The Patient Journey for Aboriginal and Torres Strait Islander Peoples with a Road Traffic Injury

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Acknowledgement of Country

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Executive Summary

This report outlines the patient journey of Aboriginal and Torres Strait Islander people after a serious road traffic injury in South Australia and New South Wales. Findings show higher rates of severe injury, longer hospital stays, and major barriers to compensation, particularly in rural and remote areas. Many injured people were unaware of available support and faced complex, culturally unsafe systems. The report calls for community-led, culturally safe reforms to improve equity, access, and recovery outcomes.

Project Artwork

“Tumbetun Ruwi” – Healing Country

Talia Scriven (Rigney), 2025, acrylic on canvas

This artwork reflects the strength and resilience that grow through identity, family, and connection to Country. At its centre, two emus stand tall – a symbol of continuity, protection, and guidance. The adult and juvenile emu represent intergenerational care (represented in the pattern work above the emus), echoing the importance of early, culturally safe intervention and support for Aboriginal and Torres Strait Islander peoples, particularly following road traffic injuries.

The circular shapes throughout the piece hold deep cultural meaning. The smaller circles represent strong identity and family support and connection to appropriate care services, while the larger central circle is a powerful symbol of connection to Country – a key cultural determinant of health and wellbeing. These elements remind us that recovery is not just about the individual, but about the strength of relationships and place.

The silver daisy bush, shown blooming beneath the emus, is known for thriving in tough conditions and acts as a totem of resilience – a natural symbol of endurance, hope, and growth even in harsh environments.

The land, the environment, and the cultural knowledge shared across generations all play an important role in the recovery process. Aboriginal participants have highlighted how connection to Country supports healing, especially after trauma, and this is echoed across the canvas.

Recovery is most effective when it is community-led – when Aboriginal Community Controlled Health Organisations and Aboriginal Health Workers are engaged, and when psychological and physical care are delivered early and in culturally appropriate ways.

This artwork calls for stronger community-focused education and campaigning to support Aboriginal patients after road traffic injuries. Healing is not just about treatment – it is about connection, culture, and care that respects the strength of community.

Contents

Introduction

Road safety is a major public health concern in Australia. Over the last decade, more than 12,000 people have died as a result of a road crash, and an additional 300,000 people have been hospitalised [1-3]. In 2023, 1,258 Australians lost their life on the road [3], and for Australians less than 44 years of age, it is amongst the top five causes of death [4].

While road safety has been a national policy priority for decades [5], the rate of hospitalisations as a result of road transport crashes is increasing [6] and the rate of 'high threat to life' hospitalisations has remained constant [6, 7]. Road traffic crashes are costly, with fatal crashes costing up to $3.5 million and each hospitalisation $261,000. Further, it is estimated that the annual on-going costs of road traffic crashes are more than $27 billion [1, 8]. These estimates are based on road crashes occurring between 2016-20, with costs likely to have increased in the years since due to inflation.

Transport injuries have widespread significant impacts on the individual, their family, the healthcare system and the broader community. Furthermore, the impact extends over time with ongoing treatment and lifelong disability. Up to a third of the cost of road crashes can be attributed to workplace and household losses, along with pain, grief and suffering. Furthermore, for people who experience profound or severe impairment following a crash, lifetime losses may reach $4.1 million, with costs associated with moderate impairment estimated to be $1.1 million [8]. The most common injuries causing hospitalisation in Australia are fractures (116.8 per 100 000 persons) with the head and neck (27%) being the most common location [9]. Transport acquired Traumatic Brain Injury (TBI) is the largest contributor to the overall burden of head injuries in Australia [10, 11] and occurs in 7% of hospitalisations [12].

National approaches to road safety

The National Road Safety Strategy 2021–30 [13] has a goal that *no one should be killed or seriously injured using our road networks* by 2050, an aim titled 'Vision Zero' [5, 13-15]. The strategy addresses all elements of the road transport system, including roads and roadsides, vehicles and vehicle mix, road users, speed function of the roads, and planning. This approach is underpinned by the Safe System framework which acknowledges that a reduction in road trauma will only be achieved by a systems approach which incorporates roads, vehicles, people, speed and post-crash care as its five pillars. While Safe Systems has been adopted world-wide in an effort to reduce the impact of road transport trauma, a recent review undertaken in Victoria found that while this approach was widely supported, a shared understanding of the intentions, desired outcomes, and how Safe Systems was to be actioned, was lacking [16].

Health inequities and Aboriginal and Torres Strait Islander people

Aboriginal and Torres Strait Islander people are 2.8 times more likely to die in road crashes as compared to the dominant Australian population [17-19]. Furthermore, for Aboriginal and Torres Strait Islander people, road transport injuries are the second leading cause of death and the fourth leading cause of injury [17]. Road transport crashes account for 26% of fatalities and 9% of serious injuries in Aboriginal and Torres Strait Islander communities with the rates of both

death and serious injury increasing with increasing remoteness. The fatality rate per capita is highest in very remote regions [13].

In line with other Australians, the fatal injury rate for Aboriginal and Torres Strait Islander people decreased over the five year period; 2010/11 to 2014/15 [18]. However, in contrast to other cultural groups, the serious injury rate rose 22% from 2013/14 to 2022/23, a change that appears to result from increasing motorbike use [20]. Additionally, pedestrian injury rates are 5.2 times higher for Aboriginal and Torres Strait Islander people compared to non-Indigenous Australians.

A specific priority area of the National Road Safety Strategy is Aboriginal and Torres Strait Islander people, in acknowledgement of higher burden of road traffic trauma on this population. One action of the strategy is to establish baseline data for fatalities of Aboriginal and Torres Strait Islander people on public roads as the basis for a new safety performance indicator for the next National Road Safety Strategy Action Plan [13].

Reporting of direct healthcare costs and patient experience

Despite the national policy focus and the considerable inequities and burden associated with road traffic trauma for Aboriginal and Torres Strait Islander people, literature is limited. Studies have focussed on geography [21], risky driving [17, 22], behaviour and attitudes [23], the circumstances leading to the crashes, as well as the social determinants of health [22] and safer driving programs [24, 25]. However, studies examining broader, holistic approaches to the prevention of road transport crashes are absent. While annual reporting by the Bureau of Infrastructure and Transport Research Economics (BITRE) includes data for road deaths for Aboriginal and Torres Strait Islander people by state and territory, these outcomes are likely to underestimate the true magnitude of burden due to under identification [26, 27] along with jurisdiction differences in recording and reporting of ethnicity throughout the traffic crash process. In addition, mechanisms to regularly report the incidence, socioeconomic determinants and longitudinal tracking of the overall burden of serious crashes are lacking despite the existence of significant linked data sets with injury data.

Compensation schemes following road traffic crashes

While individuals who survive a road traffic crash and sustain an injury will require initial treatment, they are likely to also experience life-long effects which impact the person, their family and community. In Australia, individuals who receive injuries as a result of a road traffic crash may receive compensation for treatment and recovery [28]. Differences between states and territories in the legislation for civil liabilities or personal damages means that the compensation programs differ between jurisdictions. For example, in South Australia, there are three pathways for compensation or support; 1. Compulsory Third Party (CTP), 2. Lifetime Support Authority (LSA), and 3. Workers Compensation.

The CTP program, legislated in the SA Civil Liabilities Act 1936, provides road traffic injury compensation using an 'at fault' approach. Individuals are eligible if they were partly responsible for the crash, the injuries occurred less than three years ago, and the vehicle involved in the crash was registered in SA. The program will cover treatment for injuries as a result of the road traffic crash until the point where their injuries are determined to be stable after which a compensation settlement is made [29]. In comparison, the LSA program, legislated in the SA Motor Vehicle

Accidents Act 2013, uses a 'no fault' approach. Individuals are eligible to claim regardless of whether the road traffic crash was their fault, however they must meet serious injury criteria (i.e. TBI or spinal cord injury) [30]. The Workers Compensation Scheme, legislated in the SA Return to Work Act 1994, also utilises a 'no fault' approach. Individuals who are injured while working are eligible and the scheme covers medical expenses, income maintenance and a payment if permanent impairment results from the crash [31].

Theoretically, access to compensation schemes should be equal for all road traffic crash survivors, regardless of cultural background, socioeconomic circumstances or geographic location. To date, no studies have examined access to compensation schemes by Aboriginal and Torres Strait Islander people following road traffic injury. Furthermore, there are no studies which report the direct healthcare costs and patient experience of the compensation schemes or a clear understanding of the enablers and barriers for accessing compensation by this population. This is despite recommendations from the National Aboriginal Community Controlled Health Organisation (NACCHO) and the Driving Change parliamentary inquiry highlighting the need for culturally specific and tailored approaches and programs for Aboriginal and Torres Strait Islander communities [32, 33].

Our project was developed to generate new knowledge, through understanding the whole patient journey for Aboriginal and Torres Strait Islander patients and create outcomes to inform initiatives to access support after road traffic injury. The project focused on Indigenous Knowledges and research methods, to provide appropriate contextualisation of outcomes for community, government and key stakeholders. The protocol for this study has been published [14].

Objective and Research Aims

Objective

The objective of this research was to characterise the patient journey for Aboriginal and Torres Strait Islander patients with a serious road traffic injury.

Research Aim 1

Determine the depth, breadth, cost and causal factors of serious injury from road traffic crashes in South Australia (SA) and New South Wales (NSW) with a focus on injury prevention.

Research Aim 2

Identify enablers and barriers to compensation schemes for Aboriginal and Torres Strait Islander patients in SA and NSW.

The Objectives and Research Aims were addressed through five studies:

- Study 1 - Road transport injury in Aboriginal and Torres Strait Islander people in New South Wales, Australia
- Study 2 – Access to compensation for Aboriginal and Torres Strait Islander people after a road transport injury in New South Wales, Australia

- Study 3 – Epidemiological profile of South Australia Road Traffic Crashes Among Aboriginal and Torres Strait Islander Peoples
- Study 4 - "I didn't know nothing" – yarning up on access to compensation from road traffic injury with Aboriginal people
- Study 5 – Health Care Associated Costs from Serious Road Traffic Crashes in Aboriginal and Torres Strait Islander People

Project Governances

Steering committee: The overall project was overseen by a project steering committee, which consisted of the main investigators involved in the project (CR, HM, RI, HA, JG, SH, SOJ, GS, SD, LO). This committee met monthly for the duration of the project and served as the main oversight body for the research project, ensuring it remains aligned with its overarching aims. Their tasks include reviewing progress reports, assessing risks, advising on resource allocation, and ensuring ethical and regulatory compliance. The committee also played a critical role in facilitating collaboration and ensuring that project outcomes meet the expected standards and impact goals, with reporting to the Aboriginal and Torres Strait Islander Governance Group.

Aboriginal and Torres Strait Islander Governance Group (ATSIGG): The ATSIGG was established to provide strategic oversight and input into practices of Indigenous Governance for Indigenous Data. The ATSIGG consisted of Aboriginal or Torres Strait Islander researchers (PS, BS, RK, MC, BP), community and healthcare workers with experience in injury. Meeting quarterly, this group had an essential role in assisting with decolonising research processes and ensuring focus on Indigenous knowledges, and experiences of road traffic injuries, throughout all aspects of the research journey.

Methods

Study 1 – Road transport injury in Aboriginal and Torres Strait Islander people in New South Wales, Australia

Aim

This study examined the characteristics of Aboriginal and Torres Strait Islander people seriously injured or killed in a road transport crash and to identify factors protective for serious injury in a crash.

Setting

According to the 2021 Census, 278,000 people in NSW (3.4% of the state population) [34] identify as Aboriginal and Torres Strait Islander [35]. One third of Aboriginal and Torres Strait Islander people in NSW live in the state's capital cities [34] with the rest living in different levels of rural and remoteness across the state.

Data sources

The data source for this study was drawn from the population-based NSW Centre for Road Safety (CRS) linked crash and health data resource including police reported crash, ambulance,

emergency department, hospital and mortality data collections from 2005-2023 (supplement figure 1). Data linkage was conducted by the Centre for Health Record Linkage (CheReL). Researchers accessed datasets where personal identifiers have been removed through a safe remote data connection. The analysis on the burden of serious injury or death from road crashes used the CRS data linked with the NSW Admitted Patient Data Collection (APDC) and mortality data, because it includes all road users seriously injury or killed (supplement figure 2). The analysis of factors protective of serious injury or deaths after crash was restricted to car drivers with a police crash report. This subset was chosen because it enables comparison of crashes resulting in serious injury or deaths with no or minor injury crashes and it records information on factors potentially associated with crash outcomes (supplement figure 3).

Identification of Aboriginal and Torres Strait Islander people in the linked data

Identification of Aboriginal and Torres Strait Islander people in routinely collected data relies on self-reporting, and underreporting is a recognised problem [36-41]. Data linkage offers the opportunity to use more than one data source to identify Aboriginal and Torres Strait Islander people. This study adopted the approach used by the NSW Ministry of Health and the CRS [42] (supplement box 1).

Statistical analysis

The outcome of the study on the burden of serious injury or death from road crashes were hospital admission or death due to a road transport injury. The analysis was stratified by road user groups (car occupants, motorcyclist, pedestrian, pedal-cyclist and other road user). Variables were selected from the linked APDC data including gender, age group, region of hospital admission, reporting year of crash, month of crash, principal injury type, nature of principal injury, injury severity, length of hospital stay, casualty type, crash counterpart, road user group and type of traffic event (supplement table 1). The injury severity score was derived from the worst injury, grouped into maximum (survival probability (sp) <85.4%), high (sp 85.4%-96.49%), moderate (sp 96.5%-99.19%) and minimum severity (>=99.2%). Rates of crash by year and age groups were calculated using Australian Bureau of Statistics (ABS) resident population projections [43].

A strengths-based approach was adopted to investigate factors protective of serious injury or deaths in a road transport crash [44]. The outcome was severity of injury (no or minor, moderate, and serious injury or death) derived from the linked data resulting from a road transport crash where the person was the driver of the car. Variables in the analysis were selected from the police reported crash data. These were gender, age, licence status, restraint use, number of occupants in the car, status of registration, street alignment, natural lighting, urbanisation, speed limit, type of location group, road surface conditions, first impact type and number of traffic units involved (supplement table 2). Descriptive statistics were used to tabulate frequencies of the outcome variables by exposure categories and multinomial logistic regression to explore factors associated with crash resulting in no or minor injury or moderate injury compared with severe injury or death.

Ethics approval & Project Governance

The project “Ongoing Data Linkage of Health Datasets to CrashLink” has ethics approvals from the organisations listed in supplement table 3. This project was overseen by an ATSIGG, who

provided support surrounding overall project aims, analyses and interpretations of findings. The Terms of Reference for the ATSIGG can be found in Appendix 1.

See Appendix 2 for draft for publication version of Study 1.

Study 2 – Access to compensation for Aboriginal and Torres Strait Islander people after road transport injury in New South Wales, Australia

Aim

To describe the personal, crash and claim characteristics of Aboriginal and Torres Strait Islander people who submitted a claim under the NSW Compulsory Third Party (CTP) scheme and to explore differences in characteristics of submitting a claim and associated factors.

Setting

Please see study one setting.

Data sets

This study used the population-based NSW Centre for Road Safety (CRS) linked crash and health data resource (supplement figure 1). This data resource links crash data with NSW and Australian Capital Territory (ACT) hospital data, emergency department and mortality data collections, State Insurance Regulatory Authority Compulsory Third-Party claim and Workers Compensation data, Lifetime Care data, and the NSW Ambulance data and Institute of Trauma and Injury Management Minimum Data Set. Data linkage is conducted by the Centre for Health Record Linkage (CHeReL).

The analysis was restricted to 2018 -2023, because the new CTP scheme was introduced in December 2017 and 2023, where 2023 was the latest full year of data availability at the time of the study. In comparison to the previous scheme, the new scheme introduced no-fault benefits, meaning that all injured people, regardless of who was at fault, are entitled to benefits for up to 26 weeks. The NSW CRS data includes information on the persons being involved in the crash, the person's vehicle and the crash circumstances. The CTP data includes information on the claimant including their injuries, the claim including the cost of the claim, the vehicle and the crash.

These datasets were linked with then Socio-Economic Indexes for Areas (SEIFA index) of relative socioeconomic advantage and disadvantage at the postcode level of the person place of residence [45]. The SEIFA index was grouped into quintiles for the analysis. As stated above on page 9, this study adopted the approach used by the NSW Ministry of Health and the CRS [42] (supplement box 1).

Statistical analysis

We summarised characteristics of CTP claimants, crash and injury from the SIRA claims data using descriptive statistics (supplement table 1). The analysis of factors associated with lodging a claim was restricted to motorised vehicle users, because most of the variables (supplement table 4) in the routinely collected data are only relevant to motorised transport. Those eligible to claim were identified from the police reported crash data defined as road users injured in a crash

involving a motorised vehicle [46]. The outcome of interest was a claim for injury compensation during 2018-2023, defined as a record in the CTP data. Variables in the analysis were person characteristics (gender, age, licence status, socioeconomic status of area of residence), crash and vehicle characteristics (level of urbanisation, speed limit, restraint use, status of registration, crash counterpart and year of crash) and severity of injury sustained in the crash. In the linked data, injury severity was identified from the different datasets – serious injuries were those requiring hospital treatment, moderate injuries were identified from the emergency department data, and minor injuries from the police reported crash data.

The analysis of factors associated with a claim after crash were investigated in two multivariable logistic regression models. Model 1 was adjusted for the potential confounder year of claim. This analysis can help identify groups with lower odds of claiming compensation. Model 2 was adjusted for all variables listed above to identify their potential impact on the differences between groups observed in Model 1. Overall completeness of variables in the analysis was high (99-100%). Records with missing values were excluded from the analysis (1.3% joint missingness in model 2).

All statistical analysis were carried out using Stata SE 17.0.

Ethics approval & Project Governance.

Please see Study 1 ethics approval & project governance.

Study 3 – Analysis of Trauma Incidence Among Aboriginal Populations in South Australia (Based on the South Australian Trauma Registry – SATR)

Aim

This study aims to determine the characteristics of Aboriginal and Torres Strait Islander people seriously injured or killed in a road transport crash and to identify factors protective for serious injury in South Australia.

Data sets

Data was obtained from the South Australian Trauma Registry (SATR) which systematically collects information on all major trauma cases admitted to South Australia's four major trauma centres: the Royal Adelaide Hospital, Flinders Medical Centre, Women's and Children's Hospital, and the Lyell McEwin Hospital. The dataset includes a comprehensive range of variables encompassing demographic details, injury characteristics, prehospital and in-hospital care processes (including interfacility transfers) and outcome measures. Clinical variables described the nature and severity of injuries, including the primary injury type, mechanism of injury, associated injury codes, Injury Severity Score (ISS), and anatomical diagnoses.

Data ranging from July 2018 to June 2023 was extracted for analysis with a focus on patients who self-identified as Aboriginal and Torres Strait Islander.

Statistical analysis

Descriptive statistics were used to summarise patient demographics and hospital presentation characteristics. Continuous variables were reported as means with standard deviations, while categorical variables were presented as frequencies and percentages. Regression models were used to assess the associations between injury and clinical outcomes. A Cox proportional hazards regression model evaluated the relationship between impact speed and time to hospital discharge, treating discharge as the event and length of stay as the survival time. On the other hand, a negative binomial regression model assessed the relationship between ICD-10 code classification type and length of stay, with car occupant related injuries serving as the reference category. A Poisson regression model with robust standard errors assessed the risk ratio between patient role (driver, passenger, pedestrian) and length of hospital stay, while an ordinal logistic regression model assessed the odds ratio of impact speed to injury severity, categorised by ordered levels of the Injury Severity Score (ISS). Model results are presented as estimates with 95% confidence intervals (CIs) and corresponding p-values. Preliminary data cleaning, descriptive analyses, and visualisation were performed in Python (version 3.12) within a Jupyter Notebook environment. All regression analyses were conducted using IBM SPSS Statistics (version 29.0.1.0).

Ethics approval

Ethics for this study was approved through the Aboriginal Health Research Ethics Committee in SA (reference no. 04-22-1016), Flinders University Human Research Ethics Committee (reference no. 6258), SA Department of Health and Wellbeing Human Research Ethics Committee (reference no. 2023/HRE00253).

Study 4 – "I didn't know nothing" – yarning up on access to compensation from road traffic injury with Aboriginal people

Aim

This study sought to develop new knowledge, with an aim to understand the enablers and barriers to compensation access for Aboriginal and Torres Strait Islander patients with a road traffic injury, but importantly through centring Indigenous knowledges (knowing, being and doing) and research methods to ensure relationality of outcomes.

Design and Governance

Indigenous Governance of Data in this study was overseen by the ATSIGG. This qualitative study was underpinned by Knowledge Interface Methodology, which is described in the research protocol for this study [14]. The Indigenous research method of yarning was used to explore the patient journey for Aboriginal and Torres Strait Islander patients who were involved in a road traffic crash that resulted in an injury, with a particular focus on identifying enablers and barriers to compensation and support for their injuries. Yarning is an Indigenous research method, following a conversational technique for rich data collection [14].

The Yarning Guide appears in Appendix 3.

Participants and Recruitment

Participants were recruited from metropolitan South Australia (SA, Adelaide - Kaurna Country), and rural and remote regions near major highways: the Far West of SA (Kokatha, Mirning and Wirangu Country) which accounts for 8% of all serious SA road traffic injuries; the Murray Mallee (Ngarrindjeri Country) which accounts for 16% of all serious road traffic injuries; and Yorke Mid North (Narungga, Nukunu and Ngadjuri Country) which accounts for 16% of all serious road traffic injuries over 2019-2021 [47]. Recruitment occurred through social media and community networks. Participants were required to identify as an Aboriginal and/or Torres Strait Islander person, be aged 18 years or over, and have been involved in a road traffic crash, regardless of fault. Participants received a $30AUD honorarium for participation in the yarning sessions.

Analysis

We aimed to recruit a yarning sample size of 14, or until theme saturation was reached. Where possible all yarns were conducted on Country with participants. Participants could select if their yarn was recorded or if free hand notes were taken – this was undertaken by CR. Recorded sessions were transcribed, and all yarns de-identified. Thematic coding of yarns started with deep listening of audio files (if available), to identify and document important contextualisation factors from the yarn which would not be identifiable in transcripts i.e. tone, Kriol/language, pauses, laughter. This was followed by coding of themes using NVivo (Version 12, QSR International), with reflection and consideration of contextual factors from deep listening. This was undertaken by SOJ and GS, with support from CR. Initial themes were presented and discussed with the ATSIGG for further contextualisation and final approval. Theme saturation was reached when no new themes were identified through the transcripts.

Ethics

Please see study 3 ethics.

See Appendix 4 for published version of Study 4.

Study 5 – Health Care Associated Costs from Serious Road Traffic Crashes in Aboriginal and Torres Strait Islander People

Aims

Costing studies are important to assess the financial burden of road traffic injuries and help to better inform cost-effective road safety action plans. Significant health inequities are present in transport injuries, with Aboriginal and Torres Strait Islander people being overrepresented. Despite its significance, there are few studies investigating costs of injuries among Aboriginal and Torres Strait Islander people.

The aim of this study was to estimate the direct health care associated costs of serious injury for Aboriginal and Torres Strait Islander people experiencing a road traffic crash in NSW.

Overview

This research used the NSW Centre for Road Safety (CRS) Linked Crash and Health Data Resource which is held by Transport for NSW. It includes data for all persons injured or killed in crashes on NSW classified and local roads. Within this data source police, health and compensation datasets have been linked and deidentified by the Centre for Health Record Linkage (CheReL). This study used linked data from: CRS CrashLink (police crash reports), NSW Admitted Patient Data Collection (APDC), NSW Emergency Department Data Collection (EDDC), and death registrations from the NSW Registry of Births, Deaths and Marriages (RBDM) (supplementary figure 4).

All Aboriginal or Torres Strait Islander people aged 17 years or older who experienced a serious injury as a result of a road traffic crash in NSW from 1 January 2018 to 31 December 2023 were included in the study cohort. CRS use the NSW Ministry of Health approach to identifying Aboriginal or Torres Strait Islander people in linked datasets [42]. This approach collates information across linked administrative datasets in order to reduce the under-reporting of Aboriginal or Torres Strait Islander people (supplementary box 2).

CRS defined serious injuries as injuries resulting in an inpatient admission. This included crashes linked to a police report (matched records) with an inpatient admission starting on the day of or the day after the crash. It also included crashes without a police report (unmatched records) where the International Classification of Diseases, Tenth Revision, Australian Modification (ICD-10-AM) codes recorded as a principle or additional diagnoses for the inpatient admission specified an injury on a public road or injury on a traffic-public road (supplementary table 5).

Inpatient deaths were included, but pre-hospital fatalities and fatalities in ED were excluded as no inpatient costs were incurred and the medical care costs incurred at the crash site could not be captured. Crashes were excluded if the injury was moderate (ED presentation only), minor or no injury; if age and gender were missing or inconsistently coded; if gender was coded as indeterminate or intersex (due to very small numbers); if all inpatient records for the crash were missing; or inpatient costs were unable to be calculated for all records for the crash.

Variables

Inpatient, emergency department (ED) and ambulance costs.

Inpatient costs

The first (index) hospital stay associated with each crash was identified for all persons in the cohort. Admission and discharge dates for the index stay were used to calculate the length of stay (LOS). A single stay could include multiple consecutive episodes of care that combined to form a single continuous period of hospitalisation following the crash. Inpatient costs weights were calculated for each included episode of care using a framework provided by the Independent Health and Aged Care Pricing Authority (IHACPA) [48]. The framework included each episode's Australian Refined Diagnosis Related Group (AR-DRG) code, episode LOS and other available characteristics of the hospital (e.g., state, remoteness classification) and patient (e.g., age, postcode, hours in ICU, Aboriginal and Torres Strait Islander identity status). The CRS APDC data used AR-DRG version 6.0 which required using the 2013-14 Admitted Acute Services calculator.

Cost weights were applied to the National Efficient Price for 2014 (AU$4,993). Estimated hospital costs were adjusted for inflation using the consumer price index (CPI) for health to obtain costs in 2024 Australian dollars [49]. Costs for each episode of care in the index stay were summed to obtain the total cost of the inpatient stay.

ED costs

ED presentations were included in the analysis dataset if they occurred on the day before or day of the index stay's admission date or at any time during the stay (including on the stay's discharge date). Individuals could experience more than one ED presentation during their index stay (e.g., due to up-transfers or down-transfers).

Costs weights were calculated for each ED presentation using a framework provided by the Independent Health and Aged Care Pricing Authority (IHACPA) [50]. The framework included each presentation's Urgency Disposition Group (UDG) and the person's Aboriginal and Torres Strait Islander identity status. For consistency the 2013-14 Emergency Department Services calculator was used. Cost weights were applied to the National Efficient Price for 2014 (AU$4,993) and adjusted for inflation using the consumer price index (CPI) for health to obtain costs in 2024 Australian dollars [49] (Australian Bureau of Statistics, 2024). All ED costs and the number of ED presentations were summed across the index stay to calculate totals.

Ambulance costs

Use of ambulance services was identified based on the mode of arrival for each included ED presentation. As of 1 July 2024, NSW ambulance fees were calculated as a call-out fee ($873) plus a per kilometre charge ($7.88) [51]. The same dollar amounts were applied to emergency road, helicopter, and fixed wing air transport. Mileage could not be determined in the current dataset, therefore proxy charges were applied. An average cost per ambulance use of $944 (in 2024 Australian dollars) was reported by Rahman et al. (2025) in their recent paper on health service use associated with NSW residential fires [52]. They applied 2024 NSW ambulance costs to individual patient-level data on ambulance use (including distance travelled). Based on the NSW call-out and per kilometre fees this would be an average of 13.7 kilometres per transport. As a sensitivity analysis, we also followed the example of Steinhauser and Lancsar (2022) who applied the set-fee costs for Victoria to calculate ambulance costs across Australia in a report for the Bureau of Infrastructure and Transport Research Economics (BITRE) [8]. The 2024 Victorian costs for emergency ambulance transport were applied ($1359 for metropolitan presentations, and $2004 for regional and remote presentations) [53]. All ambulance costs and the number of ambulance transports were summed across the index stay to calculate totals.

Comorbidities

Comorbidities were identified using the Australian Injury Comorbidity Indices (AICIs), which were recently developed to predict cost burden, readmissions, and mortality for injury-related hospital admissions [54]. The AICI uses the ICD-10-AM-based comorbidity coding algorithms of Quan et al. (2005) and Sundararajan et al. (2004) [55, 56]. It re-combines comorbidities found in the Charlson Comorbidity Index and the Elixhauser Comorbidity Measure. The most parsimonious version of the AICI-burden index was used (AICI-b), where a comorbidity score was obtained by summing the number of comorbidities identified for the individual across the index stay (see

supplementary box 3 for included comorbidities). Condition onset flags (which indicate the condition was present prior to admission) were not available in the CRS dataset. To avoid coding crash injuries as pre-existing comorbidities, expert clinical opinion was obtained to review the ICD-10-AM codes in the coding algorithms to exclude conditions potentially caused by the crash (e.g., cerebrovascular conditions).

Data analysis

The analysis used person-crashes as the unit of analysis, i.e. costs were calculated per person per crash (commonly referred to as 'per crash').

Key cost outcomes were the per crash ambulance transport costs, ED presentation costs, inpatient stay (hospital admission) costs, and total health care associated costs for the cohort. Additionally, the total cost per year for all crashes in the cohort was calculated. The per crash cost of the inpatient stay was used as the primary outcome, as missing ED and ambulance costs could impact the total health care associated costs per crash. Inpatient costs made up the majority of the costs (89%). Costs were reported across the total cohort and stratified by the person, crash and injury characteristics of interest. To account for sampling uncertainty, costs were bootstrapped and 95% confidence intervals for the estimate of the mean generated.

The person characteristics of interest were age, gender and comorbidity burden (AICI-b). Crash characteristics were the crash outcome (hospitalisation, inpatient fatality), road user group, remoteness classification of the first presenting or admitting hospital, facility region of the first hospitalisation, reporting year of crash, month of crash, and whether the crash was matched or unmatched to a police report. ED and hospital remoteness were added to the APDC and ED datasets based on AIHW classification data [57]. Injury characteristics included worst injury severity score, injury site and the nature of injury. The worst injury severity score was calculated by CRS using the International Classification of Disease Injury Severity Score (ICISS) Worst Injury Method. This calculates the probability of survival (survival risk ratio; SRR) for all of the person's injuries and takes the lowest SSR as the worst. Scores were grouped into maximum (SSR: < 85.4%), high (SSR: 85.4% to < 96.5%), moderate (SSR: 96.5% to < 99.2%) and minimum severity (SRR: ≥ 99.2%).

Additional analyses explored costs for the total cohort and selected subgroups of interest (injury outcome, gender, remoteness, road user group, and for matched/unmatched records) alongside the person, crash and injury characteristics of the cohort.

Sensitivity analyses

Health care cost data is typically right skewed, with a large number of people having very low costs and very small number having very high costs. Sensitivity analyses used winsorising to explore the impact of the high-cost outliers on total costs [58]. Winsorising trims the cost value of the outlier by setting it to the cost value at a specific threshold. In these analyses, thresholds of three standard deviations above the mean, and the 98th and 95th percentiles, were used. Additional one-way sensitivity analysis applied Victorian instead of NSW ambulance fees.

Imputation of missing ED and ambulance costs

There were 796 hospital stays (24%) that did not have at least one corresponding ED presentation. Without an ED presentation, we were unable to generate ED or ambulance costs for the stay. Mean-value imputation was used to replace the missing values with the mean for the non-missing records.

Ethics approval and project governance

Please see study one ethics approval and project governance.

Results

Study 1 – Road transport injury in Aboriginal and Torres Strait Islander people in New South Wales, Australia

Burden of serious injury and death from road transport crashes

A total of 7,587 Aboriginal and Torres Strait Islander people aged 17 or above were involved in a crash resulting in serious injury, and 320 were killed in NSW between 2005-2023. Most people who were seriously injured or killed in a road transport crash were car occupants (52.5%), followed by motorcyclists (24.5%), pedestrians (9.7%), pedal cyclists (8.5%), and other road users (4.8%) (supplement table 1, supplement figure 5). Most car occupants were aged 17-29 (48.7%) or 30-59 (43.7%), and 7.6% were 60 years or older (supplement table 4).

A higher percentage of males (67.5%) than females (32.5%) were seriously injured or killed in a road crash. The largest differences between males and females were for motorbike (90.8% male) and pedal cycle (84.1% male) crashes. Head injuries were the leading type of injury in car occupants (21.1%), pedestrians (23.3%) and pedal cyclists (20.5%). In motorcycle riders injuries to the knee and lower leg were the most common (22.4%). Fractures (39.8%) were the leading nature of injury, contributing to more than half of all motorcycle (52.7%) and 49.1% of pedal cycle injuries. Most injuries were of moderate (42.8%) or high severity (31.1%). Pedestrians sustained the largest proportion of maximum severity injuries (14.6%). Car/pick-up/van/heavy vehicle/bus were the most common crash counterparts (35.7%), followed by non-collision crashes (28.0%).

Numbers and rates of serious injury or death varied for road user groups over time (supplement figure 5, supplement table 7 & 8). For car occupants, rates increased from 2005 to 2016, declined until 2022, and increased again in 2023, with highest rates observed in 2016 (210 per 100,000 population). The 17-29 year olds had the highest rates of injury and deaths as car occupants in each year (supplement figure 5). Motorcycle injuries increased over the whole time-period.

Factors protective of serious injury or deaths after road crash

From 2005-2023, 20,402 Aboriginal and Torres Strait Islander people aged 17 or older were involved in 22,393 police recorded crashes as the driver of a car in NSW. Of these, 2,416 resulted in serious injury or death, 5,465 in moderate injury, and 14,512 were minor or no injury crashes (supplement table 9). Overall, more men (n=12,827; 57.3%) than women were involved in a crash

and more men sustained serious injuries (n=1,444, 59.8%). There were differences in crash patterns between males and females, overall and by injury severity (supplement table 9). A higher proportion of men (n=897, 62.1%) than women (n=480, 49.4%) were involved in single vehicle crashes resulting in serious injury or deaths. In contrast, a higher proportion of women (n=297, 30.6%) than men (n=304, 21.1%) were seriously injured in crashes at intersections and in right angle crashes (n=123, 12.7% vs n=87, 6.0%, respectively).

Drivers in the youngest age group had the highest number of single vehicle crashes (n=3,547, 33.2%), followed by the 30-59 year olds (n=2,724, 26.5%). Most drivers held a standard licence (n=11,395, 50.9%) and wore a restraint at the time of crash (n=20,941 87.9%). Most drivers were in a registered vehicle at the time of the crash (n=19,022, 84.9%) and most crashes occurred in metropolitan (Sydney, Wollongong or Newcastle) or urban country areas (n=18,532, 82.7%).

In the adjusted regression analysis, females had lower odds of minor or no injury after a crash (OR 0.60; 95% CI 0.54-0.66) than males (supplement table 3). Each year of increase in age decreased the odds of minor or no injury after a crash by 2%. Drivers holding a standard licence had 70% higher odds of no or minor injury, compared with those driving unauthorised. Drivers wearing a seatbelt (OR 8.54; 95% CI 6.43-11.33) had higher odds of no or minor injury compared with those not wearing a seatbelt. Compared with those crashing in country non-urban areas, those crashing in Sydney metropolitan area (OR 1.28; 95% CI 1.04-1.58) had higher odds of no or minor injury after crash. Each 10km/h increase in the speed limit decreased the odds of no or minor injury crash by 2%. Those crashing at non-intersections compared with intersection had lower odds of no or minor injury (OR 0.81; 95% CI 0.72-0.92). Drivers crashing in wet conditions had higher odds of no or minor injury (OR 1.51; 95% CI 1.33-1.72) compared with dry conditions. Compared with head on crashes, drivers in rear end crashes (OR 9.50; 95% CI 7.57-11.91), other angle crashes (OR 5.46; 95% CI 4.46-6.70) and right-angle crashes (OR 4.44; 95% CI 3.51-5.61) had higher odds of no or minor injury.

Study 2 – Access to compensation for Aboriginal and Torres Strait Islander people after road transport injury in New South Wales, Australia

Claimants' characteristics

From 2018-2023, 1954 (52.7% male) Aboriginal and Torres Strait Islander people lodged a claim for an injury sustained in a road transport crash under the CTP scheme in NSW (supplement table 10). More than half (1091, 55.8%) lived in areas of lowest and second lowest socioeconomic status, and most were private car owners (1183, 60.5%) and not at fault (1254, 64.2%) (supplement table 10). Almost half of claimants (925, 47.3%) had a linked record for being admitted to hospital for treatment for an injury. The mean length of hospital stay was 10.7 days (stdv: 23.5).

Claims status by road users involved in crash potentially eligible to claim.

From the NSW police reported crash data, 4,802 Aboriginal and Torres Strait Islander people were identified as potentially eligible to claim compensation under the NSW CTP scheme during 2018-2023 (supplement table 11). Of these, 1,133 (23.6%) had a claim recorded, and 635 (56.0%)

claimants were male. Most of those potentially eligible to claim were aged 17-29 (2378, 49.5%) or 30-59 (2073, 43.2%). Those living in the lowest (297, 26.4%) and the second lowest (319, 28.4) SES areas had the highest percentage of claims. Most claimants were in a registered vehicle (933, 82.3%), and, in most cases, the crash counterpart was another vehicle (584, 51.5%). More than half of all claimants (631, 55.7%) had serious and 340 (30.0%) moderate injuries.

Factors associated with lodging a claim in users of motorised transport

Model 1 adjusted for reporting year

After adjusting for reporting year (model 1), females had 16% higher odds of claiming compensation under the NSW CTP scheme compared with males (supplement table 10, supplement figure 2). Each year of increase in age increased the odds of issuing a compensation claim by 1%. Compared with those living in the areas with the lowest SEIFA quintile, those in the fourth and highest had 1.5 and 1.6 times higher odds of raising a claim, respectively. Compared with unauthorised drivers, all other groups had had higher odds of claiming, WITH learner drivers (OR 4.19, 95% CI 2.77-6.35) and those on a standard licence (OR 3.83, 95% CI 2.83-5.19) having the highest odds of claiming.

Those injured in a road transport crash in metropolitan areas in Sydney (OR 1.65, 95% CI 1.34-2.01), Newcastle (OR 1.50, 95% CI 1.14-1.99) and Wollongong (OR 1.79, OR 1.22-2.63) had higher odds of raising a claim compared to those who crashed in non-urban country areas. Motorcycle riders wearing and open (OR 2.91, 95% CI 1.65-5.14) or full-face helmet (OR 2.42, 95% CI 1.65-3.56) had higher odds of claiming compensation compared with car occupants not wearing a seatbelt. Compared to those with a serious injury, those with moderate (OR 0.27, 95% CI 0.23-0.31) or minor/other injuries (OR 0.73, 95% CI 0.59-0.90) had lower odds of claiming. Compared with crashes where the counterpart was a fixed object, those where the counterpart was a two or three wheeled vehicle (OR 2.28, 95% CI 1.17-4.42), car, pick up or van (OR 2.26, 95% CI 1.90-2.70), or heavy vehicle or bus (OR 2.74, 95% CI 1.95-3.86), had higher odds of claiming compensation.

Model 2 fully adjusted analysis

In the fully adjusted analysis (model 2), females had 25% higher odds (OR 1.25, 95% CI 1.06-1.47) of claiming compensation under the NSW CTP scheme compared with men (supplement table 10, supplement figure 3). Compared with those driving unauthorised, all other groups had higher odds of claiming compensation, the largest differences were observed for those with a standard licence (OR 3.48, 95% CI 2.45-4.96) and for those who were passengers recorded as “not applicable” (OR 4.52, 95% CI 3.11-6.59). Motorcycle riders wearing an open face helmet (OR 3.71, 95% CI 1.94-7.08) or a full-face helmet (OR 3.73, 95% CI 2.37-5.86) had higher odds of claiming compensation compared with those wearing no seatbelt. Compared with a serious injury those with a minor/other (OR 0.57, 95% CI 0.45-0.72) and moderate injury (OR 0.22, 95% CI 0.19-0.26) had lower odds of claiming. Compared with crashes where the counterpart was a fixed or stationary object, crashes with cars, pick ups or vans (OR 2.49, 95% CI 2.02-3.07) and heavy vehicles/bus (OR 2.66, 95% CI 1.82-3.89) had higher odds of claiming.

Study 3 – Analysis of Trauma Incidence Among Aboriginal Populations in South Australia (Based on the South Australian Trauma Registry – SATR)

A total of 127 patients identified as Aboriginal and Torres Strait Islander people (supplement table 12). A higher proportion identified as male compared to female (63% vs 37%), with minor variations observed across age groups.

Injury events were most frequently associated with travel speeds exceeding 60 km/h, accounting for 59.8% of all cases. Most injuries occurred during the afternoon (29.1%) and evening (29.9%) hours. Injury Severity Scores (ISS) greater than 15 were reported in 39.4% of cases (supplement table 12). The survival to hospital discharge rate was high at 96.1%, with a mortality rate of 4%. Regarding discharge destination, 65.4% of patients returned to home or non-institutional care, 22.8% were transferred to acute or specialised medical facilities, and 6.3% were discharged to rehabilitation or other long-term care facilities. All cases were classified as blunt trauma. While one third of patients arrived at hospital within 1.5 hours of injury, another third took more than 6 hours (supplement table 13), with most arrivals occurring during the afternoon (35.4%) and evening (29.1; supplement table 13). Based on ICD-10 classification codes, the most common injury mechanism was car occupant-related (49.6%), followed by pedestrian related injuries (26%; supplement table 13). Drivers constituted 54.3% of the injured cohort. The average length of hospital stay was 22.2 days (95% CI: 14.1-30.1), with majority of patients (38.9%) hospitalised for 7–28 days (supplement table 13, supplement figure 7).

Injuries occurring at speeds greater than 60 km/h (supplement table 14 and 15) were most commonly sustained by individuals aged 18–24 years (26.3%) and those identifying as male (64.5%). These high-speed injuries predominantly occurred during the evening (26.3%) and night-time hours (32.9%: supplement table 14). Despite the high-speed context, a substantial proportion of these cases (27.6%) had low ISS scores (0–8). Survival to discharge remained high in this subgroup. Most high-speed injury cases (31.7%) arrived at hospital within 45 minutes to 1.5 hours post-injury (supplement table 15), although 23% of patients presented more than 12 hours after the incident (supplement table 15). Length of hospital stay was longest among patients injured at speeds greater than 60 km/h, with a mean (95% CI) of 19.1 (13.3-24.8) days, compared to those injured at 40–60 km/h [Mean (95% CI): 9.7 (5.7-14.4)] and <40 km/h [Mean (95% CI): 7.6 (4.5-11.6)].

Characteristics associated with hospitalisation after injury

Impact speed had a significant effect on length of stay (Wald $\chi^2(2) = 6.48$, $p = .039$). Patients involved in crashes exceeding 60 km/hr had a significantly lower hazard of discharge (HR = 0.591, 95% CI [0.391, 0.894], $p = .013$), suggesting longer hospital stays compared to those involved in crashes at speeds less than 60km/hr. Furthermore, patients classified as "two-wheel riders injured in transport crash" had a significantly shorter length of stay (IRR = 0.33, 95% CI: 0.21–0.52, $p < .001$) compared to those classified as "car occupants injured in transport crash". Similar lengths of stays were observed between patients classified as "pedestrians" and "car occupants injured in transport crash" (IRR = 0.77, 95% CI: 0.50–1.19, $p = 0.242$). Passengers also had longer hospital stays (IRR = 1.37, $p < .001$) compared to drivers, while similar lengths of stay were observed between pedestrians (IRR = 1.04, $p = .450$) and drivers. Patients involved in crashes at

speeds greater than 60km/hr were also 2.75 times more likely to sustain more severe injuries (ISS>15) compared to those in crashes at speeds less than <60 km/hr (p = .007).

Study 4 – "I didn't know nothing" – yarning up on access to compensation from road traffic injury with Aboriginal people

A total of eight yarning sessions were conducted (6 audio recorded, 2 free hand) as theme saturation was reached. All but one yarn was conducted on Country, with five participants from the Far West, one from the Murray Mallee, one from Yorke Mid North and one metropolitan. All participants were above 18 years of age with an even spread of males and females. Data were arranged into injury themes and sub themes depicting the compensation journey for participants, as summarised in supplement figure 8.

Traffic Injury

Primary occurrence of road traffic injuries was on regional and country roads. Causes of road traffic injuries, as identified by participants, included: poor road conditions, driver error, alcohol consumption or speeding. Only one participant reported being at fault, with the remaining sustaining their injuries as passengers or cyclists. The majority of participants (n=6) discussed severe and life-long injuries from their road traffic incident. Only two of the eight participants received compensation for their road traffic incident.

Impacts

A major theme identified from participant yarns was the overall impact of their road traffic incident across life domains, and in immediate, short- and long-term timeframes. This theme included four subthemes which encompassed physical and psychological impacts of their injury, ongoing financial and lifestyle impacts of their injury. These subthemes are explored further below.

- *Physical*

Participants reported experiencing immediate physical impacts from their injuries as a result of their road traffic incident, which for some included internal bleeding, fractures, concussion, or being in a coma. However, participants also reported managing the long-term effects from their road traffic injuries, including muscle loss, amputations, ongoing pain, traumatic brain injury, vertigo and nerve damage.

> *"I lost all muscles in my left arm, and now I get a lot of pain in there. The older I'm getting. I'm feeling it a lot."*

Participants reported the ongoing impacts their road traffic injury had on completing employment tasks or leisure activities. This included difficulty in no longer being able to sit or stand for long periods of time. Participants also reported having to make individual changes and adaptations themselves to adapt to the work environment.

> *"I've just got to work in vertical positions most of the time. I can't bend over for long periods of time."*

While the majority reported ongoing rehabilitation for their injuries with allied health providers, this was described as a long and painful process. Some participants required multiple surgeries and extensive ongoing physiotherapy.

> *"I had almost a full year of going to the disc specialist … to get my back fixed up again."*

- *Trauma and Mental Health*

In addition to physical injuries, participants experienced considerable mental health impacts, which were described as stress, anxiety or depression, from the ongoing pain and management of their road traffic injuries.

> *"I'm still dealing with back and neck injuries and [the money] doesn't really compensate for the rest of your life… [especially] with the mental side of health."*

Ongoing fear surrounding the initial crash continued to be prominent throughout participants' everyday life, with one participant describing their ongoing fear during subsequent car rides.

> *"We were going too fast, but the guy was just driving normal… It's just fear."*

This same individual reported turning to substance use (alcohol) as a coping mechanism for their situation.

> *"I used to… drink a lot… I don't know why but everything was hard."*

Other participants reported avoiding the location where their road traffic incident occurred, as it induced trauma and flash backs to their incident.

- *Financial Impacts*

Participants who were not aware, unable to apply or did not receive compensation for their road traffic incident reported significant financial challenges as they grappled to cover the cost of their vehicle damage and out-of-pocket healthcare expenses (OOPHE). OOPHE costs were both immediate from spending time in hospital for their road traffic injury, but also long-term and included ongoing treatment through both healthcare services and rehabilitation for their injury. One participant struggled with the ongoing cost of regular physiotherapy sessions prior to receiving compensation access for their road traffic incident, another who had their leg amputated because of their road traffic incident reflected on the sheer frustration and untenable costs of a suitable sport prosthesis.

> *"I wanted to try and run, but the main [prosthetic] leg to run is … thousands and thousands of dollars."*

- *Daily Life*

Participants spoke about the significant effect their road traffic crash and subsequent injury had and continues to have on their daily lives, employment opportunities and labour force participation. One participant discussed the impact it had on their ability to drive, another lamented on how their incident impacted their future employment.

> *"It was a lot. You know, that took my sporting career."*

Participants described the shame they felt from the physical aspects of their road traffic injuries, which included scarring or amputation, which caused these participants to want to hide or cover up their injury.

> *"I always cover my scar up. And I think ... a lot of people [that have] scars, there is that shame of exposing it."*

Loss of autonomy from their road traffic injuries was often described by participants, who were no longer able to engage in the sporting or leisure activities they undertook pre-road traffic injury. One participant who was an avid runner prior to their injury described the sadness and depression they felt from no longer being able to undertake running at the same pre-injury level.

> *"You never [going to] run like you did before."*

Barriers to Compensation

Knowledge translation and legal barriers, historical/mistrust and accessibility of services were the three subthemes identified as barriers, which was a major subtheme identified in participant yarns.

- *Knowledge translation and legal barriers*

Participants consistently advised that they were not informed of avenues for compensation for their road traffic incident, or they did not have any knowledge of these processes at the time.

> *"I had nobody come up to me and [speak] to me about any compensation."*

This lack of knowledge or understanding by participants did not however indicate a lack of interest in accessing compensation for their road traffic injuries. One participant strongly indicated they would have sought compensation if they had been aware of it at the time, and later approached lawyers about the possibility. The length of time since the crash increased the difficulty of obtaining compensation and the participant was turned away after being told it was "too late." Of the eight yarning participants, only two were aware of being able to access compensation for their road traffic injuries, and engaged lawyers, attaining successful claims. One of the participants who was able to access compensation, was made aware by their employer.

> *"I didn't know nothing about it before [the army told me]."*

Both successful claimants were male, claimed through the CTP 'at-fault,' and waited over three years to receive the compensation, with one participant commenting on the lengthy process.

> *"Five years until I agreed to a settlement [that] could have been more, but I'd had enough."*

This same participant discussed the financial impacts of using "No Win, No Fee" lawyers with 52% of their compensation going towards legal fees.

- *Historical / mistrust*

Participants discussed how past interactions with hospitals and government agencies influenced their likelihood to participate in accessing compensation for their road traffic injuries. One

participant recalled their profound fear of hospitals and distrust of government services, which would impact them accessing and providing documentation for compensation access.

> *"I remember overhearing an old family member being told 'don't go to hospital you will die' and that old fella [old man/Elder] passed away"*

Participants touched on feelings of powerlessness and injustice, as related to not knowing or understanding the compensation process for their injuries. Some indicating that their experience and feelings may have been linked to their Aboriginal identity. One participant reported there were no culturally tailored or appropriate recovery services for road traffic injuries.

> *"If it was somebody else [non-Aboriginal], I think that person would have – he would have gotten huge compensation for that."*

- *Accessibility of services*

Regional accessibility to appropriate rehabilitation services for a participants road traffic injury was discussed. A few participants reported having difficulty accessing services where they lived, one participant needed to travel a long way for rehabilitation services "it's a big drive." One participant shared how they were required to travel one hour to access their rehabilitation provider. Another commented on how they received minimal medical follow-up after their traffic injury.

Enablers to Compensation

Across all yarning sessions, there was minimal discussion on enablers or support for access to compensation schemes for road traffic injuries. However, one participant commented on their workplace support, attaining support from the Department of Veterans Affairs (DVA) during their time in the army.

> *"Well, it was – the army organised to bring that [compensation]. The lawyers were army lawyers and everything so everything was taken care of that way"*

Protective factors

Despite the resounding lack of enablers for participants to access compensation for their road traffic injuries, protective factors, such as family, community, and connection to Country, supported individuals throughout their road traffic injury journey. At the time of the initial road traffic incident participants expressed gratitude for the supports they received from fellow road users.

> *"I still know … the bloke who saved my life because he was the one that just threw me in the car and said … We'll get him in the car and get him going [to the hospital]."*

During periods of hospitalisation and rehabilitation, the presence of family supported participants as they navigated this process with their road traffic injuries. With one participant reflecting:

> *"There's one thing that's true and that is family. When you've got a family around you, they love you, there's nothing better than that really."*

Following discharge from the hospital, participants often commented on healing and recovery from their road traffic injuries through connection to Country.

> *"I just came out here in the bush and the country and everything and fixed myself up. I didn't need any medication, and I reckon I'm in good health now because of that."*

Study 5 – Health Care Associated Costs from Serious Road Traffic Crashes in Aboriginal and Torres Strait Islander People

This is the first study to comprehensively analyse the costs associated with a road traffic injury for Aboriginal and Torres Strait Islander people.

The outcomes of this study require approval from Transport NSW prior to publication.

Key findings of the project

- In absolute numbers, men were more likely to sustain a road traffic injury than women
- More than 40% of the injuries were classified as severe
- Fractures were the leading cause of injury
- Head injuries were the leading type of injury for car occupants
- Half of the injuries were sustained by occupants of cars
- One quarter of all injuries were sustained by pedestrians
- The largest proportion of high severity injury occurred in pedestrians
- Younger males (18 – 24 years) were more likely to injured in crashes that occurred at speeds greater than 60 km/hr
- Crashes at speeds > 60 km/hr resulted in more severe injuries than crashes at slower speeds
- Men were more likely to be involved in single vehicle crashes, particularly younger men
- More injuries resulted from crashes in the afternoon or evening
- Men sustained more serious injuries
- Driving without a licence increased the odds of moderate or severe injury
- Driving without a seatbelt increased the odds of moderate or severe injury
- Increasing speed increased the odds of moderate or severe injury
- Head on collisions had the highest odds of moderate and severe injury in comparison with other crashes types
- Hospital length of stay was similar for pedestrians and car occupants
- One quarter of injured people required transfer to acute/specialised medical facilities, rehabilitation or long-term facilities
- One third of injured people faced a significant transit to time hospital of > 6 hours
- Road traffic crashes had a significant impact on the mental health and wellbeing of injured people
- Injuries resulted in a loss of autonomy, particularly daily and leisure activities and sporting participation
- Shame and embarrassment resulted from visible injuries to the body
- Injuries had a significant impact on the individual, their family and their community
- Despite potential eligibility, limited uptake of compensation schemes

- Significant gaps in knowledge and understanding of compensation schemes
- Challenges associated with navigating compensation schemes and legal requirements
- The onus of workplace adaptations to lifelong injury fell on the injured person

Traffic Roundtable Workshop

Purpose

The Aboriginal and Torres Strait Islander Road Traffic Injury Roundtable focused on the outcomes of the Lifetime Support Authority (LSA) funded project '*Understanding the Patient Journey of Aboriginal and Torres Strait Islander People after Serious Road Traffic Injury*' and to receive feedback for future research priority areas.

Attendees

Attendees represented the following organisations: Aboriginal Health – SA Health, Australian Road Safety Foundation, Central Adelaide Health Network (CALHN), Centre for Automative Safety Research (CASR) – Adelaide University, CTP Insurance Regulator, Department of Health and Wellbeing, SA Department of Infrastructure and Transport, SA Department of Premier and Cabinet, SA Department of Premier and Cabinet, Multicultural Affairs, Far West Community Partnerships, Flinders Medical Centre, Flinders University, Flinders Health and Medical Research Institute, Lifetime Support Authority, Menzies School of Health Research, Preventive Health SA, SA Ambulance Service (SAAS), South Australian Police (SAPOL), University of New South Wales (UNSW) and the SA Women's and Children's Hospital.

See Appendix 5 – Traffic Roundtable Attendees List.

Approach

The roundtable framework was established with a slide presentation summarising the plan for the day, purpose of the projects, methods and results of the individual studies, time for reflection and discussion and consideration of next steps. Participants were able to contribute reflections, comments and ask additional questions on an individual basis, via a QR code, or as a small group via written summaries.

Through two focused co-design sessions, 'Policy Implications' and 'Targeting Change: Prevention, Support and Initiatives', participants explored opportunities to improve equity, access and culturally responsive care across systems. Discussions drew on lived experience, professional expertise and local knowledge to identify practical, strengths-based strategies for more coordinated and effective policy and service responses.

Findings

The Roundtable Discussion identified a number of overarching principles across both sessions.

Equity	Participants emphasised the need for equity to be embedded at every level of policy and practice, from data governance to service delivery.
Better coordination	There was strong support for better coordination across jurisdictions and systems, particularly where health, compensation, and community services intersect. Contributions reflected a strong commitment among many participants to work collaboratively, while also highlighting critical gaps in systems and opportunities for reform.
Clarity, accessibility and cultural safety	Improving the clarity, accessibility and cultural safety of compensation processes was a recurring theme, as well as calls for greater support in navigating these systems.
Community-led approaches	The importance of community-led approaches was consistently highlighted, with suggestions to build on existing trusted roles and services, rather than creating new structures in isolation.
Data-driven change	Data was seen as critical for driving meaningful change, with participants calling for better linkage, more consistent reporting, and adherence to Indigenous Data Sovereignty and Governance principles.

Discussion

This overarching aim of this project was to provide an epidemiological profile of Aboriginal and Torres Strait Islander people involved in serious traffic injury in SA and NSW and their post injury patient journey including barriers and facilitators to access to compensation.

The 5 studies examined the current system level interventions affecting the traffic injury related outcome of Aboriginal and Torres Strait Islander people, as well as individual experiences of this population accessing compensation following a road traffic injury. The outcomes of the studies were presented and discussed at a roundtable workshop with key stakeholders working at both a state and federal level. Recommendations were developed for improvements both in line with, and, in addition to, the current National Road Safety Strategy to support the priority area focussing on Aboriginal and Torres Strait Islander people.

The studies included in the project consistently confirm the added burden of road traffic trauma for Aboriginal and Torres Strait Islander communities. Of particular concern is that road traffic crashes resulted in significant injury, with more than 40% of injuries classified as severe. This severity of injury was also reflected in given that around one quarter of the injured people required transfer to acute/specialised medical, rehabilitation or long-term care facilities. Injured

people also discussed the significant impact of the road traffic crash on their mental health and wellbeing and their ability to engage in work and everyday activities.

The impact of inequity on road traffic injury

One consistent theme that emerged from the studies and the roundtable discussion was inequity. Inequity had a profound impact on all aspects of road traffic trauma and at all points along the post injury patient journey. Previous research with non-Indigenous patients claiming compensation has demonstrated that chronic pain, disability, poorer health outcomes and psychological impacts affect the claim for compensation [59]. Furthermore, at fault compensation schemes appear to lack an appreciation of the life altering nature of road traffic injuries [28] and as a result offer insufficient settlement amounts to the injured person, failing fail to cover 'whole of life' costs [60].

Injured people frequently reported feelings of discrimination and injustice because of the crash which were not considered during the determination of a settlement [59, 61, 62]. For an Aboriginal and Torres Strait Islander person, these issues are compounded by marginalisation from ongoing colonisation, creating feelings of injustice and a belief that the treatment that they are receiving is different from that offered to the dominant population. The participants in our study discussed the inadequacies of compensation received, particularly around an acknowledgement of the impact of the injury on their mental health and functioning. What is absent from the literature is the compounding effect of systemic and structural racism, faced by Aboriginal and Torres Strait Islander people daily [33, 63-66].

Remoteness and road traffic injury

A second theme that emerged was the impact of remoteness on the causes of the road traffic crash as well as treatment and recovery from their road traffic injury. Similar to previous research, crashes which occurred at higher speeds were related to increasing severity of injury. Given the higher travelling speeds on rural and remote roads, it stands to reason that crashes which occur in these locations are more likely to be associated with significant burden of injury. Issues which affect the safety of rural and remote roads increase the chance of crashes as well as impacting the severity of the crash and outcomes. Our studies showed that serious injury resulted from head-on collisions in comparison to other forms of crashes and undivided rural and remote roads are more likely to result in serious injury.

Analysis of statistics from NSW and SA showed that both the frequency and severity of pedestrian injuries were higher among Aboriginal and Torres Strait Islander people, with a death rate twice that of the general population [67]. It is likely that both a lack of pedestrian infrastructure, roadside safety features and a lack of other transport options in rural and remote areas contributed to this [68].

In our studies, 50% of serious injuries and deaths occurred in car occupants while one quarter occurred in motorcyclists. Rural and remote areas of Australia have seen a dramatic increase in motorcycle crashes, which have doubled in number from 2014 to 2023 [67]. The increase in the number of crashes may have resulted from increasing motorcycle ownership (which are cheaper than other vehicles), poor road quality (which has a proportionally greater impact on motorcycles), and increased allowable speeds in remote locations [69].

Road traffic crashes in rural and remote locations are impacted by access to timely treatment, particularly in access to dedicated trauma centres which are in metropolitan centres. One alarming statistic from our study was the finding that for one third of injured people, the transit time to hospital was more than six hours. It is conceivable that during transit times of six hours or more, the patient is likely to deteriorate significantly and miss optimal application of treatment for their injuries. As such it is conceivable that similar injuries which occur in urban as compared with remote locations may have vastly different outcomes.

Challenges with the current compensation schemes

Compulsory Third Party insurance states that the purpose of compensation following road traffic injury is to cover medical expenses, lost wages, and pain and suffering and that if an individual is injured in a motor vehicle crash health outcomes improve if the injured person receives the right treatment at the right time and returns to their usual activities [29]. In addition, an Injury Recovery and Early Intervention Framework (2018) was developed in SA to help improve health outcomes for injured people [70]. Despite the intention of these documents and the presence of websites to support both the injured person and care providers, the participants in our study reported significant challenges with awareness, access, understanding and use of compensation schemes.

In our study, Aboriginal and Torres Strait Islander people reported a lack of awareness of the existence of compensation schemes following road traffic injury, a finding that has been previously reported in non-Indigenous populations [71]. Absence of support further exacerbates the complex and often chronic nature of injuries resulting from road traffic trauma, which, combined with established marginalisation enforced by colonisation, adds to the ongoing inequity [63]. Without access to a compensation scheme, it is unlikely that an injured person, particularly in the presence of established inequity, will be able to receive "*the right treatment at the right time*" in order to "*return to their usual activities*" as stated on page two of the CTP Injury Recovery and Early Intervention Framework [70].

For those participants who were successful in accessing a compensation scheme, the process was suboptimal. Participants reported that the schemes were confusing, there was an absence of support in managing the required processes, including medical assessments, and there were often delays in compensation payments. Similar reports have been made by non-Indigenous participants [60, 61, 72]. In addition, compensation settlements did not reflect the ongoing mental health aspects of either the injury (such as chronic pain, recovery, and acceptance of injury) or the compensation process itself. Previous criticism of compensation schemes has pointed to a lack of appreciation and understanding of injury burden and financial settlements that do not reflect the injured person's requirements for the remainder of their lives [28, 60].

Injured persons who were able to return to work reported that there was frequently an absence of understanding on the part of the employer and the onus was on the injured person to make modifications in the workplace to enable workplace participation.

Improvements that are needed to the recovery process following road traffic injury

New approaches to compensation schemes that maximise Aboriginal and Torres Strait Islander participation and outcomes require a co-design approach that includes Aboriginal Torres Strait

Islander participation in design, delivery and evaluation. Co-design approaches are likely to include features such as a focus on Indigenous knowledges, retaining Connection to Country, and culturally safe practices during recovery. In addition, a better understanding of the advantages and challenges of remote settings would benefit those injured outside of urban areas. Strategies should explicitly mitigate the impact of severe injury for those previously employed in physically demanding jobs with labour force performance expectations. Furthermore, compensation schemes should incorporate an understanding of inequity and the complexity of injury for people also experiencing financial hardship. This will require novel return-to-work practices and programs.

An advantage of co-design of compensation schemes is that the community can develop programs that reflect the community priorities and values. Community-led and owned programs can incorporate culturally appropriate road safety messaging and education initiatives focused on the issues that are more relevant for their region. An example would be messaging around the use of seatbelts which has been shown in this project and previous literature to significantly reduce severe injury and death [73, 74].

Our study identified that family and community connection were protective factors in recovery for Aboriginal and Torres Strait Islander people. A unique finding of this study was the importance that the participants placed in connection to Country as an integral aspect of the healing process following road traffic injury. Connection to Country is a cultural determinant of health and wellbeing for Aboriginal and Torres Strait Islander people and is a fundamental element of other initiatives such as suicide prevention, and women's and men's health [75]. For Aboriginal and Torres Strait Islander people, compensation schemes need to find innovative ways to retain Connection to Country at every point along the recovery process.

Given the challenges identified by participants in compensation schemes, one possible solution is the introduction of a claims navigator or support officer to assist the injured person to navigate the entirety of the claims process. Ideally this support officer would be based in the health system, either in the hospital or the Aboriginal Community Controlled Health Organisation. In addition to supporting the injured person, they could liaise with all health services and the insurer in order to minimise any further distress caused by the compensation process.

Best practice approaches to compensation schemes need to centralise Indigenous knowledge, in addition to the current evidence-based approaches. Incorporating strength-based approaches and targeting positive cultural determinants of health, such as self-determination, sovereignty and connectedness, are likely to be more successful. It will be important to evaluate any new models of compensation schemes programs to examine awareness, engagement and satisfaction from the Aboriginal and Torres Strait Islander people who need them.

Strengths and limitations of this project

A significant strength of this project was the use of Indigenous research methodologies and methods. A novel mixed-methods approach was taken to the studies making up this project with oversight by an ATSIGG. The purpose of this group was to ensure that Indigenous Data Governance principles enact Sovereignty throughout the research process. This group was tasked with the provision of expert advice including on issues such as participant recruitment,

consent, data collection, data analysis, synthesis and reporting, as well as providing approval for outcome translation (Appendix 1).

In Study 4 we were able to gain a rich understanding of compensation access for Aboriginal people following road traffic injury. While South Australia has different road traffic compensation schemes to other Australian states and territories, we believe the insights gained from this work are applicable in other states and territories, particularly those with 'at-fault' schemes. All eight participants accessed compensation through the CTP scheme which meant that we were unable to examine compensation accessed through LSA or Return to Work SA 'no-fault' schemes. It is likely that our outcomes would have differed with this representation as positive health and wellbeing outcomes in the dominant population have been associated with no-fault schemes in Australia [61, 72].

This project highlights the challenges associated with undertaking epidemiological studies in different jurisdictions. The approach in NSW utilised a large, linked crash and health data set held by the NSW Centre for Road Safety, whereas in SA data was obtained from the SA Trauma Registry. Identification of Aboriginal and Torres Strait Islander people relies on self-reporting, and is frequently under-reported [36]. In the NSW studies, the NSW Ministry of Health Protocol [42], was used to identify Aboriginal and Torres Strait Islander people. In comparison, the SA Trauma Registry includes a self-reported item which resulted in a smaller sample size than anticipated. There is room for improvement in how identifying information is recorded in this registry.

The project could be improved with access to larger and comprehensive data infrastructure, which includes additional information related to coronial and ambulance data. However, time constraints, available data and practicalities meant that this work was limited to SA and NSW.

Recommendations

A series of eight key recommendations have been developed from the overarching '*Understanding the Patient Journey of Aboriginal and Torres Strait Islander People after Serious Road Traffic Injury*' research project. These recommendations collectively emphasise the importance of embedding equity and cultural safety into all aspects of injury recovery and compensation systems. They advocate for improved coordination across health and support services, enhanced cultural competence in service delivery, and the inclusion of Indigenous-led roles to guide and support patients through complex recovery journeys. The recommendations also call for greater awareness of compensation entitlements, stronger data governance practices, and the adoption of Indigenous Sovereignty Principles to ensure that systems are not only more accessible but also genuinely reflective of the needs and rights of Aboriginal and Torres Strait Islander peoples.

1	Services and systems involved in injury recovery and compensation will ensure that equity is a core component of their philosophy, policies, protocols, procedures and service delivery models.
2	That all services and systems involved in injury recovery and compensation improve coordination between local, state, and federal systems to ensure continuity of care and support after serious injury.
3	Trial new models of the CTP process and provision to reduce barriers for people recovering from trauma or experiencing stress, grief, or literacy challenges.
4	That all services involved in injury recovery and compensation can demonstrate culturally safe methods to identify Aboriginal and Torres Strait Islander patients and culturally safe care coordination and intervention.
5	That all services involved in injury recovery and compensation establish a navigator or advocate role, with a similar skill set to a Resource Aboriginal Liaison Officer or an Aboriginal Health Worker.
6	That all services involved in injury recovery and compensation increase awareness of compensation schemes in Australia.
7	That all services involved in injury prevention and compensation commit to improving data infrastructure, quality, completeness and consistency of Indigenous data.
8	That all services and systems involved in injury prevention and compensation commit to the use of principles of Indigenous Data Sovereignty at all stages of data use – from collection through to reporting and advocacy.

These overarching principles provide the foundation for the detailed recommendations below, each targeting specific areas where services and systems can improve to better support Aboriginal and Torres Strait Islander people throughout their injury recovery and compensation journey.

Equity

Recommendation 1: Services and systems involved in injury recovery and compensation will ensure that equity is a core component of their philosophy, policies, protocols, procedures and service delivery models

At a national level, this will require all services to have a better understanding of how current systems contribute to inequitable access to treatment, support, or compensation.

From the studies included in this project, inequity should be addressed in the following ways:

- A continued focus on improving roads and road safety in rural and remote areas that ensure roads that are safe for all users - pedestrians, motorcyclists and motorists
- Co-designed models of compensation that minimise barriers to accessing compensation programs, broaden the provision of and access to eligible services, simplify the administrative claim processes, support injured persons during recovery, and recognise and incorporate features that promote recovery.
- Co-designed models of compensation that demonstrate an understanding of the injury-related loss of autonomy of injured persons in the context of the cultural determinants of health for Aboriginal patients, their families and their community
- Co-designed models of compensation that promote individual resilience of Aboriginal and Torres Strait Islander people in the context of marginalisation resulting from colonisation
- Co-designed models of compensation that utilise a strengths-based approach and work to locate the compensation process in its entirety on Country.

Care coordination

Recommendation 2: That all services and systems involved in injury recovery and compensation improve coordination between local, state, and federal systems to ensure continuity of care and support after serious injury.

At a system-level, this may include the need to improve care across jurisdictional boundaries such as:

- Challenges in care for patients from cross-border communities (e.g. patients from the Anangu Pitjantjatjara Yankunytjatjara (APY) Lands being treated in the Northern Territory).
- Clarification of service catchments and responsibilities across organisations to reduce duplication and fragmentation.
- Strengthening of communication and continuity between services, especially where electronic medical records are not linked across systems.

For individual services, improvements are needed to:

- Provide ongoing support beyond discharge, not just for patients but also for families and carers, who may experience lasting emotional impacts from supporting someone with long-term injury.
- Increase workforce capacity in remote and regional areas to reduce service shortfalls.

- Ensure health and rehabilitation services are available closer to home, not just in major hospitals.
- Provide early and ongoing support for claimants, including information at the right point in the recovery journey (not just during the acute phase).
- The use of models like the Tri-State Agreement to guide shared governance and data access across jurisdictions.

Recommendation 3: Trial new models of the CTP process and provision to reduce barriers for people recovering from trauma or experiencing stress, grief, or literacy challenges.

At a national or state level, this would include:

- New models are co-designed with Aboriginal and Torres Strait Islander communities and local Aboriginal and Torres Strait Islander Health Services.
- A simplification of the process for the traffic crash survivor.
- Explore models that allow for more holistic, individualised compensation options – with support options beyond financial payments, such as funding for physiotherapy, mental health, or family-based supports.
- A nationally consistent CTP process (i.e. no fault policy) or template to reduce jurisdictional variation and complexity.

Cultural safety

Recommendation 4: That all services involved in injury recovery and compensation can demonstrate culturally safe methods to identify Aboriginal and Torres Strait Islander patients and culturally safe care coordination and intervention.

At a system-level, this may include:

- A re-design of the CTP process and claim forms to ensure cultural safety, simplicity, and accessibility.
- Ensuring that the CTP process includes culturally relevant design and language.
- The provision of Indigenous language options on paper and digital forms.
- Modifying forms to include the nomination of support people and preferred contact methods.
- Remote health services who are equipped to discuss CTP options with patients, even when social work support is limited.

Individual services will benefit from:

- An expansion in the availability of trauma and recovery services that are Aboriginal-led and culturally safe.
- An increase in access to outreach or locally based supports to help claimants in areas with limited service availability.
- Culturally appropriate compensation literacy resources as part of care plans.
- Providing additional Indigenous language support information to forms and online platforms, alongside existing multicultural language options.

Recommendation 5: That all services involved in injury recovery and compensation establish a navigator or advocate role, with a similar skill set to a Resource Aboriginal Liaison Officer or an Aboriginal Health Worker.

This role will assist a patient by:

- Visiting in hospital post-injury.
- Assisting with form completion and follow-up care and system navigation.
- Guiding individuals and families throughout the recovery and claims journey.

Recommendation 6: That all services involved in injury recovery and compensation increase awareness of compensation schemes in Australia.

At a national level, this will include:

- A public campaign to increase awareness of what support exists after a crash and how to access it
- Provide consistent resources about that to expect in the post-crash process ("what next" phase)
- Raising awareness of the available CTP schemes, their eligibility and timelines using trusted channels including community organisations, health workers, SAPOL and the Aboriginal Legal Rights Movement (ALRM)
- Incorporating structured CTP awareness discussions into hospital discharge and post-discharge planning.
- Providing resources and messaging that is culturally appropriate, straightforward and tailored to different regions and community contexts

Front-line health services can:

- Equip hospital and remote health staff with the tools and knowledge to raise CTP and recovery pathways with patients early.
- Include community members in designing and testing messaging materials to ensure relevance and effectiveness
- Build awareness of compensation and support options through culturally safe education embedded into care planning.

Data Integrity, Linkage and Governance

Recommendation 7: That all services involved in injury prevention and compensation commit to improving data infrastructure, quality, completeness and consistency of Indigenous data.

At a national and state level this will require a coordinated, system-wide use of data and shared governance including:

- The incorporation of comparative data between Aboriginal and Torres Strait Islander populations and general population groups of similar geographic and socioeconomic profiles.
- Linked datasets across transport, health, and compensation systems to allow for clearer tracking and evaluation.
- Improved access to datasets to support robust economic evaluation and identify regional service disparities.
- A reduction in duplication of effort by standardising coding, terminology, and reporting platforms.
- The employment of dedicated staff and resources to support data accuracy, linkage and integrity

Additional gaps in data collection that should be included are:

- Crashes not reported to police.
- ED-only presentations not linked to trauma registries.
- Readmission data and long-term recovery outcomes.
- Capture data on home address versus crash location to highlight regional risks and service gaps.
- ED costs for non-fatal, non-admitted crash injuries.
- Post-discharge treatment costs and long-term follow-up.
- Community impacts of injury and fatality (psychosocial, cultural, and financial).

A comprehensive understanding of the impact of traffic crashes and injuries would result from data on the costs associated with follow-up, post-discharge treatment and community-based recovery programs.

Recommendation 8: That all services and systems involved in injury prevention and compensation commit to the use of principles of Indigenous Data Sovereignty at all stages of data use – from collection through to reporting and advocacy.

Gaps in the current understanding of the needs and experiences of Aboriginal and Torres Strait Islander people still exist and could be addressed with future research.

1. A comprehensive analysis of the differences in CTP access across priority populations groups (i.e. rural and remote health, culturally and linguistically diverse, youth, etc).
2. An analysis of the compensation received across priority populations groups (i.e. rural and remote health, culturally and linguistically diverse, youth, etc).
3. An investigation of outcomes for those who do not claim CTP schemes.
4. An understanding of the barriers to accessing CTP schemes from the perspective of injured people.

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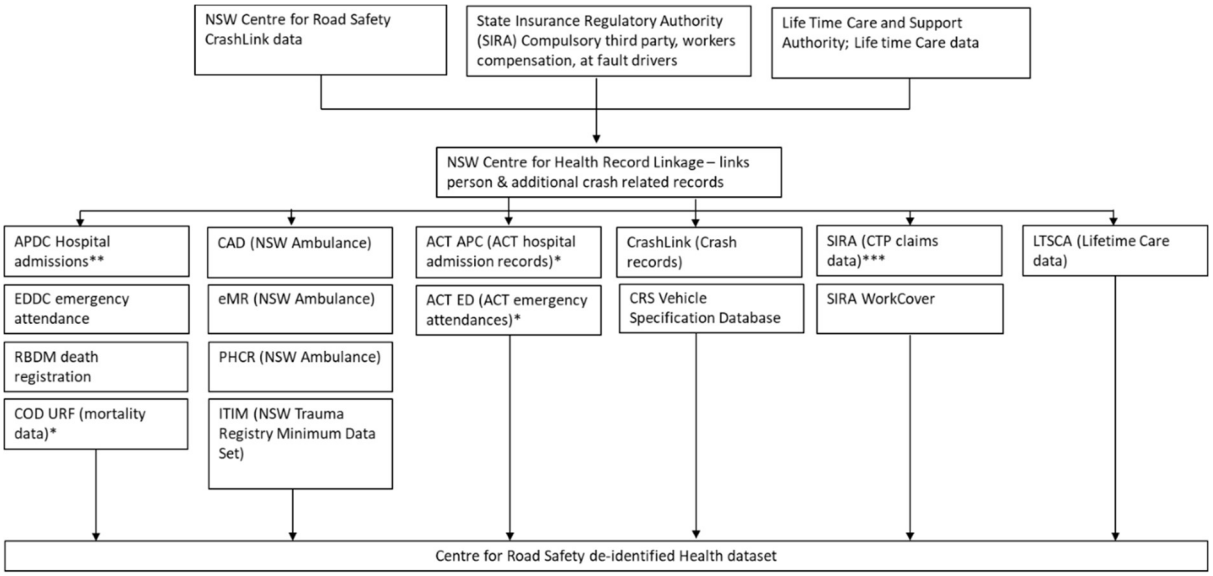
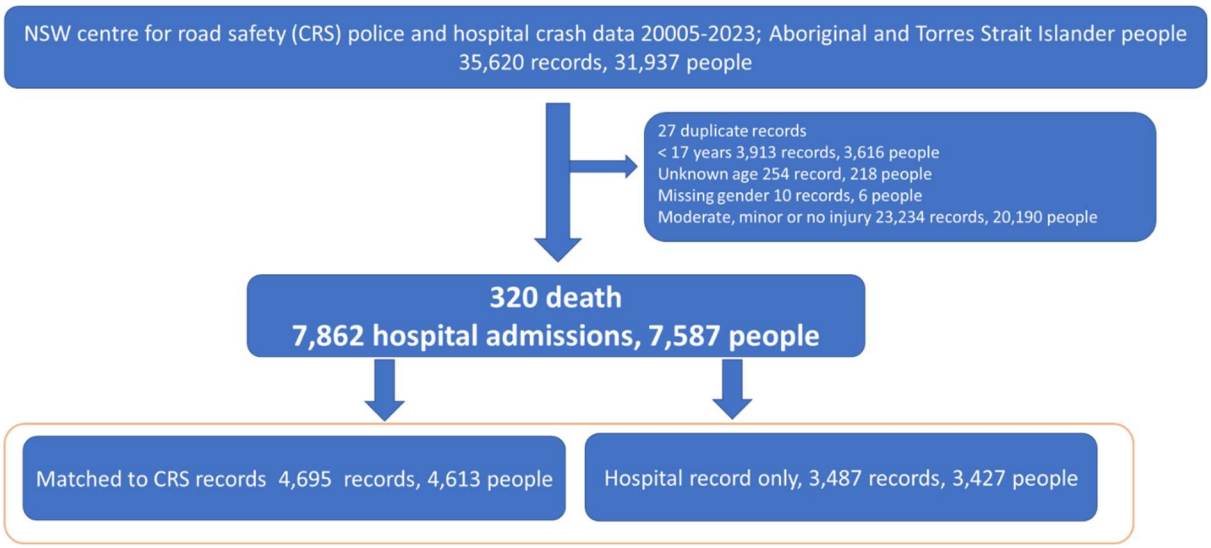
Supplements

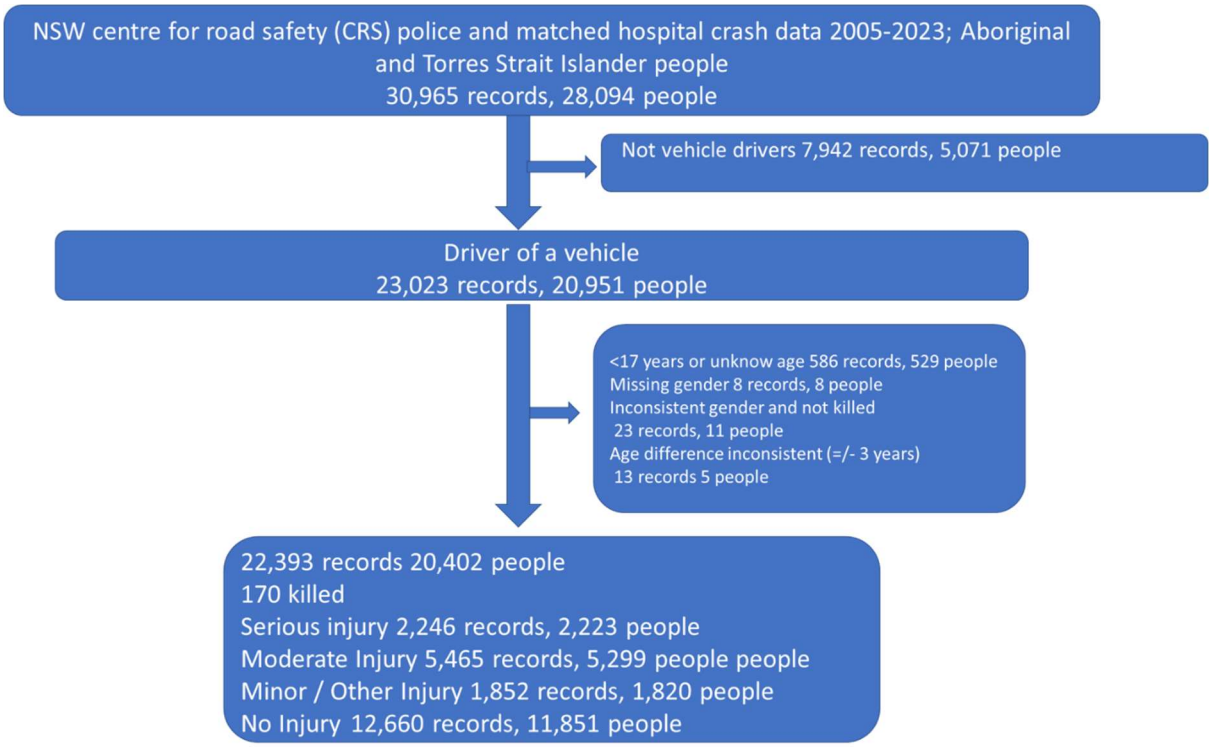
Figures



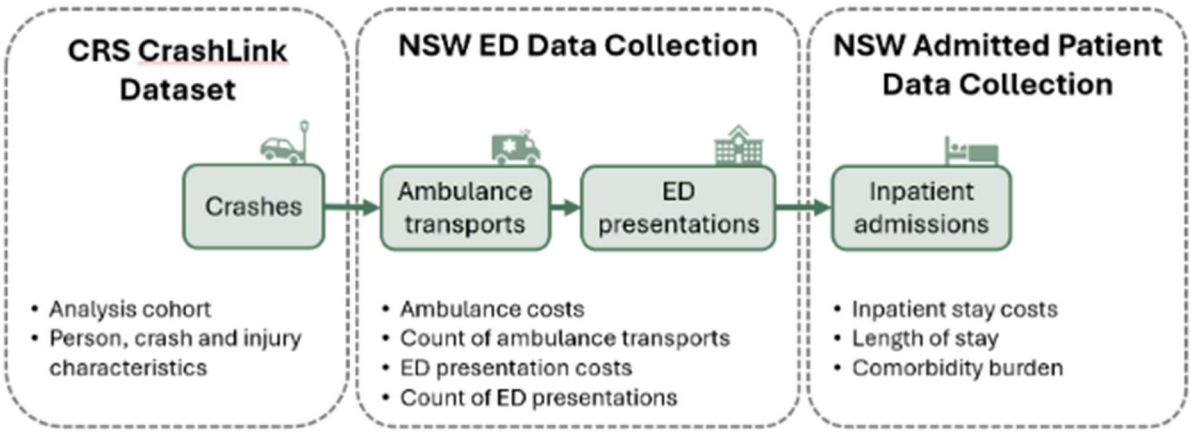
Supplement Figure 1: NSW Centre for Road Safety (CRS) linked crash and health data resource, data flow



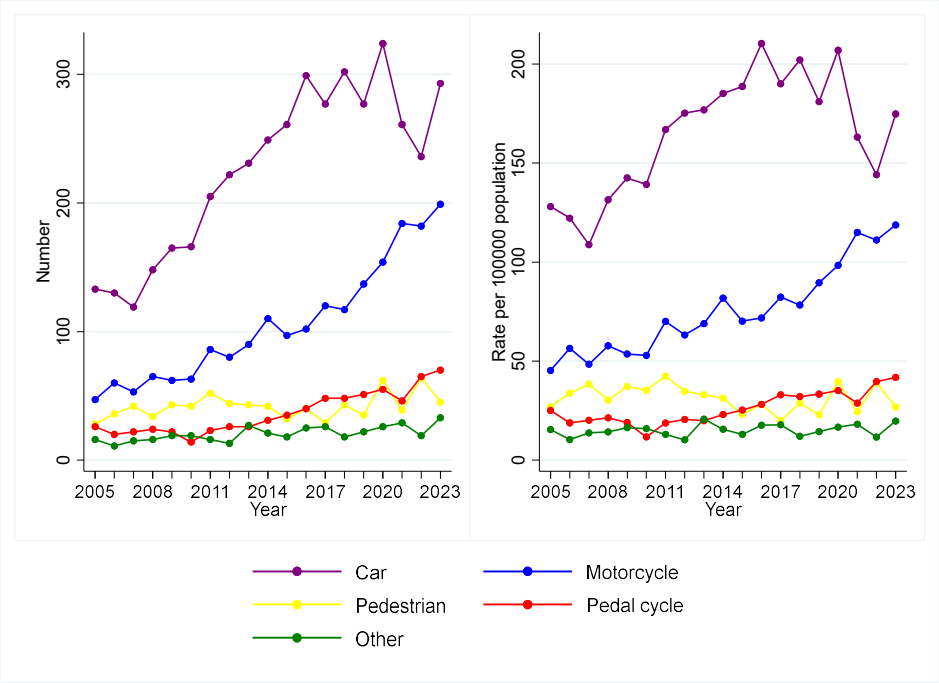
Supplement Figure 2: Study cohort of Aboriginal and Torres Strait Islander people aged 17 or over seriously injured or killed in a road crash, NSW 2005-2023.



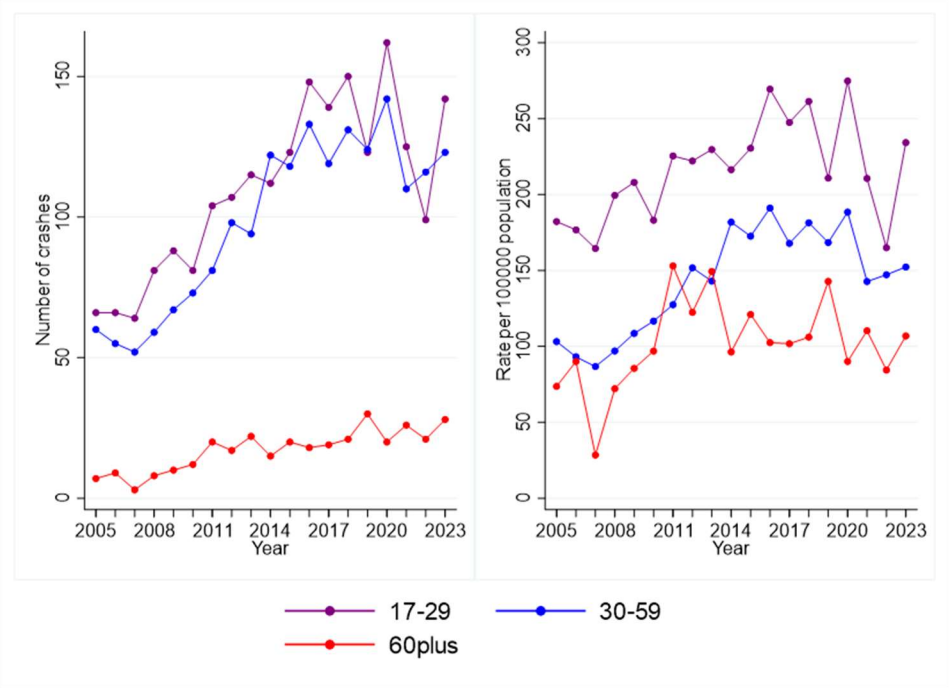
Supplement Figure 3: Study cohort of Aboriginal and Torres Strait Islander people aged 17 or over with a police recorded crash, NSW 2005-2023.



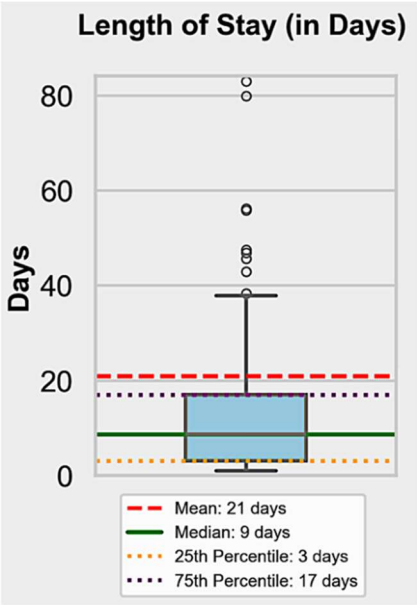
Supplement Figure 4: Study cohort of Aboriginal and Torres Strait Islander people aged 17 or over with a police recorded crash, NSW 2005-2023.



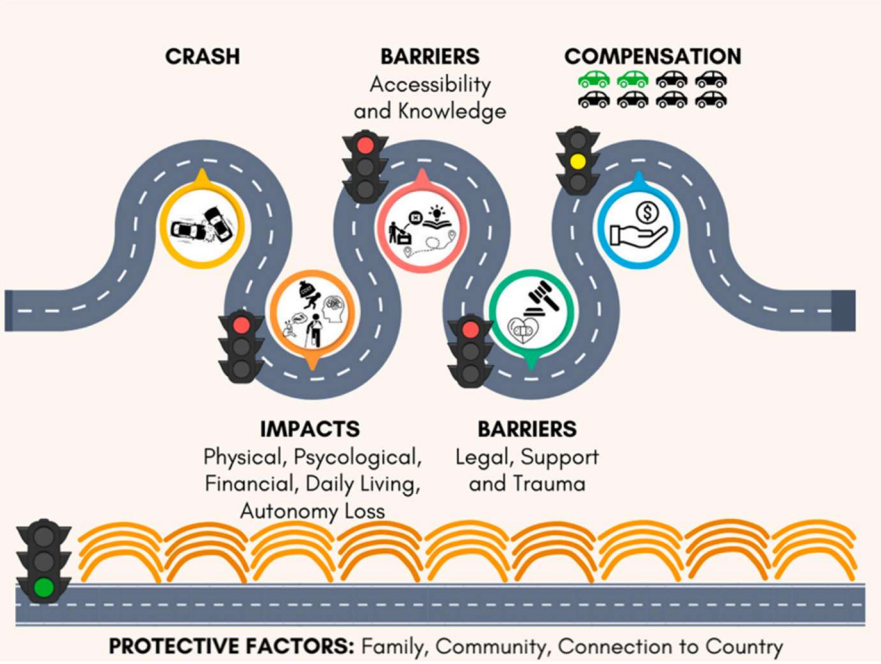
Supplement Figure 5: Trends in number and population rates of serious road transport injury or deaths in Aboriginal and Torres Strait Islander people aged 17 or over by road user group, NSW 2005-2023.



Supplement Figure 6: Trends in number and population rates of Aboriginal and Torres Strait Islander people seriously injured or killed as car occupants in a road transport crash, NSW 2005-2022.



Supplement Figure 7: Length of Stay (in Days)



Supplement Figure 8: Compensation journey for Aboriginal individuals who have had a road traffic injury. Legend: Each turn in the image represents a step along the participant compensation journey. The green traffic light, for the road located behind the yellow sandhills dictates how protective factors operate at all stages of the journey, at time of crash, impacts and barriers. The red stop lights represent the barriers participants face to accessing compensation for their road traffic injury, with the yellow stop light indicating compensation challenges.

Boxes

Supplement Box 1: Centre for Road Safety adopted approach to identify Aboriginal and Torres Strait Islanders people in linked data.

NSW Ministry of Health recommended approach to identify Aboriginal and Torres Strait Islanders in linked data sets.[1]

- where a person is reported as Aboriginal or Torres Strait Islander on the dataset of interest they are considered Aboriginal or Torres Strait Islander
- otherwise: if the person has three or more units of information, at least two indicating that the person is Aboriginal or Torres Strait Islander are required to report the person as Aboriginal or Torres Strait Islander; or
- if the person has one or two units of information, one is sufficient to report the person as Aboriginal or Torres Strait Islander.

This approach, is modified slightly in the case of datasets where there may be more than one unit of information for a person, such as multiple records of hospitalisations for one person in the APDC. Where there are multiple units of information in the same data collection for the same person, the above approach is modified so that part one reads: "where a person is always reported as Aboriginal or Torres Strait Islander on the dataset of interest".

Supplement Box 2: The NSW Ministry of Health approach to identifying Aboriginal or Torres Strait Islander people in linked datasets

Each record in an administrative dataset counts as a unit of information.

The following approach was used to identify Aboriginal or Torres Strait Islander people:

- Where a person is reported as Aboriginal or Torres Strait Islander in the dataset of interest this is accepted as reported;
- Where there are multiple records (i.e. multiple units of information) for a person in a single dataset then where a person is **always** reported as Aboriginal or Torres Strait Islander in the dataset of interest this is accepted as reported.

Otherwise:

- If the person has 3 or more units of information, at least 2 indicating that the person is Aboriginal or Torres Strait Islander are required to report the person as Aboriginal or Torres Strait Islander.
- If the person has 1 or 2 units of information, 1 is sufficient to report the person as Aboriginal or Torres Strait Islander.

Source: POPULATION AND PUBLIC HEALTH DIVISION 2012. Improved Reporting of Aboriginality in NSW Population Datasets using Record Linkage: A Feasibility Study Sydney: NSW Ministry of Health. https://www.health.nsw.gov.au/hsnsw/Pages/atsi-data-linkage-report.aspx

Supplement Box 3: Comorbidities included in the Australian Injury Comorbidity Indices – burden (AICI-b) (Fernando et al., 2021)

- Alcohol dependence
- Any malignancy
- Blood loss anaemia
- Cardiac arrhythmia
- Chronic pulmonary disease
- Coagulopathy
- Congestive heart failure
- Deficiency anaemias
- Depression
- Diabetes with chronic complications
- Diabetes without complications
- Drug dependence
- Hemiplegia/paraplegia
- Hypertension uncomplicated
- Hypothyroidism
- Mild liver disease
- Moderate or severe liver disease
- Obesity
- Peripheral vascular disease
- Psychoses
- Renal disease including renal failure
- Rheumatic disease including some other connective tissue disorders
- Valvular disease

Source: FERNANDO, D. T., BERECKI-GISOLF, J., NEWSTEAD, S. & ANSARI, Z. 2021. Australian Injury Comorbidity Indices (AICIs) to predict burden and readmission among hospital-admitted injury patients. BMC Health Services Research, 21, 149-149. https://doi.org/10.1186/s12913-021-06149-1

Tables

Supplement Table 1: Characteristics of Aboriginal and Torres Strait Islander people aged 17 or over seriously injured or killed in a road transport crash, NSW 2005-2023.*

Variable	Category	Car occupant Number (%)	Motorcyclist Number (%)	Pedestrian Number (%)	Pedal cyclist Number (%)	Other road user Number (%)	Total Number (%)
Gender	**Male**	2362 (55.0)	1824 (90.8)	535 (67.3)	582 (84.1)	216 (55.5)	5519 (67.5)

	Female	1936 (45.0)	184 (9.2)	260 (32.7)	110 (15.9)	173 (44.5)	2663 (32.5)
Age group	**17-29**	2095 (48.7)	1146 (57.1)	306 (38.5)	232 (33.5)	159 (40.9)	3938 (48.1)
	30-59	1877 (43.7)	804 (40.0)	419 (52.7)	422 (61.0)	186 (47.8)	3708 (45.3)
	60plus	326 (7.6)	58 (2.9)	70 (8.8)	38 (5.5)	44 (11.3)	536 (6.6)
Region of hospital admission	**Greater Sydney**	1001 (23.3)	541 (26.9)	298 (37.5)	267 (38.6)	80 (20.6)	2187 (26.7)
	North	1711 (39.8)	749 (37.3)	263 (33.1)	252 (36.4)	147 (37.8)	3122 (38.2)
	South	563 (13.1)	281 (14.0)	87 (10.9)	104 (15.0)	49 (12.6)	1084 (13.2)
	West	611 (14.2)	303 (15.1)	74 (9.3)	55 (7.9)	72 (18.5)	1115 (13.6)
	Unknown	412 (9.6)	134 (6.7)	73 (9.2)	14 (2.0)	41 (10.5)	674 (8.2)
Principal injury type	**Head**	905 (22.1)	231 (11.8)	185 (24.1)	142 (20.6)	70 (18.0)	1533 (19.4)
	Neck	535 (13.1)	38 (1.9)	22 (2.9)	18 (2.6)	21 (5.4)	634 (8.0)
	Thorax	698 (17.0)	164 (8.4)	52 (6.8)	50 (7.3)	31 (8.0)	995 (12.6)
	Abdomen, lower back, lumbar spine & pelvis	598 (14.6)	162 (8.3)	73 (9.5)	42 (6.1)	37 (9.5)	912 (11.5)
	Shoulder & upper arm	268 (6.5)	195 (9.9)	35 (4.6)	63 (9.1)	40 (10.3)	601 (7.6)
	Elbow & forearm	195 (4.8)	204 (10.4)	50 (6.5)	89 (12.9)	22 (5.7)	560 (7.1)
	Wrist and hand	136 (3.3)	173 (8.8)	22 (2.9)	81 (11.8)	27 (6.9)	439 (5.6)
	Hip & thigh	153 (3.7)	128 (6.5)	48 (6.3)	43 (6.2)	15 (3.9)	387 (4.9)
	Knee, lower leg, ankle, foot	380 (9.3)	579 (29.5)	233 (30.4)	119 (17.3)	59 (15.2)	1370 (17.3)
	Other	230 (5.6)	89 (4.5)	47 (6.1)	42 (6.1)	67 (17.2)	475 (6.0)
Nature of principal Injury	**Superficial injuries**	532 (13.0)	110 (5.6)	59 (7.7)	52 (7.5)	33 (8.5)	786 (9.9)
	Open wound	401 (9.8)	233 (11.9)	90 (11.7)	101 (14.7)	39 (10.0)	864 (10.9)
	Fracture	1364 (33.3)	1059 (53.9)	365 (47.6)	340 (49.3)	130 (33.4)	3258 (41.2)
	Dislocations, sprains & strains	156 (3.8)	94 (4.8)	22 (2.9)	28 (4.1)	21 (5.4)	321 (4.1)
	Injury to internal organs	455 (11.1)	202 (10.3)	100 (13.0)	62 (9.0)	32 (8.2)	851 (10.8)
	Other and unspecified injuries	1016 (24.8)	211 (10.7)	90 (11.7)	68 (9.9)	77 (19.8)	1462 (18.5)
	Unknown	174 (4.2)	54 (2.8)	41 (5.3)	38 (5.5)	57 (14.7)	364 (4.6)
ICISS Injury Severity indicator - Worst Injury	**Minimum severity**	434 (10.1)	338 (16.8)	84 (10.6)	156 (22.5)	89 (22.9)	1101 (13.5)
	Moderate severity	1879 (43.7)	828 (41.2)	307 (38.6)	322 (46.5)	165 (42.4)	3501 (42.8)
	High severity	1395 (32.5)	639 (31.8)	254 (31.9)	170 (24.6)	88 (22.6)	2546 (31.1)
	Maximum severity	378 (8.8)	157 (7.8)	116 (14.6)	41 (5.9)	38 (9.8)	730 (8.9)
	Not recorded	212 (4.9)	46 (2.3)	34 (4.3)	3 (0.4)	9 (2.3)	304 (3.7)
Length of stay group	**0-1**	1971 (45.9)	789 (39.3)	253 (31.8)	356 (51.4)	181 (46.5)	3550 (43.4)
	2	565 (13.1)	272 (13.5)	91 (11.4)	92 (13.3)	50 (12.9)	1070 (13.1)
	3	314 (7.3)	168 (8.4)	81 (10.2)	70 (10.1)	27 (6.9)	660 (8.1)
	4	202 (4.7)	144 (7.2)	47 (5.9)	28 (4.0)	21 (5.4)	442 (5.4)
	5-7	348 (8.1)	207 (10.3)	61 (7.7)	64 (9.2)	35 (9.0)	715 (8.7)
	8-14	305 (7.1)	210 (10.5)	83 (10.4)	42 (6.1)	31 (8.0)	671 (8.2)
	15-28	200 (4.7)	89 (4.4)	67 (8.4)	18 (2.6)	21 (5.4)	395 (4.8)
	29+	193 (4.5)	84 (4.2)	84 (10.6)	19 (2.7)	23 (5.9)	403 (4.9)
	Not applicable	200 (4.7)	45 (2.2)	28 (3.5)	3 (0.4)	0 (0.0)	276 (3.4)
Casualty type	**Killed**	219 (5.1)	53 (2.6)	42 (5.3)	6 (0.9)	0 (0.0)	320 (3.9)
	Serious Injury	4079 (94.9)	1955 (97.4)	753 (94.7)	686 (99.1)	389 (100.0)	7862 (96.1)

Crash counterpart	**Car/pick-up/van/ heavy vehicle / bus**	1487 (36.3)	445 (22.7)	697 (90.9)	170 (24.7)	23 (5.9)	2822 (35.7)
	Fixed/stationary object	1322 (32.3)	280 (14.3)	0 (0.0)	56 (8.1)	10 (2.6)	1668 (21.1)
	Non-collision	986 (24.1)	818 (41.7)	0 (0.0)	299 (43.4)	113 (29.0)	2216 (28.0)
	Other/unspecified	303 (7.4)	420 (21.4)	70 (9.1)	164 (23.8)	243 (62.5)	1200 (15.2)
Type of traffic event	**Non-traffic - off road**	261 (6.5)	200 (10.2)	34 (4.5)	94 (13.7)	16 (4.2)	605 (7.8)
	Traffic - public road	3752 (93.1)	1726 (88.1)	630 (83.9)	581 (84.4)	226 (59.9)	6915 (88.6)
	Not specified road type	15 (0.4)	33 (1.7)	87 (11.6)	13 (1.9)	135 (35.8)	283 (3.6)
	Total	4298 (100.0)	2008 (100.0)	795 (100.0)	692 (100.0)	389 (100.0)	8182 (100.0)

*missing values not shown

Supplement Table 2: Adjusted* odds ratios of no or minor or moderate injury compared with serious injury or deaths after a vehicle crash as the driver; Aboriginal and Torres Strait Islander people NSW 2005-2023.

Variable	Category	Minor / no injury OR (95% CI)	p value	Moderate injury OR (95% CI)	p value
Gender	**Male**	Ref		Ref	
	Female	0.60 (0.54-0.66)	<0.01	1.14 (1.03-1.27)	0.01
Age	**per 1 year increase**	0.98 (0.98-0.99)	<0.01	0.98 (0.98-0.99)	<0.01
Licence status	**Unauthorised**	Ref		Ref	
	Learner	1.27 (0.89-1.81)	0.19	0.87 (0.60-1.28)	0.49
	Provisional	1.42 (1.19-1.69)	<0.01	1.20 (1.00-1.45)	0.05
	Standard	1.70 (1.44-2.01)	<0.01	1.19 (1.00-1.42)	0.05
	Other/ unknown	1.05 (0.87-1.27)	0.61	1.00 (0.82-1.22)	0.97
Restraint	**Belt not worn**	Ref		Ref	
	Belt worn	8.54 (6.43-11.33)	<0.01	3.86 (2.94-5.06)	<0.01
	Unknown	8.59 (6.36-11.59)	<0.01	2.47 (1.84-3.31)	<0.01
Number of occupants	**1**	Ref		Ref	
	2	1.43 (1.26-1.61)	<0.01	1.29 (1.14-1.47)	<0.01
	3plus	1.72 (1.49-2.00)	<0.01	1.45 (1.24-1.70)	<0.01
Status of registration	**Not registered**	Ref		Ref	
	Registered	1.03 (0.77-1.37)	0.86	1.06 (0.78-1.44)	0.71
	Registration status unknown	1.06 (0.76-1.49)	0.72	1.07 (0.76-1.52)	0.69
Alignment	**Straight**	Ref		Ref	
	Curved	0.92 (0.83-1.03)	0.15	0.91 (0.81-1.02)	0.12
Natural lighting	**Darkness**	Ref		Ref	
	Daylight	1.27 (0.97-1.66)	0.08	1.23 (0.92-1.63)	0.16
	Dawn	1.43 (1.28-1.60)	<0.01	1.33 (1.19-1.50)	<0.01
	Dusk	1.53 (1.20-1.93)	<0.01	1.31 (1.02-1.68)	0.04
Urbanisation	**Country non-urban**	Ref		Ref	
	Sydney metro. area	1.28 (1.04-1.58)	0.02	0.82 (0.65-1.02)	0.08
	Newcastle met. area	1.06 (0.82-1.36)	0.68	0.92 (0.70-1.20)	0.52
	Wollongong met. area	1.03 (0.75-1.42)	0.85	0.76 (0.54-1.07)	0.12
	Country urban	1.08 (0.88-1.32)	0.48	1.02 (0.83-1.27)	0.83
Speed limit	**per 10km increase**	0.98 (0.98-0.99)	<0.01	0.99 (0.98-0.99)	<0.01
Type of location group	**Intersection**	Ref		Ref	
	Non-intersection	0.81 (0.72-0.92)	<0.01	0.83 (0.73-0.95)	0.01
Surface condition	**Dry**	Ref		Ref	
	Wet	1.51 (1.33-1.72)	<0.01	1.30 (1.14-1.48)	<0.01
	Other/ unknown	1.05 (0.40-2.71)	0.93	0.70 (0.24-2.05)	0.51
First impact type	**Head-on**	Ref		Ref	
	Right angle	4.44 (3.51-5.61)	<0.01	2.36 (1.84-3.03)	<0.01
	Rear end	9.50 (7.57-11.91)	<0.01	4.06 (3.19-5.16)	<0.01
	Other angle	5.46 (4.46-6.70)	<0.01	2.53 (2.04-3.15)	<0.01
	Vehicle - Object	1.89 (1.32-2.72)	<0.01	1.37 (0.93-2.02)	0.12

	Rollover	2.56 (1.73-3.78)	<0.01	1.62 (1.07-2.46)	0.02
	Other/ unknown	19.43 (12.04-31.34)	<0.01	5.99 (3.62-9.88)	<0.01
Number of traffic units involved	**1**	Ref		Ref	
	2	1.50 (1.07-2.09)	0.02	1.08 (0.75-1.55)	0.67
	3plus	1.27 (0.88-1.82)	0.21	1.02 (0.69-1.51)	0.92

Supplement Table 3: Human Research Ethics Committee approvals of the project "Ongoing Data Linkage of Health Datasets to CrashLink"

Human Research Ethics Committee	**Reference Number**
AU RED ACT Health – Human Research Ethics Committee	HREC/13/CIPHS/53
NSW Population & Health Services Research Ethics Committee (PHSREC)	2013/10/484
Aboriginal Health & Medical Research Council Ethics Committee	966/13
ACTH-HREC	ETH.10.13.284
ACT Health Epidemiology	2013-316
Calvary Public Hospital Bruce HREC	42-2017

Supplement Table 4: Characteristics of Aboriginal and Torres Strait Islander people seriously injured or killed in a road transport crash as car occupants, NSW 2005-2023.*

		17-29 Number (%)	**30-59 Number (%)**	**60plus Number (%)**	**Total Number (%)**
Gender	**Male**	1130 (53.9)	1063 (56.6)	169 (51.8)	2362 (55.0)
	Female	965 (46.1)	814 (43.4)	157 (48.2)	1936 (45.0)
Region of hospital admission	**Greater Sydney**	502 (24.0)	433 (23.1)	66 (20.2)	1001 (23.3)
	North	847 (40.4)	746 (39.7)	118 (36.2)	1711 (39.8)
	South	282 (13.5)	230 (12.3)	51 (15.6)	563 (13.1)
	West	275 (13.1)	281 (15.0)	55 (16.9)	611 (14.2)
	Unknown	189 (9.0)	187 (10.0)	36 (11.0)	412 (9.6)
Principal Injury Type	**Head**	491 (24.5)	375 (21.0)	39 (12.7)	905 (22.1)
	Neck	246 (12.3)	252 (14.1)	37 (12.1)	535 (13.1)
	Thorax	273 (13.6)	344 (19.3)	81 (26.4)	698 (17.0)
	Abdomen, lower back, lumbar spine & pelvis	326 (16.2)	234 (13.1)	38 (12.4)	598 (14.6)
	Shoulder & upper arm	139 (6.9)	109 (6.1)	20 (6.5)	268 (6.5)
	Elbow & forearm	83 (4.1)	92 (5.2)	20 (6.5)	195 (4.8)
	Wrist and hand	69 (3.4)	57 (3.2)	10 (3.3)	136 (3.3)
	Hip & thigh	88 (4.4)	53 (3.0)	12 (3.9)	153 (3.7)
	Knee, lower leg, ankle, foot	196 (9.8)	164 (9.2)	20 (6.5)	380 (9.3)
	Other	96 (4.8)	104 (5.8)	30 (9.8)	230 (5.6)
	Superficial injuries	266 (13.3)	215 (12.1)	51 (16.6)	532 (13.0)
	Open wound	208 (10.4)	175 (9.8)	18 (5.9)	401 (9.8)
Nature of Principal Injury	**Fracture**	602 (30.0)	639 (35.8)	123 (40.1)	1364 (33.3)
	Dislocations, sprains & strains	75 (3.7)	73 (4.1)	8 (2.6)	156 (3.8)
	Injury to internal organs	257 (12.8)	174 (9.8)	24 (7.8)	455 (11.1)
	Other and unspecified injuries	526 (26.2)	431 (24.2)	59 (19.2)	1016 (24.8)
	Unknown	73 (3.6)	77 (4.3)	24 (7.8)	174 (4.2)
ICISS Injury Severity indicator - Worst Injury	**Minimum severity**	228 (10.9)	178 (9.5)	28 (8.6)	434 (10.1)
	Moderate severity	893 (42.6)	844 (45.0)	142 (43.6)	1879 (43.7)

	High severity	678 (32.4)	609 (32.4)	108 (33.1)	1395 (32.5)
	Maximum severity	202 (9.6)	147 (7.8)	29 (8.9)	378 (8.8)
	Not recorded	94 (4.5)	99 (5.3)	19 (5.8)	212 (4.9)
Length of stay	**0-1**	1067 (50.9)	789 (42.0)	115 (35.3)	1971 (45.9)
	2	264 (12.6)	256 (13.6)	45 (13.8)	565 (13.1)
	3	149 (7.1)	145 (7.7)	20 (6.1)	314 (7.3)
	4	79 (3.8)	105 (5.6)	18 (5.5)	202 (4.7)
	5-7	145 (6.9)	173 (9.2)	30 (9.2)	348 (8.1)
	8-14	143 (6.8)	133 (7.1)	29 (8.9)	305 (7.1)
	15-28	91 (4.3)	87 (4.6)	22 (6.7)	200 (4.7)
	29+	69 (3.3)	96 (5.1)	28 (8.6)	193 (4.5)
	Not applicable	88 (4.2)	93 (5.0)	19 (5.8)	200 (4.7)
Casualty type	**Killed**	94 (4.5)	105 (5.6)	20 (6.1)	219 (5.1)
	Serious injury	2001 (95.5)	1772 (94.4)	306 (93.9)	4079 (94.9)
	Driver	1340 (64.0)	1437 (76.6)	256 (78.5)	3033 (70.6)
	Passenger	755 (36.0)	440 (23.4)	70 (21.5)	1265 (29.4)
Crash counterpart	**Car/pick-up/van/ heavy vehicle / bus**	667 (33.2)	664 (37.2)	156 (50.8)	1487 (36.3)
	Fixed/stationary object	717 (35.7)	537 (30.1)	68 (22.1)	1322 (32.3)
	Non-collision	468 (23.3)	454 (25.4)	64 (20.8)	986 (24.1)
	Other/unspecified	155 (7.7)	129 (7.2)	19 (6.2)	303 (7.4)
	Total	2095 (100.0)	1877 (100.0)	326 (100.0)	4298 (100.0)

Supplement Table 5: ICD10AM codes used to identify unmatched serious injury crashes in the Admitted Patient Data Collection (APDC)

Code category	ICD10 codes	Description
Injury code	S00 to T98	Injury to single body region (Sxx) or to multiple, unspecified body regions (Txx).
External cause code	V00 to V89 Y85	Land transport accident indicating a relevant traffic accident (selected codes from V00 to V89)
Place of occurrence code	Y92.00 Y92.4x	Site of transport accident on a street or highway (including sidewalk or cycleway) (Y92.4x) or driveway to home (Y92.00).

To be identified in the unmatched cohort the inpatient hospital record must include an injury code AND either a relevant external cause code or a place of occurrence code.

Supplementary Table 6: The "Ongoing Data Linkage of Health Datasets to CrashLink" project has received ethical approval from these organisations

Human Research Ethics Committee	Reference Number
AU RED ACT Health – Human Research Ethics Committee	HREC/13/CIPHS/53
NSW Population & Health Services Research Ethics Committee (PHSREC)	2013/10/484
Aboriginal Health & Medical Research Council Ethics Committee	966/13
ACTH-HREC	ETH.10.13.284

ACT Health Epidemiology	2013-316
Calvary Public Hospital Bruce HREC	42-2017

Supplementary Table 7: Number, and population rates of Aboriginal and Torres Strait Islander people seriously injured or killed in a crash as car occupants, NSW 2005-2023.

	Number of crashes			Population			Rate per 100,000 population		
Year	17-29 years	30-59 years	60 plus years	17-29 years	30-59 years	60 plus years	17-29 years	30-59 years	60 plus years
2005	66	60	7	36219	58147	9502	182	103	74
2006	66	55	9	37343	59059	9991	177	93	90
2007	64	52	3	38912	59947	10546	164	87	28
2008	81	59	8	40612	60844	11091	199	97	72
2009	88	67	10	42309	61734	11691	208	109	86
2010	81	73	12	44248	62575	12382	183	117	97
2011	104	81	20	46139	63551	13074	225	127	153
2012	107	98	17	48179	64576	13890	222	152	122
2013	115	94	22	50084	65759	14728	230	143	149
2014	112	122	15	51765	67101	15573	216	182	96
2015	123	118	20	53367	68387	16532	230	173	121
2016	148	133	18	54937	69617	17560	269	191	103
2017	139	119	19	56171	70896	18673	247	168	102
2018	150	131	21	57398	72217	19790	261	181	106
2019	123	124	30	58345	73635	21010	211	168	143
2020	162	142	20	58958	75361	22203	275	188	90
2021	125	110	26	59354	77072	23571	211	143	110
2022	99	116	21	60011	78823	24872	165	147	84
2023	142	123	28	60631	80774	26198	234	152	107

Supplementary Table 8: Number, and population rates of Aboriginal and Torres Strait Islander people seriously injured or killed in a crash, NSW 2005-2023.

	Number of crashes						Rate per 100,000 population				
Year	Car occupant	Motorcyclist	Pedestrian	Pedal cyclist	Other road user	Population	Car occupant	Motorcyclist	Pedestrian	Pedal cyclist	Other road user
2005	133	47	28	26	16	103868	128.0	45.2	27.0	25.0	15.4
2006	130	60	36	20	11	106393	122.2	56.4	33.8	18.8	10.3
2007	119	53	42	22	15	109405	108.8	48.4	38.4	20.1	13.7
2008	148	65	34	24	16	112547	131.5	57.8	30.2	21.3	14.2
2009	165	62	43	22	19	115734	142.6	53.6	37.2	19.0	16.4
2010	166	63	42	14	19	119205	139.3	52.9	35.2	11.7	15.9
2011	205	86	52	23	16	122764	167.0	70.1	42.4	18.7	13.0
2012	222	80	44	26	13	126645	175.3	63.2	34.7	20.5	10.3
2013	231	90	43	26	27	130571	176.9	68.9	32.9	19.9	20.7
2014	249	110	42	31	21	134439	185.2	81.8	31.2	23.1	15.6
2015	261	97	32	35	18	138286	188.7	70.1	23.1	25.3	13.0
2016	299	102	40	40	25	142114	210.4	71.8	28.1	28.1	17.6
2017	277	120	29	48	26	145740	190.1	82.3	19.9	32.9	17.8
2018	302	117	43	48	18	149405	202.1	78.3	28.8	32.1	12.0
2019	277	137	35	51	22	152990	181.1	89.5	22.9	33.3	14.4

2020	324	154	62	55	26	156522	207.0	98.4	39.6	35.1	16.6
2021	261	184	39	46	29	159997	163.1	115.0	24.4	28.8	18.1
2022	236	182	64	65	19	163706	144.2	111.2	39.1	39.7	11.6
2023	293	199	45	70	33	167603	174.8	118.7	26.8	41.8	19.7

Supplementary Table 9: Driver and crash characteristics of Aboriginal and Torres Strait Islander people involved in a police reported crash by injury severity; NSW 2005-2023.

		Male				Female			
		Serious injury / death Number (%)	Moderate injury Number (%)	Minor / no injury Number (%)	Total Number (%)	Serious injury / death Number (%)	Moderate injury Number (%)	Minor / no injury Number (%)	Total Number (%)
Gender	**Female**					972 (100.0)	2840 (100.0)	5754 (100.0)	9566 (100.0)
	Male	1444 (100.0)	2625 (100.0)	8758 (100.0)	12827 (100.0)				
Age group	**17-29**	621 (43.0)	1289 (49.1)	4106 (46.9)	6016 (46.9)	440 (45.3)	1413 (49.8)	2825 (49.1)	4678 (48.9)
	30-59	698 (48.3)	1177 (44.8)	4066 (46.4)	5941 (46.3)	444 (45.7)	1284 (45.2)	2625 (45.6)	4353 (45.5)
	60plus	125 (8.7)	159 (6.1)	586 (6.7)	870 (6.8)	88 (9.1)	143 (5.0)	304 (5.3)	535 (5.6)
Licence status	**Learner**	35 (2.4)	46 (1.8)	161 (1.8)	242 (1.9)	16 (1.6)	51 (1.8)	126 (2.2)	193 (2.0)
	Provisional	286 (19.8)	732 (27.9)	2296 (26.2)	3314 (25.8)	248 (25.5)	844 (29.7)	1662 (28.9)	2754 (28.8)
	Standard	632 (43.8)	1144 (43.6)	4632 (52.9)	6408 (50.0)	468 (48.1)	1405 (49.5)	3114 (54.1)	4987 (52.1)
	Unauthorised	256 (17.7)	353 (13.4)	785 (9.0)	1394 (10.9)	86 (8.8)	204 (7.2)	346 (6.0)	636 (6.6)
	Other/ unknown	235 (16.3)	350 (13.3)	884 (10.1)	1469 (11.5)	154 (15.8)	336 (11.8)	506 (8.8)	996 (10.4)
Restraint	**Belt worn**	1013 (70.2)	2158 (82.2)	7312 (83.5)	10483 (81.7)	832 (85.6)	2619 (92.2)	5088 (88.4)	8539 (89.3)
	Belt not worn	132 (9.1)	73 (2.8)	85 (1.0)	290 (2.3)	42 (4.3)	26 (0.9)	22 (0.4)	90 (0.9)
	Unknown	299 (20.7)	394 (15.0)	1361 (15.5)	2054 (16.0)	98 (10.1)	195 (6.9)	644 (11.2)	937 (9.8)
Number of occupants	**1**	1062 (73.8)	1744 (66.7)	5608 (64.3)	8414 (65.9)	620 (63.9)	1619 (57.1)	3169 (55.2)	5408 (56.7)
	2	253 (17.6)	552 (21.1)	1963 (22.5)	2768 (21.7)	206 (21.2)	702 (24.8)	1415 (24.7)	2323 (24.3)
	3plus	124 (8.6)	320 (12.2)	1147 (13.2)	1591 (12.5)	145 (14.9)	514 (18.1)	1156 (20.1)	1815 (19.0)
Status of registration	**Registered**	1249 (86.5)	2357 (89.8)	8201 (93.6)	11807 (92.0)	880 (90.5)	2676 (94.2)	5494 (95.5)	9050 (94.6)
	Not registered	66 (4.6)	88 (3.4)	163 (1.9)	317 (2.5)	24 (2.5)	30 (1.1)	68 (1.2)	122 (1.3)
	Unknown	129 (8.9)	180 (6.9)	394 (4.5)	703 (5.5)	68 (7.0)	134 (4.7)	192 (3.3)	394 (4.1)
Alignment*	**Straight**	891 (61.7)	1827 (69.6)	6938 (79.2)	9656 (75.3)	627 (64.5)	2227 (78.4)	4713 (81.9)	7567 (79.1)
	Curved	553 (38.3)	798 (30.4)	1819 (20.8)	3170 (24.7)	345 (35.5)	613 (21.6)	1041 (18.1)	1999 (20.9)
Natural lighting*	**Dawn**	61 (4.2)	100 (3.8)	318 (3.6)	479 (3.7)	27 (2.8)	62 (2.2)	99 (1.7)	188 (2.0)
	Daylight	663 (45.9)	1457 (55.5)	5483 (62.7)	7603 (59.3)	616 (63.4)	1982 (69.8)	4079 (71.0)	6677 (69.9)
	Dusk	54 (3.7)	131 (5.0)	515 (5.9)	700 (5.5)	48 (4.9)	160 (5.6)	371 (6.5)	579 (6.1)
	Darkness	666 (46.1)	935 (35.6)	2429 (27.8)	4030 (31.5)	281 (28.9)	636 (22.4)	1198 (20.8)	2115 (22.1)
Urbanisation*	**Sydney metro. area**	226 (15.7)	539 (20.5)	2896 (33.1)	3661 (28.6)	195 (20.1)	643 (22.7)	1932 (33.6)	2770 (29.0)
	Newcastle met. area	99 (6.9)	190 (7.2)	733 (8.4)	1022 (8.0)	53 (5.5)	226 (8.0)	466 (8.1)	745 (7.8)

		Male				Female			
		Serious injury / death	Moderate injury	Minor / no injury	Total	Serious injury / death	Moderate injury	Minor / no injury	Total
		Number (%)	Number (%)	Number (%)	Number (%)	Number (%)	Number (%)	Number (%)	Number (%)
	Wollongong met. area	35 (2.4)	77 (2.9)	298 (3.4)	410 (3.2)	33 (3.4)	77 (2.7)	204 (3.5)	314 (3.3)
	Country urban	519 (35.9)	1160 (44.2)	3658 (41.8)	5337 (41.6)	347 (35.7)	1405 (49.5)	2521 (43.8)	4273 (44.7)
	Country non-urban	565 (39.1)	658 (25.1)	1164 (13.3)	2387 (18.6)	344 (35.4)	487 (17.2)	628 (10.9)	1459 (15.3)
Speed limit*	<=50	317 (22.0)	841 (32.1)	3238 (37.0)	4396 (34.3)	239 (24.6)	1058 (37.3)	2282 (39.7)	3579 (37.4)
	60	233 (16.1)	583 (22.2)	2445 (27.9)	3261 (25.4)	186 (19.1)	738 (26.0)	1784 (31.0)	2708 (28.3)
	70-80	288 (19.9)	482 (18.4)	1620 (18.5)	2390 (18.6)	184 (18.9)	502 (17.7)	920 (16.0)	1606 (16.8)
	>=90	606 (42.0)	718 (27.4)	1445 (16.5)	2769 (21.6)	363 (37.3)	539 (19.0)	762 (13.3)	1664 (17.4)
Type of location group*	Intersection	304 (21.1)	947 (36.1)	3967 (45.3)	5218 (40.7)	297 (30.6)	1278 (45.0)	2920 (50.7)	4495 (47.0)
	Non-intersection	1140 (78.9)	1678 (63.9)	4789 (54.7)	7607 (59.3)	675 (69.4)	1561 (55.0)	2834 (49.3)	5070 (53.0)
Surface condition*	Wet	246 (17.1)	492 (18.8)	1648 (18.9)	2386 (18.7)	171 (17.6)	529 (18.7)	1077 (18.8)	1777 (18.6)
	Dry	1188 (82.7)	2122 (81.1)	7081 (81.0)	10391 (81.2)	793 (81.8)	2295 (81.1)	4661 (81.2)	7749 (81.2)
First impact type	Head-on	179 (12.4)	191 (7.3)	373 (4.3)	743 (5.8)	100 (10.3)	139 (4.9)	150 (2.6)	389 (4.1)
	Right angle	87 (6.0)	324 (12.3)	1458 (16.6)	1869 (14.6)	123 (12.7)	567 (20.0)	1189 (20.7)	1879 (19.6)
	Rear end	92 (6.4)	363 (13.8)	2289 (26.1)	2744 (21.4)	98 (10.1)	722 (25.4)	1760 (30.6)	2580 (27.0)
	Other angle	160 (11.1)	472 (18.0)	2205 (25.2)	2837 (22.1)	155 (15.9)	561 (19.8)	1411 (24.5)	2127 (22.2)
	Vehicle - Object	734 (50.8)	920 (35.0)	1610 (18.4)	3264 (25.4)	390 (40.1)	619 (21.8)	767 (13.3)	1776 (18.6)
	Rollover	179 (12.4)	271 (10.3)	474 (5.4)	924 (7.2)	92 (9.5)	162 (5.7)	240 (4.2)	494 (5.2)
	Other/ unknown	13 (0.9)	84 (3.2)	349 (4.0)	446 (3.5)	14 (1.4)	70 (2.5)	237 (4.1)	321 (3.4)
Traffic units involved	1	897 (62.1)	1190 (45.3)	2136 (24.4)	4223 (32.9)	480 (49.4)	805 (28.3)	1037 (18.0)	2322 (24.3)
	2	441 (30.5)	1128 (43.0)	5175 (59.1)	6744 (52.6)	392 (40.3)	1628 (57.3)	3795 (66.0)	5815 (60.8)
	3plus	106 (7.3)	307 (11.7)	1447 (16.5)	1860 (14.5)	100 (10.3)	407 (14.3)	922 (16.0)	1429 (14.9)
	Total	1444 (100.0)	2625 (100.0)	8758 (100.0)	12827 (100.0)	972 (100.0)	2840 (100.0)	5754 (100.0)	9566 (100.0)

Supplement Table 10: Person, crash, injury and claim characteristics of CTP claimants NSW 2018-2023.

Level	Variable	Category	Number (%)
Claimant characteristics	**Gender**	Female	917 (46.9)
		Male	1030 (52.7)
		Non-specific	7 (0.4)
	State of person	NSW	1907 (97.6)
		Other	47 (2.4)
	SEIFA quintile	Lowest	538 (27.5)
		Second	553 (28.3)
		Third	442 (22.6)
		Fourth	233 (11.9)

Level	Variable	Category	Number (%)
		Highest	185 (9.5)
		Missing	3 (0.2)
	Usual occupation	Clerical and Administrative Workers	74 (3.8)
		Community and Personal Service Workers	75 (3.8)
		Labourers	295 (15.1)
		Machinery Operators and Drivers	72 (3.7)
		Managers	53 (2.7)
		Professionals	107 (5.5)
		Sales Workers	33 (1.7)
		Technicians and Trades Workers	118 (6.0)
		Missing	1127 (57.7)
Crash characteristics	**Year of crash**	2018	322 (16.5)
		2019	307 (15.7)
		2020	311 (15.9)
		2021	320 (16.4)
		2022	350 (17.9)
		2023	344 (17.6)
	Role of person	Motor vehicle driver	873 (44.7)
		Motor vehicle passenger	401 (20.5)
		Motorcycle pillion	12 (0.6)
		Motorcycle rider	220 (11.3)
		Other controller	23 (1.2)
		Other passenger	38 (1.9)
		Pedal cycle rider	43 (2.2)
		Pedestrian	194 (9.9)
		Other	150 (7.7)
	Ownership type description	Corporate	117 (6.0)
		Government	12 (0.6)
		Private	1183 (60.5)
		Missing	642 (32.9)
	At least one CRS record is linked (police recorded)	Yes	1233 (63.1)
		No	721 (36.9)
	Fault status code description	Mostly at fault	39 (2.0)
		Not at fault	1254 (64.2)
		Unknown	114 (5.8)
		Yes, at fault	387 (19.8)
		Missing	160 (8.2)
Injury characteristics	**Ambulance role at the crash**	Ambulance Attendance and treatment of claimant by ambulance officer but not transported	80 (4.1)
		Ambulance Attendance only with no treatment administered or transport of claimant	14 (0.7)
		Ambulance attendance and transport of claimant to hospital	740 (37.9)
		No Ambulance Attendance	365 (18.7)
		Missing	755 (38.6)
	Maximum Abbreviated Injury Score description based on claims data	Critical	13 (0.7)
		Minor	690 (35.3)
		Moderate	462 (23.6)
		Serious	240 (12.3)
		Severe	40 (2.0)
		Unknown	470 (24.1)
		Missing	39 (2.0)
	At least one hospital record is linked	Yes	925 (47.3)
		No	1029 (52.7)
	Hospitalised crash Injury Severity indicator - worst Injury	Minimum severity	60 (3.1)
		Moderate severity	315 (16.1)
		High severity	360 (18.4)
		Maximum severity	179 (9.2)
		Not recorded	1040 (53.2)
	Length of stay group	0-1	219 (11.2)
		2	117 (6.0)

Level	Variable	Category	Number (%)
		3	86 (4.4)
		4	58 (3.0)
		5-7	106 (5.4)
		8-14	118 (6.0)
		15-21	50 (2.6)
		22-28	52 (2.7)
		29+	119 (6.1)
		Not applicable	1029 (52.7)
	Days of hospital stay	mean (stdv)	10.7 (23.5)
Claim outcomes*	**Statutory benefit liability status description**	Liability accepted for after 26 weeks	579 (29.6)
		Liability accepted up to 26 weeks	125 (6.4)
		Liability partially accepted with contributory negligence after 26 weeks	44 (2.3)
		Liability rejected for after 26 weeks	977 (50.0)
		Liability rejected up to 26 weeks	83 (4.2)
		Not yet determined	74 (3.8)
		Missing	72 (3.7)
	Risk screening outcome description	Good risk recovery	666 (34.1)
		Medium risk recovery	854 (43.7)
		Poor risk recovery	311 (15.9)
		Unknown	53 (2.7)
		Missing	70 (3.6)
	Certificate of Fitness status last description	Fit for pre-injury duties	263 (13.5)
		Fit for reduced capacity	345 (17.7)
		No capacity	555 (28.4)
		Not applicable	56 (2.9)
		Missing	735 (37.6)
	At least one Life-Time Care record is linked	Yes	102 (5.2)
		No	1852 (94.8)
		Total	1954 (100.0)

Supplement Table 11: Road users involved in a crash potentially eligible to claim under the NSW CTP scheme with and without a claim 2018-2023.[#]

Variable	Category	No Claim Number (%)	Claim submitted Number (%)	Total Number (%)
Gender	**Male**	2162 (58.9)	635 (56.0)	2797 (58.2)
	Female	1507 (41.1)	498 (44.0)	2005 (41.8)
Age group	**17-29**	1934 (52.7)	444 (39.2)	2378 (49.5)
	30-59	1512 (41.2)	561 (49.5)	2073 (43.2)
	60plus	223 (6.1)	127 (11.2)	350 (7.3)
SEIFA quintile	**Lowest**	1008 (27.9)	297 (26.4)	1305 (27.5)
	2	1153 (31.9)	319 (28.4)	1472 (31.1)
	3	886 (24.5)	261 (23.2)	1147 (24.2)
	4	320 (8.8)	131 (11.7)	451 (9.5)
	Highest	249 (6.9)	115 (10.2)	364 (7.7)
Reporting year	**2018**	616 (16.8)	174 (15.4)	790 (16.5)
	2019	555 (15.1)	198 (17.5)	753 (15.7)
	2020	629 (17.1)	194 (17.1)	823 (17.1)
	2021	608 (16.6)	158 (13.9)	766 (16.0)
	2022	623 (17.0)	195 (17.2)	818 (17.0)
	2023	638 (17.4)	214 (18.9)	852 (17.7)
Licence status	**Standard**	1212 (33.0)	485 (42.8)	1697 (35.3)
	Learner	137 (3.7)	60 (5.3)	197 (4.1)

Variable	Category	No Claim Number (%)	Claim submitted Number (%)	Total Number (%)
	Provisional	640 (17.4)	121 (10.7)	761 (15.8)
	Unauthorised	506 (13.8)	53 (4.7)	559 (11.6)
	Other/ unknown	497 (13.5)	142 (12.5)	639 (13.3)
	Not applicable	677 (18.5)	272 (24.0)	949 (19.8)
Urbanisation	**Sydney metro. Area**	691 (18.8)	292 (25.8)	983 (20.5)
	Newcastle met. Area	254 (6.9)	97 (8.6)	351 (7.3)
	Wollongong met. Area	103 (2.8)	49 (4.3)	152 (3.2)
	Country urban	1699 (46.3)	454 (40.1)	2153 (44.8)
	Country non-urban	922 (25.1)	241 (21.3)	1163 (24.2)
Status of registration	**Registered**	2806 (76.5)	933 (82.3)	3739 (77.9)
	Not registered	264 (7.2)	39 (3.4)	303 (6.3)
	Unknown	425 (11.6)	83 (7.3)	508 (10.6)
	Not applicable	174 (4.7)	78 (6.9)	252 (5.2)
Road user group*	**Driver**	2570 (70.1)	620 (54.7)	3190 (66.4)
	Motorcyclist	440 (12.0)	253 (22.3)	693 (14.4)
	Passenger	485 (13.2)	182 (16.1)	667 (13.9)
	Pedal Cyclist	69 (1.9)	15 (1.3)	84 (1.7)
	Pedestrian	104 (2.8)	63 (5.6)	167 (3.5)
Crash counterpart	**Car/ pick up / van**	1384 (37.7)	584 (51.5)	1968 (41.0)
	Two/three wheeled vehicle	40 (1.1)	18 (1.6)	58 (1.2)
	Pedestrian/animal	103 (2.8)	17 (1.5)	120 (2.5)
	Heavy vehicle/bus	127 (3.5)	66 (5.8)	193 (4.0)
	Fixed/stationary object	1198 (32.7)	223 (19.7)	1421 (29.6)
	Non-collision	429 (11.7)	97 (8.6)	526 (11.0)
	Other/unspecified	388 (10.6)	128 (11.3)	516 (10.7)
Restraint	**Belt worn**	2352 (64.1)	655 (57.8)	3007 (62.6)
	Belt not worn / not fitted	160 (4.4)	43 (3.8)	203 (4.2)
	Open face/bicycle helmet	65 (1.8)	41 (3.6)	106 (2.2)
	Full face helmet worn	287 (7.8)	187 (16.5)	474 (9.9)
	Unknown	701 (19.1)	144 (12.7)	845 (17.6)
	Not applicable	104 (2.8)	63 (5.6)	167 (3.5)
Injury severity	**Serious injury / death**	1076 (29.3)	631 (55.7)	1707 (35.5)
	Moderate injury	2188 (59.6)	340 (30.0)	2528 (52.6)
	Minor/ other injury	405 (11.0)	162 (14.3)	567 (11.8)
	Total	3669 (100.0)	1133 (100.0)	4802 (100.0)

#missing values not shown
* other not shown

Table 12: Demographic Profile of Aboriginal and Torres Strait Islander patients involved in a road traffic crash (2018-2023) by gender

				Male		Female	
Variable		**Count**	**Proportion**	**Count**	**Proportion**	**Count**	**Proportion**
Total		**127**	**100**	**80**	**63 (53.6-71.7)**	**47**	**37 (28.3-46.4)**
Age (yrs)	**Mean**		**37.1 (34.5-39.7)**		**36.3 (32.8-39.7)**		**38.4 (33.9-43.2)**
	18-24	32	25.2 (17.5-31.7)	20	25 (16.3-35.0)	12	25.5 (10.9-36.9)
	24-34	33	26 (18.3-34.1)	23	28.7 (18.8-38.8)	10	21.3 (10.9-34.8)
	35-44	24	18.9 (11.9-26.2)	16	20 (11.3-28.7)	8	17 (8.7-30.4)
	45-54	17	13.4 (7.9-19.8)	7	8.8 (3.8-15)	10	21.3 (10.9-34.8)

	55+	21	16.5 (11.1-23.8)	14	17.5 (10.0-26.3)	7	14.9 (4.4-26.1)
Impact Speed (km/hr)	<60km/hr	39	30.7 (22.8-40.2)	23	28.7 (18.8-38.8)	16	34.0 (21.3-48.9)
	>60km/hr	76	59.8 (50.4-68.5)	49	61.3 (51.2-71.3)	27	57.4 (42.6-70.2)
	Unspecified	12	9.4 (4.7-15.0)	**		**	
Injury Time (AM/PM)	Morning (06:00-11:59)	21	16.5 (10.3-23.8)	14	17.5 (10.0-26.3)	7	14.9 (6.5-26.1)
	Afternoon (12:00-17:59)	37	29.1 (20.6-37.3)	22	27.5 (17.5-38.7)	15	31.9 (17.4-43.5)
	Evening (18:00-23:59)	38	29.9 (22.2-38.9)	24	30 (20.0-40.0)	14	29.8 (17.4-43.5)
	Night (00:00-05:59)	30	23.6 (16.7-31.7)	19	23.8 (15.0-33.7)	11	23.4 (10.9-37.0)
Injury Severity Score	0-8	42	33.1 (25.2-40.2)	26	32.5 (22.5-42.5)	16	34 (21.3-48.9)
	9-15	35	27.6 (20.5-35.4)	23	28.7 (18.8-40.0)	12	25.5 (14.9-38.3)
	>15	50	39.4 (31.5-47.2)	31	38.8 (28.7-48.8)	19	40.4 (25.5-55.3)

Table 13: Hospital presentation of Aboriginal and Torres Strait Islander patients involved in a road traffic crash (2018-2023) by gender

				Male		Female	
Variable		**Count**	**Proportion**	**Count**	**Proportion**	**Count**	**Proportion**
Total		**127**	**100**	**80**	**63 (53.6-71.7)**	**47**	**37 (28.3-46.4)**
Hospital Arrival Time (AM/PM)	Morning (06:00-11:59)	16	12.6 (7.1-19.0)	7	8.8 (2.5-15.0)	9	19.1 (8.7-30.4)
	Afternoon (12:00-17:59)	45	35.4 (26.2-44.4)	31	38.8 (27.5-50.0)	14	29.8 (17.4-45.7)
	Evening (18:00-23:59)	37	29.1 (19.8-36.5)	23	28.7 (18.8-38.8)	14	29.8 (15.2-41.3)
	Night (00:00-05:59)	29	22.8 (15.9-31.7)	19	23.8(15.0-33.8)	10	21.3 (10.9-34.8)
Length of transit time (min/hr)	<45 min	9	7.1 (2.4-11.2)	7	8.9 (2.5-16.4)	2	4.3 (0.0-6.5)
	45 min - 1.5 hrs	40	31.7 (24.0-40.8)	25	31.6 (21.5-41.8)	15	31.9 (19.6-45.7)
	1.5 - 6 hrs	27	21.4 (14.4-28.8)	17	21.5 (12.7-30.4)	10	21.3 (10.9-34.7)
	6 - 12 hrs	21	16.7 (10.4-24.0)	13	16.5 (7.6-25.3)	8	17 (6.5-28.3)
	12+	29	23 (16.0-31.2)	17	21.5 (11.4-30.4)	12	25.5 (13.0-39.1)
ICD-10 code classification	Car occupant injured in transport accident	63	49.6 (40.9-58.3)	35	43.8 (33.8-55.0)	28	59.6 (46.8-72.3)
	Pedestrian injured in transport accident	33	26 (18.9-33.1)	19	23.8 15.0-33.8)	14	29.8 (19.1-42.6)

	Two-wheel rider injured in transport accident	31	24.4 (17.3-32.3)	26	32.5 (22.5-42.5)	5	10.6 (2.1-19.1)
Patient Role	Driver	69	54.3 (45.7-63.0)	47	58.8 (47.5-68.8)	22	46.8 (31.9-61.7)
	Passenger	19	15 (9.4-21.3)	10	12.5 (6.3-21.2)	9	19.1 (8.5-31.9)
	Pedestrian	33	26 (18.9-33.9)	19	23.8 (15.0-32.5)	14	29.8 (17.0-42.6)
	Unspecified	6	4.7 (1.6-8.7)	**	**	**	**
Initial ED Triage Category	Resuscitation	66	52 (43.3-60.6)	38	47.5 (37.5-58.8)	28	59.6 (46.8-72.3)
	Emergency	52	40.9 (33.1-49.6)	39	48.8 (37.5-60.0)	13	27.7 (4.3-23.4)
	Other*	9	7.1 (3.1-11.8)	**	**	**	**
Length Of Stay (days)	**Mean**		**22.2 (14.1-30.1)**		**14.3 (10.4-18.6)**		**16.9 (10.3-25.7)**
	1-2 days	23	18.3 (11.9-24.6)	13	16.3 (8.8-25.0)	10	21.7 (10.9-34.7)
	2-7 days	37	29.4 (21.4-37.3)	25	31.3 (21.3-41.3)	12	26.1 (13.0-39.1)
	7-28 days	49	38.9 (30.2-47.6)	32	40 (28.7-50.0)	17	37 (23.9-52.1)
	28+ days	17	13.5 (7.9-19.8)	10	12.5(6.3-20.0)	7	15.2 (6.5-26.1)

Table 14: Demographic Profile of Aboriginal and Torres Strait Islander patients involved in a road traffic crash (2018-2023) by impact speed

				<60km/hr		>60km/hr		Unspecified	
Variable		**Count**	**Proportion**	**Count**	**Proportion**	**Count**	**Proportion**	**Count**	**Proportion**
Total		**127**	**100**	**39**	**30.7 (22.8-38.6)**	**76**	**59.8 (51.2-67.7)**	**12**	**9.4 (4.7-15)**
Age (yrs)	**Mean**		**37.1 (34.2-39.8)**		**38.5 (32.9-44.6)**		**35.6 (32.5-38.9)**		
	18-24	31	24.8 (17.6-32.8)	8	21.1 (7.9-34.2)	20	26.7 (17.3-37.3)		
	25-34	32	25.6 (18.4-33.6)	11	28.9 (15.8-44.7)	20	26.7 (17.3-37.3)		
	35-44	24	19.2 (12.8-26.4)	5	13.2 (2.6-26.3)	16	21.3 (12.0-30.7)		
	45-54	17	13.6 (8.0-20.0)	4	10.5 (2.6-21.1)	10	13.3 (6.7-21.3)		
	55+	21	16.8 (11.2-23.2)	10	26.3 (13.2-42.1)	9	12 (5.3-20.0)		
Gender	Male	79	63.2 (54.4-71.2)	23	60.5 (44.7-76.3)	48	64 (52.0-74.7)		
	Female	46	36.8 (28.8-45.6)	15	39.5 (23.7-55.3)	27	36 (25.3-48.0)		
Injury Time (AM/PM)	Morning (06:00-11:59)	36	28.8 (20.8-36.0)	15	39.5 (23.7-55.3)	18	24 (14.7-33.3)		
	Afternoon (12:00-17:59)	38	30.4 (22.4-38.4)	14	36.8 (21.1-52.6)	20	26.7 (17.3-37.3)		
	Evening (18:00-23:59)	30	24 (16.8-32.0)	3	7.9 (0.0-18.4)	25	33.3 (22.7-44.0)		

	Night (00:00-05:59)	21	16.8 (10.4-24.0)	6	15.8 (5.3-28.9)	12	16 (8.0-25.3)	
Injury Severity Score	0-8	42	33.1 (24.0-40.0)	19	48.7 (31.6-63.2)	21	27.6 (17.3-37.3)	
	9-15	36	28.3 (20.0-36.0)	11	28.2 (15.8-44.7)	20	26.3 (16.0-34.7)	
	>15	50	39.4 (32.0-48.8)	9	23.1 (10.5-36.8)	36	47.4 (36.0-60.0	

Table 15: Hospital presentation of Aboriginal and Torres Strait Islander patients involved in a road traffic crash (2018-2023) by impact speed

				<60km/hr		>60km/hr		Unspecified	
Variable		**Count**	**Proportion**	**Count**	**Proportion**	**Count**	**Proportion**	**Count**	**Proportion**
Total		**127**	**100**	**11**	**8.7 (3.9-13.4)**	**76**	**59.8 (51.2-67.7)**	**12**	**9.4 (4.7-15)**
Hospital Arrival Time (AM/PM)	Morning (06:00-11:59)	45	36 (28.0-44.8)	14	36.8 (21.1-52.6)	28	37.3 (26.7-48.0)		
	Afternoon (12:00-17:59)	35	28 (20.0-35.2)	13	34.2 (21.1-50.0)	18	24 (14.7-33.3)		
	Evening (18:00-23:59)	29	23.2 (16.0-30.4)	6	15.8 (5.3-28.9)	20	26.7 (17.3-37.3)		
	Night (00:00-05:59)	16	12.8 (7.2-19.2)	5	13.2 (2.6-23.7)	9	12 (5.3-20.0)		
Length of transit time (min/hr)	<45 min	8	6.4 (2.4-11.2)	5	13.2 (2.6-23.7)	3	4 (0.0-9.3)		
	45 min - 1.5 hrs	40	32 (24.0-40.0)	14	36.8 (21.2-52.6)	21	28 (18.7-37.3)		
	1.5 - 6 hrs	27	21.6 (14.4-28.8)	7	18.4 (7.9-31.6)	17	22.7 (13.3-32.0)		
	6 - 12 hrs	21	16.8 (10.4-24.0)	5	13.2 (2.6-23.7)	15	20 (12.0-29.3)		
	12+	29	23.2 (16.0-30.4)	7	18.4 (7.9-31.6)	19	25.3 (16.0-36.0)		
ICD-10 code classification	Car occupant injured in transport accident	61	48.8 (40.0-57.6)	7	18.4 (7.9-31.6)	52	69.3 (58.7-80.0)		
	Pedestrian injured in transport accident	33	26.4 (19.2-34.4)	17	44.7 (31.6-60.5)	9	12 (5.3-20.0)		
	Two-wheel rider injured in transport accident	31	24.8 (17.6-32.0)	14	36.8 (21.1-52.6)	14	18.7 (10.7-29.3)		
Patient Role	Driver	68	54.4 (45.6-63.2)	16	42.1 (26.33-57.9)	48	64 (53.3-74.7)		

	Passenger	19	15.2 (8.8-21.6)	5	13.2 (2.6-26.3)	14	18.7 (9.3-26.7)
	Pedestrian	33	26.4 (19.2-34.4)	17	44.7 (31.6-60.5)	9	12 (5.3-20.0)
	Unspecified	5	4 (0.8-8.0)	*	**	*	**
Initial ED Triage Category							
	Resuscitation	66	52.8 (44.0-62.4)	17	44.7 (28.9-60.5)	46	61.3 (50.7-72.0)
	Emergency	50	40 (31.2-48.8)	18	47.4 (31.6-63.2)	25	33.3 (22.7-44.0)
	Other*	9	7.1 (3.1-11.8)	*	**	*	**
Length of stay (days)	**Mean**		**15.2 (11.7-19.6)**		**9.1 (6.2-12.6)**		**19.1 (13.3-25.9)**
	1-2 days	22	17.6 (11.2-24.0)	11	28.9 (15.8-42.1)	11	14.7 (6.7-22.7)
	2-7 days	37	29.6 (21.6-37.6)	12	31.6 (18.4-44.7)	20	26.7 (17.3-37.3)
	7-28 days	49	39.2 (31.2-20.0)	12	31.6 (15.8-47.4)	30	40 (29.3-50.7)
	28+ days	17	13.6 (8.0-20.0)	3	7.9 (0.0-18.4)	14	18.7 (10.7-28.0)

Appendices

Appendix 1

The Patient Journey for Aboriginal and Torres Strait Islander Peoples with a Road Traffic Injury (Traffic Project)

Aboriginal and Torres Strait Islander Traffic Governance Group

Terms of Reference

A. Purpose of the Group

The Aboriginal and Torres Strait Islander Traffic Governance Group will act as the primary **governance group** for the Traffic Project, to ensure Indigenous Data Governance principles enact Sovereignty.

Key requirements of this committee are to:

1. Provide expert advice to the Traffic CI group on Indigenous Research Excellence Criteria
2. Advise on governance procedures to enact Indigenous data sovereignty principles for the Provide oversight into methods, analyses and outcomes for the Traffic project, including Indigenous knowledges and research methods for appropriate contextualisation,
3. Provide advice on participant recruitment, consent, data collection, data analysis, synthesis and reporting for the Traffic project
4. Approve all outcome translation pertaining to Aboriginal and Torres Strait Islander data, and participate in authorship (by choice) of all publications (manuscripts, reports and infographics)

B. Membership of the Group

The Aboriginal and Torres Strait Islander Governance Group will draw on members from both South Australia and New South Wales.

C. Procedures of the Group

The Aboriginal and Torres Strait Islander Governance Group will hold its meetings on an approximately bimonthly basis, commencing in March 2023 and concluding in June 2024 running for a maximum of one hour.

Associate Professor Courtney Ryder, will chair these meetings. Secretarial support will be provided by administration staff in Injury Studies at Flinders University.

D. Governance & Oversight

The Aboriginal and Torres Strait Islander Traffic Governance Group has been developed to provide complete governance and oversight of the Traffic project (Part 3 and 4), to ensure that the deficit discourse and data narrative surrounding Aboriginal and Torres Strait Islander communities is avoided. This includes the overall approach and conduct of the group, focussing on Indigenous research methods of yarning, a conversational research method for rich data collection, will be used, along with processes of deep listening for recording and understanding. The Aboriginal and Torres Strait Islander Traffic Governance Group is fundamental in ensuring that research approaches and outcomes are focussed on a strength-based approach for Aboriginal and Torres Strait Islander communities.

Terms of Reference Version 1 5/6/2023

Road transport injury in Aboriginal and Torres Strait Islander people in New South Wales, Australia

Background: Road transport injuries remain a critical public health issue in Australia, with Aboriginal and Torres Strait Islander communities disproportionately affected. Despite being a national policy priority, there is limited research on transport injuries in Aboriginal and Torres Strait Islander people in Australia.

Methods: This study utilized the NSW Centre for Road Safety linked crash and health data from 2005-2023 including police reported crash, hospital, emergency department and mortality data. Statistical analysis focused on the burden of serious injury and factors protective of serious injury.

Results: Between 2005-2023, 7,587 Aboriginal and Torres Strait Islander people were seriously injured, and 320 were killed in a road transport crash in NSW. Car occupants were the most affected group. Protective factors for serious injury included wearing seatbelts, holding a standard license, and crashing in urban areas.

Conclusion: The study highlights the significant burden of road transport injuries on communities and identifies key protective factors.

Implications for Public Health: Findings emphasize the need for culturally appropriate, community-led road safety initiatives to reduce transport injuries and deaths in Aboriginal and Torres Strait Islander people.

Appendix 3

YARNING GUIDE

The Patient Journey for Aboriginal and Torres Strait Islander Peoples with a Road Traffic Injury

Investigator Team
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Ethics Approval
1. Aboriginal Health Research Ethics Committee 04-22-1016
2. Human Research Ethics Committee, Flinders University 6258

Study Yarning Guide
Yarning

> *"Story telling is a feature of Indigenous societies where oral traditions were the main form of transmitting and sharing knowledge with individuals and between groups."*
> Professor Dawn Bessarab
> Director of the Centre for Aboriginal Medical and Dental Health
> University of Western Australia
>
> Dr Bridget Ng'andu [1]
> Lecturer in Social Work
> University of Kent

Yarning is an Indigenous research method, which uses an Indigenous conversation process for collecting rich data [1-6]. Yarning follows a prescribed procedure of '*process and exchange*', which establishes culturally safe ways of discourse and also ensures accountability [1-5]. Yarning can take a variety of forms, social, therapeutic, research topic, and collaborative, to name a few, Bessarab (2010) outlines these processes through a flow diagram (Figure 1.1)[1, 4].

Figure 1.1: The process of research yarning, as described by Bessarab and Ng'andu (2010, pp.40)[1]

The process of yarning, requires all participants to follow a unique enquiry process, which does not follow direct questioning, or ways of semi structured interviews [1-6]. The yarning process is an equitable process, where emphasis and accountability is placed on the host to create a culturally safe environment which diminishes power differentials and creates equal partnerships [1, 4].The

Appendix 4

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"I didn't know nothing" - yarning up on access to compensation from road traffic injury with Aboriginal people

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ABSTRACT

Background: Road safety is a major public health concern in Australia. In the last decade over 12 thousand Australians have died from a road crash, and even more live with lifelong injuries and disabilities from these events. Individuals injured in a road traffic crash can access support through compensation schemes, which differ across jurisdictions. Here we show a lack of knowledge among high burden populations in accessing compensation schemes for road traffic injuries.

Methods: An Aboriginal and Torres Strait Islander Traffic Governance Group oversaw this study to centralise Indigenous knowledge. Yarning an Indigenous research method for data collection was used with participants. Aboriginal participants who lived near major highways in metropolitan, rural and remote regions, were recruited through social media and community networks. Qualitative analysis software was used to thematically code transcripts.

Results: A total of eight yarning sessions were conducted with Aboriginal participants. We identified Aboriginal people had limited knowledge, access or support for accessing compensation schemes. This impacted on their labour force engagement, leisure and community activities creating a loss of autonomy for individuals, of which family support and connection to Country assisted in healing for individuals.

Conclusion: Our outcomes identify an urgent need for compensation scheme review and co-design with community, to decrease burden on Aboriginal people, and ensure strength-based, culturally specific, whole of life compensation is provided.

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Appendix 5

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