides hyperlinks to 311’s online request form and SFMTA’s Regulated Mobility Feedback Form for the same purpose.
Chicago	<ul style="list-style-type: none"> Scooters must be parked in the public ROW unless there is a parking arrangement between the vendor and a private property owner. Scooters must be parked on the sidewalk, locked to a fixed physical object, and leave clear path of travel at least 5 feet wide for pedestrians Physical objects that cannot be used for locking the scooter include private fences, bus stop shelters or signs, or disabled parking signs. Scooters cannot be parked along building facades and cannot block fire hydrants, bus

City	Parking Guidelines and Requirements Information
	<p>stops, loading zones, or access points to buildings.</p> <ul style="list-style-type: none"> • Vendors must require riders to provide and submit a photo to the vendor of their parked scooter at the end of the trip, to verify it is parked correctly. Vendors must also provide a representative sample of these photos and their approximate locations when taken to the city for their review. • The city’s Department of Streets and Sanitation (DSS) will investigate cases of improper parking not resolved within two hours, potentially removing the scooter if it is parked in the public ROW. The vendor will be notified of the scooter’s removal and must pick up the scooter within 5 business days of notification (along with paying the removal fees charged by the city). Vendors are also required to retrieve scooters thrown into Lake Michigan within 3 miles of the city corporate limits, within 24 hours of notification (if practically possible).
Portland	<ul style="list-style-type: none"> • The PBOT website provides an E-Scooter Factsheet, YouTube video, and other information that provides rules for riding and safe navigation on city streets, including summaries of state and local laws. One of the rules provides that state and local laws require that e-scooter riders park scooters on the sidewalk, close to the curb, or in designated scooter parking areas, and that If a scooter is parked in a way that prevents access to the sidewalk, curb ramps, bike lanes, or vehicle travel lanes, the user may be fined or their account suspended.
Dallas	<ul style="list-style-type: none"> • The City’s website provides information on “Where to Park”, listing 4 places: in scooter and bicycle parking corrals; locked to a bike rack; upright using the kickstand, in the landscaping/buffer zone between the sidewalk and the street; or at the curb facing the street, on sidewalks that are at least 8 feet wide. • The site also asks the public to report improperly parked vehicles to the applicable operator or through Dallas 311. • The website states that riders of rented scooters and e-bikes that are improperly parked will be fined \$20. • The permit application provides that applicants must provide photos and a description of how riders will be instructed to take a correct-end-of trip photo, and how end-of-trip photos will be reviewed for compliance.
Miami	<ul style="list-style-type: none"> • The City of Miami’s Scooter Pilot Program website asks “Where can I park an e-scooter?” providing that the city placed “Parking Corrals” in areas of high usage, which users are not required, but are strongly encouraged to park. • The website also provides that users must not park: in front of driveways, crosswalks, transit stops, or on private property; blocking building entrances or window displays; near ADA access ramps; in front of loading spaces, zones, or valet parking service areas; near utilities (such as fire hydrants); on landscaped areas or grass; on sidewalks less than 3 feet wide or on a street that does not have sidewalks. • Users are warned to leave at least 6 feet of sidewalk space for pedestrians and persons with disabilities.
Bellevue	<ul style="list-style-type: none"> • Permitted operators are required to establish parking incentives and disincentives for users to encourage parking at Bike Hubs. • Findings from the 2018 permit period found that: (1) bike hubs were installed at 15 locations in Downtown Bellevue, and expanded to 50 locations throughout the city by late 2018; (2) permitted operators did not implement incentives to encourage users to park at bike hubs and only 9% of trips ended within 50 feet of a bike hub with 16% ending within 75 feet of a bike hub; and (3) no parking areas were geofenced during the 2018 permit period.

Data Sources

As shown in Table 22, all jurisdictions except for Miami and Bellevue include data-related information on their websites or permit documents. Some (San Francisco and Portland) expressly provide that operator data is offered to the public through dashboard visualizations.

Table 22. Data Sources Information Provided in City Sources

City	Data Sources Information
Los Angeles	<ul style="list-style-type: none"> LADOT published a set of Data Protection Principles (2019), which provide that MDS data is categorized as confidential and thereby exempted from disclosure under the California Public Records Act. The Data Protection Principles state that law enforcement and other government agencies will not have access to raw trip data other than that required by law. However, aggregated data is available to these agencies as well as the general public through the city's Open Data Portal. The Data Protection Principles state that LADOT will not release any data on the Open Data Portal until data de-identification and destruction treatments are implemented.
San Francisco	<ul style="list-style-type: none"> Permittees are required to share real-time and periodic data on its entire permitted fleet through documented APIs. Permittees are required to retain data and keep it accessible via all required endpoints for at least two years after it is generated. Data contained in the API must be offered to the public and SFMTA under a non-revocable license that allows the API data to be used, modified and shared without restriction beyond attribution. The data is used, in part, to display visualized information on SFMTA's Shared Mobility Dashboards, which include dashboards showing shared mobility trips, service area coverage, origin and destination locations, parking citations, 311 complaints, responses, and fines and fees.
Chicago	<ul style="list-style-type: none"> Vendors are required to produce and share MDS data with the city, as well as provide GBFS data that is available to the general public. Vendors are required to provide quarterly reports to the city and CDOT with information on ridership and operations, education and outreach, helmets provided, environmental impact, customer service, incidents and crashes, and parking compliance. Crashes and police action incidents must also be reported to the city within 24 hours of the event. Vendors are required to maintain and validate data for sidewalk riding detection technology on the scooters themselves.
Portland	<ul style="list-style-type: none"> The City provides a Micromobility Dashboard that shows shared scooter and bikeshare trips per day, trip distance per day, trips per vehicle per day, and average active vehicles per day. The data is sourced from shared micromobility providers (BIKETOWN, Bird, Lime, Spin).
Dallas	<ul style="list-style-type: none"> Once the Shared Dockless Vehicle Program is launched, access to the General Bikeshare Feed Specification (GBFS), a data feed for shared mobility system availability, will be made publicly available. The permit application asks the operator to describe their ability and timeline to support the MDS, as well as how they will comply with the Data Privacy Requirements of the Program Rules to promote user privacy.
Miami	None
Bellevue	None

Community Engagement

As shown in Table 23, each jurisdiction except for Miami and Bellevue include community engagement requirements for operators in their permit documents. The engagement is primarily

focused on educating users on the law, safe operation and parking of devices, and reporting issues to the operator.

Table 23. Community Engagement Information Provided in City Sources

City	Community Engagement Information
Los Angeles	<ul style="list-style-type: none"> • Providers must submit a quarterly report to the city of engagement activities and outreach materials. • Minimum requirements listed in the annual permit application include: Meetings with key stakeholders, residents, and neighborhood organizations; timeline of proposed community engagement activities; and engagement of underserved communities. • Requires providers to submit screenshots to LADOT showing how customers will be notified of educational campaigns on encouragement to wear helmets, obeying local traffic laws, proper parking procedures, prohibition of scooter sidewalk riding, and notifying the provider on safety issues with vehicles.
San Francisco	<ul style="list-style-type: none"> • SFMTA’s scooter share permit terms and conditions provides Community Engagement Guidelines and Requirements, which instruct applicants on how to meet public accountability requirements, conduct community outreach, and develop programs for engagement and partnership. • The Guidelines provide elements that are required for applicants’ community engagement plans, including: mobility justice goals and priorities; multilingual communications services; a communications strategy routinely updated for service changes; an easily accessible public online forum for community feedback concerns and reporting complaints, a strategy to incorporate disability community input into services, expansion of outreach beyond current users or target markets; an easily navigable online annotated record of community engagement efforts; a community engagement staffing plan; a culturally sensitive marketing plan; and partner-ready programs.
Chicago	<ul style="list-style-type: none"> • CDOT’s license rules and regulations require vendors to conduct a public information campaign which includes focuses on safety, responsible riding, and parking compliance for scooters. • Vendors must communicate and educate their users on legal scooter operations while implementing compliance policies that encourage such behavior, along with encouraging the use of helmets while riding scooters. • Vendors are required to develop a specific education program for first time users, which includes at-minimum an app-based quiz with questions on scooter parking, safe riding, helmet use, and allowable riding areas. Users are required to answer at least 80% of the quiz questions correctly before taking their first ride. • Vendors are required to conduct at least 9 outreach events per quarter per year of their license. Six of these events must occur in Equity Priority Areas that are designated by the city. Vendors may also be required to conduct additional outreach events in Equity Priority Sub-Areas if scooter usage falls below set thresholds. • Vendors must have information about safe riding behavior and proper procedures in their application and on their website.
Portland	<ul style="list-style-type: none"> • PBOT engaged stakeholders in surveys, focus groups and collaboration with community-based organizations to capture and address community needs and awareness. Those organizations include Disability Rights Oregon, with whom PBOT produced a video; Forth Mobility, partner in coordinating safety workshops with companies; the Multnomah County Health Department, who undertook the study on scooter-related injuries; Portland State University, who researched the impact of e-scooter operations; and the Oregon Department of Environmental Quality to analyze company life cycle analyses; and affordable housing providers to assess ridership among low-income Portlanders.
Dallas	<ul style="list-style-type: none"> • The permit application asks operators to describe their Education Plan to educate users on all applicable laws in the City of Dallas, including minimum age, parking requirements, and prohibition of sidewalk riding, through the Operator’s smartphone application and through any other channels.

City	Community Engagement Information
	<ul style="list-style-type: none"> The permit application asks operators to describe their Complaint Education Plan to communicate to users and non-users on how to report complaints. The permit application asks operators to describe their Staffing Plan to enable 24/7 customer service.
Miami	None
Bellevue	None

Principles

As shown in Table 24, the Los Angeles, San Francisco, Chicago, and Portland micromobility programs provide a set of goals and/or objectives that serve as principles guiding delivery, management, and enforcement of the programs. Dallas, Miami, and Bellevue do not provide such principles on their websites or permit documents.

Table 24. Program Principles Provided in City Information Sources

City	Program Principles
Los Angeles	<ul style="list-style-type: none"> Micromobility Program Objectives: (1) Safety; (2) Equity; (3) Access; (4) Quality of Life.
San Francisco	<p>SFMTA and the San Francisco County Transportation Authority’s Guiding Principles for Emerging Mobility Services and Technologies (2019) describe ten principles:</p> <ol style="list-style-type: none"> Safety Transit Sustainability Collaboration Equitable Access Labor Congestion Financial Impact Accountability Disabled Access
Chicago	<ul style="list-style-type: none"> The city developed goals for scooter sharing licenses as part of their program pertaining to safety, including minimizing sidewalk riding, promoting safe use of scooters by riders, limiting potential challenges to other street users (particularly persons with disabilities), ensuring timely remedy of improperly parked scooters, achieving good public outreach and user education, and ensuring a high level of device safety.
Portland	<ul style="list-style-type: none"> The Portland Scooter Sharing Pilot goals were to: <ul style="list-style-type: none"> Increase the share of trips made using active and low-carbon transportation modes; Prevent fatalities and serious injuries; Improve pedestrian safety, accessibility, and convenience for people of all ages and abilities; Provide equitable transportation services; and Reduce air pollution, including climate pollution The Portland Scooter Sharing Pilot objectives were to: <ul style="list-style-type: none"> Increase mode shift from automobiles, including single-occupancy vehicle and private for-hire; Reduce barriers and increase access to Shared Scooters by people with low incomes, people of color, and people with disabilities; Increase Permittees’ employment of people with low incomes and people of color; Support safe riding and safe walking conditions, including reducing scooter sidewalk riding and improper parking; and Quantify Permittees’ scooter life cycle climate impacts, including scooter acquisition, replacement, and disposal; and attempt to reduce permittee operational vehicle miles traveled from deployment, rebalancing, and charging methods.

City	Program Principles
Dallas	None
Miami	None
Bellevue	None

Permits and Fees

As shown in Table 25, permit and permit fee information is detailed in websites or permit rules or applications for each city except for Bellevue.

Table 25. Permit and Fees Information Provided in City Sources

City	Permit and Fees Information
Los Angeles	<ul style="list-style-type: none"> LADOT’s permit agreement includes indemnification for the city for any bodily injury or damage to property in connection with use or misuse of micromobility vehicles. The application process requires providers to attach certifications of safety standard compliance to their micromobility vehicles, which include rider education and localized safety information.
San Francisco	<ul style="list-style-type: none"> SFMTA’s provides: (1) the permit letters and permit terms and conditions for the three current approved scooter sharing operators, and permit documents for the 2021 scooter sharing program; and (2) the 2017 stationless bikeshare permit, 2019 permit application, and 2021 adaptive bikeshare evaluation fact sheet. The permit fee structure is not included in the websites or the permit materials because they are set in the law.
Chicago	<ul style="list-style-type: none"> Beginning in October 2021, the city issued up to three scooter sharing business licenses at a time, each lasting for two years. Licenses are non-renewable, meaning the vendor must reapply at the end of each two-year period. The program rules and regulations state that the city may increase the fleet size cap for licensed vendors if another vendor’s license is revoked; any increases would be subject to a \$1 fee per scooter per day for the remainder of the license period.
Portland	<ul style="list-style-type: none"> No permits issued yet. Permit requirements and fees are provided in PBOT’s Administrative Rule TRN-15.01.
Dallas	<ul style="list-style-type: none"> As of January 2023, city staff are working with the three top-scoring companies to collect outstanding documents required for permitting, confirm that the companies' data feeds are connected to the City's Data Vendor, connect customer service systems, and issue the permits. It is currently anticipated that services will launch in mid-February 2023, to provide the three companies with sufficient time to establish their Dallas operations. The application required a \$2000 non-refundable fee. Before a permit could be issued, the operator is required to pay a Vehicle Fee for the maximum number of units the Operator agrees to deploy. If the Operator plans to deploy the maximum allowable number of 500 units at permit initiation, the fee would be \$17,500.
Miami	<ul style="list-style-type: none"> The City of Miami’s Scooter Pilot Program website asks “How much does it cost to participate in the scooter program?” and provides that operators must pay a non-refundable licensing fee to offset any costs to the city of off-street parking and enforcement of the program, as well as a motorized scooter fee in an amount of \$1.00 per motorized scooter per day designated for sidewalk/ sidewalk area, and/or street improvements within pilot program area.
Bellevue	None

Pilots and Services

As shown in Table 26, each of the seven jurisdictions conducted or are conducting pilots for their micromobility programs. Miami is the only jurisdiction currently in the pilot stage. Los Angeles, San Francisco, Chicago, and Dallas have deployed permanent programs based on findings from their pilots.

Table 26. Information on Pilots and Services Provided in City Sources

City	Information on Pilots and Services
<p>Los Angeles</p>	<ul style="list-style-type: none"> <p>Pilot: LADOT launched an initial dockless mobility pilot program in March 2019, and conducted a Year One analysis of the pilot results. An objective was to ensure safety of all roadway users, including non-riders. LADOT staff would conduct monthly audits using an Audit Mobile App developed by the city to look at vehicle deployment, user parking, vehicle conditions, and location accuracy of MDS. LADOT also applied several “No Electric Scooter Riding on Sidewalk” sidewalk stencils in Council District 5, with the goal of increasing safety and awareness of sidewalk riding rules. During the initial pilot, LADOT established a Special Operations Zone (SOZ) in the Venice Beach area in order to address oversaturation of vehicles and illegal riding behavior. The city worked with providers to use geofencing within the zone and slow vehicle speeds to 0 MPH in specific locations. The zone also set restrictions on vehicle operation times, number of vehicles within the zone and at parking locations, and rebalancing of vehicles. SOZs were then established in 2020 along the Hollywood Walk of Fame and Downtown Los Angeles.</p> <p>Findings: LADOT’s <i>Year One Snapshot</i> reviewed the agency’s one-year dockless vehicle pilot program between 2019-2020, finding that between January and mid-July 2020: (1) LAPD issued 800 tickets to e-scooter users and cited them for more than 900 violations, with approximately 2/3 of the violations involving sidewalk riding; (2) nearly 90% of all MyLA311 dockless mobility service requests involved vehicles that were improperly parked or parked on private property, 68% were resolved within the required two-hour window, and service requests involving unpermitted operators took the longest to resolve; (3) 47% of vehicles were correctly parked in the amenity zone on sidewalks, while 26% were parked in the pedestrian zone and 9% in the frontage zone; (4) only 67% of riders knew about the driver’s license requirement; (5) while 82% knew that sidewalk riding was prohibited, one-third still preferred to ride on sidewalks; (6) 12% of riders fell below the federal poverty line and 26% did not have regular access to a vehicle; 54% of micromobility rides originated or ended outside a State-designated disadvantaged community (DAC).</p> <p>Parking: During the pilot, LADOT developed Drop Zones for marked parking areas and had providers make Drop Zones displayed in the apps. The city also increased the number of corrals for parking micromobility vehicles. The city found that</p> <p>Engagement: During the pilot, LADOT organized quarterly community meetings to provide information on the pilot program and facilitate dialogue between the public and dockless mobility providers. Some examples of community engagement practices by providers included public safety events, vehicle demonstrations, street ambassador programs, and social media engagement. LADOT also worked with the City of Santa Monica on an educational campaign on safe riding and parking practices.</p> <p>Equity: The pilot found that operators avoided DACs despite LADOT incentives intended to induce operators to deploy in the communities or provide consistent service there.</p>
<p>San Francisco</p>	<ul style="list-style-type: none"> <p>In 2018, San Francisco’s first permit to operate a stationless bikeshare service was issued to JUMP Bikes (now owned by Uber). The JUMP permit allowed for a pilot program of up to 500 stationless electric bikes in San Francisco. With lessons learned from both the Stationless Bikeshare Pilot and the Powered Scooter Share Permit, the SFMTA has scaled the Stationless Bikeshare Permit toward citywide service.</p> <p>SFMTA’s Powered Scooter Share Pilot started in October 2019 following unpermitted deployment of shared electric scooters in spring 2018. Under the 12-month Pilot Powered Scooter Share Permit Program, the SFMTA issued permits for a maximum total of 1,250 scooters during the first six months and discretion to increase the total up to 2,500 scooters after six months. For the first six months, the SFMTA chose to issue two permits to Skip and Scoot for 625 scooters each in the interest of promoting geographic equity and allowing the necessary scooter density to serve neighborhoods beyond the downtown core. During the Pilot, Scoot and Skip reported monthly to the SFMTA on metrics</p>

City	Information on Pilots and Services
	<p>organized around the Emerging Mobility Guiding Principles, including safety, disabled access, sustainability, equitable access, accountability, and collaboration.</p>
Chicago	<ul style="list-style-type: none"> • Following the city’s pilots in 2019 and 2020, the permanent program to issue licenses to shared scooter vendors began in October 2021. • The 2020 pilot included safety objectives to test new policies, reduce dangers to people with disabilities, mitigate conflicts to other street users, reduce sidewalk riding, and improve compliance to parking rules. • During the 2020 pilot, none of the three scooter companies participating in the pilot ultimately deployed the sidewalk detection technology promised in their applications. • On helmet usage, Bird deployed “helmet selfie” incentives that enable users to earn ride credits if they submitted a picture with them wearing a helmet; the company collected 87 such selfies in 2020.
Portland	<ul style="list-style-type: none"> • The City of Portland conducted a pilot for the regulation of Shared Scooters beginning on April 26, 2019 and ending June 30, 2022. The purpose of the pilot was to determine whether Shared Scooters can support the city’s policy goals. • PBOT developed a Request for Proposals for one to two companies to operate shared electric scooter services throughout the City of Portland. The City released the RFP on June 3, 2022 and proposals were due on August 5, 2022. • PBOT has extended the ability of current e-scooter providers in Portland to operate until operations begin with the company or companies that are successful responders to the RFP. It expects to start service under the new contract or contracts in 2023.
Dallas	<ul style="list-style-type: none"> • Starting in June 2018, the City of Dallas conducted a bike and scooter pilot program called the Dockless Mobility Program. The City extended that program in 2018 and 2019, and in March 2020, approved revised ordinances guiding dockless scooter use. • Program concerns and key issues, cited in both 2020 and 2022 presentations focus on compliance regarding a lack of systematic permitting, vehicle volume, sidewalk clutter, and unspecified illegal behavior, operating in restricted areas or outside of the approved operating time, as well as operating on sidewalks, in parks and on trails. Though the issue of riding on sidewalks and parks is listed as a safety concern, there is no information supporting what specific safety concerns are triggered by this non-compliance. The materials do not address whether riding on sidewalks and in parks poses a threat to scooter riders or other sidewalk and park users, or why. By 2022, safety is not mentioned at all in the materials proposing rule changes, and no crash, injury or fatality data is offered or referenced. • The new permit program will start with 1350 scooters, 100 seated scooters, 45 e-bikes, and 5 assisted scooters. The number of shared dockless vehicles may be increased in the future.
Miami	<ul style="list-style-type: none"> • The City of Miami’s Scooter Pilot Program was originally approved by the City Commission through passage of an ordinance authorizing the scooter pilot program in October 2018. Rollout of the pilot program was delayed due to permitting, information technology, technical, and other issues. • A City Commission resolution adopted in December 2019 extended the pilot program to April 15, 2020 for the city’s administration to pursue a thorough and competitive sealed solicitation process for the establishment of a permanent Motorized Scooter Program. • On Sept. 24, 2020, the City Commission extended the pilot program until the execution and rollout of a permanent program or until the end of the pilot program. • Delays in the pilot program occurred due to the coronavirus pandemic. Further, unsafe conditions posed by scooters and numerous safety incidents reported in the city rights-of-way prompted the City Commission to terminate the pilot program in November 2021. • At a special City Commission meeting in late November 2021, the Commission reinstated the pilot program and directed the city manager to immediately implement safety measures. Also at that meeting, the Commission requested an ordinance to codify additional safety measures for the pilot program and the eventual permanent program.

City	Information on Pilots and Services
	<ul style="list-style-type: none"> In October 2022, two City Commissioners introduced a proposal to amend the current ordinance governing “bicycles, skateboards, scooters, and other similar devices” by modifying and providing for additional safety measures and other regulations, and add Division 2 to provide for the permanent motorized scooter program. As it stands today, local statutes require the city manager to report to the City Commission on or before the expiration of the pilot program on the status of the pilot. Following the city manager's report, the City Commission will consider the city's options relative to the pilot program including discontinuing, reinstating, or expanding the pilot program, issuing a competitive solicitation for a more permanent motorized scooter license program, or other measures as determined to be in the city's best interests.
Bellevue	<ul style="list-style-type: none"> The City of Bellevue launched a one-year bike share pilot on July 31, 2018. One permitted operator (Lime) operated the service for the full period. There were no responses to the 2020 opportunity to operate Shared Micromobility services in Bellevue as permitted. Vendors indicated that they were not prepared to operate a service based solely on e-bikes without including scooters.

Equity

As shown in Table 27, each of the jurisdictions except for Miami have made efforts to promote equity in their micromobility programs. For the most part, these included actions by operators to provide shared micromobility services to low-income, unbanked, and underserved populations, as well as the disabled population and those with limited English proficiency.

Table 27. Equity and Opportunity Zones Information Provided in City Sources

City	Equity Information
Los Angeles	<ul style="list-style-type: none"> Providers are required to submit an Equity Plan as part of their permit application to LADOT. The plan must include (at minimum) criteria for cash option, non-smartphone option, and low-income plans, waiving hold deposits and providing free trips under 30 minutes for low-income customers, and verification of low-income customer status. there.
San Francisco	<ul style="list-style-type: none"> Scooter sharing permittees must consistently meet all equitable distribution targets in order to be considered for fleet size expansion or permit term extension, which includes compliance with service coverage targets in specific “Key Neighborhoods”. At least 20% of bikeshare stations are required to be located in low-income communities to promote equitable distribution of bikeshare service. Scooter sharing permittees must offer a one-year low-income customer plan that waives any applicable scooter deposit and offers a minimum 50% discount off rental fees, or a plan that offers unlimited trips under 30 minutes, to any customer with an income level at or below 200% of the federal poverty guidelines, subject to annual renewal. Permittees must advertise the low-income plan as part of its targeted marketing, and during the first-time sign-up process (including in-app checkouts). Permittees’ goal for these plans is to have one low-income plan member for every two scooters authorized under their permit. Permittees must offer a cash payment option that is clearly advertised and easy to use. The Bikeshare for All subsidized membership program makes membership accessible to low-income individuals. The membership includes trips up to a full hour without redocking. After the first year, low-income members pay \$5 per month. Permittees must maintain a multilingual website, make outreach materials available in non-English languages, and adherence to Mobility Justice Requirements, which includes participation in SFMTA identified training or certification programs, SFMTA facilitated emerging mobility public-outreach efforts, and a Community Engagement development program to address disparities in the transportation systems, directly informed by stakeholder needs.
Chicago	<ul style="list-style-type: none"> Vendors must conduct outreach events in Equity Priority Sub-Areas based on monthly

City	Equity Information
	<p>ridership. If ridership falls below the threshold, vendors have to hold 3 events in that Sub-Area the following month. The threshold is calculated as the average of 2 rides per 1,000 residents per day, divided equally by the total number of active licenses.</p> <ul style="list-style-type: none"> • Vendors are required to put Braille signage on scooter vehicles as part of the communication regulations. • Each vendor must implement a low-income and equity pricing program for users, and make information on their programs available through web, mobile, and print materials. • Vendors are required to provide a low-tech access program for users to rent scooters through a call and text option (or other additional options) rather than through a smartphone. • Vendors are required to deploy at least 50% of their scooters in equity priority areas.
Portland	<ul style="list-style-type: none"> • A 2019 report assessed the results of the pilot reports on its efforts to make the shared mobility economy more inclusive, including the results of focus groups that the city held with Black Portlanders, East Portlanders, and Portlanders with disabilities. The report found that 74% of people of color, and 66% of people on low incomes viewed e-scooter positively, but were concerned about barriers to adoption (e.g., traffic safety, fear of being targeted for racial profiling, cost, difficulty transporting children, not having a helmet or safe place to learn to ride, not having bank account or smart phone, and fear of submitting account information over smart phone). • As part of the E-Scooter Pilot Program, scooter companies are required to offer discounted pricing for Portlanders living on low incomes: <ul style="list-style-type: none"> ○ Bird – 50% off all rides for Users who demonstrate eligibility for or participation in any federal, state, or local assistance program; people over age 65; veterans; and select community and non-profit organizations ○ Lime – 5 free 30-minute scooter rides per day for Users who demonstrate eligibility for or participation in any federal, state or local assistance program. ○ Spin – Users can unlock a scooter for \$0.50 and ride for \$0.07 per minute if they make less than double the federal poverty level for their household size or are enrolled in a federal, state or local assistance program.
Dallas	<ul style="list-style-type: none"> • The permit application asks the operator to describe how they will: (1) promote access to and utilization of shared dockless vehicles in low-income and historically underserved areas; (2) provide discounted pricing for low-income or disadvantaged users, and (3) provide information in its mobile applications and/or online platforms in languages other than English.
Miami	None
Bellevue	<ul style="list-style-type: none"> • A goal of the 2018 permit program was to make bike share a viable and accessible mobility option to low income and underserved populations. • Permitted operators are required to submit a plan for providing bikeshare service to “low-income, unbanked, and underserved populations.

Safety Analysis

As shown in Table 28, most of the cities that have completed pilot programs have published studies assessing injuries and fatalities from the pilots (Los Angeles, San Francisco, Chicago, and Portland). These studies provided consistent findings related to the prevalence of scooter-related injuries and low helmet use.

Table 28. Safety Analysis Information Provided in City Sources

City	Safety Analysis Information
Los Angeles	<ul style="list-style-type: none"> • A 2020 California Highway Patrol (CHP) report found that, between January 2016 through December 2019, 40 crashes involving EMBs were reported, amongst which 6 resulted in property damage only (PDO, or noninjury), 13 resulted in possible injury, 16

City	Safety Analysis Information
	<p>resulted in suspected minor injury, four resulted in suspected serious injury, and one resulted in a fatality. In the one fatality, the rider was not wearing a helmet and sustained fatal head trauma. The report found no identifiable safety trend and no clear unique characteristics or similar causes unlike crashes involving bicyclists and pedestrians. Even so, the CHP recommended including EMBs in comprehensive traffic safety campaigns, highlighting the importance of protective equipment and the safe operation and handling of EMBs.</p> <ul style="list-style-type: none"> In the pilot's twelve-month period, LADOT found that 407 scooter-related collisions occurred, 80% involving drivers and 3% involving pedestrians. 43% of these incidents resulted in a visible injury, 11% led to severe injuries, and none of these collision incidents resulted in fatalities.
San Francisco	<ul style="list-style-type: none"> SFMTA performed a mid-point evaluation of its Powered Scooter Share Pilot Program in 2019. Part of this evaluation assessed the safety performance of the two permittees and users of their services. The midpoint evaluation for the pilot found that: <ul style="list-style-type: none"> Complaints about sidewalk riding and improper parking were significantly reduced under the Pilot. While State law no longer requires scooter riders over the age of 18 to wear helmets, helmet use should nonetheless be encouraged to prevent injuries. The lock-to design addressed major issues with sidewalk clearance. Company-reported collision rates were generally low on a per-trip and per-VMT basis, and absolute numbers of injuries have decreased compared with unpermitted scooter deployment. Powered scooter riders involved in collisions and sustaining injuries are predominantly male, adult, and White or Asian. Of nine people with traumatic injuries in 2018, 44% were injured in crashes with motor vehicles, 22% reported wearing a helmet, and one person was struck and injured by an e-scooter while walking. Of 32 e-scooter related injuries reported to SFPD in 2018, 19% were severe, 7% involved wearing a helmet, and 13% were injuries to people walking. Across all data sources, reported or documented rider helmet use is low. Only 12% of users who reported a collision to either operator indicated they were wearing a helmet. Scot and Skip both proposed distribution of free helmets upon request or at events. The permittees distributed 1,775 helmets as part of the Pilot.
Chicago	<ul style="list-style-type: none"> During the 2020 pilot, the city measured the number of emergency room visits (171) related to e-scooters against the number of scooter trips, finding 0.27 visits per 100,000 trips. The 171 total of visits was down from 192 during the 2019 pilot, when 73% of injuries were by persons between 18-44 years of age and 55% of injuries were by males. The 2020 report found that most injuries were minor and to the scooter riders themselves (as opposed to other pedestrians). On helmet usage, 25% of users reported wearing a helmet sometimes, while only 9% of users reported wearing a helmet often.
Portland	<ul style="list-style-type: none"> The final pilot report found that during the two pilot periods spanning 2019-2020 and 1.7 million e-scooter trips, no fatalities were reported. The pilot report found that, though required by state law, helmet use remains low. Staff observations indicate that people who own e-scooters wear helmets, while those who rent tend not to.
Dallas	None
Miami	None
Bellevue	<ul style="list-style-type: none"> The City of Bellevue Transportation Department is aware of two crashes during the 2018 permit period. No collisions were reported by the permitted operator.