



# Injuries associated with e-scooter use in the City of Calgary: Canada joins an international conversation

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Electric scooter or e-scooter use is a rapidly growing form of urban transportation, with numerous cities worldwide permitting ride-sharing fleets to operate since their introduction to Southern California in 2017. E-scooters are a relatively inexpensive and enjoyable mode of micro-mobility and are often advertised as a beneficial alternative to automobile use. However, a growing body of international studies reports serious injuries for riders who crash while riding e-scooters [1].

With their report in this issue of *CJEM*, VandenBerg and colleagues describe characteristics of injuries related to e-scooter use in Calgary [2]. This is the first Canadian study to report e-scooter injury rates and crash risk factors. The authors identified injured patients by searching medical records using variants of the search term “scooter” and characterized a variety of documented crash factors. A total of 1272 ED/urgent care patient visits were identified over the summers of 2019 and 2020, a large sample size compared to many other published e-scooter injury studies [1]. E-scooter injuries represented 15% of transportation-related injuries in Calgary emergency departments, with an incident rate per ride of 1 injury requiring an emergency department visit for every 1400 e-scooter trips. Emergency department visit rate

per ride is not frequently described in other studies, making it difficult to compare the Calgary injury rate to other municipalities.

The results of VandenBerg’s study can be added to the international effort to understand risks associated with e-scooter use and identify opportunities to enhance rider safety. A number of contributing factors to e-scooter injuries reported by the authors can be categorized into a safety matrix of rider risky behaviors (e.g., not wearing a helmet, riding while intoxicated), environmental contributors (e.g., potholes, curbs, night riding, streets, bicycle paths), and e-scooter design issues (e.g., rear wheel bolt). Not wearing a helmet and alcohol impairment are well-known e-scooter crash contributors [1]. The authors found that an ethanol level was obtained in 7% of e-scooter-related visits transported by EMS, and of these, 60% demonstrated a level that would be expected to cause impairment [2]. These results likely underestimate the contribution of alcohol and other legal and illicit substances that contribute to rider crashes. Riding while impaired may affect balance on the e-scooter, such as when striking a pothole or a curb, and limit the speed of rider responses in a variety of hazard contexts. Other studies have reported significantly higher levels of intoxication associated with e-scooter use [3].

The authors describe finding right ankle lacerations that were sustained by contact with the rear wheel e-scooter bolt. The bolt may scrape the ankle when a rider pushes off from the ground. This e-scooter design issue was also identified in a Berlin study of injured e-scooter riders [4]. The maximum vehicle speed is a design feature that may influence injury rate. The maximum speed that rental e-scooters are capable of achieving is often established by contract with e-scooter providers and varies by location.

Environmental factors reported by VandenBerg and co-authors include time of day and location. With the highest proportion of severe injuries presenting between 2000 and 2400 h, it is likely that rider impairment, e-scooter lighting and visibility factors may have contributed to some injuries.

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Front and rear lighting systems, if present on e-scooters, may be difficult for drivers to recognize as an e-scooter rider at night. E-scooter users may want to limit operation on roadways outside of daylight hours. To improve rider visibility at night, a flashing bike light can be added to the frame or rider equipment, and/or riders can wear retroreflective clothing, particularly in a manner that enhances biological motion [5]. E-scooter visibility at night represents a gap in e-scooter design and a likely collision contributor.

Calgary has approximately 1000 km of regional pathways and 300 km of on-street bikeways, providing one of the largest pathway systems in Canada. Many e-scooter riders prefer using bike paths over riding on streets with traffic. The availability of a large pathway system for e-scooter riders may have affected the prevalence of e-scooter injuries from vehicle collisions and requires further investigation.

The study by VandenBerg focused on adult emergency departments and excluded patients under 18 years of age. While many e-scooter rental companies require riders to be at least 18 years of age, children and adolescents, despite regulations, are injured when they use rental and privately owned e-scooters. [1] Other types of electric motorized devices, such as hoverboards, e-skateboards, e-wheels and e-bikes are also a significant source of injuries to both children and adults. While beyond the scope of the study, further characterization of risks and frequency of injury related to these devices is required so that effective injury-reducing policies and interventions can be developed.

Injury data was collected in Calgary during the summer 2020, which was during the covid-19 pandemic. Some potential riders may have avoided using e-scooters for hygiene reasons. Others who were injured while riding an e-scooter may have avoided going to emergency departments to reduce exposure.

Emergency physicians may want to take advantage of teachable moments with their patients and discuss modifiable crash risk factors. Perhaps the most important of these lessons is to use a helmet. A 2021 scoping review reported data from 16 studies showing that helmets were used by 4.5% of riders, not used by 67.5%, and not known in 28%; a

protective effect was reported in one study that explored the association between helmet use and injury [1]. Helmet use is known to reduce frequency and severity of head injuries across many types of transportation and recreational activities. Talking with injured e-scooter users about using a helmet has the potential to change behavior. The importance of enhancing visibility and avoiding e-scooter use while intoxicated are other messages worth reinforcing.

The study by VandenBerg and co-authors is the first to publish Canadian data on e-scooter patterns of injuries in emergency departments. The results add to the expanding international literature on e-scooter injuries and provide several strategies to reduce injury frequency and severity.

## Declarations

**Conflict of approval** The authors declare that there is no conflict of interest.

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