



SHAPING OUR
TRANSPORT
FUTURE

ARRB Submission to the Joint Select Committee on Road Safety

Prepared for:

Committee Secretary
Mr Gerry McNally

31/01/2020

LETTER OF INTRODUCTION

This document has been submitted by ARRB via the [Online Submission System](#) as well as by email via roadsafety.sen@aph.gov.au to:

Committee Secretary
Joint Select Committee on Road Safety
c/- roadsafety.sen@aph.gov.au

Dear Mr McNally,

As Australia's National Transport Research Organisation, ARRB has, for 60 years, worked with the nation's road agencies to create knowledge to solve tomorrow's transport challenges, developing solutions and expertise for today's road practitioners. Through our efforts to provide independent, practical advice, ARRB has earned a reputation for scientific integrity and for leading the provision of value-added applied research, technical and knowledge transfer services.

With this experience and our commitment to improving safety of our road transport system, it is with great pleasure that we submit our support of the Joint Select Committee on Road Safety in your endeavours to integrate Safe System principles into health, education, industry and transport policy.

Road trauma is a societal problem which has considerable impact on the prosperity, safety and health of the Nation. ARRB believes that achieving zero deaths on our roads is possible; we have already begun to see examples of this in local communities and on major routes such as the Hume Freeway in Victoria, which recently had a zero fatality year in 2019 primarily as a result of the installation of safe system infrastructure in the form of 1,500 km of flexible barriers. The significance of this achievement is highlighted considering that prior to this safety initiative, the Hume produced approximately 12 fatalities per month.

But there is so much more that can be done to ensure that Australia delivers on a future free of death and serious injuries on our roads. Leadership from government through record investment in road infrastructure is just the beginning. As a nation we need to learn from crashes that continue to occur; we need to set challenging but achievable targets to plot the path to success and to measure our performance against these to ensure we remain focused.

The terms of reference of this inquiry show a strong desire to look to the future, to improve what is done currently, to build upon the successes of initiatives introduced since compulsory seatbelts in motor vehicles in 1971. It is our belief, at ARRB, that the issues highlighted by this inquiry will set Australia up for a successful delivery of Vision Zero for our road transport system.

We hope that our input, via this submission, and our ongoing collaboration with state and local road agencies, the federal government and with community and organisational stakeholders will continue to make a difference.

Kind regards

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National Leader, Transport Safety

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1. ARRB RESPONSE TO THE JOINT SELECT COMMITTEE ON ROAD SAFETY

On 1 August 2019, the Joint Select Committee on Road Safety was appointed under a resolution of appointment which was passed by the House of Representatives and the Senate.

The resolution was subsequently amended on 2 December 2019 to include the following terms of reference:

The **Joint Select Committee on Road Safety** has been established to inquire into and report on:

- a. the effectiveness of existing road safety support services and programs, including opportunities to integrate Safe System principles into health, education, industry and transport policy;
- b. the impact of road trauma on the nation, including the importance of achieving zero deaths and serious injuries in remote and regional areas;
- c. the possible establishment of a future parliamentary Standing Committee on Road Safety and its functions;
- d. measures to ensure state, territory and local government road infrastructure investment incorporates the Safe System principles;
- e. road trauma and incident data collection and coordination across Australia;
- f. recommending strategies, performance measures and targets for the next National Road Safety Strategy;
- g. recommendations for the role of the newly established Office of Road Safety; and
- h. other measures to support the Australian Parliament's ongoing resolve to reduce incidents on our roads, with a focus on the recommendations from the Inquiry into the effectiveness of the National Road Safety Strategy 2011–2020.

The committee is required to produce an interim report by **31 July 2020** and its final report on **31 October 2020**.

Our submission addresses each the issues outlined in the Terms of Reference listed above.

2. ARRB RESPONSE TO THE JOINT SELECT COMMITTEE ON ROAD SAFETY

Our submission has been prepared to respond to each of the terms of reference for this inquiry by the Joint Select Committee on Road Safety. For ease of reference, we have collated our input under each of the articles of the terms of reference.

a. The effectiveness of existing road safety support services and programs, including opportunities to integrate safe system principles into health, education, industry and transport policy

Summary

- *Australia's action on road safety has been effective; factoring in the growth in population and vehicle travel, the nation is tracking well to achieving the vision of zero fatalities on our road networks. But more needs to be done to sustain and even accelerate this success.*
- *The Safe System approach is a cornerstone to continuing the trajectory towards zero.*
- *More that needs to be done to integrate Safe System principles into other areas of government policy, ensuring a stronger coordinated approach to tackling road safety challenges.*
- *Action is required to ensure that road managers and policy makers have access to road safety fundamentals, beginning with undergraduate studies and continued through as post-graduate and continuing professional development.*

Australia first introduced the Safe System approach in 2004/05 (ARRB). Since that time, State and Territory road agencies have worked methodically to develop guiding principles as a unifying framework with the elimination of (road) death and serious injury at its core.

Under the guidance of the National Road Safety Strategy 2011 -2020 and its supporting action plans, Australia's government road agencies, working through the Austroads Safety Task Force and ARRB, has conducted research and developed practitioner guidelines to assist the take up of this approach.

Most road safety practitioners have highlighted the failings to reach safety targets set by the last Road Safety Strategy, particularly the 30% reduction in the number FSI crashes. If we only consider the quantum of crashes, then it is true (as highlighted by many) that we have not met this target, and this in turn poses the question that if we are [spending more on road infrastructure](#) than ever before and [producing safer vehicles](#) than ever before, then [why are we not seeing a continuing decline in road trauma?](#)

But the situation is perhaps better than is generally reported.

Graphics like Figure 1, produced by BITRE and others, are potentially, albeit unintentionally, harmful to the message that our efforts to improve road safety are indeed having an effect and working.

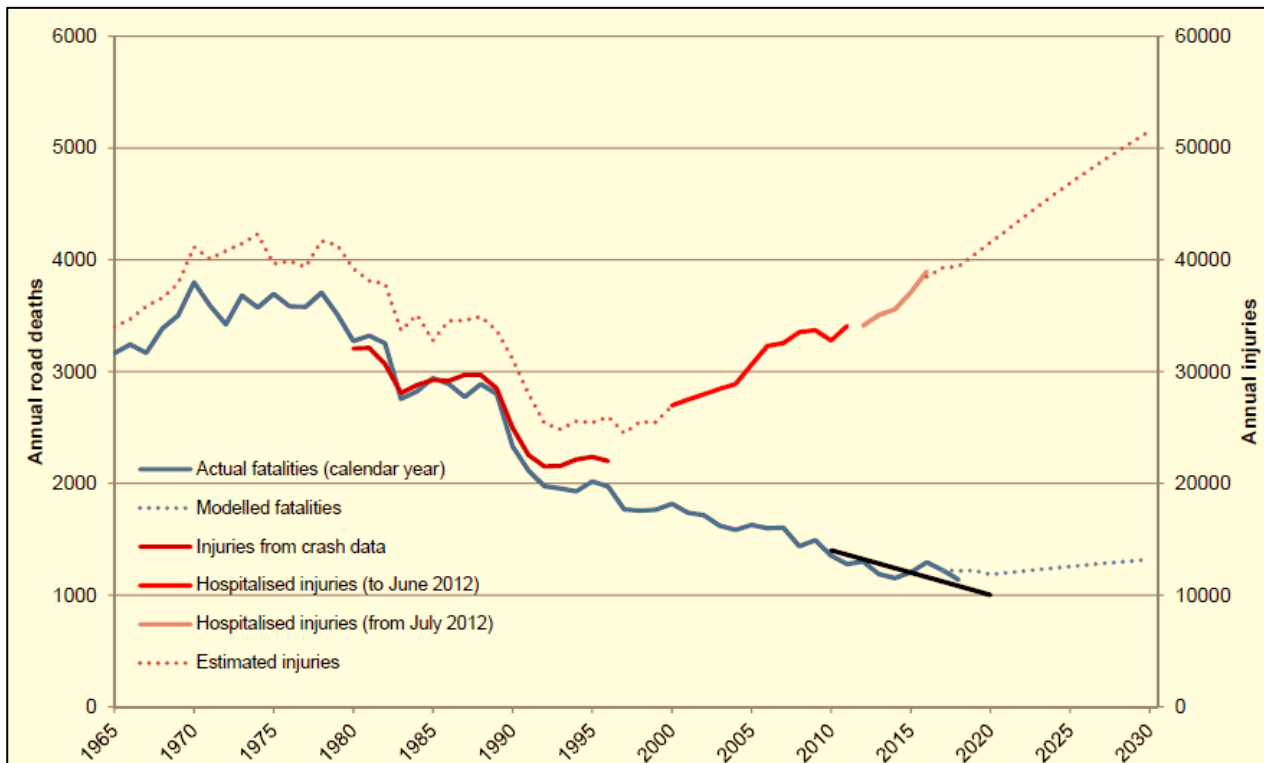
In truth, reports and graphics illustrating Australia falling short of our targets are misleading as they do not account for measurable increases in population and growth in our economy, both resulting in a significant increase in the national vehicle kilometres (vkt) travelled¹.

Although the NRSS was written in terms of a reduction in the number of fatal and serious injury (FSI) crashes, it is important to highlight to the public (and to government agencies and road safety practitioners)

¹ Fatalities per 100,000 population is the measure specified in the UN Sustainable Development Goals to monitor road crash trauma.

that on a rate per population basis, **we are well on our way to achieving our vision of zero deaths and serious injuries on our roads by 2050**, if not before (Figure 2).

Figure 1 New trauma predictions from BITRE (2019) which neglects population increases and suggests that fatalities and serious injuries are predicted to rise.



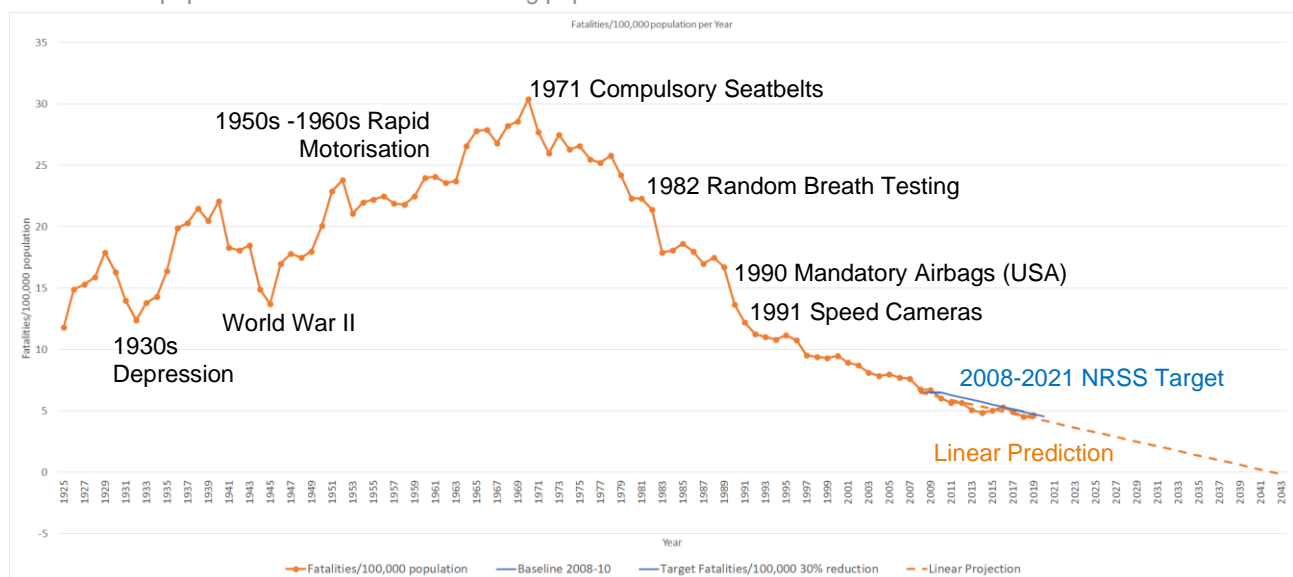
Source: BITRE 2019

Reported crashes and road deaths are headed towards zero because **road safety initiatives work**.

Since 1970, safety initiatives such as mandatory seat belt and airbag laws, random breath testing, speed cameras, graduated licence schemes have all resulted in a significant decline in road casualties (Figure 2).

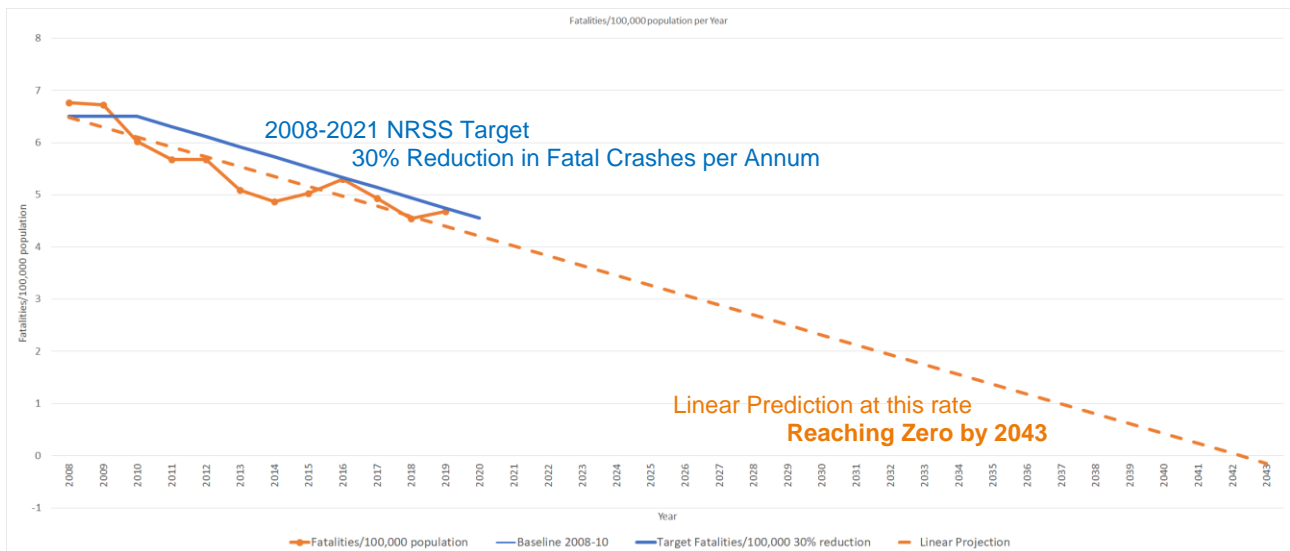
Clearly, achieving marked FSI crash reductions becomes more and more challenging as we get closer to our zero target, but we need to highlight one key fact - **what we are doing is working**.

Figure 2 Declining road trauma in Australia since 1970 as a result of road safety initiatives, plotted per 100,000 population to account for increasing population.



Source: ARRB (based on original plot from TfNSW at <https://roadsafety.transport.nsw.gov.au/statistics/fatalitytrends.html>)

Figure 3 Recent declining road trauma in Australia as we approach Zero. If rises in population are considered, we are currently meeting the 30% reduction targets set by the NRSS 2011-2020.



Source: ARRB

Figure 4 Predicted crashes and fatal crashes per population following a similar downward trend, both predicting we will reach Zero by 2050. The serious injury plot is rising, but not as rapidly as the BITRE plot **Error!** Reference source not found. suggests.



Source: ARRB

Note: There is marginal confidence in the 'all crashes' dataset at this stage. This data is not currently reported by BITRE and state-based data varies. 'All crashes' were obtained by ARRB from each individual state and have not been analysed to account for whether such crashes are casualty, tow-away, non-injury or reported.

The question then turns to what more needs to happen to ensure we remain on track to achieve our vision zero?

There are shortfalls in what we do currently, and the take up and applied embedment of Safe System principles into the road transport processes of road practitioners at the State, Local and consultant industry level still has a considerable way to go.

It is our view that having the Safe System approach truly an everyday part of managing the nation's road transport system will see a significant and sustained improvement in the reduction of road trauma. Key areas of attention to maximise the take up and application of the Safe System approach include:

- Better linkage of hospital data with road crash reporting mechanisms – understanding the consequences of crashes on the road users provides a rich source of information that can assist researchers and practitioners to better understand what elements of the system are contributing to serious casualty outcomes, and just as importantly, how treatment measures – better road infrastructure, vehicle safety features – are contributing to a the saving of lives and serious injury.
- Today's road infrastructure designers and managers, the engineers and technicians who are responsible for the nation's road network have gained their road safety knowledge 'on the job'.

Tomorrow's engineers, those who are developing new infrastructure to address improved mobility, transport efficiency and road safety performance need to have road safety as a fundamental part of their curriculum.

Unfortunately, road safety does not feature in an undergraduate study, and the opportunity for post-graduate study in road safety is limited. Often references to road safety in existing curricula are dated and a long way from delivering a sound understanding of the modern road safety paradigm.

- Continuing professional development training in road safety to industry is disjointed and lacks a pathway for practitioners to build their expertise and aid delivery of the nation's road safety vision.

b. The impact of road trauma on the nation, including the importance of achieving zero deaths and serious injuries in remote and regional areas

Summary

- **Road trauma costs the Australian community over \$30B each year and disproportionately impacts on remote and regional areas.**
- **Road infrastructure throughout rural, regional and remote areas present a higher risk to road users compared to metropolitan road networks, and rural road treatment programs may not target infrastructure risk as effectively as occurs around metropolitan areas.**
- **Limited access to medical services means rural, regional and remote communities suffer additional and ongoing burden during the recover and rehabilitation stages after road crashes.**

The impact of road trauma on the nation, both economically and socially, is well established. Current estimates place the value of road trauma to the Australian community due to the more than 1100 people killed and almost 40,000 hospitalised, in excess of \$30B per year.

But the social impact of road trauma extends beyond just economics.

The impact of a crash, particularly on rural and regional communities will often spread beyond the victims and their immediate family, with a tragedy affecting friends and work colleagues, local social networks, community groups and clubs. Those who are seriously injured will require ongoing medical and social support during their rehabilitation and recovery, and this may continue for months; for those who suffer a catastrophic injury, there may need to be ongoing support for years, and even the rest of their life.

Rural and regional communities often do not have the medical, rehabilitation and social support services necessary to provide the required care and so those who are affected will be required to spend countless hours travelling to and from a regional centre, or a capital city, to get the services they need.

As a society, Australians seemingly accept a level of trauma on our roads that would never be considered acceptable in any other aspect of life. Road crashes are one of the largest societal plagues that we face. In truth, it is the **community** and a true cultural shift that will have the greatest effect on eliminating road trauma.

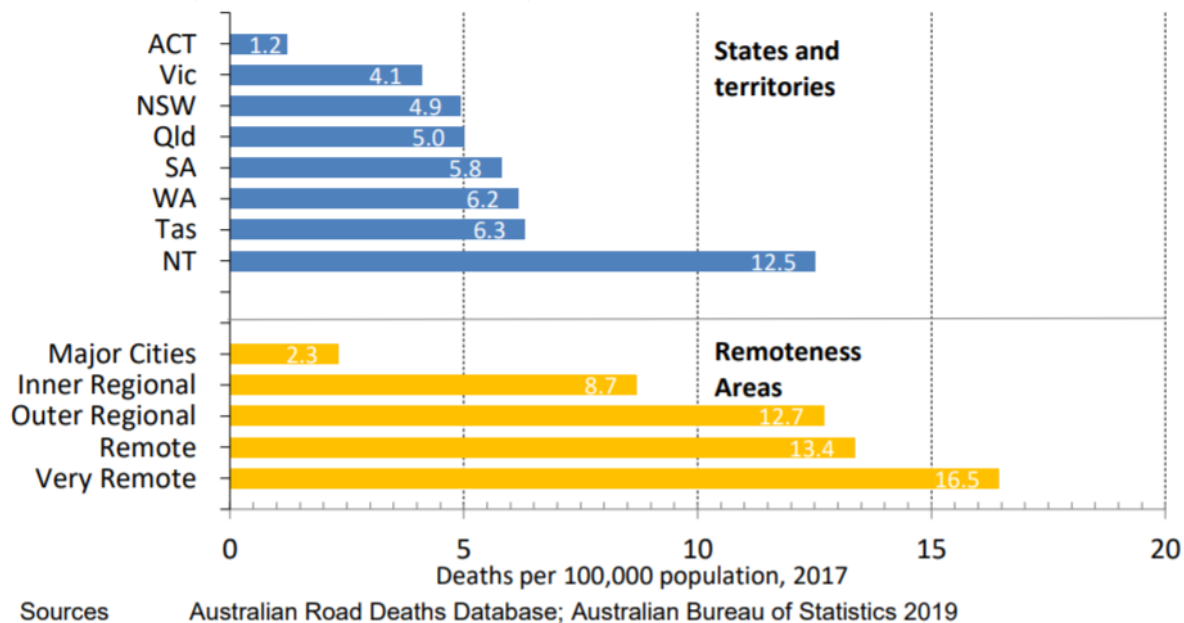
It is often the case that road networks provide a vital, even only, connection of one community to another. In the absence of alternatives, the private passenger car will be the dominant mode of transport, with high proportions of heavy trucks being an economic lifeline transporting goods from farm to market and back again from manufacturer to consumer. As a result, we know that 73% of travel, nearly 65% of road deaths and almost 40% of road injuries occur on local and regional roads. Crash figures and network risk assessments clearly show that the FSI rate is disproportionally high in rural and remote areas, Figure 5.

ARRB has been involved in the national road infrastructure risk assessment program, AusRAP, since its beginning, working collaboratively with the Australia Automobile Association (AAA). This assessment, now expanded across the state and major regional road networks in many jurisdictions, clearly identifies the elements of the road infrastructure contributing to crashes in rural, remote and regional areas. The crashes occurring in rural and remote areas can be condensed into the following:

1. **Intersection crashes in rural city centres** where the speed is typically 60 km/h or less (many of which involve vulnerable road users)
2. **Undivided high-speed roads** (typically run-off road crashes and head-on crashes with a high severity index).

Without addressing road safety in rural areas, Australia will not be able to achieve zero.

Figure 5 Fatality rate per 100,000 population by jurisdiction and ABS remoteness areas, 2017



Source: BITRE 2019

As they should, local councils in rural and regional areas target road infrastructure spending on public feedback. This, however, often leads to road safety funding being spent to meet public demand in areas where there is not a critical safety need, or is not applied to corridors which would have the most measurable safety outcome. While public opinion must always be an important consideration, safety measures implemented in rural and remote areas must target the main crash types listed above (namely intersection and undivided high-speed roads) in order to most effectively achieve desired crash reductions.

c. The possible establishment of a future Parliamentary Standing Committee on Road Safety and its functions

Summary

- ***A Parliamentary Standing Committee on Road Safety is needed and should be established to provide leadership and accountability to all levels of government and the community in a national response to this important national issue.***

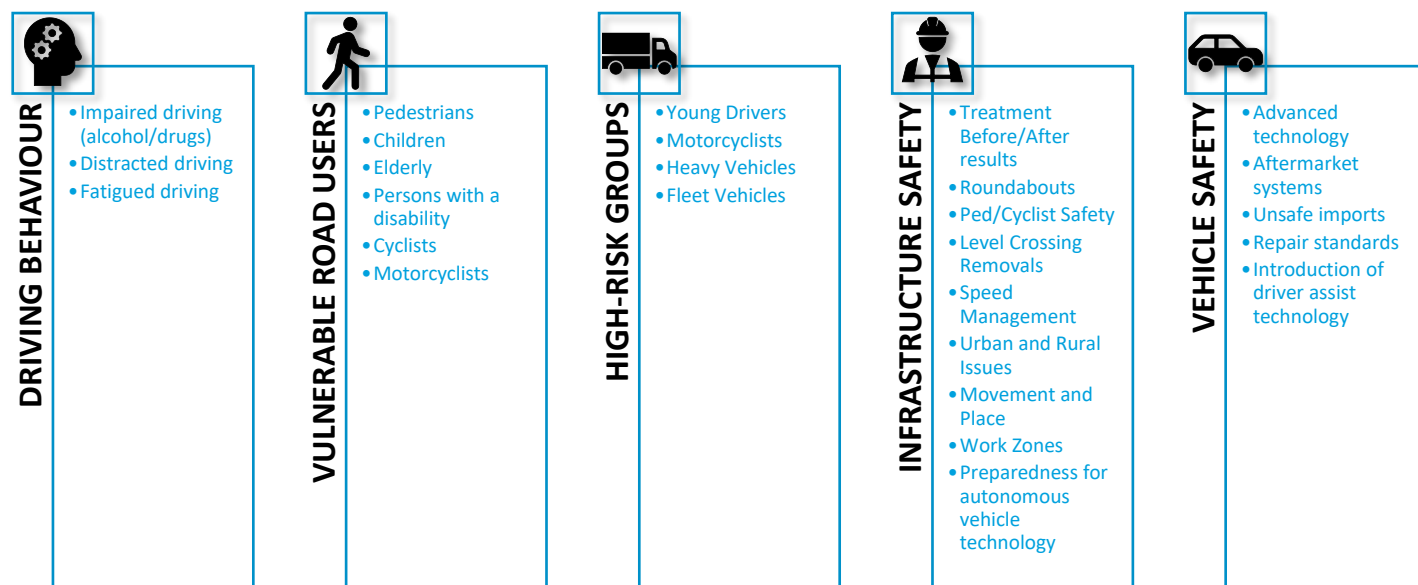
Road safety stakeholders have long called for a co-ordinated national approach to road safety planning and action. While the National Road Safety Strategy sets a vision and provides a formal outline of how Australia proposes tackling the road safety issue, there is limited accountability at the national and jurisdictional level to ensure delivery of the strategy and its action plans.

A National Parliamentary Standing Road Safety Committee could provide oversight and a degree of accountability to the delivery of road safety across Australia; it could serve as a mechanism for reporting progress on meeting agreed performance targets, for reviewing successes, and considering where more focus is required; it could engage with experts and agencies to seek out best practice and consider implementation to support the national agenda.

A Parliamentary Standing Committee could be set up to mirror – on a National Scale – the efforts of the Staysafe Standing Committee in NSW or the Parliamentary Road Safety Committee in Victoria, wherein it seeks out and receives communication from the community alerting government to emerging road safety issues that may not otherwise receive parliamentary attention.

It would be the function of a standing committee to commission reports on issues of a national relevance, coordinating attention and response to issues of common concern to all jurisdictions. Examples of areas of common national interest are highlighted in Figure 6, below.

Figure 6 Areas of common national road safety interest and concern



Source: ARRB

Ultimately, the key role of a future Parliamentary Standing Committee on Road Safety is to provide national leadership to elected officials and road safety stakeholders in this important area of national economic performance and social wellbeing.

d. Measures to ensure state, territory and local government road infrastructure investment incorporates the Safe System principles

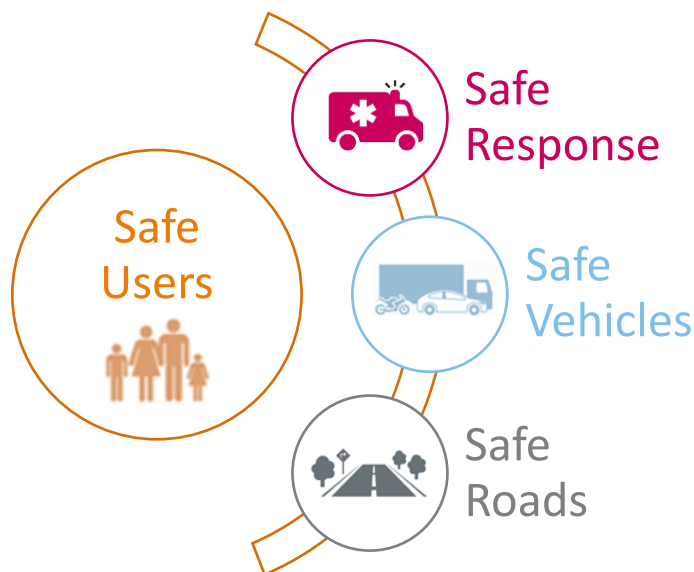
Summary

- *Road safety has been too inwardly focussed and as a consequence the community has not been taken on the journey; there is a lack of community acceptance of vision of zero and understanding of Safe System principles.*
- *Seven key areas of change - greater leadership, partnership, engagement, evidence led, advocacy, training and education.*

The Safe System approach has been a central approach to road safety in Australia since 2004/05 when it was first introduced to the road safety action plan. For over 15 years, it has been developed, promoted, embedded and integrated into the National Road Safety Strategy. Yet there remains an inconsistent application of Safe System principles in the delivery of road safety actions.

Delivering Australia's guiding vision that no person should be killed or seriously injured on our roads will require a fundamental change in the national narrative around road safety commitment and action. Significant investment has been made by governments in road infrastructure, enforcement and awareness campaigns telling the community and industry about what needs to happen (or mostly by telling people what not to do). The result has seen little effective and sustained investment in changing of community attitudes and broad active support for the vision zero strategy.

Figure 7 A renewed focus on Safe System principles



Source: ARRB

Now is the time to make history. Australia can become the first nation in the world to achieve zero deaths and injuries on the road. To achieve a step change, we must develop better metrics to measure the performance of pillars of the system.

The beyond 2020 Road Safety Strategy will need to shift and put the safety road users at the heart of every new road we build or upgrade; actions targeted to achieve safe roads (with matched speed limits), safe vehicles (travelling at appropriate speeds) and safe response efforts will further solidify the protective ecosystem of road safety beyond 2020.

Key areas for developing a new national narrative on road safety based on safe system principles that can be supported by all levels of government should include the following:

1. Strategy and Leadership from the National Government

The National government commits to a sustained spending on road safety.

National road safety initiatives need to be driven by a new and different road safety strategy with infrastructure implemented using the Safe System Framework and mass action corridor treatments.

This roll out will be backstopped by bow tie risk (reactive and predictive) mitigation using the most advanced methods available. Such methods will include historical blackspot and blacklength analysis and mitigation combined with innovative risk projections using metrics such as iRAP and ANRAM (road ratings), road condition, congestion and technology such as probe and telematic data.

2. Partnerships and Funding from Jurisdictional Governments

Like the public, jurisdictional governments must shift thinking toward the greater good.

We can all agree that each jurisdiction faces unique challenges. Still, the treatments which result in reduced fatal and serious injury (FSI) crashes do not differ depending on where you are. Separation, delineation, controls, lighting, and speed are the common threads of the safety dialogue. At present, there is no reliable way to compare the effects of safety initiatives from jurisdiction to jurisdiction. Every jurisdiction reports that their implemented safety measures are effective. But how effective are they really? Unless we are able to objectively compare each state and territory, we will be unable to determine which treatments actually work and which treatments may not be effective.

3. Engagement with and Delivery through Local Government

We know we need buy in from local government. We hear again and again from councils there is insufficient funding to invest in safety on local roads. As we bring local government along, our mission must initially avoid safety ideology, rather focusing on **quick wins** – instead there needs to be a promotion of **simple** and **effective** treatments for high risk crash types.

Readying roads for connected and automated vehicles (lines + signs) will also have a measurable effect for human drivers. Councils must be able to easily determine how and where to invest what funding they have. This will require ranking of sites with high crash risk based on reactive (blackspot) analysis coupled with predictive techniques like iRAP and corridor stereotype assessments along with mass action treatment solutions.

In this mass action model, adjoining councils can form an alliance to share resources.

Councils will have to do the work in order to assess the true public perception of reduced rural speed limits.

Safety advocates state that speed kills, but ARRB's preliminary research suggests this is a localised problem on high speed rural roads where there is a clear lack of infrastructure investment. Reduced speeds on these local roads will unequivocally result in reduced crashes. But for locals this may mean reduced connectivity, greater travel time, and more exposure time on the road.

It is time for us to do the work in order to evaluate what speed limits actually mean to country people. And if it means a reduced quality of life, safety advocates need to start talking about a different solution.

As a start, funding is required for compiling data on local roads to map risk, speeds, crashes and road condition ratings of all major council roads in Australia. With this, there can be an informed discussion about the strategic response.

4. Data, Evidence and Analysis by Independent Research Organisations

Today, with the transport world experiencing extraordinary technological transformation, the research challenge has become exponentially more complex. How do we conduct research in a way that will allow stakeholders to make the right investment decisions today to support all known and unknown future road-use cases and vehicle technologies twenty, fifty, even one hundred years hence? The theme for researchers over the next five years will be the explosion of big data and the transformation of vehicles from primarily

mechanical systems to effectively software devices. Research organisations functioning in this climate must be agile.

Most importantly, they must be funded.

Independent research will bring the brightest transport minds together to inform our policy makers, while exporting cutting-edge research to influence transport solutions.

5. Advocacy and Funding from Road User Groups

We need to identify sources of industry funding, outside of government, which will drive the application of evidence-based road safety solutions. Too often, safety research is censored and subject to evidence-bias.

We need road user groups to generate funding for road safety through alliances with government and one another. An example of such an alliance is the insurance institute for highway safety in the USA who is a leading innovator for vehicle safety.

This year the AAA in Australia has made funding road safety a top priority with the launch of its new Road Safety Research Program to support research and translation activities that deliver practical benefits for road users and the community. The Program will fund road safety projects in identified priority research areas that have a strong potential to prevent FSI crashes on Australian roads.

6. Motivation and Training for Industry

We need to ensure that industry buys into the safety ideal. Toll, Fed Ex, Transurban and Australia Post have demonstrated that leadership in safety correlates with positive brand impacts.

Still, industry practitioners have little knowledge of the Safe System framework, particularly in local government. Only a percentage of practitioners can recite the core principles of the Safe System and fewer can discuss on-ground application.

We can talk about safety but if it is not being implemented on the ground at the critical conception and preliminary design phases, safety will always be an add on or afterthought.

We need to invest in training of our town planners, engineers and practitioners in Safe System principles, as well as the consultants who support developers.

It must become business as usual.

7. Education and Acceptance by the Community

Perhaps the **most important part** of generating a step change in road safety starts with the **community**.

As road safety practitioners, we must ask ourselves – Is what we are saying to the community working? Are people listening? We continually speak of the impact of road trauma; it is spoken about so frequently that people appear to have become immune to it.

It is time to shift our language from the negative to the positive. Rather than speak about the negative impact of road trauma (death and destruction), we need to promote the positive impact of road safety measures (greater health and prosperity for our citizens).

ARRB has recently been promoting the concept that, as soon as we walk out of the front door, **everyone is a road user**. As drivers, passengers, riders, cyclists, scooterists, pedestrians, pram-pushers, wheelchair users and skaters, we – the users of the system – have the responsibility for forcing safe and sustainable change.

We need to shift the driving mentality of Australians from 'I' to 'we'. Road safety, along with related metrics such as sustainability and liveability, must become a community initiative.

Road safety is prioritised in European nations because people see it as a community goal. The community will come along if we give them reliable information that they can trust and which means something personal for them.

We have seen this with vehicle star ratings and workplace health and safety. The public requires access to **simple** and **easy to understand** safety ratings, but these must be backstopped by evidence-based data and

research. In order for road safety data to have meaning, we must gather evidence on crashes on a National scale.

We need a national approach to crash reviews that provides individual reports with personal stories, an annual report, annual summary reports, data trends and crash maps made available to the public that will enable them to understand the problem and make good choices.

e. Road trauma and incident data collection and coordination across Australia

Summary

- *Valuable lessons and insights are being missed under the current approach to documenting and investigating road crashes and the contributing causal factors.*
- *A new 'blameless' approach that reviews crashes against Safe System principles is required, so Australia can learn where vulnerabilities lie and what responses are necessary to prevent fatal and serious injury crashes continuing to occur.*

We are not learning enough from the crashes occurring on our roads.

In order to **effectively measure** the impact of proposed and installed safety treatments, we need both a National crash (Safe System) review framework and a National crash database. To this end, on 27 June 2019, Michael Caltabiano, the CEO of the Australian Road Research Board (ARRB) along with Tia Gaffney (ARRB Transport Safety) met with the Chief Commissioner, Mr Greg Hood of the Australian Transport Safety Bureau (ATSB) to highlight the importance of a Federal-level investigation of roadway crashes.

Of critical importance to public interest in the future is the investigation of significant, high-profile crashes and incidents (for example, those involving children, heavy vehicles and dangerous goods, suicide in heavy transport, connected and autonomous vehicles (CAV) and electric vehicle fires, to name a few key areas of immediate concern).

The NRSS 2018 inquiry recommended the establishment of *'a national investigative regime to enhance current police, coronial and research centre road crash investigations along the lines of the ATSB. This would ensure independent investigation and analysis, and open reporting on road safety matters without a focus on "blame".'* The Australian Road Research Board (ARRB) concurs with this recommendation and has sought to form partnerships in order to foster a specialised investigative and research element to assist the new National Office of Road Safety to deliver key road safety outcomes based on learnings of real world crash experiences.

A 2017 Report from the Australian National University³ found *'heavy trucks were involved in 14.7% of fatalities in 2016, despite making up 3.13% of registered vehicles and 7.2% of vehicle kilometres travelled'*.

It was found that 22% of property damage costs are borne by heavy trucks (\$400 million for rigid trucks and \$700 million for articulated trucks). The total social cost of road crashes in Australia for 2016 was \$33.16 billion and crashes involving heavy vehicles represent a disproportionate amount of the total cost that our society bears. Considering the potential negative media exposure and economic impact (disruption to traffic, damaged cargo, lost productivity, etc.) and the NTC's recent projection that the freight task will double in Australia over the next 15 years (NTC 2016), the National investigation of heavy vehicle crashes will become a major issue for public safety.

In March 2019, a 2018 Tesla Model 3 drove into a Heavy Vehicle Trailer in Delray Beach, Florida, shearing its roof off, killing the driver and causing a massive fire. (The South Florida Sun Sentinel reported that the

³ Litchfield, F., (2017), *The cost of road crashes in Australia 2016: An overview of safety strategies (A report drafted for Senator Alex Gallacher)*, The Australian National University.

vehicle ‘caught fire and burned the 48-year-old driver beyond recognition. First responders said they couldn’t get the car’s door handles to work before flames became too intense’.) This fatal crash, and other similar crashes involving autonomous and electric vehicles, are being investigated by the USA National Highway Traffic Safety Administration (NHTSA) and the USA National Traffic Safety Board (NTSB) as a matter of national public interest.

NHTSA and NTSB are investigating a number of crashes since 2017 that focus on two primary issues

1. The role of Tesla’s driver assistance technology Autopilot in accidents
2. Significant battery fires in electric vehicles after crashes, including cases of batteries reigniting. Current estimates suggest that it takes on the order of 2000L of fluid to extinguish a petrol vehicle fire while it takes up to an astounding 20,000L of fluid to distinguish an electrical vehicle fire; while a typical fire truck carries up to 4,000L of fluid.

It is not difficult to foresee the rapid emersion of connected and autonomous (CAV) and electric vehicles on Australia’s Roads. Looming issues such as vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) technology advances and potential hacking ramifications must be understood so that lessons can be immediately learned and applied. We cannot delay learning lessons from crashes and incidents involving vehicles incorporating these emerging technologies.

The roadway collision investigations performed by the Police, even those by the Major Collision Investigation Units, across each State and Territory focus mainly on the actions of the driver involved. Police investigations do not typically assess the role of the road or the vehicle in the crash and are not, by definition, ‘blameless’ and are therefore insufficient to satisfy the national public safety interest.

Nor are road crashes under the current mandate of the ATSB, who are governed by the Transport Safety Investigation Act 2003. The ATSB is limited under the current definition provided by the Act, which specifically defines the types of transport vehicle accidents to be investigated as an aircraft, ship or rail vehicle and thereby excludes road vehicles. Even with a change in legislation, the ATSB has a considerable backlog and minimal resources with which to investigate road crashes at present.

There needs to be established a cooperative and collaborative arrangement to deliver a world leading Road Accident Investigative Framework (RAIF) for Australia. This will deliver a step change in the understanding of Road Crashes in Australia; ‘new’ solutions will flow from this understanding that will provide the necessary guidance on what must be done to reduce the road toll.

f. Recommending strategies, performance measures and targets for the next National Road Safety Strategy

Summary

- **Road safety strategies and actions need to be inclusive of the whole community, working together, collaboratively.**
- **Performance measures and road safety targets need to be challenging but achievable and they need to be inclusive of all stakeholders, not just government and road managers.**

There have been two reviews of the NRSS 2011 – 2020; a mid-term progress review in 2014 and an end of strategy review in 2018. Both identified shortcomings in the delivery of the strategy with targets being missed, and a slow take up of the Safe System approach by road agencies.

*‘...it became evident that a transformative approach to road safety was needed across Australia. Road trauma targets are **not being met** and, at the same time, the Safe System approach espoused in the National Road Safety Strategy 2011–2020 is **often not being honoured ‘in the field’**. There is a **disconnect** between noble intentions, resourcing the actions and road safety practice. [2018 Wooley Crozier Review of the Road Safety Strategy 2011-2020]*

Figure 8 A collaborative and inclusive approach to road safety action



Source: ARRB

The focus of the NRSS, its supporting action plans, and the two reviews, is, and remains, action by government at the Federal, State and Local levels, with targets, and performance indicators referencing metrics centred around the number of deaths and serious injuries, compliance with speed limits, age of the national fleet, etc.

Action delivered under the NRSS has saved thousands of lives during the ten years of its existence, however, over 1100 Australians continue to die each year, and tens of thousands suffer life-long debilitating injury due to entirely predictable and preventable road crashes.

The NRSS is very government/road agency focused – industry is not actively engaged to form a commitment to delivering road safety action and achieving and current KPIs reinforce the disconnect.

g. Recommendations for the role of the newly established Office of Road Safety

Summary

- **The Office of Road Safety should take a leadership role in coordinating national delivery of road safety actions.**

The NRSS 2011 - 2020 inquiry found that the policy leadership [in road safety] previously provided by the ATSB and the Federal Office of Road Safety (FORS) *'is no longer obvious'*. The inquiry team infer that this lack of policy leadership *'has contributed to a lessening decline in national road safety performance, and the recent increase in road trauma as the longer-term benefits of that leadership have worn off'*.

Further it was suggested, *'Austroads has attempted to fill that gap, but with limited responsibility to direct funding change, it is unlikely to be able to achieve the necessary and urgent reform this inquiry recommends'*.

Many of the points raised earlier in our submission could be delivered by each jurisdiction, but experience has shown this leads to reduced commitment to the NRSS and a fragmentation of delivering action items.

The newly established Office of Road Safety should be the lead road safety agency for Australia; it should be the 'go to' office for coordinated road safety advice and national guidance. It should act as the link across all jurisdictions and with the national leadership in delivering road safety action.

h. Other measures to support the Australian Parliament's ongoing resolve to reduce incidents on our roads, with a focus on the recommendations from the Inquiry into the effectiveness of the National Road Safety Strategy 2011–2020.

Summary

- **Review the method of coding road crash data in Australia to allow greater consistency across jurisdictions and therefore a more accurate reporting of FSI occurrences.**

Crash data coding – a nationally consistent approach

A key area of interest for ARRB is ensuring a national consistency in the collation of our crash data. An area need attention is the coding of the abbreviated injury scale (AIS) definitions. The following outlines ARRB's suggestion on this.

Why is coding AIS severity for road crashes important?

The current focus of road safety initiatives is to reduce the number of fatal and serious injury or 'FSI' crashes.

While the definition of fatal is obvious, the scope of what defines a 'serious injury' varies between jurisdictions, Figure 9. As shown, it is currently presumed that a person who is hospitalised in some form has been seriously injured. However, it is the case that many persons who are hospitalised will be released without significant injury and without considerable societal harm. If we are using the term 'hospitalised' to equate with 'serious', this is not a correct assumption and it seems reasonable that 'FSI' crashes should at a minimum be replaced with the correct term 'FHI' (Fatal and Hospitalised injury) crashes.

Figure 9: Jurisdiction definitions of 'serious injury'

<i>Jurisdiction</i>	<i>Official 'serious injury' definition</i>	<i>Confirms admission</i>	<i>Notes</i>
New South Wales	A person identified in the Police crash report who is matched to a hospital admission record on same day or the day after a crash.	Yes	At a high level "serious injuries" in NSW are considered to be all road-related injuries admitted. Total admissions includes cases which were matched and not matched to police records.
Victoria	Admitted to hospital.	Yes	Includes a small number of cases with unknown admission status.
Queensland	Admitted to hospital for at least 24 hours.	No	Long term goal is matching of police and hospital records.
Western Australia	Admitted to hospital – overnight stay.	Partial	Transitioning to on-line reporting.
South Australia	Admitted to hospital for 24 hours or more.	Yes	No plans to change this definition.
Tasmania	Admitted to hospital for 24 hours or more.	Yes	Police contact hospitals to confirm road users initially classified as a 'serious injury' were admitted to hospital.
Northern Territory	Admitted to hospital.	No	No process in place to confirm admission.
Australian Capital Territory	Admitted to hospital.	No	No process in place to confirm admission.

Source: BITRE

AIS is the world-recognised scoring system for classifying injury into categories of varying severity. There are 6 categories in total with AIS 1 representing a very minor injury and AIS 6 representing a fatal injury. AIS

also forms the basis for determining the Injury Severity Score (ISS) of a patient with multiple crash injuries.

In general, the following describes each AIS value:

AIS	Injury Severity	Examples
AIS 1	MINOR injury.	Scratches bruises and minor abrasions. Fractures of small bones such as the nose.
AIS 2	MODERATE injury.	Closed fractures (broken arm, broken leg) or dislocated joints.
AIS 3	SERIOUS injury.	Multiple compound fractures or bruising to the brain (concussion).
AIS 4	SEVERE injury.	Complex fractures to the face, spine or limbs (burst, blunt or compression fractures), subdural/epidural haematoma (brain).
AIS 5	CRITICAL injury.	Critical injuries, mass destruction of skull, brain, spine or internal organs.
AIS 6	MAXIMAL injury.	Fatal (currently untreatable).

In Queensland (2009), 6,674 persons were 'hospitalised' and would therefore have been defined as being 'seriously injured'.

However, only 672 persons (approximately 10% of those who were hospitalised) received what medical and biomedical experts would define as a 'serious injury' (being AIS 3+ score).

Based on this data, a large proportion of occupants in crashes are being characterised as being seriously injured when they have sustained relatively minor injuries. This gives the incorrect impression that safety initiatives and infrastructure improvements are not working as well as they should be (or as well as they are.)

As safety professionals, it is our duty to reduce the quantity of fatal and serious injury crashes down to zero. We must allow for a level of injury that is acceptable for the system to bear. The inclusion of minor hospitalised injuries in our KPI is giving the impression that the system is still failing. However, minor broken bones are not indicative of a system failure.

We must be judged fairly and applying an AIS metric allows us to do so going forward.

Figure 10: Number of seriously injured persons in police crash records using different definitions of serious injury, Queensland, 2009

<i>Injury definition</i>	<i>Number of persons in police crash records</i>
Police definition of 'hospitalised' (taken to hospital)	6,674
Cases where people attended hospital (emergency ward and/or hospital admission)	10,649
Cases where people were admitted hospital > 24 hours	1,879
Abbreviated Injury Scale 3+	672
High threat to life cases with a Survival Risk Ratio < .942	1,041

Source: Watson et al 2015

Just like with road star and safety ratings and vehicle star and safety ratings, the AIS score is a general indicator of how well crash energy was managed or dissipated. Lower AIS injury would suggest a lower force and energy application to a person while a higher AIS injury would suggest high impact forces. Along with the road and vehicle performance, the human performance to impact is a critical variable to define.

Historically, AIS coding (or ISS coding) has not been undertaken because it requires a human to review the medical records and rank each injury according to its AIS value. In 2020, it is now possible to utilise machine learning algorithms in order to populate this dataset. ARRB encourages a project wherein hospital

discharge summaries are data mined in order to apply machine learning techniques toward a semi-automatic AIS ranking or injury score for each crash.

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