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The social and economic cost of road related injury and death

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Introduction

The Royal Australasian College of Surgeons was integral in 1960's and 1970's working alongside pioneers dedicated to bringing an end to the escalating carnage on the roads. Pioneering Fellows of the College advocated to change public opinion, public behaviour and influence legislators. The resulting radical changes included mandatory seat belts, helmets for cyclists and drink driving laws - all of which accounted for the massive downturn in the rates of road trauma.

The collection of trauma data has been on the radar of trauma professionals since the recommendations of the National Road Trauma Advisory Council report on Trauma Systems in 1993, and the Victorian Review of Trauma and Emergency Services in 1999 which recognised trauma registries as having the potential to improve care of the injured patient. The Australian Trauma Registry delivered its inaugural report in 2014 (<http://www.ntri.org.au/quality-improvement/austqip>) which, through data entry and analysis, provided an opportunity for comprehensive analysis of injury - the first time such an analysis has been possible. The report highlighted:

- 15-24 year olds had the highest incidence of injury
- Over half of all injured patients admitted were the result of vehicle-related accidents
- Nine-in-10 seriously injured patients survived their trauma after receiving hospital care

The quality assurance of the registry, benchmarks performance against national and international standards, which, through consistency and high performance trauma care throughout the country, effects improved patient outcomes and ensures all future seriously injured people have the best chance of survival and recovery from injury. The Trauma Committee is committed to supporting the sustainment of the Australian Trauma Registry and the further maturation of the registry, data entry and data analysis to help effect Australian trauma system quality improvement.

The College is committed to ensuring the highest standard of safety and comprehensive surgical care for the community we serve through excellence in surgical education, training, professional development and support. As part of the commitment the College strives to take

informed and principled positions on issues of public health. In February 2015 it submitted the following response to the Senate Inquiry into aspects of road safety in Australia. We believe that, if addressed by the Government, the road safety initiatives contained within the submission could make a significant difference to public safety and well-being.

Executive summary

The governments of the last decade should be congratulated for prioritising road safety and producing the National Road Safety Strategy 2011-2020 [1]. The Strategy is an excellent document which analyses road safety risks in terms of the elements of the Safe Systems Approach to Road Safety and makes good recommendations as to how individual components of these major elements can contribute to reductions in fatalities and serious injuries.

The College of Surgeons believes that the target of a 30% reduction in fatalities will still result in over 800 deaths per year (and possibly 4,000 to 5,000 serious injuries). For surgeons who see road trauma victims on a daily basis, this is unacceptable. We urge the Government to implement the recommendations in the strategy as a major priority. Key initiatives, aligned to the Senate Terms of Reference, include (but are not limited to):

- Greater efforts to reduce speed
- Greater efforts to reduce the role of alcohol in road-related injuries and deaths
- Separate vulnerable road users from motor vehicles
- Rapid introduction of life-saving technologies in all new cars, and policies which encourage consumer uptake of newer vehicles
- Compulsory introduction of 'black box' technology in all heavy vehicles and cars
- Cease the open speed limit trial in the Northern Territory
- Vehicle safety and licensing

The College of Surgeons has a long history of road safety advocacy. It regularly revises and updates its positions in accordance with safety measures which undergo ongoing research and development by a large 'road safety' industry.

Social and economic cost of road-related injury and death

Road traffic injuries are the leading cause of death by injury worldwide (one fifth of all deaths from injury) and the tenth leading cause of all deaths (2.2% of all deaths). Road traffic injuries rank second to HIV/AIDS as the leading cause of

ill health and premature death for adult men aged 15 - 44 years. [2]

In Australia, on average four people die and 90 people are seriously injured every day. However Australia has achieved substantial reductions in road crash fatalities over the last 30 years. Evaluation evidence indicates that many of these gains can be attributed to specific road safety interventions, such as the introduction of seatbelt laws and random breath testing.[3]

More can be done to reduce the number of road-related injuries and deaths.

Greater efforts to reduce speed

Recognising the major role that excessive speed plays in the causation of serious road crashes, the College recommends that:

- Appropriate speed limits be adopted having regard to the environment, traffic density and other relevant considerations.
- Enforcement programs and initiatives be intensified so that there will be a higher chance of detection and penalties for drivers and riders who exceed the speed limit.
- Ban radar detection devices in vehicles.
- Cancellation of licence for drivers and riders exceeding the speed limit by a specified margin.
- Gradation of speed penalties commensurate to the level of danger.
- Regular reviews of speed limits using input from road users.
- Prominent display of signage relating to speed limit changes.

Greater efforts to reduce the role of alcohol in road-related injuries and deaths

Because of the continuing major influence of the misuse of alcohol in road crash causation, assault and violence, the College supports countermeasures aimed at drink drivers, riders and the general community. These countermeasures include:

- Fitting alcohol ignition locks to commercial vehicles such as trucks, passenger coaches and buses, taxis, trams and trains.
- Intensification of random breath testing of drivers and riders.

- Compulsory breath testing of all drivers, riders and pedestrians involved in an injury-producing crash or charged with a moving traffic offence.
- Compulsory breath testing of all adults 16 years and older who attend hospital for treatment, for the purposes of data collection to inform future policy.
- Improved drink driving education programs.
- Including knowledge of how alcohol will affect driving ability as part of driver's and rider's licence tests.
- Relicensing of drivers or riders disqualified for driving with a BAC above 0.15g/100mls, or for a second offence, compulsory installation of an alcohol ignition lock.
- Research to address the incidence of alcohol-impaired pedestrians.
- Strategies to reduce the rate of reoffending in relation to drink driving.

The College also supports measures to reduce the problem of alcohol abuse and/or misuse throughout the community more generally, in particular reducing the number of **H**ours alcohol is available for, reducing the number of **O**utlets where alcohol is sold, and introducing a volumetric **T**ax on alcohol (**HOT** issues).

Separate vulnerable road users from motor vehicles

More than one fifth of the road traffic deaths that occur worldwide are pedestrians. [4] Separation is essential to ensure the safety of our most vulnerable road users, for example pedestrians and cyclists. Increases in our population will only exacerbate this vulnerability, as people seek alternative, inexpensive and efficient forms of transport, while seeking to improve their health and wellbeing.

Where separation is not feasible, it is vital that efforts are made to control the speed environment. Roadway design is also an important factor and should be undertaken to maximise pedestrian safety. The World Health Organization's Pedestrian Safety manual has assessed the effectiveness of specific interventions that can be undertaken. [5]

The importance of design standards on imported vehicles, as Australian vehicle manufacturing winds down

The College supports all evidence-based initiatives that assist in the prevention of road trauma and the reduction

of the devastating effects of injury. These include design features such as airbags, seat belt reminder systems, electronic stability control and anti-lock braking systems.

The impact of new technologies and advancement in understanding of vehicle design and road safety.

Rapid introduction of life-saving technologies in all new cars, and policies which encourage consumer uptake of newer vehicles.

Mandating proven life-saving technologies (for example reversing cameras) in all new cars, including fleet cars, will significantly improve the safety of Australian vehicles overall and decrease the average age of Australian fleet vehicles.

Compulsory introduction of 'black box' technology in all heavy vehicles and cars

Having black boxes installed in all vehicles may act as a deterrent to unsafe driving practices, particularly with respect to truck drivers. In addition to improving law enforcement, the technology can be useful in the analysis of crashes, facilitating a better understanding of crash and injury risk factors and mechanisms. New knowledge can be utilised by the insurance industry to improve overall standards.

The different considerations affecting road safety in urban, regional and rural areas

Cease the open speed limit trial in the Northern Territory

Numerous international studies have shown conclusively that the introduction of point to point speed monitoring for all vehicles on lengths of road known to have a high crash risk reduces the number of crashes occurring and also the severity where crashes do occur. The Northern Territory 'unlimited speed' trial contradicts the goals and recommendations of the National Road Safety Strategy (to which the Northern Territory Government is a signatory) - primarily the recommendation that speeds should be reduced on high risk roads. The stretch of highway involved in the 'trial' has been assessed by the Australian Road Assessment Program (AusRAP) as a high risk road.

Vehicle safety and licensing

In remote Australia, where there is a high rate of injury per capita, risk factors which have improved in metropolitan areas are still very relevant. These include vehicle roadworthiness, driver training and licensing, seatbelt use and alcohol. These issues are compounded by barriers in cross-cultural communication and access to services,

but can be rectified with appropriate communication and resources.

In terms of road trauma prevention, the Royal Australasian College of Surgeons recognises the need for a range of measures as outlined in the following position paper.

Position paper: road trauma prevention

Background

In 1965 the Royal Australasian College of Surgeons (the College) recognised that road trauma was a serious public health problem reaching epidemic proportions. A Road Trauma Committee was appointed to report to Council on measures needed to prevent or reduce serious injury (trauma). The College has been influential with policy makers and legislators and was a major contributor towards mandatory seat-belt wearing, drink driving countermeasures and the compulsory wearing of helmets by pedal cyclists.

Since the mid-1980's the College saw that it would need to widen its role in trauma prevention and management beyond those injuries which resulted from road crashes. In July 1991, the College Trauma Committee was formed which continued the College's double commitment: prevention and mitigation of injuries, and management of injuries - encompassing injuries resulting from all sources.

The College's position on road trauma has been developed and continually updated since the original standing committee was formed in 1970. Many of the recommendations have been introduced around Australia and New Zealand although some jurisdictions are slow to take up new initiatives – such as graduated licensing and even BAC (blood alcohol content) in drivers; which the College recommends should remain at .05.

The College continues to play an active role in road trauma prevention. The College Trauma Committee hosts annual trauma workshops, holds regular meetings, engages with the media, hosts international speakers at the annual scientific congress, supports research, prepares submissions to inquiries and promotes and participates in trauma training such as EMST (Early Management of Severe Trauma and DSTC (Definitive Surgical Trauma Care) courses. It also plays an important advocacy role regarding issues such as quad bikes, speed, vehicle safety and alcohol.

Many Fellows of the College see the effects of road safety issues on a regular basis and in the case of trauma surgeons, almost daily.

The College supports all evidence-based initiatives that assist in the prevention of road trauma and the reduction of the devastating effects of injury. Initiatives such as speed control, airbags, seat belt reminder system, electronic

stability control and countermeasures for alcohol and driver distraction can all make a difference to reduce the road toll. The College regularly revises and updates its positions in accordance with safety measures that are being constantly researched and developed by a growing industry. The College recommends and supports the following positions:

Frontal Protection Systems (FPS)

The College supports the following safety measures that:

- Australasian FPS be compliant with standards that offer the best outcome for pedestrians e.g. the current Economic Commission for Europe (ECE) pedestrian impact standard.
- Policies to reduce the number of non-conforming FPS particularly in the metropolitan-based fleet, perhaps including the prohibition of sale and use of non-compliant FPS to all vehicles from a specified date.
- Consideration be given as to the legality of some FPS in urban areas where the probability of a crash occurring involving a pedestrian is much higher.
- Consideration be given to research and development of removable FPS for use by vehicles that are used in both urban and rural areas.

Railway Crossings

Recognising the seriousness and frequency of trauma associated with Railway Crossings, the College recommends the following safety measures:

- A program to eliminate level crossings be pursued and, where this is not possible, that automatic boom gates, rumble strips, warning signs with flashing lights and speed restriction zones be installed.
- Level crossings frequented by heavy vehicles be prioritised for safety improvement.
- All level crossings be illuminated when trains are crossing.
- All rail cars and engines be marked with appropriate reflector tape along the sides.
- When railway crossings are used infrequently and seasonally, the decision to use the crossing should be assessed by safety officers from the road traffic authority, police and rail authorities before and during use, and signage and illumination be installed.
- Police be given powers to veto the use of such a crossing if considered unsafe.
- A campaign be run to educate drivers about the dangers of level crossings.

Pedal Cycling

The very nature of cycling makes riders extremely vulnerable to injury either by falls or collisions. The College supports the following safety measures:

- Adequate enforcement of legislation for mandatory wearing of nationally approved safety helmets with regular review of compliance.
- Continued promotion of bicycle helmet wearing by national, state and local campaigns, through community road safety councils, municipal councils, school authorities and parents.
- Expansion of bicycle path networks in cooperation with local government and other agencies, supporting those networks that separate motor vehicles, bicycles and pedestrians.
- Mandatory use of approved tail lights, fixed reflectors, light-coloured clothing and reflectors on clothing and helmets particularly for night cycling.
- Support for initiatives which encourage all road users to ‘share the road.’
- Development of national primary school bicycle education programs.
- Support for graduated licensing programs which require a minimum age for solo riding equal to the minimum age for obtaining a probationary car driver’s licence with longer probationary periods.
- Support for increasing restrictions regarding alcohol and other drugs, in light of the knowledge that riding a motorcycle requires higher levels of vehicle control and cognitive skill than driving a motor vehicle.
- Support for governments to view motorcycles as a significant, increasing and distinct mode of transport and form of recreation when planning roads and safety strategies.
- Support for governments to place emphasis on off-road motorcycle strategies and measures such as age restrictions, mandatory helmet wearing, appropriate training and supervision, particularly for younger riders, to reduce off-road motorcycle injuries.
- Support for identifiers on all motorcycles.

Motor Cycling

After a crash motorcycle death and injury rates are significantly higher than those involving motor vehicles. The College supports the following strategies to reduce the risk of death or injury to motorcycle riders:

- Mandatory wearing of approved helmets by all motorcycle riders and pillion passengers on and off public roads - with no exemptions on medical grounds.
- Support for further research into injury patterns of motorcycle riders, pillion and sidecar passengers and motorcycle protective clothing suitable for Australasian conditions.
- Support for further research into the effectiveness of Daytime Running Lights for all motorcycles in Australasia.
- Support for further development and research into other safety features such as motorcycle airbags, airbag jackets, ABS (automatic braking systems).
- Motorcycle licensing programs to take into account the higher levels of vehicle control and cognitive skill required to ride a motorcycle compared to driving a vehicle.
- Vehicle safety features such as, but not limited to, front, side and curtain airbags, anti-lock braking systems, electronic stability control and aggressive seat belt reminder systems be installed in all new cars.
- Close liaison between vehicle designers, road engineers and those who treat road trauma victims to ensure vehicle safety improvements are in line with world’s best practice.
- Clinical representation on National Design Rules Committees.
- Programs such as the Australian New Car Assessment Program (ANCAP) and mandatory display of car safety ratings at point of sale to communicate the importance of safety.
- Vehicle safety advertising codes that place safety as the highest priority.
- Mandatory wearing of approved seat belts or other restraints by all occupants wherever seated in a motor vehicle including buses, and there be no exemption from wearing a restraint on medical grounds.
- Mandatory wearing of approved child restraints and use of booster seats for all children up to 135 cm.
- Support for Government loan and community-based schemes designed to improve availability of approved infant and child restraints.

Speed

Recognising the major role that excessive speed plays in the causation of serious road crashes; particularly in combination with alcohol, the College supports the following, that:

- Appropriate speed limits be adopted having regard to the environment, traffic density and such other considerations as may be relevant to safe road usage.
- Enforcement programs and initiatives be intensified so that there will be a higher chance of detection and penalties for drivers and riders who exceed the posted limits.
- Radar detection devices in vehicles be banned. Speed limits be reduced on both urban non-arterial roads and regional/small towns, and that there be consistency of speed limits in shopping centres, school zones and precincts of high risk to pedestrians, and cyclists.
- Cancellation of licence for drivers and riders exceeding the speed limit by the specified margin be supported.
- The gradation of speed penalties be commensurate with the level of danger.
- All heavy vehicles such as trucks, coaches and buses be fitted with speed governors and effective monitoring programs and adequate penalties for tampering with such devices be enforced.
- Regular reviews of speed limits occur, taking into consideration what road users suggest are appropriate in the particular situation.
- Signs advising changes in speed limits be prominently displayed on all roads.

Licensing

The College, aware of the diversity of licence regulations in various jurisdictions, recommends the following licensing initiatives:

Young Drivers

- The application of a graduated licensing system whereby newly licensed drivers have a period of time in which to gain experience.
- Increasing the probationary period to an age which research shows a greater ability to assess risks, control impulsive behaviour and handle distractions.
- A national minimum driving age of 18 years.

- A national minimum learner driver age of 16 years and at least 120 hours of supervised pre-licence driving (a minimum of 10% of these to be with a fully qualified driving instructor) in varying conditions.
- Passenger restrictions, particularly in the first year of licenced driving.
- Night time curfews, particularly in the first year of licenced driving.
- Zero blood alcohol for all probationary drivers.
- Prohibition of use of telephones within motor vehicles by learner or probationary drivers.
- Vehicle power restrictions for all learner and probationary drivers.
- A graded demerit point allowance system for drivers up to the age of 25 years.

Older and impaired drivers

- Policies which strike a balance between the rights of our senior community for mobility and independence and their responsibilities as safe drivers.
- Further research and development into effective methods of identifying hazardous drivers.
- Self-assessment style tools which older drivers should be asked to consider at licence renewal. These could also have potential for use by a General Practitioner. For example a driver could be asked to respond to a health questionnaire either by themselves or in conjunction with their regular medical practitioner which would provide the driver with an opportunity to seriously consider their driving ability on a regular basis. A General Practitioner could use these tools to monitor a patient on a regular basis.
- Restricted licences which can allow drivers to maintain mobility and independence in lower risk situations. An 'R plate' system is supported.
- Policies which improve the availability of alternative transport options and encourage their use by senior community members.
- Policies which improve the safety of the Australasian vehicle fleet and encourage their purchase by older drivers as a way of reducing injury severity.

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Enhanced road safety data in NSW – serious injuries experience

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Access to relevant, timely and reliable data on road traffic crashes is essential for road safety improvement and effectively reducing road trauma on roads. The quality and completeness of the data and information available to decision makers is critical for success in achieving road safety outcomes. While, in most jurisdictions, the primary source of road crash information is police reports, often they don't have the required dimensions and depth to cover all aspects of road safety management. Research into best practice in road safety data management systems suggests that additional data is required to provide context for crashes [1] [2]. A data management manual for road safety data managers recommends the following attributes for a good road safety data system:

- It must capture all crashes that result in death and a significant proportion of those that result in serious injuries;
- Must provide adequate detail on the vehicle, the road user (and vehicle controllers) and the road/environment to assist with identification of causes, and selection of countermeasures;
- Accurate crash location information is essential;
- A responsive Business Intelligence (BI) system that provides information and reports in a timely manner to facilitate evidence-based decisions [1].

In NSW, a robust system is in place through Centre for Road Safety (CRS) at Transport for NSW to extract road safety data and information from police reports. For many years this process has provided a reliable and solid foundation for identifying road safety risk factors and developing strategies and policies to address them.

Like any other data system, an effective road safety data structure should follow and support the road safety business model. Road safety practice in NSW is structured on the

Safe Systems approach, so the information landscape to support this must have adequate coverage of the main aspects of the system (with data sources providing specific data on roads, vehicles and road users).

Recognising the need to invest effort and time into improvement and enhancement of existing data systems, CRS developed an information capability road map in 2013 to enhance and better integrate road safety data in line with Safe System components and requirements. A series of relevant data sources were identified to provide context, complement and enhance NSW crash data, among which hospital records were targeted as a priority. The information capability road map implementation, so far, has resulted in a transformed road safety data system as depicted in figure 1.

This figure represents the data sources currently being linked with crash data to complement and enhance road safety data structures in NSW. Each one of those data sources either addresses a gap in crash data or supplements and verifies existing crash information from police reports.

There are still a few data sources which will be investigated for data linkage in the future. Among those are Ambulance Service of NSW (to address the gap in data in terms of post-crash response), WorkCover NSW (to cover employment related road trauma), and Health data from Queensland, Victoria and South Australia (for crashes occurring in NSW where casualties are treated in interstate hospitals).

Identifying serious injuries in NSW

Serious injuries are a key focus in the NSW Road Safety Strategy 2012-21. A main goal of the strategy is 30% reduction in the number of serious injuries resulting from road crashes by 2021.

Until very recently NSW was not collecting serious injury data as part of the road safety data collection. In late 2011, Transport and Road Safety (TARS) Research at UNSW