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Electric Kick Scooters on Sidewalks in Virginia but Not in California? A Review of How States Regulate Personal Transportation Devices

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1. Introduction

Every weekday morning in San Francisco's SoMa district, a stream of workers disembark from the city's commuter rail station carrying an assortment of small, wheeled devices—kick scooters, electric skateboards, hoverboards, and more—which they then use to roll on to their offices. These "personal transportation devices" (PTDs)—also called micromobility or microtransit—encompass a growing set of devices that provide low-speed, flexible mobility for individual travelers. In recent years, the number of PTD types and their use has exploded with the introduction of new devices (see figure at left).

This Perspective reports findings from a research project reviewing how these PTDs are regulated in the vehicle codes for the 50 states, District of Columbia, and five U.S. territories. (Hereafter, we collectively refer to these entities as "states.") In each vehicle code, we looked for: (1) The definitions of all transportation modes that would include some form of PTDs,[1] and (2) all regulations that would apply to how a person operates a PTD.[2]

Greater use of PTDs has the potential to benefit both individual travelers and communities as a whole. From the traveler's perspective, PTDs offer a cheap and fast way to move short distances, such as trips within a commercial district. Transit passengers might also use PTDs to go to and from transit stops that are farther than a quick walk from their origins and destinations. From a community perspective, every time travelers replace an auto trip with

[1] PTDs as conceived for this project exclude all forms of bicycles, though we did review state bicycle regulations to see if these might offer a model for how to regulate PTDs.
[2] A forthcoming report will also address these questions in detail for municipal and campus regulations, as well as with additional information about states.

a PTD trip (or a PTD-plus-public-transit trip), that means fewer cars on the road generating air pollution, causing traffic congestion, raising the risk of severe collisions, emitting greenhouse gases, and competing for parking spots. PTDs also may offer a low-cost way to improve mobility for many people who cannot afford to drive regularly. And the potential for extensive PTD use is more than theoretical: in California, travelers riding non-motorized PTDs such as skateboards and kick scooters log nearly 50 million miles per year.

Despite the long list of possible benefits, incorporating PTDs into communities is not without challenges, most notably thorny regulatory and facilities management questions. Conventional modes of transportation already compete for contested space on streets and sidewalks. Adding PTDs to the mix introduces new users and new devices with different capabilities. Are PTDs compatible on transportation facilities with people walking, bicycling, or driving automobiles? No widely-established regulations at any level of government clearly and effectively regulate where and how PTDs should be used in order to manage the risk of collisions while still making PTDs a viable, convenient transportation option.

2. Wheels of tomorrow? The wide array of PTDs rolling through cities

A plethora of PTDs are on the market, some developed by tech startups and others by name-brand corporations. PTDs can be both non-motorized or motorized (e.g., kick scooters versus electrified kick scooters) and utilize new technology or old (e.g., hoverboards versus skateboards). The devices tend to fall into one of two categories:

- **The "traditionals" and their motorized versions.** The simplest PTDs are human-powered devices (e.g., skateboards, kick scooters, and in-line skates) that, in the past, were viewed as being for recreation rather than as an option for getting where one needs to go. Today, motorized versions of these recreational devices are also available. Motorized scooters and skateboards are, as their name implies, scooters and skateboards with an added power supply and brakes.
- **Purpose-built electric-powered devices.** Other electric-powered devices have been developed specifically for the purpose of providing personal transportation. The trailblazer of these devices, the Segway, was unveiled in 2001. Given that this is a brand name, regulations refer to Segways and their competitors as "electric personal assistive mobility devices" (EPAMDs). Since the introduction of the first EPAMDs, manufacturers have produced additional devices evolved from the original design, typically smaller. Other recently introduced electric PTDs include devices like the Onewheel that can be described as electric unicycles; e-unicycle/skateboard hybrids such as the Solowheel and Haloboard; and concept devices from major auto companies such as the Toyota i-Real and Honda UNI-CUB.

When considering how PTDs might be regulated, it is helpful to understand how PTDs operate and their capabilities with respect to speed, braking, and turning.

- **Speed:** Studies of human-powered PTDs find that riders on flat ground tend to travel eight to ten miles per hour on average. For motorized PTDs, most devices limit maximum speed either mechanically or through programming, typically around 10-20 mph. In many cases, a

single device may have different capabilities depending on user-defined settings. For example, the Boosted Board electric skateboard has four settings which riders can set based on their experience level: beginner, eco, pro, and expert. The settings vary in acceleration potential and maximum speeds between 11 and 22 mph. So while the device can go up to 22 mph, it is hard to know whether that speed is likely as only the most experienced riders at full throttle would reach that speed.

- **Braking:** Human-powered devices generally lack mechanical brakes and rely on riders slowing down with their feet or maneuvering the device in a way that slows them down. Motorized PTDs are typically equipped with brakes. These can be hand-operated through a hard-wired control or remote controls, or with foot pedals. Some motorized PTDs do not have hand or foot controls and are instead self-propelled, sensing shifts in rider weight to speed up or slow down.
- **Turning:** Some PTDs, like kick scooters and EPAMDs, have handlebars that allow for hand-controlled turning. Most other PTDs are short in height and do not reach hand-level. These devices turn based on shifts in rider weight.

3. Current state-level regulations vary widely

Our detailed review of state PTD regulations revealed that there is no "normal": PTD regulations vary wildly from state to state and device to device in terms of specificity, content, and form.

Specific regulations for PTDs are rare. State vehicle codes organize themselves by defining types of vehicles or road users—motor vehicles, bicycles, pedestrians, etc.—and then provide rules to guide the use of each vehicle type. First and foremost, our analysis reveals that, with the exception of EPAMDs (regulated in 36 states), states generally do not define and regulate specific PTDs. For example, only four states (Virginia, Delaware, California, and New Jersey) specifically address motorized skateboards, and only six (Virginia, California, Oregon, New Jersey, Utah, and Washington) specifically address electric scooters.

PTD users are often subject to regulations for other modes. In the absence of regulations specific to PTDs, regulations on other modes are sometimes sufficiently broad to capture PTDs. In 27 states, motorized PTDs fit under the definition of "vehicles" (except for some states which do regulate EPAMDs separately). In another 12 states, both motorized and human-powered PTDs fit under the definition of vehicles. And six states regulate all motorized and human-powered PTDs as vehicles with the exception of EPAMDs; in these states, a skateboard would be a vehicle, but not a Segway. Finally, three states (California, Massachusetts, and Washington) have a notably different approach, with human-powered PTDs fitting under the definition of pedestrians.

The same PTD is regulated differently from state to state. Even in the uncommon event that multiple states regulate a specific PTD, those states often disagree on how to regulate that device. For example, roller skaters riding on roads have the rights and responsibilities of bicyclists in New Jersey, but of vehicles in New York. An EPAMD is regulated as a vehicle in Nebraska and as a pedestrian in Idaho.

States regulate devices with similar characteristics differently. Some states regulate specific devices differently even though those devices have similar capabilities, such as speed. For example, California has very different regulations for electric skateboards and motorized scooters. Electric skateboards can be ridden on sidewalks, while motorized scooters cannot. A driver's license is not required to ride an electric skateboard, but a license is required to ride a motorized scooter. Electric skateboards are subject to a 15 mile per hour speed limit, while motorized scooters are not.

States regulate PTDs to varying levels of detail. While some states offer very specific guidelines for safe, compliant use, others provide only general guidelines. For example, Maine's regulations for EPAMDs include requirements to ride on specific transportation facilities, keep within speed limits, give an audible signal while passing, and have safety equipment like lights and reflectors. On the other hand, North Carolina simply states that EPAMD users must yield right-of-way to pedestrians and other human-powered devices.

States are inconsistent in terms of *where* PTDs should be ridden. Some states specify the location within the street that PTDs must be used. For example, in California, users of motorized scooters must ride on roads, unless there is a bicycle lane, in which case they must ride there. By contrast, in Virginia, users of EPAMDs, motorized scooters, and motorized skateboards can choose whether to ride on streets or sidewalks, but the rules are different for each location. If riding on sidewalks, riders have the same rights and responsibilities as pedestrians. If riding on roads, PTD users must yield to pedestrians.

4. Approaches for revising state regulations

Given the inconsistency and frequent absence of PTD regulations in state vehicle codes, states and territories may benefit from revised regulations. Here, we recommend a set of general principles that can be used to develop new regulations and then present two types of existing regulations that policymakers might use as models to craft PTD regulations.

The following set of principles is designed to help regulators craft effective regulations that fairly balance the needs of all road users and are also practical to implement:

1. **Clarify who has the right to use sidewalks.** A clear statement of the activities and devices appropriate on sidewalks will underpin any coherent set of PTD regulations. If sidewalks are deemed appropriate for people walking *and* other users, the resulting regulations will look quite different than they would if regulators determine that only people on foot may use sidewalks.
2. **Protect public safety.** Regulations should protect other travelers from collisions, especially pedestrians, the most vulnerable road users. At the same time, PTD users are themselves "vulnerable" road users relative to cars, so regulations need to protect their safety as well.
3. **Permit PTD use as a convenient travel option.** The "complete streets" paradigm in transportation planning holds that streets should accommodate the needs of all users, regardless of mode. This principle implies that regulators should avoid regulations that make PTD use illegal.

4. **Accommodate new device types without new regulations.** Innovators are continuously coming up with new PTD devices, so regulations should be able to easily accommodate new device types as they appear. For this reason, regulators may prefer to set rules for *classes* of PTDs rather than setting rules for each specific device.
5. **Base rules on facts, not perceptions.** Little research has been done on the use of PTDs thus far, but as data become available, regulations should be grounded on evidence of how PTD users actually behave, rather than untested assumptions about the devices or their users.
6. **Craft rules that are easy to understand and remember.** Regulations will be much more effective if the general public can easily understand and remember them. Not only PTD users themselves, but other travelers and traffic enforcement officers all need to know what to expect from PTD users. For this reason, simple rules will likely be more effective than complex ones.

Two existing regulatory approaches provide models that may serve as an appropriate basis for PTD regulations:

1. **EPAMDs (Segways)** offer one useful example of a PTD currently regulated in some states. In the early 2000s, when the invention of Segways led to hype about its potential, 46 of the 56 states and territories passed enabling legislation. Unlike regulations for other PTDs, EPAMD rules are fairly consistent from state to state. States generally do not specify where Segway users must ride: users can ride on sidewalks, roads, or bike lanes. However, regulations do frequently call for safe behavior, including yielding to pedestrians and riding at a prudent speed given the conditions (such as congestion, crowding, road conditions, and weather). The regulatory definition of EPAMDs usually narrowly describes a device that looks like a Segway. States can consider applying this set of EPAMD rules to a larger set of PTDs.
2. **Electric bicycles** provide another potential approach. Several states have adopted regulations that break e-bikes into three tiered classes based on how the bikes are propelled and their maximum speed. Generally, restrictions significantly tighten for e-bikes that can exceed 20 mph, including rider age limits, facility restrictions, and helmet requirements. It is worth noting that this approach to regulating e-bikes is inconsistent with how most other modes are regulated. For example, cars are allowed to drive on residential streets with a 25 mph speed limit even though cars are capable of far greater speeds.

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