

Electric Scooters and Health: Evidence Review

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Background

Dockless electric scooters (e-scooters) are a new emerging mode of transportation being introduced in North America and around the world, particularly in warmer climates, as a feasible solution to the last mile gap of moving riders from their transit stop to their final destination. E-scooters are located by the rider using the company's app and are rented using the app or SMS text. Dockless e-scooters are picked up nightly by vehicles, charged and then transported to designated areas around the city to be used again the following day. Safety is a major consideration when it comes to e-scooters, which can travel up to 25 kilometers per hour, operated by riders with little or no experience.

Experience in other jurisdictions

E-scooters have appeared on the sidewalks and streets of over 100 cities in 20+ states in the United States. While new safety regulations have been introduced in several jurisdictions, there are a growing number of reports describing e-scooter injuries and complaints from the public about safety concerns and riders' noncompliance with regulations. Canadian experience is limited. In 2018, Waterloo, Ontario conducted a pilot project that saw more than 6,000 riders take more than 18,000 trips on a network of private trails and university campuses over a nine-week period. The next phase of this pilot will evaluate the feasibility of expanding beyond the campus. A number of Canadian cities have been approached by e-scooter companies and are considering the road safety and regulatory implications.

Injury

Injuries associated with e-scooters vary in severity, with most injuries resulting from falling off while riding scooters and the remainder due to collisions with vehicles or pedestrians and tripping over scooters left on the sidewalk (Notopoulos, 2018; Trivedi et al., 2019). Since e-scooters began populating streets, there has been a surge in emergency room visits for fractures, dislocations and head trauma (Austin Public Health Report, 2019). As a result, the Centers for Disease Control (CDC) and Prevention launched the first-ever study of electric scooter accidents at the request of Austin Public Health and the Austin Transportation Department. When identifying the risk factors for those who get injured, how severe the injuries are and why they're getting hurt, CDC found that head injuries topped the list of accident-related incidents involving e-scooters at 45%. In another study characterizing scooter-related injuries among 249 patients, 15 (6%) were admitted and 2 (<1%) were intensive care unit admissions (Trivedi, 2019). The total number of e-scooter injuries may be underrepresented as patients may present to urgent care clinics or primary care clinics and would not be captured in an emergency department study (Badeau et al., 2019).

Results from recent studies are beginning to identify specific injury patterns that can inform regulatory changes. An emergency department study of 249 e-scooter injuries included 228 (91.6%) riders and 21 (8.4%) pedestrians (11) hit by a scooter, 5 tripped over a parked scooter, and 5 were attempting to lift or carry a scooter not in use (Trivedi, 2019). Among scooter riders, the most common mechanisms of injury were falls (80.2%), collision with an object (11.0%), and being hit by a moving vehicle or object (8.8%). A similar study of 271 e-scooter injuries documented that 55% were injured in the street and 33% on the sidewalk. Cars or other motorized vehicles were involved in 16%, but only 10 % of riders actually collided with a car. Ten percent of injured riders hit a curb, and 7% struck an inanimate object, such as a light pole or manhole cover (Austin Public Health Report, 2019).

Regulatory Approaches and Rider Behaviour

Local laws regarding electric scooters are variable, with most municipalities having age restrictions, prohibiting riding on the sidewalk, and requiring the use of helmets, but regulations are not consistent (City of Santa Monica Planning and Urban Development, 2019). Compliance with regulations is poor. In a recent UCLA study, researchers reported that even though riders of e-scooters in California are required to be at least 16 years old by state law and 18 years old by company rental agreements, 11% of e-scooter injuries were in patients younger than 18 years (Trivedi et al., 2019). The same study observed 193 e-scooter riders during three public observation sessions, and documented 182 riding without a helmet, 15 tandem riding, 18 failing to comply with traffic laws, and 15 riding on the sidewalk where scooter use is prohibited. Currently, companies that rent e-scooters do not provide helmets (Rivara, 2019); the City of Portland required companies to have a helmet distribution plan, however few helmets

are observed on riders. Cities including San Francisco, Denver, St Paul, Cleveland and Milwaukee banned e-scooters after the company entered the market without consultation or permission of the municipality. Reintroduction of e-scooters occurred in all cities with the exception of Cleveland, after the company met regulations imposed by the cities including speed and safety rules and compliance with operational standards.

Environmental Impacts

E-scooter waste is a new environmental problem that did not exist even two years ago (The Financial Times Limited, 2019). The average e-scooter lifespan is 28.8 days (with 3.5 rides per day) which may be reduced further by harsh weather and heavy usage (Louisville Open Data, 2018). The total environmental impact of e-scooters and e-bikes, including greenhouse gas emissions related to their manufacture and shipping, daily recharging, and eventual disposal, may be negative, given that the number of vehicle trips they are averting is questionable (The Financial Times Limited, 2019). The Portland study documented that 33% of trips replaced vehicle trips (private or ride-share) and for the remainder the rider would have walked or used other forms of active transportation. In many municipalities in Canada, harsher climates will force e-scooters off the streets for part of the year, limiting the potential for year-round use.

Health Equity and Accessibility

In Santa Monica, California and Portland, equity considerations have included introducing cash payment options for renters who do not have a credit or debit card and offering discounted rates for low-income riders. In response to concerns about riders without smartphones and/or data plans, companies have introduced online and SMS text messaging options. Most companies distribute e-scooters on a daily basis, relocating them to areas with higher demand, which could limit access in lower income areas. The City of Portland required e-scooter companies to deploy a minimum number of scooters in lower income areas of the city but found poor compliance with this requirement. Feedback from low income Portland residents raised concerns about traffic safety and lack of infrastructure for safe riding. Minority groups also reported that they feared being targeted for racial profiling and harassment by using e-scooters.

Considerations for action

There are many unanswered questions regarding e-scooter and e-bike rental programs. Further discussion and public consultation should focus on how these programs could enhance Winnipeg's [sustainable transportation](#) and Vision Zero strategies. These programs should be designed to align with current active transportation goals including safety, efficiency, and equity; reducing traffic congestion by shifting trips away from motor vehicle use; preventing fatalities and serious injuries on Winnipeg's streets; expanding access for underserved citizens; and reducing waste and air pollution.

The following are considerations for municipalities considering e-scooter/e-bike rental programs:

- Consider regulations pertaining to maximum vehicle speed, operating speed, distribution (minimum and maximum number, location), parking, and rider restrictions (age, helmet use, where they may be operated) and reporting requirements.
- Require e-scooter/bike companies to ensure riders are informed of local regulations and safety recommendations before renting.
- Explore strategies to expand access to low income individuals and neighbourhoods (through distribution requirements, discounted rates, ability to pay cash, etc.).
- Require e-scooter/bike companies to provide a minimum number of helmets and support local agencies in distributing them to riders.
- Monitor the nature and burden of significant injuries. This will require new methods to capture e-scooter and e-bike deaths and injuries and impacts on health/police/EMS services and insurance claims.

- Require companies to minimize environmental impacts in their daily operations (collecting, charging and redistributing scooters and bikes).
- Evaluate the lifecycle environmental impacts of e-scooters and e-bikes.

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