Inquiry into e-mobility safety and use in Queensland

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Breaking bones and the rules: An audit of paediatric e-scooter trauma in a regional Queensland hospital

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Abstract

Objective: To retrospectively analyse paediatric electronic scooter (e-scooter) injuries presenting to the Sunshine Coast University Hospital by evaluating trauma severity and compliance with safety regulations to help inform policy discussions.

Methods: A retrospective review of paediatric e-scooter trauma presentations between January 1, 2023, and December 31, 2024, was conducted using emergency department records. Data collected included demographics, incident mechanisms, helmet use, two persons riding one e-scooter "doubling", speed, imaging requirements and paediatric trauma scores.

Results: A total of 176 cases were identified, with a median age of 14 years and 71% were male. Falls accounted for 78% of crashes, while 13% involved motor vehicles. Helmet non-compliance was documented in 42% of the presentations, 12% involved doubling, and 36% exceeded the 25 km/hr speed limit. Fractures occurred in 37% of cases, 18% required computerised tomography scans and 11% sustained life-threatening or potentially life-threatening injuries.

Conclusions: E-scooters pose a significant safety risk to paediatric users and this study highlights gaps in safety compliance.

Implications for Public Health: This study highlights the high risk e-scooters pose to Queenland's youth. It is our belief that minimum age limit for e-scooters should be raised to 16 years old until improved safety measures prove effective. Dr Clanfield is currently engaging with the Queensland Government to advocate for policy review. This report's data helps to inform other doctors and policymakers about the dangers of e-scooter use in young people.

Key words: e-scooters, trauma, paediatrics

Introduction

E-scooters have become a popular mode of transportation in recent years, offering a convenient, affordable and environmentally friendly way to travel; however, their use has been associated with a commensurate rise in associated trauma.[1–3] While e-scooters were originally designed for adults, their use has expanded to include children and teenagers. This shift raises safety concerns, as younger users may lack the road sense and developmental maturity necessary to operate these devices safely. In Queensland, legislation mandates that children aged 12 to 15 years must be supervised by an accompanying adult riding alongside them on another device, such as another e-scooter or bicycle; all other states and territories in Australia, bar the Australian Capital Territory, have the minimum age between 16 to 18 years of age.[4–10] Additional regulations require adherence to speed limits, helmet use and other common road laws.[11] Despite these measures, our clinical observations from a regional paediatric emergency department indicate e-scooter-related injuries among children are on the rise. Despite this, there are no paediatric-specific data on e-scooter trauma in Queensland, leaving policy change bereft of meaningful evidence to refine and strengthen current regulations. This study seeks to address this gap by analysing the nature and severity of e-scooter-related injuries with the hope of encouraging further research into the impacts of these incidents on Queensland's youth.

Methods

The study was a retrospective analysis of e-scooter-related emergency department (ED) presentations for patients under the age of 16 years,

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at the Sunshine Coast University Hospital from January 1, 2023, to December 31, 2024. Ethics approval was obtained from the Gold Coast Health and Hospital Ethics Committee as a clinical audit (HREC exemption EX/2024/QGC/113956). To obtain the necessary data, all Paediatric ED triage notes containing the word scooter were analysed to determine if it was a e-scooter, and not a self-propelled push scooter. Only cases where the notes explicitly identify the use of an e-scooter were included in the analysis. Once the appropriate presentations were selected, data from ED documentation was extracted and included incident mechanisms, "doubling", helmet use and estimated speeds at the time of the incident. To quantify injury severity, a paediatric trauma score was calculated for each patient based on factors such as weight, airway status, systolic blood pressure, Glasgow Coma Scale (GCS), tissue injuries and fractures. Scores were categorised as minor trauma (9–12), potentially life-threatening (6–8), life-threatening (0–5) or usually fatal (<0).[5] The calculation of medians, percentages and paediatric trauma score weas all conducted in Microsoft Excel.

Results

In two years, 176 children aged 5–15 presented with e-scooter related injuries, accounting for 1% of total paediatric ED visits. The patients were predominantly male (71%), with a median age of 14 years (Table 1); a concerning point was that e-scooters accounted for approximately 1 in 30 presentations for 14 to 15-year-olds. Most incidents (78%) occurred due to falls or collisions with stationary objects such as trees; however, 13% of incidents involved collisions with cars and 8% involved other e-scooters or mobility devices. These findings highlight the risks associated with operating e-scooters in shared spaces, particularly when road rules are not followed. Alarmingly, a portion of incidents that disobeyed at least one road law; 12% of incidents involved "doubled" riders and 42% of patients had self-reported not wearing helmets. At least 36% of incidents involved self-reported speeds exceeding 25 km/hr, which is the maximum legal limit for e-scooters on Queensland roads. It should be noted that the maximum speed for footpaths in Queensland is 12 km/hr, suggesting that the actual proportion of those exceeding speed limits may be higher.

Table 1: E-scooter incident demographics, details and injuries.

	2023	2024	Total
E-scooter incidents	82	94	176 (1%)
Age (years), median (range)	14 (6-15)	14 (5-15)	14 (5-15)
Male (%)	63 (77%)	62 (66%)	125 (71%)
Mechanism			
Vs. Ground/stationary object (%)	65 (79%)	73 (91%)	138 (78%)
Vs. Car (%)	10 (14%)	13 (16%)	23 (13%)
Vs. e-scooter/mobility scooter (%)	6 (7%)	8 (10%)	14 (8%)
Doubling (%)	8 (10%)	14 (15%)	22 (12%)
Helmet usage			
Yes (%)	38 (46%)	41 (44%)	79 (45%)
No (%)	32 (39%)	42 (45%)	74 (42%)
Unknown (%)	12 (15%)	11 (11%)	23 (13 %)
Speed in excess of 25km/hr* (%)	34 (60%)	29 (38%)	63 (36%)
Injuries			
At least 1 fracture (%)	36 (44%)	30 (32%)	66 (37%)
Required imaging (%)	69 (84%)	63 (67%)	132 (75%)
At least 1 CT scan (%)	15 (18%)	17 (18%)	32 (18%)
Paediatric trauma severity score			
Life threatening injuries (%)	1 (1%)	2 (2%)	3 (2%)
Potentially life threatening injuries (%)	12 (15%)	4 (4%)	16 (9%)
Median (IQR)	11 (10-11)	11 (10-11)	11 (10-11)

CT = computed tomography; IQR = interquartile range.
*If speed was not recorded or unknown – it was deducted from the total number of crashes when calculating percentage

Most presentations were classified as minor trauma, with a median paediatric trauma score of 11, a proportion (11%) were categorised as potentially life-threatening or life-threatening. Imaging was required in 75% of cases, and 18% of patients underwent at least one computerised tomography scan. Fractures were identified in 38% of presentations, with some cases involving multiple fractures that required surgical intervention. These findings underscore the healthcare resources required to manage e-scooter-related injuries, as well as the potential for long-term physical and psychological impacts on affected children.

Discussion

Despite its valuable insights, this study has several limitations that likely contributed to the underreporting of e-scooter-related injuries. Data were collected from a single hospital within the Sunshine Coast Health Service, excluding presentations to adjacent hospitals with EDs. Additionally, cases where the triage notes did not explicitly mention trauma or scooter involvement were not captured, further limiting the case ascertainment. Another key limitation was the incomplete documentation regarding whether children were accompanied by a responsible adult at the time of the incident, as mandated by Queensland road regulations. The small sample size also limits the statistical analysis that could be completed to garner further associations between different variables, an example being helmet use and injury severity.

The findings of this study highlight the urgent need for enhanced safety measures and tighter enforcement of existing regulations. Helmet use was alarmingly low, with nearly half of the patients not wearing helmets at the time of the accident. Research has consistently shown that helmets reduce the risk of traumatic brain injuries, making their use a critical component of e-scooter safety .[3,12] Furthermore, given that paediatric traumatic brain injury is devastating with lifelong impacts on patients and families alike–urgent action is required. Similarly, with slightly more than one third of incidents related to speeding and 13% involving doubling, there is a clear need for improved education and awareness campaigns aimed at both children and their parents. Schools, community organisations and local governments could play a key role in promoting safe e-scooter practices and reinforcing the importance of adhering to road laws.

As the first paediatric-focused e-scooter trauma study in Queensland, this research provides a valuable foundation for future investigations. Prospective cohort studies are necessary to investigate the broader implications of e-scooter use among young people in Queensland. This includes examining associated costs, healthcare resource utilisation, prevalence of risk factors and long-term outcomes for injured patients. It is essential that this research specifies whether the child was accompanied by an adult at the time of the incident, as the

absence of this data was a significant limitation in this audit. Anecdotally, we suspect that the findings of this review may be generalisable to other health services in Queensland. Further collaboration and research may help to confirm these suspicions. However, we believe this issue requires immediate governmental action and policy change, as our findings suggest that e-scooter accidents currently represent a public health emergency. Raising the minimum age limit to at least 16 years old to match other states and introducing mandatory road safety courses in schools, like the United Kingdom bicycle safety program, would be a great starting point to improve the safety of Queensland's youth (4-10, 13).

Conclusion

While e-scooters do offer some transportation advantages, their use among children and adolescents raises significant safety concerns that cannot be ignored. This study sheds light on the prevalence and severity of e-scooter-related injuries in this population in Queensland and underscores the importance of targeted interventions to mitigate these risks. We believe policymakers should urgently revisit the age limits in Queensland to ensure the safety of the state's youth until improved safety measures such as better speed restricted e-scooters and driving proficiency tests, have been implemented and demonstrated a significant risk reduction.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Matthew Clanfield reports a relationship with Sunshine Coast Hospital and Health Service that includes: previous employment. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Ethics

This study was conducted as a clinical audit and received ethics exemption from the Gold Coast Health and Hospital Service Human Research Ethics Committee (HREC exemption: EX/2024/QGC/113956). All data collected was de-identified, and no patient follow-up was conducted.

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