Inquiry into e-mobility safety and use in Queensland

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Submission to the Queensland Parliamentary Committee Inquiry on Personal Mobility Devices: Dr Ruth Barker, Queensland Injury Surveillance Unit: 20th June 2025

1. Benefits of e-mobility (including both Personal Mobility Devices (PMDs), such as e-scooters and e-skateboards, as well as e-bikes) for Queensland;

2. Safety issues associated with e-mobility use, including increasing crashes, injuries, fatalities, and community concerns;

3. Issues associated with e-mobility ownership, such as risk of fire, storage and disposal of lithium batteries used in emobility, and any consideration of mitigants or controls;

4. Suitability of current regulatory frameworks for PMDs and ebikes, informed by approaches in Australia and internationally;

5. Effectiveness of current enforcement approaches and powers to address dangerous riding behaviours and the use of illegal devices;

6. Gaps between Commonwealth and Queensland laws that allow illegal devices to be imported and used;

7. Communication and education about device requirements, rules, and consequences for unsafe use; and

8. Broad stakeholder perspectives, including from community members, road user groups, disability advocates, health and trauma experts, academia, the e-mobility industry, and all levels of government.

I am an emergency paediatrician and Director of the Queensland Injury Surveillance Unit based at the Jamieson Trauma Institute, Metro North.

I have provided a broad perspective (item 8 in this inquiry) that touches on topics 2-7 above).

QISU in collaboration with JTI have been tracking and providing data on PMD injuries since 2018. Our reports are based on emergency department data provided by hospital sites that participate in injury surveillance reporting (currently 31 sites across QLD). Participating sites can be found here:

https://metronorth.health.qld.gov.au/qisu/data

We have provided a comprehensive report to TMR, with analysis conducted to understand the impact of various regulatory changes between Jan 2021 to Dec 2024. Data (continually updated) can be provided to the committee on request.

There is no specific ICD code relevant to PMDs in either the routine health data (ICD codes) or injury surveillance codes. Therefore, identification of PMD related injuries depends on text mining of the triage text narrative.

This narrative is also used to understand the mechanism of injury and events that preceded the injury.

At present, we are able to provide good reporting on:

- The number of injuries at participating sites
- Admission status
- Diagnosis
- Demographics (age, gender)
- Date and time of presentation

We are able to provide limited reporting (depending on the triage text narrative) on:

- Speed
- Helmet use (may indicate a helmet was worn but may not note whether the strap was done up)
- Passengers
- Drug and alcohol use
- Hire vs private PMD
- Type of PMD
- Location of incident

We have no data on the age of the device nor the brand/ country of origin.

PMD injuries are increasing rapidly, concurrent with the introduction of hire schemes, but also as private use devices become more popular.

The mechanisms of injury identified in the emergency data are:

- Falls from the device
    - This often involves the wheel hitting an irregularity and the device becoming unstable or flipping
- Collisions with stationary objects
- Collisions with other device users
- Collisions with pedestrians

- Collisions with vehicles
- Burns related to battery fires

These mechanisms are also demonstrated in the fatalities.

A recent review of media reported fatalities revealed 30 fatalities nationally with **15 in Queensland and 6 of those, in children under the age of 16 years.**

https://www.facebook.com/7NEWSMelbourne/videos/emergency-surgeons-have-an-urgent-warning-for-melbourne-parents-as-e-scooters-be/992884239677110/

Speed:

Queensland currently allows riding of PMDs on the footpath as well as bike lanes and roads with a speed of < 50km/h and no dividing line. Speed is required to be limited to 25km/h but it is clear that many devices are travelling much faster than this with speeds over 60km/h reported in the ED data. Private modifications and hacking of hire devices contributes to this.

Location:

Footpath use puts pedestrians, particularly vulnerable pedestrians at significant risk, especially when devices are ridden close to shop exits. Traversing footpath to road across the curb can also increase the risk of device instability.

Age:

Use is prohibited under the age of 12 years but allowed between 12-15 years with adult supervision. The notion that adult supervision is able to prevent significant injuries for young PMD riders is flawed, as adult supervision is unable to control for infrastructure inadequacies, irregularities in the riding surface and dynamic pedestrian and vehicular interactions. Clinicians are increasingly calling for a ban on use under the age of 16 years which I would support.

Charging and storage:

PMDs are increasingly a device of choice for school and work transport, and this creates significant issues for safe storage and charging of devices for institutions and workplaces. PMDs have also been responsible for house fire fatalities and injuries. Lithium battery fires due to thermal runaway are more likely when the battery has been damaged or the device modified.

Design:

To date much of the focus of PMD regulation has been around user behaviour, road rules and police enforcement. Whilst it is true that illegal use has contributed to injuries, legal use (the right place at the right speed with no drugs or alcohol and a helmet) can still result in severe injury or fatality, particularly when a collision with a vehicle occurs. This is most evident in the paediatric population.

Similar to quads, PMDs are inherently unstable. This is due to the small wheels, high centre of gravity and rapid acceleration. Consideration should be given to product design standards, which are currently lacking in Australia and overseas.

Existing standards are as follows:

ASTM F2641-23 Standard Consumer Safety Specification for Recreational Powered Scooter and Pocket Bikes.
This doesn't cover commercial devices.

IEC 60335-2-114:2022
Household and similar electrical appliances - Safety - Part 2-114: Particular requirements for Personal-e-Transporters
IEC 60335-2-114:2022 deals with the electrical safety of Personal e-Transporters used in the private or public areas. The device can have one or more wheels...

IEC 63281-3-1:2024 E-Transporters - Part 3-1: Performance test method for the total run time of an e-scooter with consideration of temperature conditions of actual use

IEC 63281-3-1:2024 specifies the test method for the total run time of an e-scooter for single-person transportation with consideration of the temperature conditions of actual...

IEC 63281-2-1:2024 E-Transporters - Part 2-1: Safety requirements and test methods for personal e-Transporters
IEC 63281-2-1:2024 specifies safety requirements and test methods for personal e-Transporters. This document is applicable to electrically powered personal e-Transporters (PeTs) which are used in...

These standards mainly focus on battery and electrical safety rather than device durability, stability, wheel dimensions and centre of gravity. In addition, PMD design could incorporate smart systems to detect both appropriate (correct use of helmets) and inappropriate (intoxication, passengers) use.

The ACCC acted in 2020 to require quads to pass stability testing and be fitted with rollover protection. This action came only after many years of lobbying by

framing groups, where blame was unfairly placed on farmers for ‘not using active riding’ or ‘not riding to conditions’, instead of manufacturers for not addressing inherent flaws in their design. There have already been some adjustments to PMD designs with larger wheels and battery placement to reduce damage and lower the centre of gravity. However, these innovations have not been standardised. In addition, sit down devices may be able to improve both stability and (if designed accordingly) reduce passenger riding.

Design also needs to focus on data and systems security such that devices cannot be illegally modified or hacked to go at speeds higher than intended or allowed.

Comparison with other devices:

Bicycles are less susceptible to flipping when traversing uneven surfaces due to the larger wheel diameter. In comparison to PMD (especially e-scooter) use, bike helmet compliance is much higher. E-bike use is on the rise, but probably involves a different demographic, riding for different purposes and mostly on road or bike lanes, so a direct comparison between e-bike and PMD injuries is challenging.

Use of single wheel or e-skateboards seems to involve a different demographic again. Helmet use in this population often involves full face helmets which provides better head and face protection in the event of a crash.

Helmet regulation:

There have been calls to require all PMD users to wear a full-face helmet. This requirement should take into consideration the increased protection offered by these helmets balanced against the increased weight and potential for neck injury, particularly if children continue to be allowed to ride.

Full face helmets are worn by children competing in motocross events. In general, we see a more severe pattern of injury in young motorcyclists engaging in unstructured riding compared to those engaged in competitive sports, where they are required to grade the power of their device and wear full protective gear which includes neck protection

Education:

In general, education is the least effective strategy to prevent injury. It is a slow cultural change that takes years to decades, as has been seen with bike helmet and seatbelt use. The current requirements regarding location of PMD use are complex and require dynamic interpretation as the user rides across new

territory. The hire scheme system attracts new users, both local, interstate and international. **Novice users, and those unfamiliar with the local PMD rules or even the road rules are more at risk of collisions.**

Regulation:

Regulation varies between states, cities and countries. Some jurisdictions have introduced regulation allowing PMDs and hire schemes only to later revoke that permission: https://www.smh.com.au/traveller/travel-news/crackdowns-and-bans-how-the-world-s-cities-are-dealing-with-e-scooters-20240823-p5k4q9.html

Age limits, speed and riding location vary, making appropriate PMD use in Queensland challenging for overseas visitors; noting that we are about to have a significant influx in 2032. Market capping of device numbers and geofencing is commonly used to limit injuries. Geofencing creates a different hazard of devices strewn at the geofence boundary, often obstructing footpaths, before being collected by 'juicers'.

Enforcement:

Given that it is impossible for police to be everywhere all at once, enforcement is more of a deterrent than a control of illegal use. As with speeding on the road, perhaps consideration could be given to camera surveillance of illegal device use linked to hire devices using geolocation or an identifier.

End of life disposal:

The hire e-scooter schemes have contributed to significant waste output through 'helmet churn', dumping and retirement of devices and retirement of lithium-ion batteries. It is unclear whether these batteries are being appropriated recycled through the nationally accredited scheme: https://bcycle.com.au/how-you-can-b-cycle/battery-safety/

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EDITORIAL

Electric scooters

This issue of the journal we publish a report analysing electric scooter injuries in Brisbane;[1] another paper on injuries in Dunedin is in the production pipeline and will be published soon. Emergency physicians know better than most, that life carries risk. So why have emergency physicians in Brisbane and Dunedin taken the time to write about this issue?

Brisbane was the first Australian city to introduce an e-scooter share hire scheme; first with Lime Scooter in November 2018 and more recently with Neuron; with other cities following suit. In Brisbane, this rollout has had no formal evaluation of public amenity and safety. There was no consultative process canvassing opinion about the implementation of a share-hire 'personal mobility device' (PMD) scheme. Did commercial interests override formal health and safety analysis?

E-scooters are not new, and before Lime's launch in Brisbane, some citizens were riding privately owned vehicles in public spaces. The recent regulatory relaxations have resulted in a steep increase in the number of both experienced and novice e-scooter users in Brisbane's transport infrastructure.

E-scooters are considered consumer products and captured under Australian consumer law. However, unlike vehicles which must adhere to the Australian Design Rules, there are currently no applicable mandatory product supply standards, and use of them is not captured in existing national road rules. Therefore, with the implementation of hire schemes, post-fix exemptions for PMDs are still evolving and vary state to state, meaning that even for Australians, permissible e-scooter use varies between cities. Nearly a year after Lime launched in Brisbane, the National Transport Commission (NTC) has released their 'Barriers to the Safe Use of Personal Mobility Devices' citing the following:[2]

> Many PMDs are already available in Australia; however, the Australian Road Rules predate the emergence of most of these devices. This means most PMDs are not recognised within the existing road rules.

Shared e-scooters are marketed as the 'last mile' commuting solution; a greener alternative to taking the car when walking is too much of an effort. Yet it seems unlikely that true commuters, needing to get from A to B on schedule, will ever be able to rely on haphazardly strewn devices that might be nabbed by competing 'commuters' at any moment. It is more likely that the scooters will be ridden by casual users and tourists.

Every new device has a user learning curve and every device has its own quirks. With new novice users riding each day on unfamiliar hire devices, mishaps will occur.

Lime and Neuron scooters currently operate devices with small wheels and an electric motor that is able to propel the rider at an advertised maximum speed of 25 km/h, with sufficient power to tackle Brisbane's hills with ease. However, small wheeled scooters have an inherent design flaw. They are susceptible to uneven terrain. Even a small obstacle can cause the front wheel to turn unpredictably. This effectively stops the scooter dead, and momentum causes the back of the scooter to flip the rider over the handlebars. This mechanism was implicated in the death of a NZ man.[3] The scooters are also top heavy. These design flaws are acknowledged in Lime's decision to roll out their 'Rolls Royce' scooter with bigger wheels, dual suspension and a lower centre of gravity touted as a 'safer, smarter and just a better ride'.[4]

Users electronically sign a user agreement prior to commencing the ride. However, this agreement appears to be rarely fulfilled[5] and difficult to enforce.

Requirements in Brisbane include:[6] single rider use, age greater than 16 years unless supervised by an adult, no consumption of liquor and helmet use (helmets are supposedly provided for riders to wear). However, personal observations from daytime walks around Brisbane's CBD have revealed helmetless-scooters, scooter-less helmets, riders wearing helmets as fashion accessories (over a wrist), an unhelmeted child riding a scooter being chased by another child on foot wearing a helmet, helmets worn but undone and riders doubling (to date no more than two on a scooter). Helmets are difficult to maintain with the scooter and this is referred to in the industry as 'helmet churn'. The scheme conveniently ignores the issue that a helmet, if provided, may or may not fit. Users can provide their own helmet, but again, one cannot rely on locating a scooter. Police have been struggling to enforce the relaxed regulations.

Reports from the USA, where share schemes have operated for some time, highlight additional issues of public nuisance, vandalism and theft.[7] In addition, there have been issues with firmware security and integrity with hacking (to override payment, geofencing, speed and mechanical control)[8,9] and glitching[10–12] that causes unexpected braking. Whether helmets and scooters are inspected, serviced or retried when damaged and remain fit for purpose is unclear.

Unfortunately, routinely collected emergency data do not support unpicking the complexity of this issue. As highlighted in the recent and forthcoming *Emergency Medicine Australasia* publications cited earlier, even basic information like helmet use and drug/alcohol intoxication is not captured in a

standardised fashion. However, issues such as product identification (personal or hire, make and model), product failure (mechanical, electronic or software), product misuse (hacking to override geofencing or speed controls), product design flaws and user behaviour are still poorly captured. And with limited data, it is challenging to properly inform the NTC regulatory impact process.

Emergency physicians, ambulance crews and the police are picking up the pieces from the mess of someone else's making.

Competing interests

None declared.

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