

INQUIRY INTO USE OF E-SCOOTERS, E-BIKES AND RELATED MOBILITY OPTIONS

Organisation: Royal Australasian College of Surgeons NSW branch

Date Received: 16 August 2024

16 August 2024

Suite 1, Level 26, 201 Kent Street
Sydney NSW 2000 Australia
Telephone +61 2 8298 4500
Facsimile +61 2 8298 4599
www.surgeons.org
ABN 29 004 167 766

Royal Australasian College of Surgeons Submission to the New South Wales Parliamentary Inquiry into E-Mobility

Background

NSW surgeons manage an exponentially rising number of injuries sustained by people riding or injured by e-mobility devices. Over 22,000 of these devices are now owned privately within New South Wales. Each day in NSW, faciomaxillary surgeons, neurosurgeons, orthopaedic surgeons, plastic reconstructive surgeons and general surgeons assist in the care of those injured in this rising pattern of injury observed in the last decade in New South Wales.

Globally, electric (e-) mobility has seen a rapid growth in recent years, as a cheap, convenient and environmentally sustainable form of travel, particularly for short trips. E-mobility encompasses a range of personal mobility devices, including e-scooters, e-skateboards, hoverboards, e-unicycles, and Segways. Other terms for this type of transport include personal mobility devices (PMDs), micromobility or e-micromobility, and rideables.

The e-mobility trend has seen an explosion of e-scooters on roads and paths in cities around the world through their availability via public hire schemes as well as private ownership for commuting, business operations, and recreational travel. Public e-scooters first became available in Australia in 2018 when e-scooter rental company Lime launched in Brisbane. Since then, competitors Beam and Neuron have also launched in locations around Australia. The introduction of e-scooters, however, has brought regulatory challenges and safety concerns.

Common injuries and impact on the health system

Since their introduction, e-scooter related trauma has increased substantially, with injuries and deaths in riders, passengers and pedestrians placing further pressure on first responders (ambulance and police) as well as hospital and health systems. National and international studies have documented injuries related to e-scooter use and report that both riders and other road and path users, such as pedestrians, are vulnerable to harm¹. Since their introduction in Australia there have been at least three fatalities from riding e-scooters, and data collected from three emergency departments in Brisbane found 952 related presentations².

The most common injuries caused by electric scooter related traumas are primarily upper limb fractures and head and facial injuries. Whilst some of these injuries are minor and only require admission to an emergency department, or treatment by a GP, there are many that require longer stays in hospital, with treatment from surgical teams and subsequent prolonged rehabilitation. In a New Zealand study, almost 40% of cases required admission to a specialty service³. This puts an increased burden on hospital resources and can profoundly affect the lives of the individual with loss of work and inability to care for themselves or others. Injuries and trauma have most occurred in males of the younger cohort and transpired in the afternoon and night times, most frequently later in the week



Committed to
Indigenous health

(weekends) and in the city or city-fringe areas. This pattern is consistent across all jurisdictions and is also consistent with other international cities that have also introduced electric scooters^{2,3, 4, 5}.

Individual risk taking contributes to e-scooter related injuries and their severity. Although risk taking behaviour is not well documented, current data suggests that drink riding is common with reports of alcohol being involved in 29% of emergency department presentations according to one Australian study². While regulations stipulate maximum speed limits, exceeding the speed limit is also common, with one study finding that 34% of individuals presenting to an emergency department with an e-scooter related injury were travelling over 20 kph at the time of the incident². The same study reported that 16% of riders injured were not wearing a helmet at the time, despite the mandatory helmet use regulation². Riding is not the only way in which injuries can occur; parking of devices has also been problematic with reports of other bystanders, including those with vision impairment, falling over discarded PMDs on footpaths. In some cases, injuries have resulted from a fault with the device or device firmware, for example, causing braking problems⁶. The devices can also be prone to risk-taking, with reports of product misuse and reports of hacking devices to override built-in speed limits allowing riders to greatly exceed speed limits.

Regulatory Challenges

E-scooters and other e-mobility devices are subject to varying regulatory frameworks across Australia. Speed limits, age limits and where people may legally ride their PMD (footpaths, roads, shared paths) varies across the states and territories. Furthermore, in some areas, only hired e-scooters are legal in public spaces whereas in other places, privately-owned e-scooters are also permitted. Safety concerns have prompted some jurisdictions in Australia to refuse to participate in e-scooter rental schemes, though electric mobility groups continue to lobby to expand the legalisation of private e-scooter use in every Australian state and territory. Implementing a consistent approach to PMD standards and legislation on a national level would provide beneficial transparency for consumers and other stakeholders.

RACS position

RACS recognises the impact that e-mobility devices are having on individuals and health systems when they are involved in a crash. To improve e-mobility safety RACS strongly advocates for:

- **The prioritisation of safe active mobility**
- **To the extent possible, nationally consistent laws to support the safe use of PMDs**
- **Appropriate law enforcement measures to be implemented**
- **Nationally consistent data to be monitored so that the impact of e-mobility devices can be measured**

Recommendations

RACS supports the following recommendations to improve e-mobility safety:

- **Infrastructure**

Greater provision of protected and connected infrastructure, and clear signage, for e-mobility device use, including non-shared paths that safely separate different transport modes.

- **Mandatory helmets**

Riders must always wear an Australian Standards approved helmet that is securely fitted to their head.

- **Single riders**

There should only be one person riding an e-mobility device at any time. Riders must not carry passengers.

- **Speed Limits**

E-mobility devices must be speed limited, recognising that more research is needed to establish safe and appropriate speed limits for various types of riding infrastructure (e.g., shared paths, bike lanes, roads).

- **Areas of designated riding and parking**

E-mobility device riding should be restricted to designated areas where there is adequate infrastructure and signage to support safe use.

Mandated geofencing technology for all e-mobility hire schemes to restrict their use outside of designated areas.

Provide appropriate and adequate infrastructure for designated device parking that does not impede the safety of others.

- **Mandatory warning devices**

All private and public e-mobility devices should be fitted with and required to use working bells and lights (front and back) to alert pedestrians and others nearby of their presence.

- **Reduce drink-riding and drugged-riding**

Riders must adhere to the applicable state or territory alcohol and drug legislation.

- **Restrictions on use of mobile phones whilst riding**

Mobile phones must not be used whilst riding. If required, riders should pull over and stop before using their phone.

- **Nationally recognised policy and regulatory framework**

National agreement on a policy and regulatory framework, including ACCC product safety standards for all e-mobility devices, particularly e-scooters, and greater coordination between the ACCC and regulatory and enforcement agencies.

- **Nationally recognised data recording**

Nationally recognised injury surveillance approaches to facilitate accurate case capture in health systems and track e-mobility related traumas and associated costs.

- **Mandatory crash reporting**

National agreement on crash definitions and mandatory reporting of all crashes involving e-mobility devices to scheme operators and e-mobility riding and device regulators so that hazards and risks can more easily be identified and tracked.

- **Funding to support e-mobility safety**

A portion of the revenue raised through e-mobility share schemes is dedicated to supporting surveillance and safety initiatives.

Future research needs

RACS recommends that further research be prioritised to address current knowledge gaps and inform evidence-based injury prevention approaches:

- The relative risks of e-mobility comparative with other transport modes (e.g., public transport)
- The relative risk and usage patterns of shared scheme e-mobility devices compared with privately owned devices
- Coding, recording and reporting of e-mobility injury in relevant jurisdictions and nationally
- Risk-factors and contributions to injury type and severity
- Costs of e-mobility injury incidents to individuals and the health system

Conclusion

The introduction of electric personal mobility devices, especially electric scooters, have been rolled out ahead of surveillance, infrastructure and legislation that adequately addresses the safety of these devices. RACS supports a nationally consistent approach that prioritises the safety of riders, pedestrians and other community members, and reduces the incidence of injury and impact on the health system.

Authors and Acknowledgements

This position paper was prepared by Professor Kirsten Vallmuur, Associate Professor Ben Beck, Dr Tanya Smyth and Ms Louise Pfrunder on behalf of the Royal Australasian College of Surgeons (RACS) and approved by the RACS Trauma Committee.

References

1. Toofany M, Mohsenian S, Shum LK, Chan H, Brubacher JR. Injury patterns and circumstances associated with electric scooter collisions: a scoping review. *Injury Prevention*. 2021 Oct;27(5):490–9. Available from <https://injuryprevention.bmj.com/content/27/5/490>
2. Jamieson Trauma Institute, unpublished data, 2022. Brisbane, Australia.
3. Mayhew LJ, Bergin C. Impact of e-scooter injuries on Emergency Department imaging. *Journal of Medical Imaging and Radiation Oncology*. 2019 Aug;63(4):461–6. Available from: <https://onlinelibrary.wiley.com/doi/10.1111/1754-9485.12889>
4. Aizpuru M, Farley KX, Rojas JC, Crawford RS, Moore TJ, Wagner ER. Motorized scooter injuries in the era of scooter-shares: A review of the national electronic surveillance system. *The American Journal of Emergency Medicine*. 2019 Jun;37(6):1133–8. Available from: <https://www.sciencedirect.com/science/article/abs/pii/S0735675719302153>
5. Trivedi TK, Liu C, Antonio ALM, Wheaton N, Kreger V, Yap A, et al. Injuries associated with standing electric scooter use. *JAMA Network Open*. 2019 Jan 25;2(1):e187381. Available from: <https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2722574>
6. Barker R. Electric Scooters. *Emergency Medicine Australasia*. 2019;31(6):914–5. Available from: <https://doi.org/10.1111/1742-6723.13424>

The rise of e-mobility devices, particularly electric scooters, has transformed urban transportation. However, this transformation has been accompanied by a significant increase in injuries, posing a burden on healthcare systems and raising safety concerns.

Current State of E-Mobility Injuries

1. Increase in Injuries:

- Electric scooters have been linked to a surge in injuries, with studies indicating that these injuries are not only frequent but can also be severe. For instance, a study reported that e-scooter-related injuries accounted for 360,800 emergency room visits in the U.S. from 2017 to 2022[3].

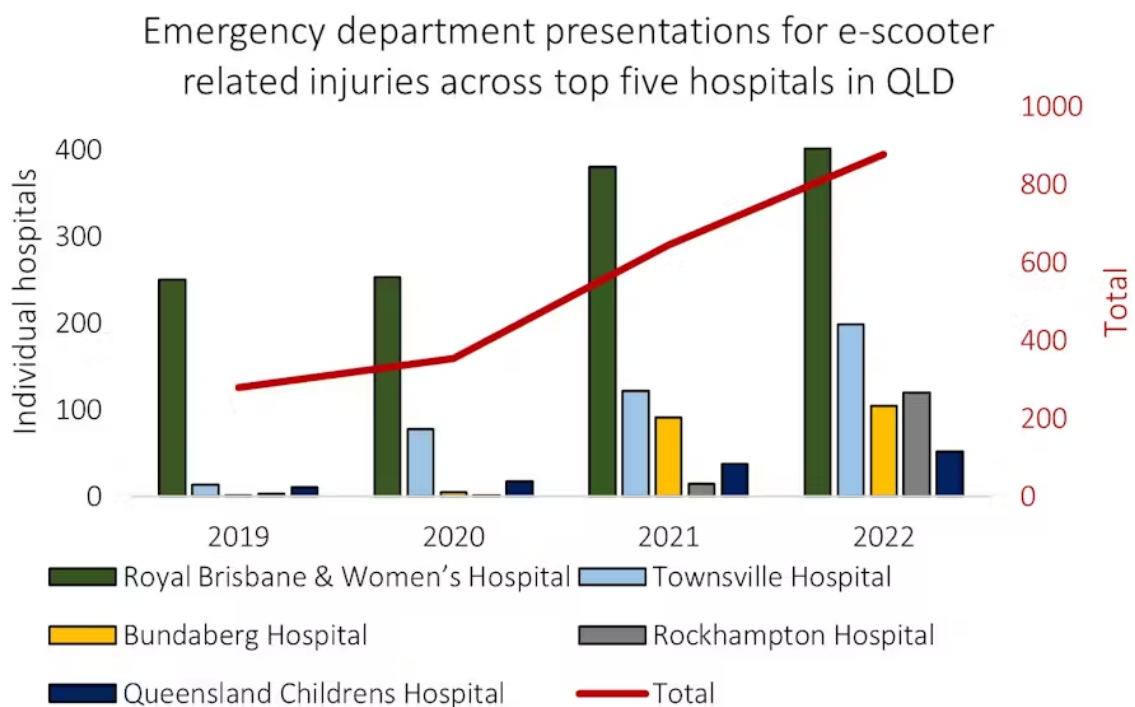
- In Australia, the number of e-scooter injuries has been rising rapidly.

The growing popularity of e-scooters worldwide, including in Australian cities, has been mirrored by a significant rise in related injuries and hospital admissions.

Most of these incidents involve males in their late 20s or early 30s, commonly sustaining head, face and limb injuries. There is consistently low helmet use in those injured. Also, about 30% of people who go to hospital with e-scooter injuries have elevated blood alcohol levels. Crashes involving riders under the influence of alcohol are associated with more severe head and face injuries.

A study examining data from the Royal Melbourne Hospital reported 256 e-scooter-related injuries in the year to January 2023 – including nine pedestrians – with a total hospitalisation cost of A\$1.9 million.

In Queensland, e-scooter-related presentations to hospitals rose from 279 in 2019 to 877 in 2022. By September of 2023, this figure had already reached 1,273. [6].



Similar trends are seen in almost every city that has introduced e-scooters.

2. Common Injury Patterns:

- The most common injuries involve the upper limbs, particularly fractures, followed by head and neck injuries. Falling is the leading mechanism of injury, and a significant number of these injuries occur due to the lack of helmet use[5].

- Head injuries are prevalent, often exacerbated by low helmet usage rates among riders, which increases the risk of traumatic brain injuries[1][5].

Anticipated Burden on Healthcare Systems

1. Emergency Department Strain:

- The increase in e-scooter injuries places a considerable burden on emergency departments, as many cases require immediate medical attention and, in some cases, surgical intervention[1][5].

2. Cost Implications:

- The financial burden of treating these injuries is substantial. Costs are often higher when injuries are associated with factors such as intoxication or lack of protective gear[5].

3. Public Health Concerns:

- The growing popularity of e-scooters necessitates interventions to prevent injuries, such as promoting helmet use and enforcing speed limits[1][6].

Recommendations for Policy and Safety Measures

1. Mandatory Helmet Laws:

- Enforce mandatory helmet laws to reduce the incidence of head injuries, as studies have shown a correlation between helmet use and reduced severity of injuries[5].

2. Speed Regulation:

- Implement stricter speed regulations and enforce penalties for non-compliance to prevent high-speed collisions and falls[6].

3. Public Awareness Campaigns:

- Launch campaigns to educate the public on safe riding practices and the importance of protective gear.

4. Data Collection and Research:

- Encourage standardized data collection on e-scooter usage and related injuries to better understand injury patterns and develop targeted interventions[1].

Conclusion

While e-mobility devices offer significant benefits in terms of convenience and environmental impact, the associated risks and burden on healthcare systems cannot be overlooked. By implementing effective safety measures and policies, we can mitigate these risks and ensure that e-mobility remains a safe and sustainable mode of transportation.

Citations:

[1] <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8461400/>

[2] <https://www.unsw.edu.au/newsroom/news/2024/02/e-scooters-are-linked-with-injuries-and-hospital-visits---but-we>

[3] <https://www.anesthesiologynews.com/Commentary/Article/01-24/Exploring-the-Rise-in-Severe-Injuries-Associated-With-Electric-Scooters/72720>

[4] <https://www.parliament.nsw.gov.au/committees/inquiries/Pages/inquiry-details.aspx?pk=3052>

[5] <https://pubmed.ncbi.nlm.nih.gov/36039663/>

[6] <https://www.drive.com.au/news/e-scooter-accidents-nearly-double/>

[7] <https://www.sciencedirect.com/science/article/pii/S0925753523002254>

[8] <https://www.aihw.gov.au/reports/injury/mobility-scooter-injuries-deaths/summary>

[9] <https://injuryprevention.bmj.com/content/29/2/121>

Financial burden on healthcare system

The financial burden of e-scooter injuries on healthcare systems is significant, as evidenced by multiple studies and reports:

1. Hospital Costs: In Western Australia, a study found that the median cost per emergency department (ED) presentation for e-scooter-related orthopaedic injuries was AU\$5,880.60, with inpatient costs being significantly higher. The range of total costs for these injuries was between AU\$413.80 and AU\$100,239.80[1].

2. Economic Impact: Another study highlighted that the average total billing charges for e-scooter clinical encounters in the U.S. were \$95,710, with insurance billing averaging \$86,376 for hospital charges alone[4]. This indicates a substantial financial impact on both healthcare providers and insurers.

3. Community and Taxpayer Burden: In Dallas, Texas, orthopedic services for e-scooter injuries cost over \$2.3 million, averaging about \$28,406 per patient. A significant portion of these costs was borne by the community due to a high number of uninsured patients or those covered by public hospital systems[5][6].

4. Public Health System Strain: In Melbourne, Australia, e-scooter injuries were found to cost taxpayers approximately \$1.9 million in hospital costs alone, in 1 year ended January 2023, in 1 hospital (Royal Melbourne Hospital), not accounting for additional indirect costs. This financial strain also affects hospital operations, impacting elective surgery wait times due to the increased demand for emergency care[7].

These facts have materially contributed to a recent decision by Melbourne City Council to break contracts with share hire e-scooter providers.

[Melbourne City Council votes to break contracts with share hire e-scooter providers, citing safety concerns \(msn.com\)](#)

[Hire e-scooters now banned from Melbourne's CBD \(msn.com\)](#)

[Public outrage prompts Melbourne e-scooter ban \(msn.com\)](#)

[E-scooters for hire banned in Melbourne CBD \(theage.com.au\)](#)

[Adelaidenow.com.au | Subscribe to The Advertiser for exclusive stories](#)

[City of Melbourne pulls the plug on e-scooters in the CBD with Lord Mayor Nick Reece 'fed-up' with rule breakers | Sky News Australia](#)

E-scooters to be banned in Melbourne (drive.com.au)

Overall, the financial burden of e-scooter injuries is considerable, affecting not only healthcare systems but also taxpayers and communities. The costs associated with treating these injuries, particularly when they require surgical intervention or extended hospital stays, highlight the need for **effective regulatory** and **safety measures** to mitigate these expenses.

Citations:

- [1] <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10607584/>
- [2] <https://www.sciencedirect.com/science/article/abs/pii/S0020138324001803>
- [3] https://www.researchgate.net/publication/336556985_Regional_Healthcare_costs_and_burden_of_injury_associated_with_electric_scooters
- [4] <https://tsaco.bmj.com/content/6/1/e000634>
- [5] <https://www.utsouthwestern.edu/newsroom/articles/year-2024/jan-e-scooter-accident-injuries.html>
- [6] <https://www.jorthobusiness.org/index.php/jorthobusiness/article/view/42>
- [7] <https://www.abc.net.au/news/2023-12-20/e-scooter-injuries-rise-as-hospitals-struggle-to-treat-riders/103246314>

E-scooter injuries have a notable impact on the overall healthcare budget, primarily due to the costs associated with emergency care, hospital admissions, and long-term treatment needs. Several studies highlight the financial implications:

1. Severity and Cost of Injuries: The severity of injuries, such as traumatic brain injuries (TBIs), significantly increases healthcare costs. In the U.S., the average total billing charges for e-scooter injuries were reported to be around \$95,710, with hospital charges averaging \$86,376[8]. Severe injuries, particularly those requiring neurosurgical intervention, contribute heavily to these costs[1].

2. Economic Burden on Healthcare Systems: In Helsinki, the total cost of e-scooter injuries, including hospital care and lost workdays, was estimated at 1.7 million euros, with a median cost per incident of 1,148 euros[7]. This indicates a substantial economic burden on healthcare systems, especially when considering the frequency of such injuries.

3. Indirect Costs: Beyond direct medical expenses, e-scooter injuries also lead to indirect costs such as lost productivity and long-term disability care. These costs further strain healthcare budgets and underscore the need for preventive measures and policy interventions[3][5].

Overall, the financial burden of e-scooter injuries on healthcare systems is significant, necessitating strategic measures to mitigate these costs through improved safety regulations, public awareness campaigns, and better urban planning to accommodate e-scooter use safely.

Citations:

- [1] <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10122265/>
- [2] <https://www.sciencedirect.com/science/article/abs/pii/S1479666X22001020>
- [3] <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC11302202/>

[4] <https://pubmed.ncbi.nlm.nih.gov/38087881/>

[5] https://www.researchgate.net/publication/336556985_Regional_Healthcare_costs_and_burden_of_injury_associated_with_electric_scooters

[6] <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7831709/>

[7] <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9641852/>

[8] <https://tsaco.bmj.com/content/6/1/e000634>

Comparison with bicycles

E-scooter injuries tend to have a significant financial impact on healthcare systems, particularly when compared to other forms of urban transportation such as bicycles and motorbikes. Here are some key points of comparison:

1. Severity and Cost of Injuries: E-scooter injuries are often more severe than those from conventional bicycles. A study found that e-scooter riders are more likely to sustain severe traumatic brain injuries (TBIs) compared to cyclists, which can lead to higher medical costs due to the need for intensive care and longer hospital stays [6].

2. Average Costs: The average total billing charges for e-scooter injury clinical encounters can be quite high. For instance, one study reported average charges of approximately \$95,710 per incident, which is substantial when compared to typical costs associated with bicycle injuries[2]. This high cost is partly due to the severity of injuries, such as intracranial bleeds and TBIs, which require expensive medical interventions.

3. Hospitalization Rates: E-scooter injuries have led to increased hospitalization rates. For example, in Auckland, New Zealand, the combined cost attributable to e-scooter injuries was significant, with an average cost per injury of \$1,693[3]. These costs reflect the burden on healthcare systems as they manage the influx of patients with severe injuries.

4. Comparative Mortality and Injury Rates: Although the mortality rate for e-scooter accidents (9.2%) is slightly lower than that for bicycles (10.0%), it is higher than that for motorbikes (5.2%)[6]. This suggests that while e-scooter injuries might not always be fatal, they often result in severe trauma that necessitates costly medical care.

Overall, e-scooter injuries impose a considerable financial burden on healthcare systems, often exceeding the costs associated with other forms of urban transportation due to the severity of injuries and the associated need for comprehensive medical treatment. This underscores the importance of implementing safety measures and regulations to mitigate these costs.

Citations:

[1] <https://www.unsw.edu.au/newsroom/news/2024/02/e-scooters-are-linked-with-injuries-and-hospital-visits---but-we>

[2] <https://tsaco.bmj.com/content/6/1/e000634>

[3] <https://www.sciencedirect.com/science/article/abs/pii/S0020138319306084>

[4] <https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2821387>

[5] <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC11302202/>

[6] <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10314314/>

[7] <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9641852/>

[8] <https://bmccemergmed.biomedcentral.com/articles/10.1186/s12873-022-00719-0>

The Royal Australasian College of Surgeons is grateful for the opportunity to provide this submission.

This submission highlights the urgent need for legislative and community action to address the safety challenges posed by the increasing use of e-mobility devices in New South Wales.

Surgeons desire a reduction in current patterns of injury due to e-mobility devices. We are keen to work collaboratively to mitigate the risks to the community posed by future use of e-mobility devices.

Yours sincerely

 **Dr John Crozier AM CSM FRACS**
Trauma Committee
RACS NSW Trauma Network