15 October 2021

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Joint Select Committee on Road Safety
Department of the House of Representatives
Parliament House, Canberra, ACT, 2600

Re: Question on Notice arising from JSC Public Hearing 13th September 2021

Please find attached a response to the question on notice posed by the Hon Darren Chester, MP.

Please do not hesitate to contact us if further information or clarification of this response is required.

Yours sincerely,

Professor Lynne E. Bilston and A/Professor Julie Brown
Co-directors of the Transurban Road Safety Centre at Neuroscience Research Australia

Question on Notice from Joint Select Committee on Road Safety's Public Hearing held 13th September 2021

Chester **CHAIR…**Lynne, you referred to the fact that this is a never-ending process, so we need to maintain some research core capacity. What sort of quantum of funding are we talking about here for core capacity? What sustains that? I imagine right now it would be fragmented. I imagine there are competitive grants, and you have to apply for them, and you get one or two years of funding and then you have to apply again. What sort of core capacity of research funding are we talking about here?

Key Points:

- Australia's current approaches have proven unable to make substantial progress towards achieving our Road Safety targets for ongoing reductions in death and injury on our roads in recent years.
- Genuine progress towards these targets requires bold, innovative, effective, and nationally implemented new solutions targeted at the underlying causes of road trauma. These can only be developed through high quality road safety research.
- To achieve this, Australian road safety research must cover the whole spectrum from targetted contract work to guide specific policy decisions (where most current funding is directed), to high-quality scientific research to understand risk factors and develop, rigorously test, and fully implement novel solutions. Historically, the latter approaches have led to major reductions in injury and death on Australian roads.
- Such high quality research requires academic research and academic-industry partnerships, which are not supported by Australia's currently highly fragmented and precarious road safety funding environment. Together with the decline in federal and state support for independent road safety research and research centres, there has been an exodus of researchers from road safety.
- Maintaining a core research capacity in road safety in Australia requires support for highly skilled and experienced researchers, high quality research facilities, and funding for innovative research programs. Investment in this research capacity should be guided by a National Road Safety Research Strategy, and requires federal and state coordination across these pillars to reduce duplication and ensure efficient use of scarce resources.
- Essential researcher capacity includes expertise in epidemiology and statistics, crash investigation, injury biomechanics, behavioural science & psychology, data science, big data analytics and artificial intelligence, road and vehicle engineering, vehicle safety performance and crash testing, implementation science, health economics, and education. We estimate the costs of maintaining this capacity, at approximately $20 million, annually across the country. This could potentially be co-funded with the states and needs national coordination to avoid unnecessary duplication.
- High quality research facilities and technical support required includes access to transport and health data, capacity to test road infrastructure, vehicle and occupant safety (including drivers & passengers of light and heavy vehicles, motorcycles, bicycles), pedestrians and emerging technologies for autonomous travel. Technical staff to operate and support such facilities are an essential component. We estimate that this would involve capital investment of approximately $150m in such facilities, plus annual maintenance and staff costs. There is scope to co-locate with, extend or adapt existing facilities to minimise costs and maximise effective use of resources.
- Funding for specific research programs. Innovative research requires funding for scientifically rigorous research with 3-5 year timeframes, based on rigorous peer-review of research quality through an appropriate selection process. A national road safety strategy should be developed to set priorities for funding within such a scheme to ensure that research is directed at high priorities for Australian road safety.

In the remainder of this submission, we provide additional information, specific recommendations, and examples of highly effective road safety research strategies that may assist the Committee.

Introduction:

Thank you for the opportunity to provide input to the Joint Select Committee on Road Safety, both through providing evidence at the recent hearing, and through this response to the above question on notice.

In the above quoted Question on Notice, we were asked to provide information about the national core research capacity that is needed to drive innovation and further reductions in Australia's road toll and the associated human and economic costs of road trauma in Australia. Here, we outline the key capacities (human and physical) required, with broad estimates of the costs. We also provide information on essential characteristics of this research capability that are needed to develop effective new strategies in road safety improvements, and provide some useful examples for the Committee's consideration.

In providing response to this question on notice, we have consulted with senior representatives of Australia's leading road safety research centres, Professors Stuart Newstead (MUARC), A/Prof Jeremy Woolley (CASR), and Prof Narelle Haworth (CARRS-Q) and this response represents the consensus view of these senior leaders in Australian road safety research. We have focussed on Australia's academic research capacity, which is currently severely depleted. The key benefits of academic research in road safety lie in its ability to:

- Undertake the highest quality, innovative, broad-scale, independent, peer reviewed, multidisciplinary research within the strongest ethical framework, across the full spectrum from identifying the underlying risk factors and causes of road trauma through to developing, implementing, and evaluating evidence-based countermeasures.
- Train the next generation of road safety researchers through higher degree research programs
- Provide quality education offerings through professional education programs within certified and quality assured education frameworks to upskill the existing workforce.

Status of Australia's Current Road Safety Research Capability:

Australia's previously world-leading road safety research workforce is currently in rapid decline, due to a combination of withdrawal of government support for road safety research projects and research centres at both federal and state level, and historically low success rates for competitive grant funding (e.g. ARC, NHMRC etc). Most road safety researchers are precariously funded, and many have left the field as a result, representing a great loss of expertise, and a waste of Australia's investment in their training and expertise. This precarious funding also creates difficulty in building capacity and succession planning – the latter is necessary because many of Australia's best road safety researchers are approaching retirement.

Current state and federal funding of road safety research is primarily targeted to short-duration contract research aimed at answering specific immediate policy questions, and thus there is little scope to properly study the causes of road trauma and develop novel solutions targeted at these underlying causes. Together with a lack of a national road safety research strategy, this funding environment has led to duplication of small-scale research programs across the country, and a failure to translate effective programs across the country. This is a waste of scarce resources and is not meeting Australia's need to produce new solutions that lead to effective reductions in the burden of road trauma.

What is Needed to Meaningfully Reduce the Burden of Road Trauma in Australia

Further reductions in the road toll in Australia require us to fully understand the causes and risk factors underpinning crashes, to develop and rigorously test new solutions, and for proven solutions to be fully and sustainably implemented on a national scale and monitored over time. These need to be solutions that fit Australia's unique (and varied) conditions. A key current gap is in the national coordination of research efforts to minimise duplication, inefficient use of scarce resources, and implementation of effective programs. To achieve these goals as efficiently as possible, we believe that there is merit in developing a National Road Safety Research Strategy to drive innovative, evidence-based, implementable, national scale solutions to road trauma, and to guide investment in research to maximise benefits. Moreover, a strong Australian research community requires funding for research capability (researchers and facilities) and also for specific research programs, which should be guided by a well-developed national road safety research strategy.

As noted above, an effective road safety research sector encompasses a range of different types of research, across the spectrum from narrowly-focussed contract work to guide specific policy decisions, to high-quality rigorous scientific research where novel solutions can be developed, trialled and rigorously tested. The latter requires academic research conducted over 3-5 year time frames, and academic-industry partnerships.

We provide two powerful examples of the success of academic research that drove major reductions in road trauma here, noting that these research activities were initiated by the research teams based on observation of critical needs, and supported by previous research funding schemes:

1. **NeuRA's research into the causes of serious and fatal injuries to child passengers** led to new child restraint laws requiring children aged 1-7 years to use size-appropriate child restraints in cars rather than seat belts. These laws were revised based on research into the mechanisms of injury to child passengers initiated by our research team, and funded by a grant from the NSW Motor Accidents Authority. **This has reduced child passenger fatalities in this age group by approximately 40% since 2010** (BITRE). *The grant scheme that supported this important research no longer exists, and there is no current equivalent*.
2. **RARU's (CASR's predecessor) research showing that vehicle speed was a major factor in urban casualty crashes** led to nationwide reductions in urban speed limits. **These have resulted in a 26-50% reduction in urban road fatalities and has been estimated to have saved $1.5 billion per year.** *The NHMRC core research centre funding that supported this research no longer exists and there is no current equivalent.*

Building and Maintaining Australia's Road Safety Research Capability:

An effective road safety research capability requires highly skilled and experienced researchers, high quality research facilities, and funding for innovative research programs. The required skills and facilities cannot be developed overnight, nor is the depth of knowledge and skill required suited to short-term outsourcing.

Core Researcher Capacity:

Key research skills required to understand causes and risk factors leading to road trauma, then develop, trial, evaluate, and implement effective road safety solutions include:

- Epidemiology and statistics
- Crash investigation
- Injury biomechanics
- Behavioural science & psychology
- Ergonomics
- Data science, big data analytics, and artificial intelligence
- Road and vehicle engineering
- Vehicle safety performance and crash testing
- Implementation science
- Health economics
- Education

This content expertise is needed in combination with expertise in the design and conduct of rigorous scientific research, as gained through postgraduate and postdoctoral research training.

<u>The estimated cost of maintaining a minimum critical mass of researchers across Australia is approximately $20 million annually</u>.

Notes:

1. A full range of research skills are required, but through national coordination, these need not be replicated in each state, and options to coordinate research and create core centres of excellence in defined areas many be beneficial.
2. It may be appropriate to co-fund researcher capability with the state governments, at least where state governments support road safety research centres.

3. In the past, salaries of road safety researchers, particularly senior leaders in the field, were subsidised by universities where research centres were based. This is no longer possible, and failure to provide continuity of funding for these staff is a major driver of researchers leaving the road safety field
4. Project-specific research staff are not included in these estimates.

Research Facilities:

High quality research outcomes need high quality research facilities for trialling and testing a broad range of road safety initiatives to improve road infrastructure, light and heavy vehicle safety, and pedestrian safety. These could be nationally distributed. Current facilities are either limited in capability and scale (e.g. NeuRA's Transurban Road Safety Centre), are fully occupied with regulatory & consumer testing (e.g. Crashlab), or commercially operated and difficult to access for research. There is also a need to enable research into future mobility scenarios such as autonomous vehicles, land based and aerial drones. Specific facilities that are needed include:

- Road infrastructure development and innovation test facility – to test new road designs, treatments and infrastructure-technology interactions
- Vehicle performance and crash testing research facility (barrier, sled, pedestrian, test track etc) – to test vehicle safety performance, occupant safety, and pedestrian safety (see also Note #2 below)
- Road Safety Simulator facility – to test the effects of vehicle, infrastructure, and other environmental factors on driver performance
- Technical staff for these facilities

Initial Capital Costs: $150m

There will also be ongoing maintenance and technical staff costs for these facilities that we were unable to estimate in the time available for developing this response.

Notes:

1. The Australian National Imaging Facility, https://anif.org.au/, which is part of the Australian Government's National Collaborative Research Infrastructure Strategy, could serve as a model for a road safety research facility network.
2. There may be some potential to provide these facilities through co-location with existing university and state crash testing facilities to minimise costs

Support for Individual Research Projects and Programs:

A national road safety research strategy needs to include mechanisms to support both long-term national priority driven and innovative fundamental research to identify blue-sky solutions to unaddressed and emerging road safety problems. It should involve rigorous peer review of scientific design and research quality, and focus on national scale and nationally collaborative research that will provide the evidence base for reductions in the harms associated with road trauma in Australia, across the spectrum from initial exploratory studies through to full-scale implementation trials and evaluations. Such programs should actively encourage national collaborations both between research teams and with industry and policymakers to build in implementation from the start. The European Horizon 2020 programs are an excellent example of this approach.

Currently the main options available for innovative road safety research are the ARC & NHMRC nationally competitive grant schemes, and the recently established Road Safety Innovation Fund. The ARC & NHMRC grants currently have very low success rates (5-15%), and even when successful, they do not fund the salaries of the lead researchers, nor do they cover the full direct costs of the research. Moreover, many important areas of road safety research are not supported by NHMRC and ARC schemes, nor by the newer Medical Research Future Fund. Austroads represents the interests of Australian road authorities and maintains a road safety program. Activity is usually conducted through tender-based project work, primarily based around road authority specific issues, rather than generation of new road injury countermeasures. These projects tend to be constrained to road authority operational and policy contexts and present limited opportunity for full academic research activity to be undertaken.

Some possible options:

1. Regular MRFF targeted calls for innovative road safety research projects with a focus on national collaborative programs to reduce injuries
2. New collaborative grant scheme for road safety research, which should include separate funding streams for exploratory/pilot studies as well as large scale research projects and trials

Useful example schemes from across the world:

- The European Union Horizon 2020 programs are an example of the benefits of broad academic and industry collaborative research at scale.

Economic Benefits of a Healthy Australian Road Safety Research Capability:

Australia's current approach is failing to reduce road toll and injury, with both fatalities and serious injury rates static over recent years. The economic cost of road crashes in Australia is estimated to be approximately $30 billion annually, with more than 1,200 deaths and 30,000 serious injuries. Failure to act inevitably accepts that the huge human and economic cost of road trauma will continue into the foreseeable future.

The potential economic return on investment in road safety research is clear. For example, the federal government's modest investment in the University of Adelaide's Road Safety Research Unit (the predecessor to CASR) produced research leading to a reduction in urban road fatalities in Australia of up to 50% with savings estimated to be approximately $1.5 billion per year.

Possible Mechanisms for Funding Australian Road Safety Research Capability

Clearly an effective road safety research capability requires both up-front and ongoing investment to achieve ongoing reductions in road trauma. In time, effective new solutions developed will reduce the economic burden of road trauma, thus offsetting the investment in research. However, this will take time, and there needs to be a mechanism to fund the research needed.

Some options include dedicating a proportion of vehicle insurance, stamp duties, licence fees (to fund state contributions) or road user/fuel excise taxes (to fund federal contributions) to fund research. There is a opportunity to direct some portion of the Medical Research Future Funding to road safety research, and for government innovation and commercialisation funding schemes to support innovative technological developments in road safety.