Submission No 17

RELIGIOUS EXEMPTIONS FOR THE WEARING OF HELMETS

Organisation: Australasian College of Road Safety

Date Received: 1 November 2024

ACRS Submission on Religious Exemptions for the Wearing of Helmets

About the Australasian College of Road Safety

The Australasian College of Road Safety was established in 1988 and is the region's peak organisation for road safety professionals and members of the public who are focused on saving lives and serious injuries on our roads.

The College Patron is Her Excellency the Honourable Sam Mostyn AC, Governor-General of the Commonwealth of Australia.

To:
NSW Joint Standing Committee on Road Safety
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Table of Contents

Introduction

The Australasian College of Road Safety is the region's peak membership association for road safety with a vision of eliminating death and serious injury on the road. Our members include experts from all areas of road safety including policy makers, health and transport professionals, academics, community organisations, researchers, federal, state and local government agencies, private companies and members of the public. The purpose of the College is to support our members in their efforts to eliminate serious road trauma through knowledge sharing, professional development, networking and advocacy. Our objectives include the promotion of road safety as a critical organisational objective within government, business and the community; the promotion and advocacy of policies and practices that support harm elimination; the improvement of relative safety outcomes for vulnerable demographic and user groups within the community; the promotion of post-crash policies and practices; and the promotion of a collegiate climate amongst all those with responsibilities for and working in road safety.

The College believes that we should prevent all fatal and serious injuries on our roads; the road traffic system must be made safe for all road users; system designers should aim to prevent human error and mitigate its consequences; life and health are not exchangeable for other benefits in society; and that all College policy positions must be evidence based.

The College has recently published a policy position statement on motorcycle safety, which we recommend to the Committee, please see attached.

We provide further comments specific to helmets for all riders below.

In this submission, ACRS recommends:

- That the NSW Government should uphold mandatory helmet laws for all motorcycle riders, bicycle riders and e-mobility riders. We do not support introducing exemptions to these protective laws.
- We value diversity and inclusion and appreciate the concerns of the Sikh community and believe that the solution to this issue lies in suitable safe helmets, for example bicycle helmets for young people of Sikh faith which are approved for use in NSW. This approach aims to ensure those of Sikh faith can ride with the same head protection as all other riders. We encourage the NSW Government to work with the community, other governments and industry to find suitable practical solutions which cater to the unique needs of riders of Sikh faith. This could include support for industry to collaborate with the Crashlab helmet test facility for research and development into suitable helmets compatible for use with turbans.

ACRS response to the Terms of Reference

a) Global road safety recognises the elevated risks for riders of two and three-wheelers and recommends helmets as a key countermeasure

The World Health Organization (WHO) Global status report on road safety 2023 reported that of the world's 1.19 million annual road traffic deaths, 30% involved two and three wheels powered devices (including motorcyclists) and 5% involved bicyclists.(1)

WHO also finds that there are elevated risks for powered two- and three- wheeler (motorcycle, moped etc) and bicycle riders as they:(2)

> *are not surrounded by protective steel enclosures, they are susceptible to serious injuries which can lead to death in the event of crashes with other vehicles and fixed objects. The increased risk is also because they often share traffic space with fast-moving cars, buses and trucks, and they are less visible (p6).*

A key countermeasure to reduce the risk of death and injury crashes for powered two- and three-wheeler vehicles which is globally recognised is helmets.(1)

> *Head injuries are the main cause of death in most motorcycle crashes. Quality helmets reduce the risk of death by over six times and reduce the risk of brain injury by up to 75% (p32).*

b) The evidence shows that there are significant safety benefits to riders wearing helmets and other safety protection

Considerable research has been conducted over the past 50 years on the effects of wearing a helmet on the risk of head injury as a result of a collision. Systematic reviews for effectiveness of motorcycle helmets have been conducted by several researchers and groups:

- The WHO notes the European Union SafetyCube Horizon 2020 project which shows that the use of helmets in the majority of outcome measures led to a reduced injury or fatality risk to a helmeted powered two- or three-wheeler vehicle user compared with those not wearing helmets.(2) The estimates for reductions in injuries are:
    - Fatal injury: 28-64%
    - Head injury: 58-60%
    - Brain injury: 47-74%
    - Face injury: 14-63%
    - Neck injury: 14-48%
- A major review by Lui et al. (2009) of available helmet effectiveness studies found that motorcycle helmets reduce the risk of head injury by around 69% and death by around 42%.(3)

Similar outcomes are found for bicycle helmets. A systematic review and meta-analysis of 40 studies with data from over 64,000 injured cyclists was conducted by the University of New South Wales in 2017.(4) The study found that wearing a helmet is associated with odds reductions of 51% for head injury, 69% for serious injuries and 33% for facial injuries.

c) The evidence shows that mandatory helmet legislation is a proven intervention

The WHO recognised the benefits of helmet laws globally as a proven intervention that results in an increase in helmet use, as well as a reduction in head injuries and deaths of motorcyclists, calling out Australian helmet laws as an exemplar.(2)

A US study published by the Insurance Institute of Highway Safety estimated the number of motorcyclist fatalities attributable to laws that allow unhelmeted riding in the United States since 1976.(5) They found that if all states had all-rider helmet laws throughout the 1976-2022 study period, 22,058 fewer motorcyclists would have died in crashes. This represents 11% of all motorcyclist fatalities during these years.

Results from a systematic review and meta-analysis of the effects of mandatory helmet legislation published in 2018 investigated results from 21 studies of the effects of mandatory bicycle helmet legislation on injuries among crash involved cyclists.(6) The summary effect is a statistically significant reduction by 20%, with larger effects found for serious head injury (-55%). Larger effects were found when legislation applies to all cyclists than when it applies to children only.

Government policy has been to move to greater motorcycle rider protection with significant research and development on rider protective clothing (refer to ACRS Motorcycle Safety Policy Position Statement). The current exemption proposal in NSW would be a step in the wrong direction.

d) Mandatory helmets are applied in other environments such as Work Health and Safety

An exemption within the road transport legislation for motorcycle and bicycle helmets would impact work health and safety (WHS) and would be at odds with other professions and community activities.

Persons conducting a business undertaking must eliminate risks in the workplace, or if that is not reasonably practicable, minimise the risks so far as is reasonably practicable.(7) This may include requirements for workers to wear appropriate personal protective equipment (PPE) such as helmets. It is also noted that an offence of Industrial Manslaughter (WHS Act, Section 34C) has recently come into force in NSW, which may in time require a Court to rule on whether allowing a worker to ride a motorcycle or bicycle without a helmet (PPE) is grossly negligent.

As a case study, in November 2014, cricketer Phillip Hughes died after receiving what was described by medical experts as an ‘unsurvivable’ head injury.(8) As Mr Hughes was hit in an area of his neck which was not protected by his helmet, Cricket Australia (CA) now requires “all CA, state and pathway players in CA managed competitions…to wear (updated) BS7928:2013 helmets when batting, wicket-keeping up to the stumps and fielding in close to the batter.”(9) ACRS is unaware of any religious exemptions to the CA requirement to wear an approved helmet, noting the large Indian diaspora in Australia.

Finally, it is noted that the Indian military is providing a newly designed combat helmet for Sikh soldiers.(10) The helmet is designed so Sikh soldiers can wear the helmet comfortably over their under-turban cloth.

e) A helmet exemption on religious grounds fails to protect all road users and opens the door to further exemptions, increasing safety risk for the community

We appreciate that compulsory helmets, like many other mandated safety requirements, may cause additional impediments to people practicing the Sikh faith. However, wearing a helmet protects the rider and safety is the overriding factor for the community. This issue has been considered recently in a decision of the Federal Administrative Court of Germany. A 2019 decision of that court found the requirement to wear a motorcycle helmet 'was a manifestation of the city's obligation to protect the right to life and physical integrity of the motorcyclist and third parties'.(11) The court referred to a decision of the Federal Constitutional Court of 1982, which noted that where a motorcyclist without a helmet who suffers a serious head injury in a crash there are extensive consequences for other people and the general public including for emergency services, medical care, rehabilitation services and disability care.

Based on the evidence, we have serious concerns that an exemption would lead to higher safety risk for Sikh riders compared with other motorcycle riders in NSW. This proposed exemption is also a slippery slope to moving away from compulsory helmet wearing in NSW with the risk of dramatic and terrible consequences. It opens the door for other groups to apply for exemptions, further eroding motorcycle rider protections, resulting in increased serious trauma outcomes.

Recent figures reported by the NSW Government show that one in five fatal crashes in NSW so far this year involved a motorcycle, while motorcycles make up just 3% of registered vehicles in NSW.(12) The proportion of motorcycles involved in road crashes has hit a ten-year high in 2024, with 50 of the 258 deaths on NSW roads as of 8 October 2024 being motorcycle riders or their passengers. Over the decade 2014-2023, a total of 590 fatalities involved motorcycle riders or their passengers, with young people being over-represented.

The ACRS has deep concerns about motorcycle crashes, and the level of road trauma in NSW; now is certainly not the time to take a deliberate step to increase safety risks for motorcycle riders.

f) Practical solutions

Rather than making a decision which would increase the safety risk for the Sikh community, we suggest that alternative practical solutions can and should be explored. There are options available now for young Sikh riders to wear bicycle helmets. For example, a Canadian company has now developed a patka-compatible helmet. This type of bicycle helmet has been approved and can be used in NSW.(13)

We urge State and Federal governments to support investigations into adult helmets that would accommodate turbans so that members of our Sikh community who wear turbans can wear appropriate head protection gear to ensure they are as safe as other motorcycle riders in our community.

Conclusion and Recommendations

The 351 road deaths in NSW during 2023 equates to 4.21 deaths per 100,000 population.(14) This is higher than the rate of 3.40 achieved in 2021 but still much lower than most Australian states and many countries throughout the world. This is attributed to many measures including mandatory motorcycle and bicycle helmet laws.

Reductions in road trauma achieved over the decades in NSW have not occurred by accident. This inquiry will likely receive submissions claiming that exemptions to helmet wearing should be granted because they already exist in jurisdictions with a poorer road safety record than NSW. This would be a betrayal of several decades of parliamentary road safety leadership.

The ACRS strongly recommends that there is no exemption to the mandatory wearing of helmets. The issue is one of design, not legislation.

We appreciate the opportunity to comment on this proposal and contribute to reducing road trauma in NSW. Please do not hesitate to contact us should you require any further information.

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NSW Chapter Chair
ACRS

Dr Ingrid Johnston
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References

1. World Health Organization. Global status report on road safety 2023. https://iris.who.int/bitstream/handle/10665/375016/9789240086517-eng.pdf?sequence=1: WHO; 2023.
2. World Health Organization. Helmets: a road safety manual for decision-makers and practitioners, second edition. https://www.grsproadsafety.org/wp-content/uploads/2023/05/WHO-Helmets-Green-Manual.pdf: WHO; 2023.
3. Liu BC, Ivers R, Norton R, Boufous S, Blows S, Lo SK. Helmets for preventing injury in motorcycle riders. Cochrane Database Syst Rev. 2008(1):CD004333.
4. Olivier J, Creighton P. Bicycle injuries and helmet use: a systematic review and meta-analysis. Int J Epidemiol. 2017;46(1):278-92.
5. Teoh ER. The human cost of allowing unhelmeted motorcycling in the United States. https://www.iihs.org/api/datastoredocument/bibliography/2317: Insurance Institute for Highway Safety; 2024.
6. Hoye A. Recommend or mandate? A systematic review and meta-analysis of the effects of mandatory bicycle helmet legislation. Accident Analysis & Prevention. 2018;120:239-49.
7. Work Health and Safety Act - Sect 19, (2011).
8. State Coroner's Court of New South Wales. Inquest into the death of Phillip Joel Hughes. https://coroners.nsw.gov.au/documents/findings/2016/Phillip%20Hughes%20Findings.pdf: State Coroner's Court of New South Wales; 2016.
9. Cricket Australia. Cricket Australia's position on helmets and neck protectors 2024 [Available from: https://play.cricket.com.au/community/clubs/managing-your-club/helmet-recommendations#:~:text=As%20reflected%20in%20the%20ICC's%20directive,%20it%20has%20been%20mandated.
10. Kumar A. Unveiled: A new Made in India combat helmet for Sikh soldiers. Asianet Newsable. 2022 11 Feb 2022.
11. Global Freedom of Expression Colombia University. The case of a motorcycle helmet obligation for turban wearers. Case number 3 C 24.17 2019 [Available from: https://globalfreedomofexpression.columbia.edu/cases/the-case-of-a-motorcycle-helmet-obligation-for-turban-wearers/#:~:text=The%20Federal%20Administrative.
12. Young male motorcyclists over-represented in road deaths [press release]. https://www.nsw.gov.au/media-releases/young-male-motorcyclists-over-represented-road-deaths: NSW Government, 21 October 2024.
13. ACCC Product Safety. Bicycle helmets mandatory standard: Australian Government; 2024 [updated 22 March 2024; cited 2024 30 October]. Available from: https://www.productsafety.gov.au/business/search-mandatory-standards/bicycle-helmets-mandatory-standard.
14. Transport for NSW. NSW Road Toll Progress - preliminary provisional data as at 1 January 2024. https://www.transport.nsw.gov.au/system/files/media/documents/2024/crs_nsw_road_toll_progress_2023.pdf: NSW Government; 2024.

Attachment A: ACRS Motorcycle safety policy position statement

ACRS Policy Position Statement
Motorcycle Safety

Summary

Motorcyclists are among the most vulnerable road users, representing an increasing proportion of the vehicle fleet and associated road trauma in Australasia, and the majority in many low-to-middle-income countries (LMIC). Specific action plans to improve motorcyclist safety based on systems thinking are needed to contribute towards the global goal of a 50% reduction in road trauma by 2030. Ensuring road designs and maintenance are inclusive of safe motorcycle use is critical due to greater vulnerability to crashing on poorer roads and more severe injury in the event of a crash compared to other motorists. With modal shift to motorcycles a key component of sustainable travel, strong leadership, commitment and action is required.

Key policy positions

1. All levels of governments must prepare for an increased modal shift to motorcycles.
2. Motorcycle safety specific action plans must be developed and implemented, with ongoing monitoring and evaluation.
3. Improvements in motorcycle crash investigations, crash reports and data analysis relative to exposure by vehicle type are needed to increase data accuracy.
4. Road designs and maintenance must be inclusive of motorcycles as a key design vehicle.
5. The highest level of safety features for motorcycles and for other vehicles to detect and safely interact with motorcycles must be prioritised for new vehicle import/exports, with incentives when possible for public and private vehicle fleet purchases.
6. Motorcycle specific education, training and licensing systems must continue to be strengthened based on best evidence and not assume trade-offs from driver experience.
7. Global attention and investment is needed to address underage children riding motorcycles and as multiple passengers on single vehicles in LMIC.
8. Increased resources are needed to improve first responder knowledge and practices in assisting motorcyclists post-crash and accessing emergency services in rural areas.

This policy position statement was developed by ACRS members including: Liz de Rome, Wendy Taylor, Duncan McRae, Shaun Lennard and Teresa Senserrick.

Date adopted: May 2024

Policy problem

Motorcycles[1] are an increasingly important part of the private and commercial road transport fleet(1). Relative to other motorised passenger vehicles, they offer a relatively low-cost and more accessible and sustainable alternative. In high-income countries (HIC), motorcycles are often a transport choice for commuting convenience and recreation(2, 3). However, in LMIC, they can be the only form of affordable transport for a family, and a source of income by providing transport or delivery services(4).

Although no more likely to crash than other motorists, motorcyclists are more likely to be fatally or seriously injured(5). Globally, almost 30% of all reported crash fatalities involve motorcyclists(6). This is despite most crashes being predictable and preventable by proven interventions(6). A whole-of-government approach towards an integrated, decarbonised and safer transport network must plan for a modal shift to electric motorcycles in addition to more active travel and public transport(1).

Principles underpinning ACRS position

- Fatal or serious injury due to road travel is preventable and unacceptable.
- The road traffic system must be made safe for all road users, with motorcycles an important part of the transport mix, especially in LMIC.
- Safety and health outcomes of the road traffic system must be prioritised ahead of efficiency or cost.
- Road safety and climate change prevention must be aligned to maximise benefits.
- The differing characteristics of motorcycle and car users, the traffic mix, vehicle handling needs and common crash types differ in important ways that require shifts in policies and practices to be inclusive of motorcyclist safety.

Evidence base

Move to safer sustainable practices

While motorcycles are recognised as a dominant vehicle in LMICs, socioeconomic shifts, including the rise of the gig economy, have contributed to a marked increase in the relative proportion of motorcycles in HICs over recent decades. Relative to passenger cars, motorcycles result in less congestion and pollution, and are part of multi-modal mobility-as-a-service networks(1). Electric and hybrid motorcycles are now on the market and sales are expected to rise as part of the modal shift towards more sustainable travel, complementary to active travel, public transport and micromobility devices(1). Governments, public and private businesses must recognise these trends and ensure safety is prioritised in their policies and practices throughout their spheres of influence. This includes professionalisation of occupations involving motorcycle transport and deliveries to ensure safe working conditions, including provision of personal protective equipment (PPE), training, regulation of hours on-road, rest breaks and realistic delivery time/volume expectations(1).

For ongoing monitoring and data, careful attention is needed to motorcycle-related crash reports. Motorcycle crash investigation is a specialist science attuned to recognising the physics and human factor limitations involved in motorcycle crashes, requiring qualified motorcycle crash investigators and auditors

[1] For the purposes of this document, 'motorcycles' are defined as motor-operated two or three-wheeled vehicles powered by either combustion engine or rechargeable batteries and requiring registration for use on a public road or road-related area and an appropriate operator licence to use. 'Motorcyclist' refers to all riders inclusive of passengers.

for more accurate outcomes. Motorcycle crash data should be reported in terms of risk rates per 10,000 registered vehicles by class, for all serious crashes including serious property damage only. Single- and multi-vehicle crashes should be analysed separately, due to their different causal patterns, when determining priorities for countermeasures (7-9).

Redesign infrastructure and maintenance protocols

Road design standards and road environment features for safe motorcycle use differ from those for passenger cars, yet are often lacking in both design and maintenance policies and practices(7, 10). This particularly relates to factors including road surfaces, safety barriers, runoff areas and signage. Motorcycle tyres have smaller contact areas to grip the road, particularly when leaning into a turn, braking or attempting evasive action. Poor road surfaces increase the probability of a crash not due to rider error, as well as the severity of injury to riders, in addition to roadside fences, poles and furniture(7, 11). Motorcyclists are more likely than other motorists to be involved in single-vehicle crashes, particularly on curves which therefore require specific attention(7). Regular motorcycle-specific road safety audits by motorcycle-specific accredited and experienced road safety auditors must be undertaken, and audit recommendations actioned; especially on key motorcycling routes and with particular attention to safe system speed(12).

Multi-vehicle crashes involving motorcycles are common, with the 'look-but-fail-to-see' phenomenon ('inattentional blindness') a key contributing human factor(13). In high density urban areas, separation may be needed. In Asia, local traffic lanes primarily for motorcycles (e.g., Thailand)(14, 15) and exclusive lanes for motorcycles on main roads (e.g., Indonesia)(7) are associated with substantial reductions in road trauma (e.g., 600% fewer fatalities in Malaysia)(16). Roads designed for motorcyclist safety are shown to provide a higher standard of safety for other road users(10). Other infrastructure needs include safe parking areas that do not increase conflicts with pedestrians and cyclists, particularly at transport hubs, such as train stations, bus interchanges and ferry terminals(1).

Advances in motorcycle safety features and PPE

Safety features common to other motor vehicles are not always suitable or modifiable for motorcycles. There is robust evidence for antilock braking systems (ABS) to improve rider control and ability to avoid obstacles(17, 18). ABS has been mandatory in Europe since 2016 for motorcycles with engine displacement greater than 125cc and is a priority of the Second UN Decade of Action for Road Safety 2021-2030 plan(18). Under UNRSF, ASEAN countries are developing a roadmap to mandate ABS for motorcycles(19). Cornering ABS (C-ABS), which takes account of a motorcycle's lean angle, is an emerging technology but still to be evaluated(20). Other measures such as rear wheel traction control and autonomous emergency braking are yet to be proven for motorcycles(20). Motorcycle daytime running lights (DRL) were previously found to draw the attention of other motorists(6), but the benefits were lost as DRLs have become a standard feature on other motor vehicles(21). The potential for different coloured (e.g., yellow) headlights designated exclusively for motorcycles to enhance their day and night conspicuity also is still to be confirmed(22).

More promising are crash avoidance technologies for other motor vehicles to detect motorcycles such as blind spot warnings and mandatory front, rear and side underrun protection for heavy vehicles in the event of a collision. Efforts are needed to increase retrofitting vehicles without these protection systems, especially in LMICs. As fleet technology advances towards increasingly connected and automated vehicles, safe interactions by and with motorcycles must be a priority. With the ever-changing fleet, including electric and 3-wheeler motorcycles, Australia's Learner Approved Motorcycle Scheme (LAMS) and similar schemes elsewhere must be regularly reviewed and updated. Consideration should be given to establishing a

motorcycle safety assessment scheme similar to Euro New Car Assessment Programs (EURO NCAP) or Australian ANCAP.

The effectiveness of motorcycle helmets in reducing fatal and serious injuries is well established and usage enforced with mandatory helmet standards in most HIC and LMIC. PPE clothing (i.e., jackets, pants and gloves) can also substantially reduce the risk of serious injury(23-25); however, a high proportion is not fit for purpose, particularly in hot climates, and could fail to protect in a crash. Garments that lack effective thermal management can impair safety due to heat stress and dehydration(26-28). Mandating PPE usage is unenforceable in the absence of mandatory standards, whereas independent test-based ratings systems can provide reliable information to encourage use and make well-informed purchasing decisions. The Motorcycle Clothing Assessment Program (MotoCAP) is an example providing freely available test data to riders and enables the industry to compete in an open market(29). Additional options, such as tax incentives to improve supply and access to PPE of high safety and thermal quality, might also increase voluntary use.

Education and licensing: riders, post-crash

The different handling and braking characteristics of motorcycles compared to cars, as well as varying demographics and experiences of new and returning riders and drivers, demand that differing education, training and licensing systems apply for safer vehicle use. The two systems should not be considered interchangeable. There is mixed evidence on whether previous experience as a driver provides transferable baseline skills (such as hazard perception) to riding so trade-offs should not be adopted(30, 31). There is growing evidence for mandatory education and training at pre-learner and pre-provisional/full licence stages(32). Voluntary initiatives appear to over-inflate riders' view of their skills and result in less cautious riding. However, New Zealand attracts post-licence and returning riders, into training programs via financial incentives (registration cash back). The New Zealand programs and international guidelines mandate on-road riding components be included; increasingly required in Australian licensing curricula.

Key motorcyclist behaviours that contribute to crashes include alcohol and drug use (including prescription medications) and excessive speed, justifying a focus on these issues in graduated licensing systems(12, 32). All new riders should commence with a zero blood alcohol concentration requirement and be restricted from riding under the influence of recreational or medicinal drugs that impact riding safely. Appropriate penalties must be in place to deter these and excessive speeds, including when restrictions are eased for experienced riders. New riders should be subject to a minimum novice licence period that is restricted from riding high power-to-weight vehicles, particularly sports bike types (implemented as LAMS in Australia). When both learner and provisional restricted licence phases are mandated, a short maximum learner phase should apply so that further training and assessment is undertaken. Evaluations determining other best-practice licensing policies, particularly to address other common crash risk factors for novices, such as riding at night and phone use while riding, should be routinely monitored and implemented.

Other important behavioural risks in LMIC settings include overcrowding on private and public motorcycles, particularly resulting in unsafe seating of children, and underage children riding motorcycles as playthings(1). In HICs, potential parallels are off-road riding by underage children, including overcrowding of quad bikes and other farming vehicles(33).

Improved education is also needed in relation to post-crash care for motorcyclists. Whether and how to remove a helmet safely can be critical to survival and should be widespread knowledge, especially among motorcyclists who are commonly the first responder to other riders, both in HIC and LMIC. Ensuring phone connectivity or access to satellite phones on rural-remote roads will increase access to specialist post-crash care. Carrying personal location beacons could also be incentivised.

Recommended policy actions

1. Governing agencies must prepare for a modal shift towards increased proportions of motorcycles in the road networks and develop and implement action plans specific to motorcyclist safety across their value chain.
2. Improvements and consistency in specialised investigation of motorcycle-related crashes and crash data reporting (per 10,000 registered vehicles by class of vehicle) are needed.
3. Road designs and maintenance must be inclusive of motorcycles as key vehicles, noting that improved safety for motorcycles provides a higher standard for other road users.
4. Anti-lock braking systems (ABS) should be mandatory for all new motorcycles (including <125cc). Other advanced technologies for motorcycles and other vehicle detection and interaction with motorcycles must be monitored, with evidence-based safety features mandated and the safest vehicles prioritised for LAMS, public and private vehicle fleets.
5. CRASH and MotoCAP should continue to be updated and advocated in preference to mandatory protective clothing policies, with HIC and LMIC consideration of incentives to increase supply and access to the highest safety and thermal quality PPE.
6. Motorcycle specific education, training and licensing systems must continue to be strengthened based on best evidence specific to motorcycling safety, with specific attention to zero alcohol/drug use, excessive speed and phone use for novice riders.
7. Investment is needed to address overcrowding on motorcycles in LMIC.
8. Investment is needed to address use of motorcycles by underage children.
9. Increased awareness of best practices for first responders in post-crash care at motorcyclist crashes, particularly helmet removal, is needed to reduce injury severity.
10. Improved access to emergency services in rural areas without phone connectivity networks is needed, such as via access to satellite phones or personal location beacons.

ACRS actions

1. Raise awareness of the relationship between climate change and road safety among members. Advocate for the recommended policy actions, particularly in Australasia and LMICs.
2. Promote education for all road users regarding motorcyclist safety.
3. Promote awareness among all road users regarding the modal shift to motorcycles as an important element of sustainable travel.
4. Promote a shift to electric and hybrid motorcycles to improve sustainability of the mode.
5. Support increased research and development into safe motorcycling.

References

1. Forsman A, Jansson J, Forward S, Nrurzzaman R, Skogsmo I, Vadeby A. Riding in a safe system - workshop on safety for powered-two-wheelers. Final report from a workshop held on 9-13 June 2021. VTI rapport 1103A. http://vti.diva-portal.org/smash/get/diva2:1622556/FULLTEXT01: VTI; 2021.
2. Oxley J, Yuen J, Ravi MD, Hoareau E, Mohammed MA, Bakar H, et al. Commuter motorcycle crashes in Malaysia: An understanding of contributing factors. Ann Adv Automot Med. 2013;57:45-54.
3. de Rome L, Brown J, Baldock M, Fitzharris M. Near-miss crashes and other predictors of motorcycle crashes: Findings from a population-based survey. Traffic Inj Prev. 2018;19(sup2):S20-s6.
4. de Vasconcellos EA. Road safety impacts of the motorcycle in Brazil. Int J Inj Contr Saf Promot. 2013;20(2):144-51.
5. Transport for NSW. Road traffic crashes in New South Wales: Statistical Statement for the year ended 31 December 2013.

https://www.transport.nsw.gov.au/system/files/media/documents/2023/NSW%20Road%20Traffic%20Crash%20Statistical%20Statement%20-%202013.pdf: Centre for Road Safety; 2014.
6. World Health Organization. Powered two- and three-wheeler safety: a road safety manual for decision-makers and practitioners. https://www.who.int/publications/i/item/9789240060562: WHO; 2022.
7. Milling D, Affum J, Chong L, Taylor S. Infrastructure improvements to reduce motorcycle casualties. Research Report AP-R515-16. https://austroads.com.au/publications/road-safety/ap-r515-16: Austroads; 2016.
8. De Rome L, Brandon T, Hurren C. The crash study: An epiemiological approach to the analysis of motorcycle crashes in Tasmania, 2012-2016. https://dro.deakin.edu.au/articles/report/The_Crash_Study_An_epidemiological_approach_to_the_analysis_of_motorcycle_crashes_in_Tasmania_2012-2016/21064261/1: Deakin University; 2021.
9. Sivasankaran SK, Rangam H, Balasubramanian V. Investigation of factors contributing to injury severity in single vehicle motorcycle crashes in India. Int J Inj Contr Saf Promot. 2021;28(2):243-54.
10. VicRoads. Making roads motorcycle friendly: A guide for road design construction and maintenance. https://www.vicroads.vic.gov.au/safety-and-road-rules/motorcyclist-safety/making-roads-motorcycle-friendly#:~:text=The%20Making%20Roads%20Motorcycle%20Friendly,of%20motorcycle%20crashes%20steadily%20decrease: Government of Victoria; 2022.
11. Bambach MR, Mitchell RJ, Mattos GA. Mean Injury Costs of Run-Off-Road Collisions with Fixed Objects: Passenger Vehicles and Motorcycles. Journal of Transportation Safety & Security. 2015;7(3):228-42.
12. Budd L, Allen T, Newstead S. Current trends in motorcycle-related crash and injury risk in Australia by motorcycle type and attributes. MUARC Report No. 336. https://www.monash.edu/__data/assets/pdf_file/0006/1572918/VSRG-Motorcycle-Crash-Risk-and-Injury-Outcome-Factors-Report-336.pdf: Monash University Accident Research Centre; 2018.
13. Pammer K, Sabadas S, Lentern S. Allocating Attention to Detect Motorcycles: The Role of Inattentional Blindness. Hum Factors. 2018;60(1):5-19.
14. Se C, Champahom T, Jomnonkwao S, Chaimuang P, Ratanavaraha V. Empirical comparison of the effects of urban and rural crashes on motorcyclist injury severities: A correlated random parameters ordered probit approach with heterogeneity in means. Accident Analysis & Prevention. 2021;161:106352.
15. Se C, Champahom T, Jomnonkwao S, Kronprasert N, Ratanavaraha V. The impact of weekday, weekend, and holiday crashes on motorcyclist injury severities: Accounting for temporal influence with unobserved effect and insights from out-of-sample prediction. Analytic Methods in Accident Research. 2022;36:100240.
16. Radin Umar RS. Motorcycle safety programmes in Malaysia: how effective are they? International Journal of Injury Control and Safety Promotion. 2006;13(2):71-9.
17. Koetniyom S, Chanthanumataporn S, Dangchat M, Pangkreung S, Srisurangkul C. Technical Effectiveness of ABS, Non-ABS and CBS in Step-through Motorcycles. Applied Science and Engineering Progress. 2021;14(1):120-30.
18. World Health Organization, United Nations Regional Commissions. Global Plan for the Decade of Action for Road Safety 2021-2030. https://cdn.who.int/media/docs/default-source/documents/health-topics/road-traffic-injuries/global-plan-for-road-safety.pdf?sfvrsn=65cf34c8_33&download=true: WHO; 2021.
19. United Nations Road Safety Fund. Motorcycle Anti-Lock Braking System Advocacy Campaign - ASEAN: UNRSF; [cited 2024 13 April]. Available from: https://roadsafetyfund.un.org/projects/motorcycle-anti-lock-braking-system-advocacy-campaign-asean.
20. Savino G, Lot R, Massaro M, Rizzi M, Symeonidis I, Will S, et al. Active safety systems for powered two-wheelers: A systematic review. Traffic Inj Prev. 2020;21(1):78-86.
21. Cavallo V, Pinto M. Are car daytime running lights detrimental to motorcycle conspicuity? Accident Analysis & Prevention. 2012;49:78-85.
22. Abdul Khalid MS, Khamis NK, Abu Mansor MR, Hamzah A. Motorcycle conspicuity issues and intervention: A systematic review. Iranian Journal of Public Health. 2021;50(1):24-34.
23. de Rome L, Ivers R, Fitzharris M, Haworth N, Heritier S, Richardson D. Effectiveness of motorcycle protective clothing: Riders' health outcomes in the six months following a crash. Injury. 2012;43(12):2035-45.

24. Solah MS, Hamzah A, Mohd Jawi Z, Ariffin AH, Paiman NF, Md Isa MH, et al. The requisite for motorcycle personal protective clothing: Malaysia's perspective. Journal of the society of Automotive Engineers Malaysia. 2019;3(1):74-83.
25. Wu D, Hours M, Ndiaye A, Coquillat A, Martin JL. Effectiveness of protective clothing for motorized 2-wheeler riders. Traffic Inj Prev. 2019;20(2):196-203.
26. de Rome L. Could wearing motorcycle protective clothing compromise rider safety in hot weather? Accident Analysis & Prevention. 2019;128:240-7.
27. Taylor L, Watkins SL, Marshall H, Dascombe BJ, Foster J. The Impact of Different Environmental Conditions on Cognitive Function: A Focused Review. Front Physiol. 2015;6:372.
28. Dai XQ, Havenith G. The interaction of clothing ventilation with dry and evaporative heat transfer of jackets: the effect of air and vapor permeability. International Journal of Clothing Science and Technology. 2016;28:570-81.
29. de Rome L, Gibson T, Haworth N, Ivers R, Sakashita C, Varnsverry P. Improving consumer information about motorcycle protective clothing products. A report prepared for the Motor Accidents Authority of NSW (MAA), commissioned by the Australian & New Zealand Heads of Compulsory Third Party Insurance. Sydney: The George Institute for Global Health; 2012.
30. Haworth N, Rowden P, Schramm A. A preliminary examination of the effects of changes in motorcycle licensing in Queensland. In: Motha J, editor. Australasian Road Safety Research, Policing and Education Conference2010. p. 1-14.
31. Liu CC, Hosking SG, Lenné MG. Hazard perception abilities of experienced and novice motorcyclists: An interactive simulator experiment. Transportation Research Part F: Traffic Psychology and Behaviour. 2009;12(4):325-34.
32. Araujo M, Illanes E, Chapman E, Rodrigues E. Effectiveness of interventions to prevent motorcycle injuries: systematic review of the literature. Int J Inj Contr Saf Promot. 2017;24(3):406-22.
33. Lower T, Peachey KL, Fragar L. A descriptive review of quad-related deaths in Australia (2011-20). Aust N Z J Public Health. 2022;46(2):216-22.