e-Scooter Safety

- e-Scooter use has increased globally in recent years due to dockless e-scooter schemes offered by private companies (e.g. Lime and Neuron).
- There are safety concerns for riders, due to the non-use of helmets, excessive riding speeds, and drink-riding, increasing injury risk.
- Pedestrians are also at risk, either by being hit by riders or tripping over parked on footpaths.
- Like powered and unpowered bicycles, these devices have a lower carbon footprint than cars, and can overcome the last-mile limitation often associated with public transport.

THE FACTS

- e-Scooters are part of a rapidly expanding family of small electric devices for personal transportation including hoverboards, powered skateboards and Segways. Various terms for this class of devices include: e-micromobility, powered micromobility, personal mobility devices (PMDs), rideables, and Personal E-Transport Systems (PeTs).
- Until now, the majority of e-scooter use has been through shared schemes and most of what we know about the use and safety of e-scooters relates to shared use. There is evidence that user behaviour may differ markedly between shared and privately owned e-scooters.
- In 2018 in the US, there were 38.5 million trips by shared e-scooter, similar to the number of trips by docked bikeshare (36.5 million) and many more than by dockless bikeshare (9 million).
- In Australia and New Zealand, trip lengths for shared e-scooters average about one kilometre.
- In Australasia, dockless e-scooters first appeared in New Zealand in October 2018. The most comprehensive Australian shared scheme began in Brisbane in November 2018 where more than 500,000 trips occurred in the first three months of operation.
- In Australia and New Zealand, trip lengths for shared e-scooters average about one kilometre.
- Share schemes for bicycles and e-scooters have the potential to decrease traffic congestion by replacing car trips. However, in many cities e-scooter use often replaces walking, cycling or public transport and is for recreation, not commuting.
- Most shared e-scooters are made by the Chinese company Xiaomi/Ninebot/Segway. They vary in motor wattage, maximum speed, range, lock-to technology, handlebar adjustment, gyroscope sensors and accelerometer sensors, which can influence data sharing opportunities, consumer experience and safety.

The rules

- Often, rules relating to e-mobility device design and construction are set at the national level, user licensing and most road rules at the state level, and rules or agreements relating to the operation of shared schemes and where the devices can be used or parked are managed at the local level. The rules and conditions that the user agrees to in shared schemes comprise another level of regulation.
- e-Scooters are classified as ‘non-road’ vehicles under the Federal Motor Vehicle Standards Act 1989 and the Motor Vehicle Standards Regulations 1989. As PMDs, e-scooters must have the following characteristics:
  ° one or more wheels;
  ° propelled by an electric motor;
  ° an effective stopping system controlled by using brakes, gears or motor control;
  ° when propelled only by the motor, cannot reach a speed of more than 25km/h on level ground;
  ° not more than 1,250mm in length by 700mm in width by 1,350mm in height; or 700mm in length by 1,250mm in width by 1,350mm in height;
  ° weigh 60kg or less when the vehicle is not carrying a person or other load; and
  ° has no sharp protrusions.
- The National Transport Commission is currently reviewing the Australian Road Rules to identify any regulatory barriers to the safe use of innovative vehicles across Australia.
- The rules for the use of PMDs in Queensland can be found here. Riders must:
  ° Be at least 16 years of age, or 12 with adult supervision;
  ° Wear a securely fitted approved bicycle helmet at all times;
  ° Not carry passengers;
  ° Not use a mobile device while riding;
  ° Not drink and ride; and
  ° Use working front (white) and rear (red) lights when riding at night, or when there is low visibility.
- Most cities require that e-scooters are used on roadways, however in Brisbane and Adelaide their use is mainly on footpaths. In Queensland, they are restricted to footpaths and minor low speed roads.

E-SCOOTER SAFETY ISSUES

- e-Scooter use can result in injuries to both riders and pedestrians – from collisions or falling over e-scooters parked on the footpath. Concerns about e-scooters blocking footpaths have been widespread, particularly among disability groups.
- Currently, it is difficult to identify e-scooter users in emergency or crash data (separating electric from non-powered), the product type (personal or shared), and cause of crash (product failure, product misuse or user behaviour).
- While e-scooters are largely restricted to footpaths and shared paths in Australasia, footpath riding is banned in many other jurisdictions. This makes it difficult to compare safety outcomes with other countries. However, most e-scooter rider injuries result from falls, rather than collisions with motor vehicles, even in countries where most riding is on roads.
- Most e-scooter rider injuries result from falls, not collisions with motor vehicles, even in countries where most riding is on roads.
- Ambulance and emergency department data from Brisbane in early 2019 showed that most injured riders were aged 20-34 years old and the numbers of males and females were similar. A comparison...
Among the patients for whom injury data was available, 10% had minor head injury, 3% had major head injury, 21% had upper limb fractures and 6% had lower limb fractures. Fractures were commonly reported in New Zealand and US studies.12,13,15,16

Inexperience appears to be a significant contributor to crash risk, particularly among riders of shared e-scooters. Use of alcohol, speeding and under-age riders have also been widely reported.13,14,16

Low rates of helmet wearing – even in Australia – among riders of shared e-scooters are contributing to frequent head injuries in crashes.14,15,16

The small size of the wheels on e-scooters has raised concern regarding their stability on uneven surfaces, particularly footpaths, but there is little scientific evaluation of their stability. The size of the wheels can vary considerably, with some shared e-scooters having larger wheels, and possibly better stability.

Braking problems related to the electronic control systems have occurred on shared e-scooters in Australia, New Zealand and Switzerland20.

There have been issues with firmware security and integrity to bypass payment processes, as well as geofencing and speed controls for shared e-scooters.17

REFERENCES
5. Jameson Trauma Institute, Royal Australasian College of Surgeons National Trauma Committee, Australasian Injury Prevention Network (AIPN), and Queensland Injury Surveillance Unit, “Response to the VTC Collaborative Response to the Consultatory Regulatory Impact Statement (CRRS) Barriers to the safe use of innovative vehicles and motorised mobility devices”, 2019.