



Centre for Accident Research
& Road Safety - Queensland

Micromobility outcomes in Australia

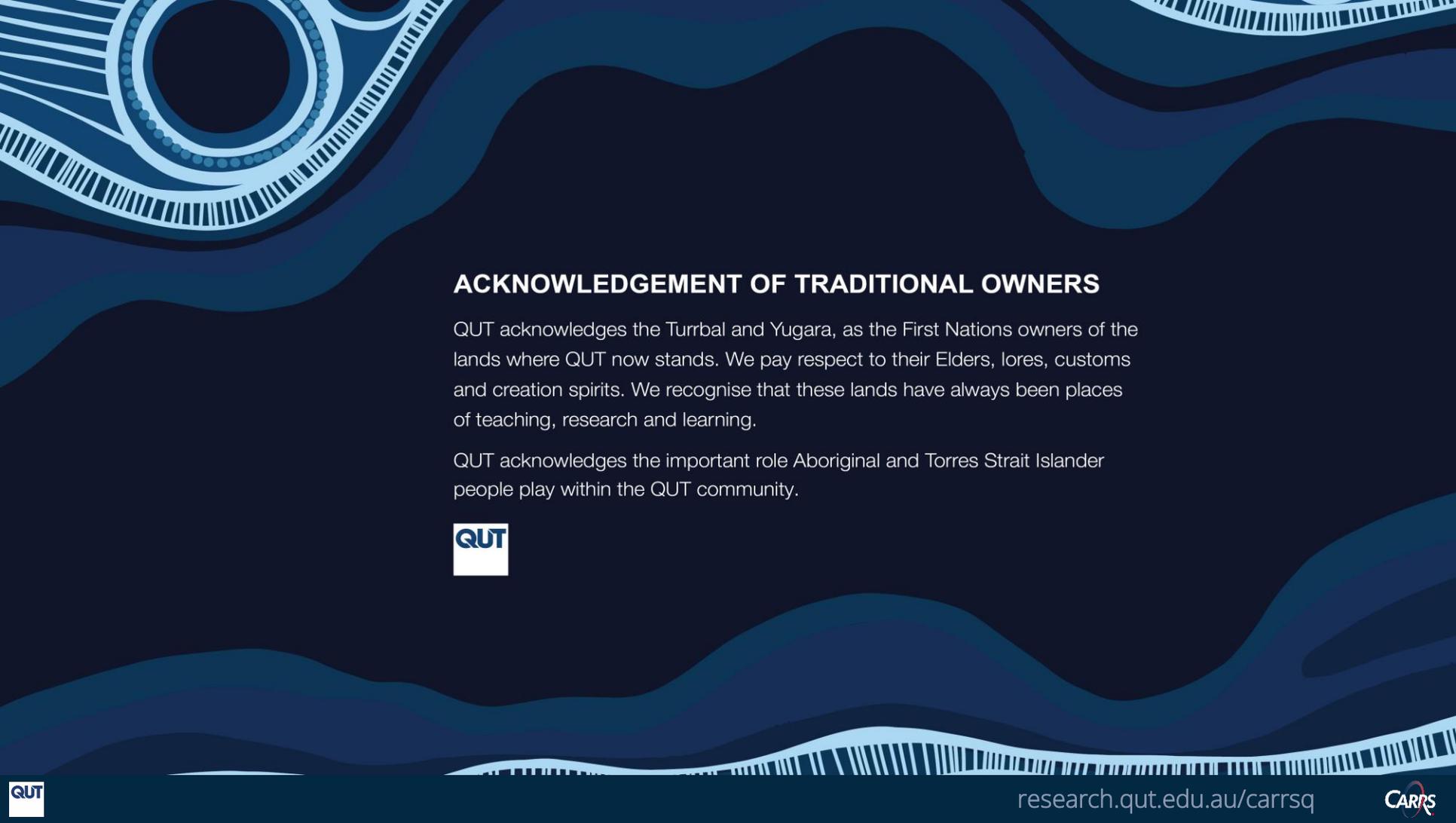
Prof Narelle Haworth AM

Presentation to Trafinz, September 2023



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ACKNOWLEDGEMENT OF TRADITIONAL OWNERS

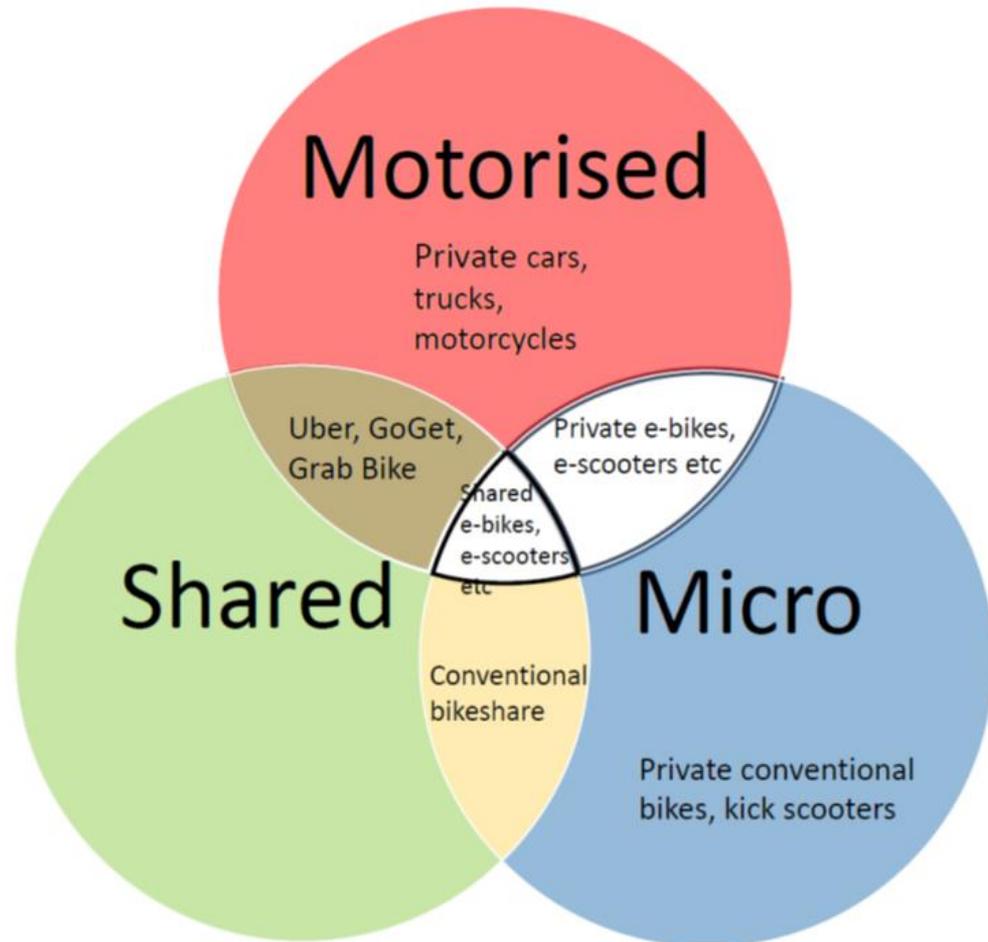
QUT acknowledges the Turrbal and Yugara, as the First Nations owners of the lands where QUT now stands. We pay respect to their Elders, lores, customs and creation spirits. We recognise that these lands have always been places of teaching, research and learning.

QUT acknowledges the important role Aboriginal and Torres Strait Islander people play within the QUT community.



Outline

- What is micromobility?
- History and status across Australia
- Injury outcomes
- How are they being used?
- Safety implications for riders and others
- Lessons learnt
- Challenges for now and the future

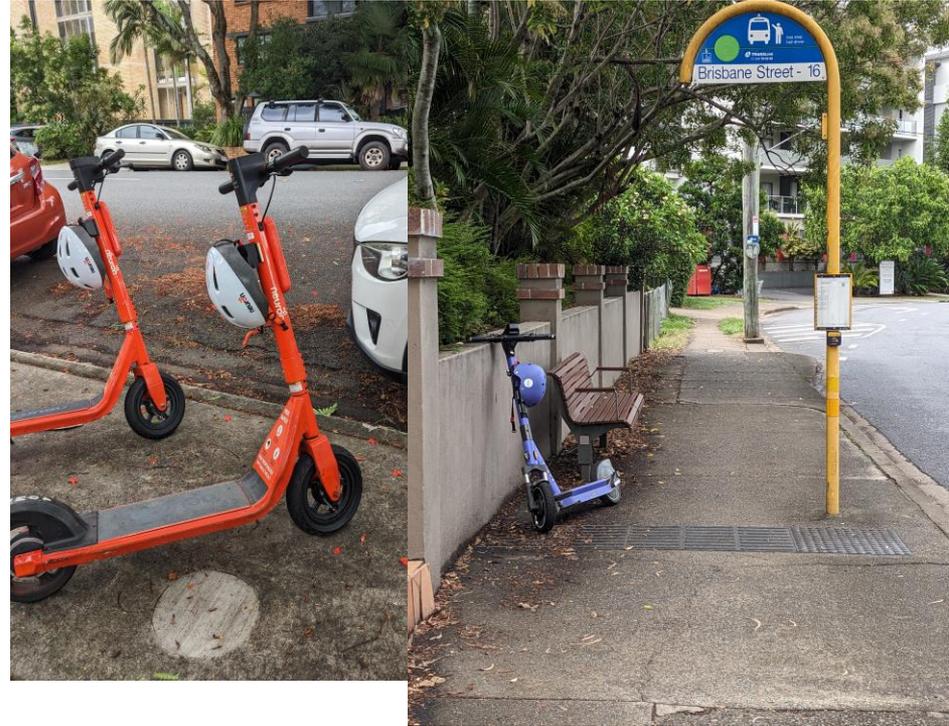


E-scooters in Australia

	Shared	Private	Ride on footpaths?	Cities
Queensland	✓	✓	✓	All state
South Australia	✓		✓	Trial in parts of Adelaide
Western Australia	✓	✓	✓	All state
ACT	✓	✓	✓	All
Victoria	✓	✓		Extended trial
New South Wales	✓			Trials in some areas

Popular among users...

- Lime - over 7 million rides since 2018
 - Rides increased by at least 90% in both 2021 and 2022
- Beam - over 10 million rides since April 2019
- Neuron – “the largest provider in Australia”



But not among others..

Concerns about

- falling over e-scooters on footpaths, especially from pedestrian and disability organisations
- injuries to riders from some road safety organisations and advocates

What we do know about e-scooter injuries?

- Head injury common – 9% of Brisbane ED presentations to May 2020 (McCreanor, 2022)
 - helmet use associated with a much lower risk of head injury (Mitchell et al., 2019; Raubenheimer et al., 2023)
- Upper limb fractures
- About half intoxicated in Vic, NT (Talia et al., 2023; Moran et al., 2023), WA 35% (Raubenheimer et al., 2023)
- 16 Qld workers compensation claims per month in 2022, mostly males aged 25-44 (Vallmuur, 2023)

Why we don't know more...

- Not widespread use across Australia until very recently
- Not “vehicles” so coded as pedestrians in police data
- Hard to identify pedestrians injured by e-scooters
- Use on footpaths, bike paths means that collisions, falls aren't “road crashes”
- No specific code in hospital data so reliance on medical records, patient interviews \$\$\$!
- No ACC!

Queensland PMD rules

- Legalised in Oct 2018, shared e-scooters launched Nov 2018
- Since Nov 2022, PMDs now *“vehicles” and users are “riders”*
- Wear correctly fastened bicycle or *motorcycle* helmet
- Use on footpaths, shared/bicycle paths, protected bike lanes, *bike lanes* and traffic lanes when speed limit 50 km/h or less
- Some areas forbidden by signage
- 25 km/h speed limit except *12 km/h* on footpaths unless otherwise signed
- *Passenger must be less than 10 years old*
- Don't use mobile phone

Qld enforcement

976 fines 1 Nov 2022 to 31 Jan 2023

- 633 helmet
- 62 speeding (14 on footpath)
- 27 running red light
- 176 travelling on a prohibited road
- 4 riding while using mobile phone

Considering laws to enable RBT, set BAC limit and penalties

Central Brisbane observations



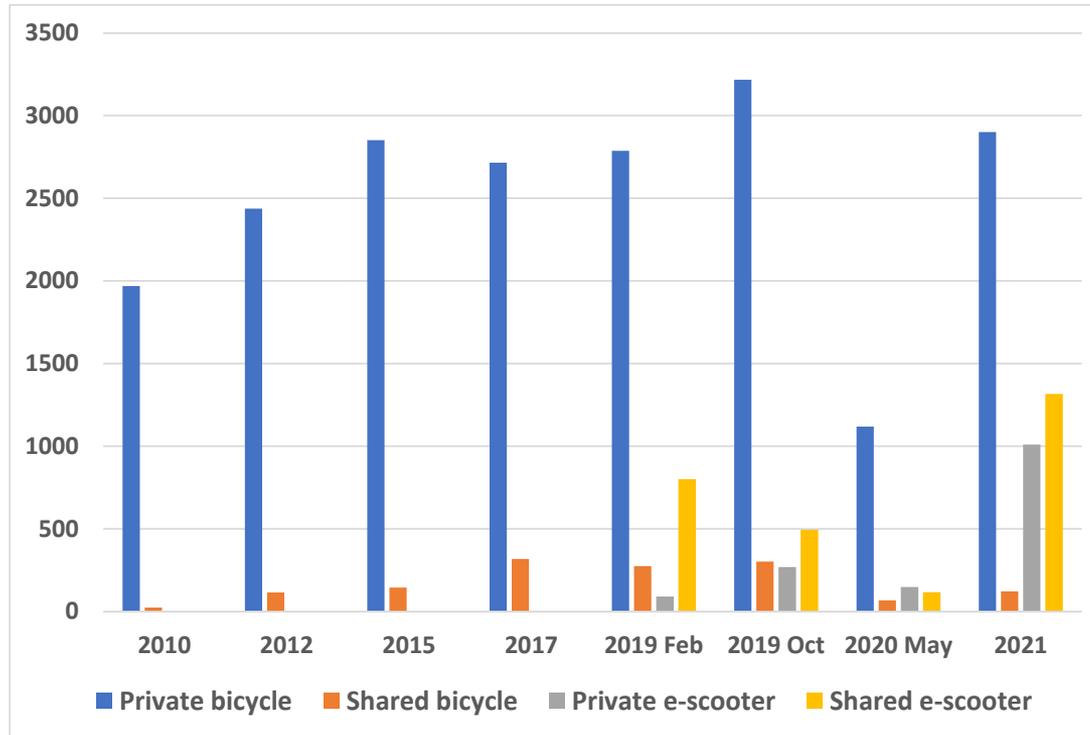
2019 x 2, 2020, 2021

7-11 am and 2-6 pm Monday to Thursday

Multi-lane roads where e-scooters must be ridden on footpath

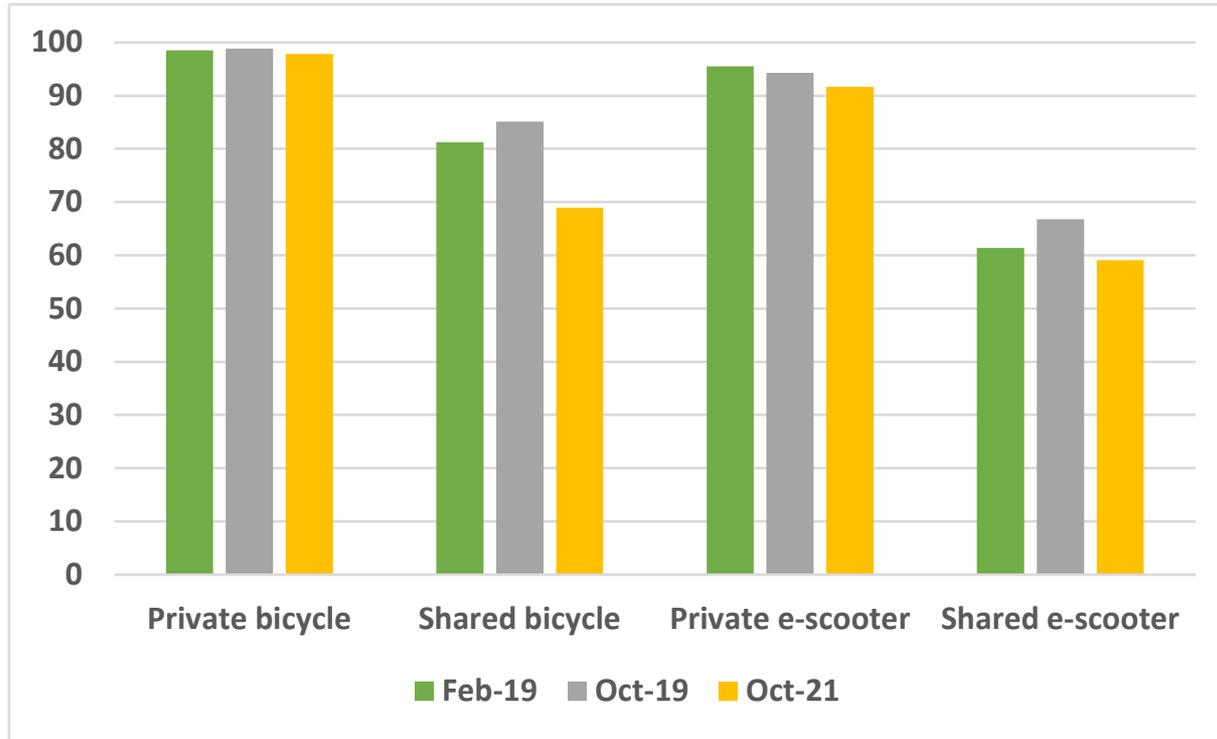
2 added sites at protected bike lanes in 2021

Trend over years



Additional sites in 2021

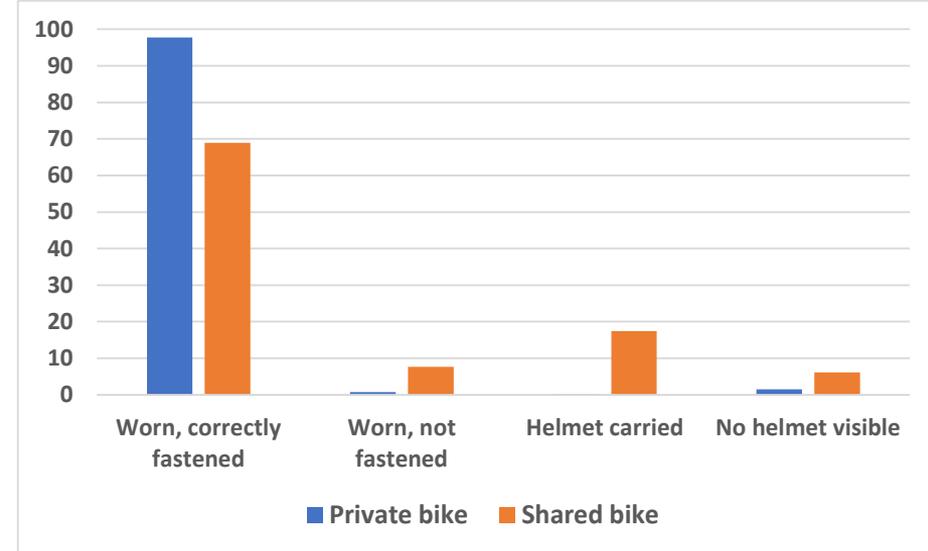
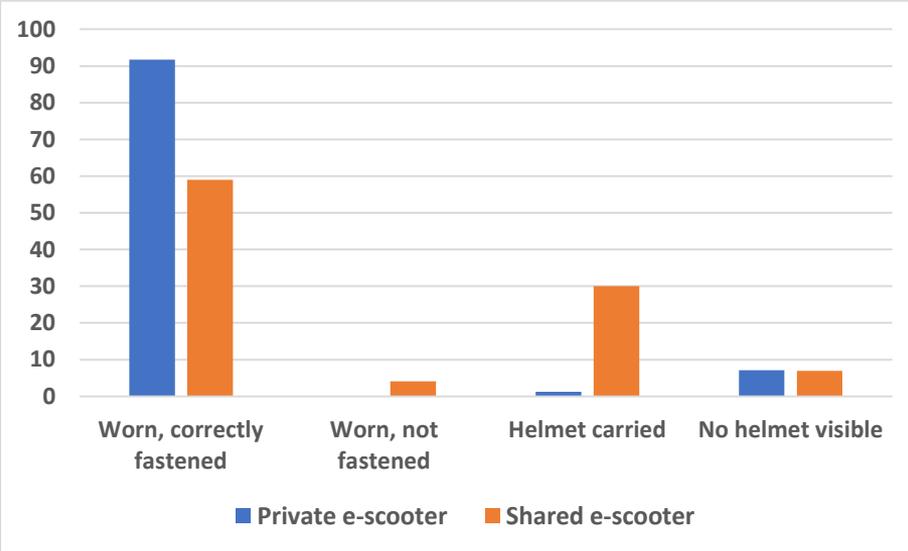
% wearing fastened helmet



A closer look at 2021 data

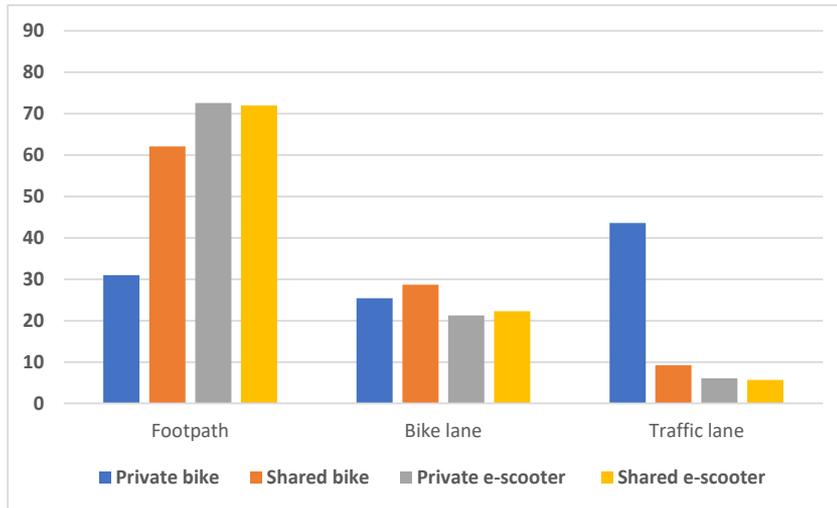
E-scooters

Bicycles

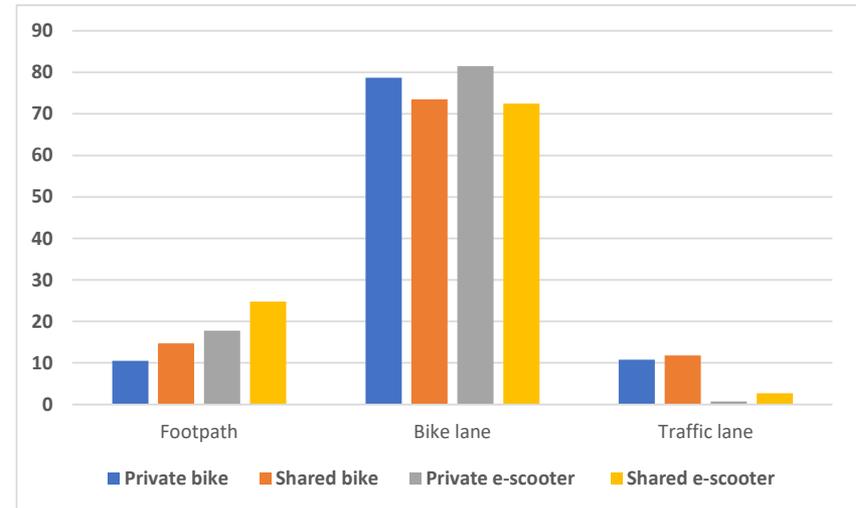


% riders by riding location

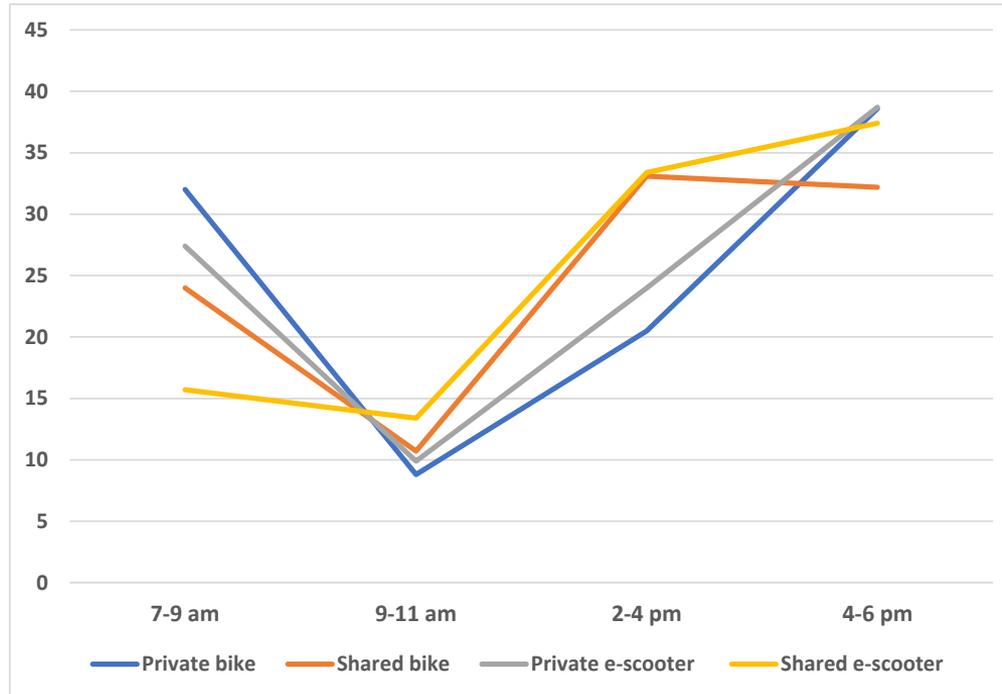
Sites **without** protected bike lane



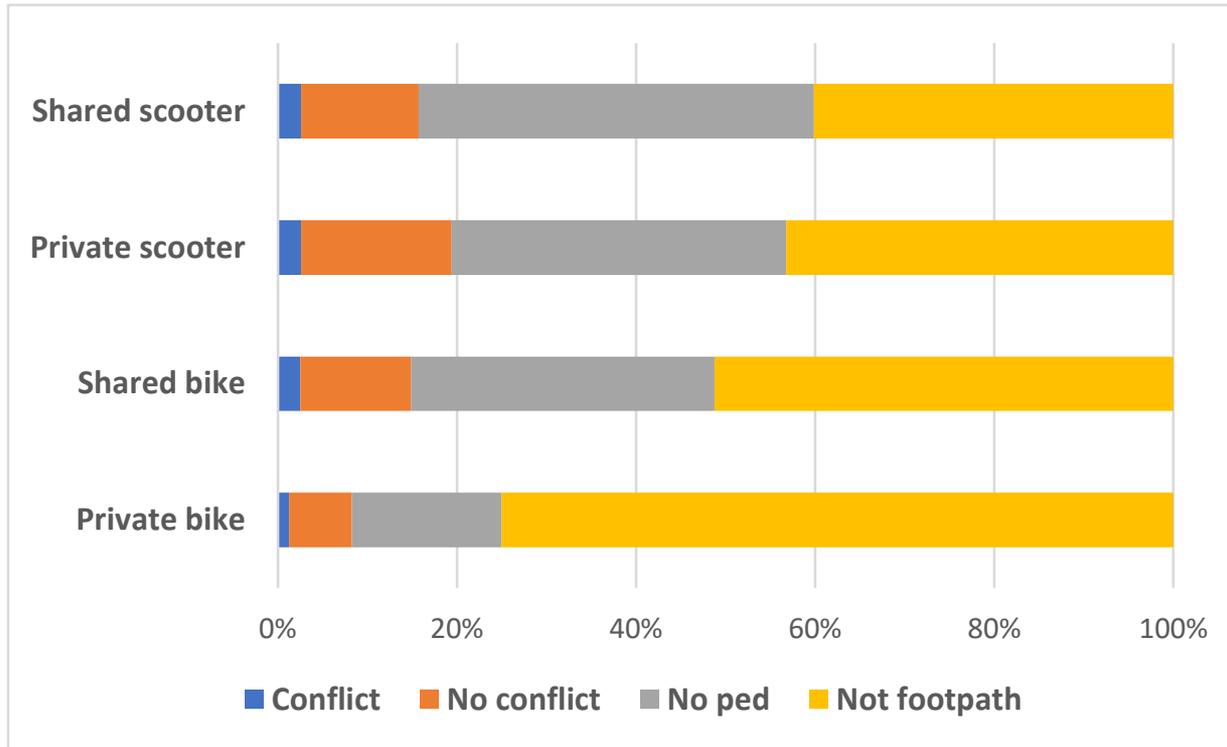
Sites **with** protected bike lane



% riding by time of day



Pedestrian interactions



TMR e-scooter data Oct 22

- Observations at CBD, urban and suburban locations, including weekends
- Highest e-scooter volumes in CBD but more private riders in suburbs
- Riders travel more slowly on footpaths than roads
- Private riders - higher speeds but more helmet use
- More than 10% private riders wearing full-face helmets in 60 km/h on-road bike lanes in suburbs

BANCS survey of e-scooter users and non-users

Belgium

Australia (Brisbane)

Norway

Czech Republic

Sweden

Online survey

Travel behaviours

Attitudes

Knowledge of rules

E-scooter crashes and near-misses

BNE user characteristics

	Private	Shared
N	159	162
Female	24%	31%
Aged 18-34	34%	62% ↑
Easy access to car	88% ↑	73%
Poor access to PT (>1km or <1/hour)	33% ↑	26%

Environmental sustainability

	Private	Shared
Commuting	43%	41%
Leisure/sightseeing	31%	25%
Single mode	62%	40%
Replaced walking (all)	31%	60%
Replaced driving (all)	45%	15%

Safer Scooting Study

3-year project funded by Australian Research Council with University of Tennessee-Knoxville and Bird Australia

- How do e-scooter safety and riding patterns change with experience?
- What are the factors associated with safer and less safe behaviours?
- Can crash risk be predicted riding parameters (shared e-scooters)?

Learnings - general

- Rules, user perceptions and behaviours
 - Lack of knowledge and confusion among riders and non-riders
 - Rules and perceptions of safety influence where e-scooters are ridden (e.g., Portland)
 - Rules can constrain impaired riding (e.g., Oslo)
 - Rules need to consider e-scooter dynamics
- Police and hospital data systems should code e-scooter incidents
- E-scooters are changing rapidly
- Private and shared e-scooters need to be distinguished

Learnings - private vs. shared

	Private	Shared
Protective behaviours	↑	
Use for recreation/fun		↑
Replace car trips	↑	
Ability to regulate		↑
Safety	?	?

Learnings - infrastructure

Footpaths

- Major concerns expressed by older pedestrians, disability organisations
- 40% of e-scooters and bikes within 1m of pedestrians but conflict rate <2%
- Relatively few ped injuries reported but perceptions could reduce walking

PMD users, pedestrians and bike riders all need

- Separated and connected infrastructure
- Adequate capacity
- Safe and equitable intersection treatments
- Lower speeds where not separated
- Smooth and uncluttered footpaths

Optimising interactions

- Perceived and objective safety
- Injury risk and severity for both parties
- Communication
 - Hand signals?
 - Looking behind?

Risk matrix

Operating environment	Maximum riding speed			
	5 km/h	10-12 km/h	25 km/h	>25 km/h
Footpath with few pedestrians			P	P+R
Footpath with many pedestrians		P	P	P+R
Shared path				P+R
Bike path/protected bike lane	R	R		R
Bike lane on road 30-40 km/h	R	R		R
Road 30-40 km/h	R	R	R	R
Bike lane low volume Road 50 km/h	R	R		R
Road Low volume 50 km/h	R	R	R	R
Bike lane High volume Road 50 km/h	R	R		R
Road High volume 50 km/h	R	R	R	R

Challenges

- Rapid changes in e-scooter design and technology
- Lack of comprehensive vehicle standards
- E-scooter rules vary from one city to another and over time
- Planning infrastructure in the face of uncertainty

Emerging trends

Seated e-scooters

- Beam launched in Brisbane in July and regional WA in August 2023
- Mobility impairments
- Longer rides (\$\$\$)



Photo courtesy of Beam

E-scooters for delivery

- Brisbane CBD 80 delivery e-scooters observed (3% of del. bikes/e-scooters)

Challenges for automated vehicles

- Variety of PMDs
- Variety of PMD users
- Predicting future trajectory



Photo credits: British Safety Council, Polestar and Phil Latz

Publications

Accident Analysis and Prevention 152 (2021) 105981

Contents lists available at ScienceDirect

Accident Analysis and Prevention

journal homepage: www.elsevier.com/locate/aap

Comparing the risky behaviours of shared and private e-scooter and bicycle riders in downtown Brisbane, Australia

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ARTICLE INFO ABSTRACT

Keywords:
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 Electric scooters
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 Footpath safety
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 Bicycles
 Shared mobility

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Protective behaviours of e-scooter riders in five countries

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Keywords: protective equipment, e-scooters, micromobility, attitudes.

1 INTRODUCTION

Micro-mobility use, such as electric scooters (e-scooters), offers convenience and environmental benefits (Chen et al., 2021; Xu et al., 2021). It has become one of the fastest growing modes of transport. Following the introduction of personal-use personal-use (2020), often

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Accident Analysis and Prevention

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Changes in shared and private e-scooter use in Brisbane, Australia and their safety implications

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ARTICLE INFO ABSTRACT

Keywords:
 E-scooters
 Footpath safety
 Urban mobility
 Micro-mobility
 Observational study
 Helmet use

Shared electric scooter (e-scooter) schemes debuted in US cities in 2017 and have spread to many cities worldwide. Rider inexperience and the inexperience of other road users in interacting with e-scooters may be contributing to injuries. Shared e-scooters came to Brisbane, Australia, in November 2018 and our observational study in February 2019 found a high level of non-compliance with regulations by riders of shared, but not private, e-scooters. This paper examines whether e-scooter safety improved over time by comparing the numbers and behaviors of shared and private e-scooter riders with a follow-up observational study conducted in October 2019. Riders of e-scooters (and bicycles) were counted at six sites in inner-city Brisbane by trained observers over four weekdays. Type of e-scooter (private, Lime, Neuron), helmet use, gender, age group, riding location, time of day and presence of passengers were recorded. The number of shared e-scooters observed dropped from 711 in February to 495 in October but the number of private e-scooters increased from 90 to 269, resulting in a slight reduction in the total number of e-scooters. The correct helmet wearing rate increased non-significantly from 61.4% to 66.8% for shared e-scooters and remained high for riders of private e-scooters (95.5% in February and 94.3% in October). The percentage of e-scooters ridden on the road (which is illegal in central Brisbane) remained roughly the same (shared: 6.6% in February, 4.2% in October; private: 4.5% in February, 4.9% in October). The percentage of children and adolescents (illegally) riding shared e-scooters fell from 10.3% to 6.7%. The prevalence of any of these illegal behaviors among shared e-scooter riders fell significantly for shared e-scooter riders from 49.6% to 39.1% while the prevalence of illegal behaviors by other riders remained lower and

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E-scooter riders and pedestrians: Attitudes and interactions in five countries

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Thank You!



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