



HE PŪRONGO WHAKAHAUMARU HUARAHĪ MŌ NGĀ IWI MĀORI

Māori road safety outcomes

June 2021

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MIHI

Tēnā koutou katoa.

Anei he pūrongo whakahaumarū huarahi mō ngā iwi Māori.

He pūrongo tēnei e huritao ana otirā e wānanga ana i ngā āhuatanga whakahaumarū huarahi hei tautoko i ā tātou mahi kia whakawhanake ai te kaupapa nei mō ngā iwi Māori katoa puta noa i Aotearoa.

Greetings to you all. Here is a report regarding Māori Road Safety. This report will reflect upon and discuss the many aspects of road safety for Māori and will support us in our journey to improve this nationally.

EXECUTIVE SUMMARY

Introduction

Waka Kotahi NZ Transport Agency (Waka Kotahi) and our central government road safety partners are on a journey to better understand road safety outcomes for Māori and, working with Māori, to design meaningful actions that will improve the safety and wellbeing of Māori communities. *Road to Zero: New Zealand's Road Safety Strategy 2020-2030* requires Waka Kotahi and our central government partners to improve our understanding of Māori road safety outcomes and build relationships and responses that will “...help us partner with Māori more effectively to co-design and develop an ongoing programme of work”. *Te Ara Kotahi* (our Māori Strategy) provides Waka Kotahi with direction and guidance on how we work with and respond to Māori as the Crown's Treaty partner. A key priority of the strategy is to support initiatives to improve Māori road safety.

Previous research and data showed Māori were over-represented in road trauma statistics. However, a more up-to-date and detailed understanding of Māori road safety outcomes, starting with existing data, is needed to set a platform for engagement with affected iwi, urban Māori, and central and local government so that we can partner to co-design activities and initiatives where appropriate. This report addresses the first stage in this process, through:

1. building on an earlier review of literature and investigation of crash and injury data from several sources to identify current road safety outcomes for Māori across the Safe System,
2. providing a snapshot of current or planned initiatives and processes led by Waka Kotahi that may positively impact on road safety outcomes for Māori, and
3. providing an indicative process for how we could address the findings of this report.

Background

Since 2013 the number of people dying or being seriously injured on Aotearoa New Zealand roads has been rising, and death and serious injury (DSI) rates for Māori increased faster than for non-Māori between 2014 and 2017. Overall, road traffic mortality rates are estimated at between 60% and 200% higher for Māori compared to non-Māori.¹

While social deprivation is a key determinant of road safety outcomes for all Aotearoa New Zealanders in deprived areas, Māori are disproportionately affected because they make up a far larger proportion of the population living in those areas. People living in the highest deprived areas have a 2-3 times higher risk of road traffic hospitalisation or death compared to those living in the least deprived areas. Many of the road user factors associated with higher DSIs are linked to social deprivation issues. However, road safety for Māori should be seen within the context of demographic and Safe System (roads and roadsides, speed, vehicles, and user factors) patterns, together with authentic engagement to establish the situational and societal context of crashes.

Analysis Approach

Existing research and information were collated, and various datasets interrogated to increase our understanding and develop insights into road safety outcomes for Māori, the issues that are impacting on these outcomes, and what we are already doing to address those issues. The following activities were carried out:

- Explored demographic, social and economic factors that influence Māori position in society to give context and improve our understanding of Māori in Aotearoa New Zealand today
- Investigated crash and injury data from several sources to identify current road safety outcomes for Māori compared to non-Māori

¹ Mackie Research, *Road Safety Outcomes for Māori literature review*, pp 6-7 (Refer Appendix C: Road Safety Outcomes for Māori Literature Review)

- Integrated key information from an earlier literature review used throughout this report to add depth and context to the data analysis
- Considered transport system factors such as access, infrastructure, vehicles, speed and user behaviour along with wider issues for Māori that could be contributing to road safety outcomes
- Developed a snapshot of current or planned initiatives led by Waka Kotahi that explicitly aim to address road safety outcomes for Māori.

Data for analysis were sourced from the Waka Kotahi Crash Analysis System (CAS), the Waka Kotahi Motor Vehicle Register (MVR), the Monash University Accident Research Centre (MUARC) vehicle crash database, Midlands Trauma Services (MTS) hospitalisation data, and Tatauranga Aotearoa's 2013 Census Data and associated population information.

To understand how different elements of the Safe System influence road safety outcomes for Māori, a Safe System analysis of the key findings was completed. This analysis provides a summary of knowledge from the literature review and the data analysis within the report and identifies knowledge gaps that could inform further research and data analysis.

It is expected that this report will provide a basis for Waka Kotahi and our road safety partners to identify, prioritise and commission further research where appropriate, and to explore opportunities to collaborate in partnership with Māori to improve their road safety outcomes.

Te Mātangi (our Māori Partnerships team) and our Road Safety Team will work with others to scope/develop a detailed Phase 2 plan to support how we engage with Māori to build relationships and identify those affected.

Māori in Aotearoa – Implications for Road Safety

The geographic distribution, age distribution, and deprivation status of Māori are important contextual considerations for Māori road safety outcomes. A high proportion of Māori live in the most populated parts of the country (e.g. Auckland, Waikato and Bay of Plenty) and so general road safety improvements in these areas will reduce risk for Māori. The Māori population is also relatively young, hence road safety initiatives that focus on youth are also likely to yield benefits for Māori.

However, a range of societal disadvantages have meant that Māori continue to experience poorer health and wellbeing outcomes than non-Māori. The contextual causes of these outcomes can be attributed to the long-term effects of colonisation, globalisation, migration, loss of language and culture, and disconnection from the land. Therefore, initially focusing on the road safety implications of deprivation is likely to be beneficial to Māori. Addressing factors such as vehicle safety and occupant numbers, longer trips on higher risk remote rural roads (to get to employment opportunities), and systemic barriers to safe road use and education pathways are likely to improve road safety outcomes for Māori. Similarly, addressing personal road safety risk factors such as driving after consuming alcohol or drugs, and not wearing a seatbelt will have beneficial outcomes. It is useful to understand these factors as part of a system, and how the various parts of the system are leading to high severity crash outcomes for Māori.

Road Trauma and Māori

From a Safe System perspective, there is incomplete data to assess performance for Māori road safety across the whole system, and the results reflect the data we have, as opposed to the priority that should be given to various areas of the system. However, several areas of concern in which Māori experience higher DSI rates than non-Māori have emerged from the analysis.

For 2013-2017 the average rate of DSIs per 100,000 population for all Māori men was 87.0; much higher than the average rate of 61.5 for all men. For non-Māori men the DSI rate is about average from 30 years onwards but for Māori men the DSI rate remains above average through to 64 years. For all Māori women the rate was 40.5; much higher than the average rate of 29.0 for all women. For Māori women the rate of DSI rate remains above average through to 59 years.

Māori are also over-represented in:

- Loss of control on bend crashes; 26% of Māori DSIs result from loss of control on bend movements, compared to 15% for non-Māori.
- Regional locations where Māori are either significantly numerous or over-represented in statistics include Auckland, Waikato, Bay of Plenty, Northland and Gisborne.
- Areas with higher rates of deprivation, particularly in Auckland, Hawke's Bay, Northland and Wellington, where the proportion of DSIs that are Māori is 7-16% higher than the proportion of the population that is Māori in high deprivation areas.
- Late night weekend driving DSIs for Māori compared with weekday afternoon peaks for non-Māori
- Under-licensed driving; Māori drivers in DSI crashes having a lower proportion of current full driver licences (42%) than non-Māori (70%) regardless of gender.
- Not wearing a restraint; 20% of Māori driver DSIs not wearing a seatbelt, compared to 10% for non-Māori.
- Driving while impaired; a total of 24% of Māori drivers seriously injured or killed in crashes having alcohol intoxication confirmed, compared with only 10% for non-Māori drivers
- Less safe vehicles and occupant numbers; the average number of occupants in a 1-star safety-rated vehicle with a Māori driver involved in a DSI crash is 1.7 compared to an average of 1.3 occupants for non-Māori drivers (a 31% difference in occupancy rates).
- Speed; earlier Waka Kotahi research reported that Māori were over-represented in fatal crashes where speed was a factor, making up 32% of casualties.

In addition to providing some more detail about the factors contributing to Māori road safety, the analysis also raises questions which may warrant further investigation as part of the learning process set out earlier. For example, what other factors are associated with time of day and week crashes for Māori; what road safety features were available on roads involving Māori DSI crashes; and what factors determine vehicle choice and use in Māori DSI crashes?

Conclusion and Next Steps

Some initiatives that specifically speak to Māori are already underway. For example, *Belted Survivors* - a national campaign - uses Māori crash survivors to emphasise the benefits of using a seatbelt. However, more fundamentally Waka Kotahi and partners are on a journey to better understand road safety outcomes for Māori and, working with Māori, to design meaningful actions that will improve the safety and wellbeing of Māori communities. Key areas of concern have been identified and a Safe System framework applied to understand system failures and areas where more information is needed. Specific areas of opportunity have also been identified, and it is suggested broadly that two courses of action are taken following on from the completion of this report:

1. Work with Māori and others to further understand and help address specific issues related to road use, as has been the focus to date; and
2. Take a Safe System approach to consider the benefits to Māori that would come from addressing routine road safety issues (e.g. problematic curves, inappropriate speed limits, less safe vehicles) in areas where Māori live and travel.

After presenting this report to Te Mātangi as custodians, the next steps could include:

- identifying and using information from across the Safe System to help complete the understanding of areas of need
- using the report to identify and commission research (internal and external) to address knowledge gaps, as prioritised in partnership with Māori
- establishing the necessary arrangements for the next phase, including learning and planning for how we will engage with Māori to better understand contextual factors that underpin the data and lessons gathered to date.

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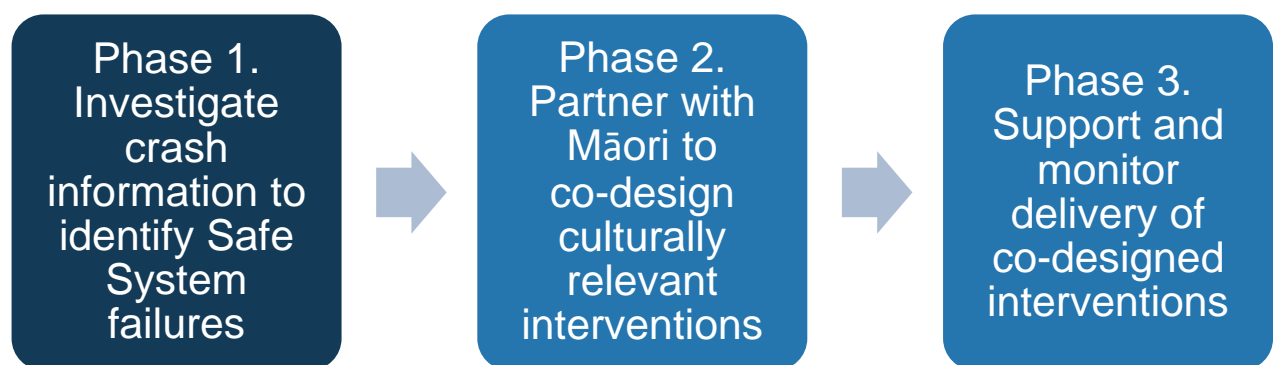
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1 INTRODUCTION

Road safety data indicates that, on a population basis, Māori (Maori)² are over-represented in death and serious injury (DSI) from road trauma. However, prior to embarking on this project, Waka Kotahi NZ Transport Agency (Waka Kotahi) did not have a detailed understanding of the Safe System failures that are resulting in poor road safety outcomes for Māori, nor what may be contributing to these outcomes. With a more nuanced understanding, any interventions developed in partnership with Māori can be developed to target areas of risk based on evidence.

An indicative process has been set out whereby initial data gathering will identify road safety outcomes for Māori and then, in partnership with Māori, contextual understanding will be gained, which in turn will inform road safety initiatives. The process shown below in Figure 1 is iterative as each phase depends on the findings or interactions within the previous phase. Please refer to Section 4.6-4.8 below for more detail on our phased approach.

Figure 1: Project Phases



This report addresses the first stage in this process. In doing so we have:

1. Investigated crash and injury data from several sources, including an earlier review of literature, to identify current road safety outcomes for Māori, across the Safe System
2. Provided a snapshot of current or planned initiatives led by Waka Kotahi that may positively impact on road safety outcomes for Māori, and
3. Provided an indicative process that will be followed to address the findings in this report.

Following the delivery of this report, the Road Safety Team will work with the Te Mātangi (our Māori Partnerships team) and other stakeholders within Waka Kotahi to design the next stages in addressing road safety for Māori, and hence begin to address our obligations in line with the *Road to Zero* strategy, *Te Ara Kotahi* (Our Māori Strategy), and Te Tiriti o Waitangi.

² This English document uses Te Reo Māori where appropriate for documents, organisational names and commonly understood words and phrases. We have inserted the English translation or the Te Reo Māori version without macrons after the first use of each Te Reo Māori word or phrase to enable online searching and accessibility e.g. Te Tiriti o Waitangi (the Treaty of Waitangi) or Māori (Maori). In some instances, such as infrequent use of an organisational name, we have provided the English translation after each use to assist with ease of reading for those audiences that cannot read Te Reo Māori. Refer to the Te Reo Māori section on page 12.

2 BACKGROUND

2.1 Māori and Road Safety

On average at least one person is killed, and seven people are reported as being seriously injured in road crashes every day in Aotearoa New Zealand. Te Manatū Waka (the Ministry of Transport) estimates that the social cost of these crashes is \$4.8 billion per year. The impact of these deaths and serious injuries on individuals, their whānau (family) and wider society is unacceptable.

Since 2013 the number of people dying or being seriously injured on Aotearoa New Zealand roads has been rising, and DSI rates for Māori increased faster than for non-Māori between 2014 and 2017. Overall, road traffic mortality rates are estimated at between 60% and 200% higher for Māori compared to non-Māori.³

While social deprivation is known to be a key determinant of road safety outcomes for all Aotearoa New Zealanders in deprived areas, Māori are disproportionately affected because they make up a far larger proportion of the population living in those areas. People living in the highest deprived areas have a 2-3 times higher risk of road traffic hospitalisation or death compared to those living in the least deprived areas.³ Many of the road user factors associated with higher DSIs are linked to social deprivation issues – especially licensing.

However, more work is needed to better understand Māori road safety risk factors within the context of different demographic factors. For example, a relatively greater proportion of Māori live in areas such as Northland, Waikato, and Gisborne, and so to some extent road safety risk is a function of higher population density. Likewise, the young age structure of the Māori population explains to some extent why young Māori are relatively more likely to be at-risk.

In addition, further work is needed to understand systemic barriers to participating in safe road use. For example, the relatively high proportions of DSIs involving less than a full driver licence for Māori should be viewed within the context of the difficulties Māori experience in accessing or participating in the driver licensing system.³

As with other aspects of the road safety system, road safety for Māori should be assessed from a Safe System perspective. Hence, factors relating to roads and roadsides, speed, vehicles, and users all need to be considered, along with the principles of taking an all-of-system approach and sharing responsibility across the system.

Most importantly, there are Māori road safety factors not easily explained through conventional data sources such as the Crash Analysis System (CAS), especially when it comes to understanding how factors come together to result in high severity crashes, which is most important if contemporary crash causation theory⁴ is to be followed. Contemporary incident causation theories focus on a combination of latent contextual and more immediate contributing factors to obtain a whole of system view. To yield this deeper understanding of context and the multiple contributors to crashes, both contemporary systems methods and robust partnerships with Māori are needed.

2.2 Policy Context

The Government has recently delivered a new road safety strategy, *Road to Zero: New Zealand's Road Safety Strategy 2020-2030 (Road to Zero)*, which commits Aotearoa New Zealand to Vision Zero:

Our vision is a New Zealand where no one is killed or seriously injured on our roads.

The Safe System approach underpins Vision Zero, and shared responsibility is a key principle within the Safe System. We are working with Ngā Pirihimana O Aotearoa (NZ Police), Te Manatū Waka (Ministry of Transport), local government, Mahi Haumarua Aotearoa (WorkSafe) and others to deliver this strategy. The new strategy holds the position that deaths and serious injuries should not be an inevitable cost of travelling

³ Mackie Research, *Road Safety Outcomes for Māori literature review*, pp 6-7 (Refer Appendix C: Road Safety Outcomes for Māori Literature Review)

⁴ E.g. Socio-technical and Socio-ecological systems approaches as described by Rasmussen and Bronfenbrenner

on our roads. It acknowledges that we all make mistakes but argues that these mistakes should not cost us our lives. To do better, we must commit to creating a transport system that protects human life so that no one is killed or seriously injured in road crashes. To support Aotearoa New Zealand's journey towards Vision Zero, the *Road to Zero* strategy proposes a target of a 40% reduction in deaths and serious injuries by 2030.⁵ This aligns strongly with Waka Kotahi's road safety position that:

...it is unacceptable for anyone to be killed or seriously injured while travelling or working on the land transport system⁶.

Importantly, this position explicitly states that those working on roads and driving for work must be protected, along with the general road-using public.

The *Road to Zero* strategy acknowledges that more needs to be done to understand the relatively high levels of road trauma for Māori. The action plan that underpins the strategy requires Waka Kotahi and partners to improve our understanding of Māori road safety outcomes and build relationships and responses that will

...help us partner with Māori more effectively to co-design and develop an ongoing programme of work.⁷

Underpinning the direction given by *Road to Zero*, the government has obligations under Te Tiriti o Waitangi (the Treaty of Waitangi) to work in partnership with Māori, to ensure equal participation at all levels, to protect Māori interests, and to reflect the views and aspirations of Māori in decisions that directly affect them. Waka Kotahi is committed to the Crown's broader vision for a treaty-based relationship. Te Tiriti o Waitangi provides for the exercise of kāwanatanga (the right of the Crown to govern) while actively protecting tino rangatiratanga (self-determination) of Māori with respect to their natural, physical and spiritual resources. Along with our obligations as a Crown entity to contribute to the Crown's broader vision for a Te Tiriti o Waitangi relationship, the Land Transport Management Act 2003 and the Resource Management Act 1991 also outline our responsibilities to engage and partner with Māori in relation to delivering and maintaining the transport system.

Te Tiriti o Waitangi is the foundation on which *Te Ara Kotahi* (our Māori Strategy) stands. *Te Ara Kotahi* articulates our recognition and respect of Te Tiriti and our commitment to working with Māori to, among other objectives: build strong, meaningful and enduring relationships with Māori to achieve mutually beneficial outcomes; and to work with Māori to identify opportunities to enhance Māori social, cultural, environmental and economic wellbeing in the work we do. One of the priorities of *Te Ara Kotahi* is to support initiatives that improve Māori road safety. Within this priority there is an action to:

Work with others to obtain and analyse data relating to death and serious injury from road trauma for Māori as an ethnic group⁸.

This report goes some way towards fulfilling this action but also identifies that there is much work still to be done. In preparing this report and considering the earlier review of literature, we begin the journey to better understand what the current road safety outcomes are for Māori.

As shown earlier in Figure 1, subsequent stages are likely to involve engaging and then partnering with Māori to undertake further research or to co-design culturally relevant safe system initiatives were appropriate to make meaningful change.

This report records the work undertaken in Phase 1, outlining what we currently know about Māori road safety outcomes and identifying the gaps and opportunities we discovered as part of the investigation.

⁵ Refer <https://www.transport.govt.nz/assets/Import/Uploads/Our-Work/Documents/e97c3b3d0d/Road-to-Zero-consultation-document-July2019.pdf>, page 61

⁶ Refer <https://www.nzta.govt.nz/assets/resources/statement-of-intent/2018-2022-amended/soi-2018-2022-amended.pdf>, page 9

⁷ Refer https://www.transport.govt.nz/assets/Import/Uploads/Our-Work/Documents/Road-to-Zero-strategy_final.pdf

⁸ *Mahia Te Mahi (Action Plan)*, Waka Kotahi/New Zealand Transport Agency, 2019 (refer Appendix A: Te Ara Kotahi / Our Māori Strategy)

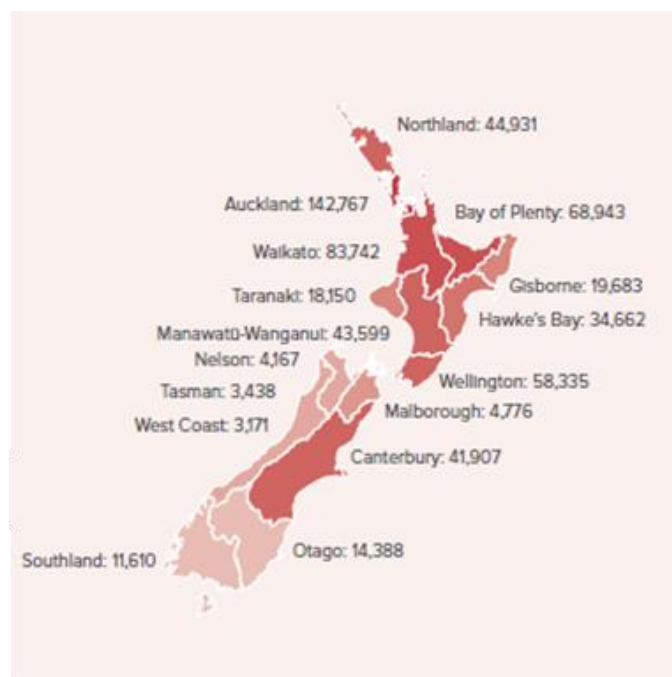
3 MĀORI IN AOTEAROA NEW ZEALAND

This section of the report summarises some general characteristics of Māori in Aotearoa New Zealand society today and their relevance to understanding road safety risk. This provides important context to help explain some of the road safety outcomes. More detailed background information on Māori demographics, health and wellbeing, and cultural identity is provided in Appendix B: Māori in Aotearoa New Zealand background information.

3.1 Geographic and Demographic Profile

Māori accounted for 15.4% of the population in 2017, with 86% living in the North Island and the largest concentration of Māori in Auckland. In line with increasing urbanisation for all New Zealanders, 84% of Māori lived in urban areas as of 2013. The 2013 census data showed that the Māori population was geographically distributed as shown in Figure 1 below.

Figure 1: Māori population distribution across Aotearoa New Zealand 2013 census⁹



Māori are expected to make up about 60% (30,200) of the total Gisborne population in 2038, up from 45% (19,683) in 2013. Other regions expected to have significant increases in the proportion of Māori in the population include Northland, Taranaki, Hawke's Bay and Manawatu-Whanganui.¹⁰

3.2 Health, Wellbeing, and Socio-economic Status

Since colonisation, Māori have endured the undermining of their culture, autonomy and ways of being through constitutional and legislative oppression, alongside rapid societal transformation. The negative effects of colonisation have included large-scale dispossession and marginalisation of Māori from their social, cultural and economic resources, including traditional lands¹¹. The cumulative impact of this historical trauma for Māori health and wellbeing has been severe and across multiple generations. Efforts

⁹ Te Puni Kōkiri, 2017. Tātai Tāngata ki te Whenua: Wāhanga Tuatahi; Te Maha, te Whakatupu, me te Pakeketanga o te Ira Taupori - Future Demographic Trends for Māori; Part One: Population Size, Growth and Age Structure; page 9.

¹⁰ Te Puni Kōkiri, 2018. Tātai Tāngata ki te Whenua: Wāhanga Tuarua; Te Heke, te Noho Tāone, te Kanorau me te Tuakiri o te Ira Tāngata - Future Demographic Trends for Māori; Part Two: Migration, Urbanisation, Diversity, Identity; page 21 – updated from Statistics New Zealand, 2017. Subnational ethnic population projections: 2013(base)–2038 update. Website: <https://www.stats.govt.nz/information-releases/subnational-ethnic-population-projections-2013base2038-update> (Accessed 12 February 2020)

¹¹ Wirihana, R., & Smith, C. (2019). Historical trauma, healing and well-being in Māori communities. *He Rau Murimuri Aroha*, 2.

to improve Māori outcomes must be based on understandings of these root causes and the ensuing disparities; disparities that now involve a complex mix of socioeconomic and lifestyle factors, healthcare access issues, structural barriers, and systematic racism^{12,13}.

It is important to note that despite overwhelming societal disadvantages, over recent decades there has been marked resurgence of cultural revitalisation and an increased demand for greater Māori autonomy and equitable outcomes^{14,15}. These ongoing efforts serve to highlight the resilience and dynamism of Māori, to contest, adapt and evolve their endeavours to address long-term barriers and challenges to Māori health and wellbeing.

In summary, Māori continue to experience poorer health and social outcomes than non-Māori. In 2017 68% of Māori were under 40 years old. Life expectancy at birth for Māori is 76 years, on average 7.4 years less than for the rest of the population. Māori also have higher mortality rates when compared with non-Māori. Mortality rates are highest in areas of high deprivation, with those in the Aotearoa New Zealand Deprivation Index decile 10 areas being 2.5 times more likely to die in a crash than those in decile one. As Māori have one of the highest percentages of people (25.4%) living in the most deprived decile areas (decile 10), next to Pacific peoples, this is of relevance for Māori wellbeing. Finally, with regard to education, a third of Māori aged over 15 years have no formal qualifications, with Māori men less likely than Māori women to hold a formal qualification.

3.3 Implications for Māori road safety

To some extent the high proportion of Māori in the upper North Island reflects Aotearoa's overall population distribution. One of the greatest determinants of road safety risk is exposure based on vehicle kilometres travelled, which in turn is heavily influenced by population size. Therefore, Safe System initiatives focusing on the highest areas of road safety risk are likely to improve road safety for Māori.

Likewise, the younger age structure of the Māori population is likely to influence the exposure of young Māori to road safety risk. There is a need to better understand whether the relatively high number of young Māori is the main determinant of risk for this group or whether there are specific life circumstances and behaviours driving the risk. As with non-Māori, the higher proportion of males involved in DSI crashes among young people (see Section 5.1.2), suggests that there is at least some behavioural element to this trend. A particular focus on specific Māori road safety outcomes, taking a Safety System approach, may be warranted where there are unique road safety issues related to Māori, particularly in centres where there are high proportions of Māori, such as Gisborne and the Bay of Plenty.

The clear link between high deprivation and poor outcomes for Māori indicates that focusing on the road safety implications of deprivation is likely to be beneficial to Māori. Addressing factors such as vehicle safety and occupant numbers, longer trips on higher risk remote rural roads (e.g. to get to employment opportunities), and systemic barriers to safe road use and education pathways are likely to improve road safety outcomes for Māori. Similarly, addressing personal road safety risk factors such as driving after consuming alcohol or drugs, and not wearing a seatbelt will have beneficial outcomes. Taking a contemporary incident causation approach, it would be most useful to understand these factors within a system, and how the various parts of the system are currently leading to high severity crash outcomes for Māori.

¹² Reid, J., Taylor-Moore, K., & Varona, G. (2014). Towards a social-structural model for understanding current disparities in Maori health and well-being. *Journal of Loss and Trauma*, 19(6), 514-536.

¹³ Nuku, K. K. (2013). Challenging Maori health inequities. *Kai Tiaki: Nursing New Zealand*, 19(9), 34.

¹⁴ Hill, R. S. (2016). New Zealand Maori: The quest for indigenous autonomy. *Ethnopolitics*, 15(1), 144-165.

¹⁵ Reid, P., Paine, S. J., Curtis, E., Jones, R., Anderson, A., Willing, E., & Harwood, M. (2017). Achieving health equity in Aotearoa: strengthening responsiveness to Māori in health research. *NZ Med J*, 130(1465), 96-103.

4 METHODOLOGY

4.1 Identifying who is Māori

Te Puni Kōkiri's 2017 report *Future Demographic Trends for Māori Part One*¹⁶ outlines the Government's approach to identifying Māori through the census and how it aligns to Māori notions of identity:

The concept of whakapapa (ancestry or descent) is central to Māori notions of identity. The right of Māori to determine their individual and collective identities is endorsed by the United Nations Declaration on the Rights of Indigenous Peoples.

The Government's approach to classifying Māori (through the census) has changed over time from one based on blood quantum to one which is now based on ethnic self-identification. ... Since 1986, ... census respondents have been able to identify their own ethnicity, and to identify with up to six ethnicities if they so choose. Self-identification is more in line with Māori social realities, and more in keeping with world-wide approaches.

Statistics New Zealand defines ethnicity as: the ethnic group or groups that people identify with or feel they belong to. Ethnicity is a measure of cultural affiliation, as opposed to race, ancestry, nationality or citizenship. Ethnicity is self-perceived and people can belong to more than one ethnic group.

In collating and analysing research, information and data for this report it became evident that how Māori ethnicity is identified varies across data sets. The Crash Analysis System (CAS) includes ethnicity data for those involved in a reported crash based on Police Officer observation, not necessarily what the people involved might have identified themselves as.

Therefore, when reviewing the findings and analysis based on CAS data in this report, the limitations and assumptions as a result of how the data was collected in relation to ethnicity should be taken into account. Please refer to Section 4.6 for information on the specific data limitations affecting the literature review and the data analysis, and to Section 8.2 in the Conclusion for the broad limitations and assumptions impacting on the findings and analysis documented in this report.

4.2 Terminology

Māori are not a homogeneous group and, as with any ethnic, cultural or social group in society, specific individuals or organisations cannot claim to represent, speak or act on behalf of all members. The term 'Māori' is used in this document to refer to all people of Māori descent; all ethnically identified Māori where tribal affiliation is not known or not collected or; in contexts where it is appropriate or necessary to treat Māori as a collective entity.

The term 'Iwi Māori' is used to acknowledge that it is not always appropriate or necessary to treat Māori as a homogenous population. It is used when it is important to acknowledge the iwi (tribal) affiliation of the reported group; where initiatives or interventions have been iwi specific; and/or to ensure the need for adaptability of initiatives and iwi specific consultation.

For the purposes of this report we use the term non-Māori to refer to all peoples of Aotearoa New Zealand who do not identify as Māori or are not identified as Māori in official records.

4.3 Te Reo Māori

Te Reo Rangatira (Our Te Reo Māori Policy) is our commitment to working collaboratively to achieve our goals and aspirations to uplift the Māori language in Waka Kotahi.

Our mātapono (principles for approach) to the use of te reo Māori in this report are to:¹⁷

- support or further enhance te whakakitenga (vision) of Te Ara Kotahi

¹⁶ Te Puni Kōkiri, 2017. *Tātai Tāngata ki te Whenua: Wāhanga Tuatahi; Te Maha, te Whakatupu, me te Pakeketanga o te Ira Taupori* - Future Demographic Trends for Māori; Part One: Population Size, Growth and Age Structure; page 6

¹⁷ As discussed with Waka Kotahi's Te Ara Kotahi working group.

- use te reo Māori where appropriate

Te reo Māori is used where appropriate for documents and organisational names.

As most online or database search engines do not enable effective searching of words with macrons, we have inserted the English translation or the te reo Māori version without macrons after the first use of each te reo Māori word or phrase e.g. Te Tiriti o Waitangi (the Treaty of Waitangi) or Māori (Maori). In some instances, such as infrequent use of an organisational name, we have provided the English translation after each use to assist those audiences who cannot read te reo. Similarly, where it would impact on readability in this document, we have used the English version of place or regional names without the Māori name, especially where many of these names appear together in one paragraph. Appendix E: Glossary contains a comprehensive list of the te reo Māori place, region, city and town names for Aotearoa New Zealand. We have taken this overall approach to help with transparency, web-based searching and document accessibility.

This report is a koha (gift) to Te Mātangi, who will be its custodians and steward it through future updates and versions, as required, with the Road Safety Team's support.

4.4 Māori data sovereignty

Māori data sovereignty is concerned with the rights of Iwi Māori to own, control, access and possess data that derives from them, and which pertains to mātauranga Māori (Māori knowledge). Increasingly there is a demand for research that applies Kaupapa Māori¹⁸ methodologies and adopts an approach that is controlled and led by Māori, gives primacy to te ao Māori and privilege to a Māori voice. This has generated a demand for data that is specific to the needs, values, and aspirations of Māori. Māori data sovereignty is reflected in Iwi use of official sources to generate information for their own purposes, with challenges to improve the inclusiveness and quality of data regarding Māori within government or institutional systems.

The concept of Māori data sovereignty is consistent with this concept of general data sovereignty, in that it sees Māori data being subject to Māori governance (at the individual and collective levels) and Māori having control over who can access their data, how it can be disclosed and how it can be used. In this context, Māori related data is that which is associated (linked) to Māori *and* significant to Māori, individually or collectively.

Currently, the Crown owns all data collected by government agencies and departments. However, the Aotearoa New Zealand Crown (and therefore Government) has obligations to Māori under both Te Tiriti o Waitangi, and the UN Declaration on the Rights of Indigenous Peoples, of which Aotearoa New Zealand is a signatory. Discussions regarding whether data is subject to the above obligations are ongoing and, from a cross-government perspective, there are no firm guidelines for identifying or managing Māori data, nor in relationship to the ownership of Māori data.

As with many other government departments and agencies, Waka Kotahi is in the early stages of looking at what processes and controls need to be put in place for the management of Māori data, in support of the concept of Māori data sovereignty, and that acknowledge the status of some Māori data as tāonga. It is acknowledged that the scope of any initiatives in this space will be on the management of Māori data residing in Waka Kotahi systems, and ensuring flexibility is built into processes to ensure that Waka Kotahi will be able to comply with any future cross-government guidelines that may be put in place.

In relation to the data used to inform this report, and in the absence of any clear guidelines on the use of such data, our guiding principal has been that the data is used to improve our knowledge and understanding of the road safety outcomes for Māori, along with that of our road safety partners. In addition, this knowledge and understanding will be built on in partnership with Māori so that we are better placed to support Māori to develop initiatives for the betterment of Māori health and wellbeing.

4.5 Approach

While we acknowledge and support the value of a kaupapa Māori approach, Waka Kotahi is in the very early stages of strengthening our capability and capacity in tikanga Māori. The decision was made to use

¹⁸ A philosophical doctrine, incorporating the knowledge, skills, attitudes and values of Māori society

the resources and capability currently existing within Waka Kotahi to progress Phase One of the project because of the priority given to improve our understanding of Māori road safety outcomes.

The team with a dedicated focus on and cultural understanding of te ao Māori (Māori worldview) within Waka Kotahi did not have the capacity or capability at the time to lead or resource the project. Given the road safety focus, the Road Safety Team (Safety, Health and Environment) sponsored and delivered this first phase of research with the support of the Senior Manager Te Mātangi and his team.

Waka Kotahi is taking a phased approach to this work to ensure we have a good understanding of the current situation and what is already happening or planned to improve road safety outcomes for Māori before any further work is planned or undertaken. Our three-phased approach is to:

1. better understand what the current road safety outcomes are for Māori and use this information to inform a detailed Phase 2 plan for engaging with Māori and build relationships,
2. partner with Māori and central and local government road safety partners where appropriate to:
 - a. identify and commission further research
 - b. co-design culturally relevant safe system interventions to address any identified gaps or opportunities, and
 - c. identify appropriate delivery agents/ organisations and channels for agreed interventions.
3. support delivery and monitor effect of any interventions designed in Phase 2.

4.6 Phase one

Phase 1 included collating and analysing existing research and information and interrogating various datasets to increase our understanding and develop insights into road safety outcomes for Māori, the issues that are impacting on these outcomes and what we are already doing to address those issues.

Specifically, to improve our understanding of Māori road safety outcomes we:

- explored demographic, social and economic factors that influence Māori position in society to give context and improve our understanding of Māori in Aotearoa New Zealand today
- investigated crash and injury data from several sources to identify current road safety outcomes for Māori compared to non-Māori
- considered transport system factors such as access, infrastructure, vehicles, speed and user behaviour along with wider issues for Māori that could be contributing to road safety outcomes
- developed a snapshot of current or planned initiatives led by Waka Kotahi that explicitly aim to impact on road safety outcomes for Māori.

These aspects of the project are covered in Sections 5-6 of this report.

Phase 1 also includes steps following completion of this report to:

- share the report with our internal and external road safety partners to gather feedback and to identify, prioritise and commission further research where necessary or appropriate, and to explore opportunities to collaborate on Phase 2.
- partner with Te Mātangi and other stakeholders to scope/develop a detailed Phase 2 plan to support how we engage with Māori to build relationships and identify affected iwi, urban Māori, or representative groups.

4.6.1 Literature review

A literature review was undertaken by Mackie Research in December 2019. It summarised evidence from existing literature on current road safety outcomes for Māori and the factors that influence these and was informed by a Safe System approach. It involved a review of academic and grey literature published online or provided by Waka Kotahi for the purposes of writing this report.

The literature review had several data limitations, which are outlined below:

- The review relied on literature that had either been published or was available to Waka Kotahi to share and does not provide a complete picture of sector knowledge on the topic.

- Many of the estimates referenced in the literature reviewed are based on Traffic Crash Reports (TCRs), which have known accuracy issues, particularly with regard to ethnicity information. The estimates referred to should therefore be used as rough approximations only.
- The use of different measures over different time periods made it difficult to directly compare rates across the studies reviewed. In addition, the most recent data was largely available from Ngā Pirihi mana o Aotearoa documents, which often did not state the data source, though much is likely to be from TCRs.
- While many of the available statistics break DSI data down by ethnicity, few did so in combination with other relevant variables, such as age, gender, and region. This makes it difficult to tease out common factors implicated in road traffic crashes involving Māori, and how these factors relate to one another.

Parts of the literature review report have been summarised and used throughout this report in Sections 5-6 to add depth and context to the data analysis as appropriate. Refer to Appendix C: Road Safety Outcomes for Māori Literature Review for the full literature review provided by Mackie Research.

4.6.2 Data analysis

To understand current road safety outcomes for Māori, data from a range of sources were analysed, with the primary focus on comparing road safety outcomes and influencing factors for Māori with those for non-Māori. These are presented in Section 5: Road Trauma and Māori.

Data for analysis were sourced from the Waka Kotahi Crash Analysis System (CAS), the Waka Kotahi Motor Vehicle Register (MVR), the Monash University Accident Research Centre (MUARC) vehicle crash database, Midlands Trauma Services (MTS) hospitalisation data, and Tatauranga Aotearoa's 2013 Census Data and associated population information.

CAS data for all crashes for 2013-2017 was used. A five-year time period was chosen for analysis because five years of data provide more meaningful indications and trends and are not subject to one off events or annual variances. At the time the analysis was being undertaken, crash data for 2018 were still being updated so the 2013-2017 data represented the best available information. The data include almost all available information relating to crashes in that time period, including location, road, vehicles, occupants, and factors that may have influenced the crash outcome (such as restraint use).

The CAS data were exported to Excel spreadsheets, then analysed by way of pivot tables and these tables were used to produce the tables and charts used in this report.

Vehicle safety rating data were derived by examining vehicles within the CAS crash data, finding the vehicle make, model and year from the Motor Vehicle Register (MVR) and then matching the vehicle make, model, year to the MUARC vehicle crash database to establish vehicle safety rating for each vehicle.

Tatauranga Aotearoa's 2013 census and 2017 population data were used for population pyramids and calculations of rates of deaths and serious injuries (DSIs) per 100,000 population.

The limitations of the CAS and population data used to inform this report include:

- Ethnicity in CAS is based on the Traffic Crash Reports (TCRs) and, as such, dependent on visual identification by the attending Police Officer. Note also that the rate of recording ethnicity has decreased since 2015.
- CAS data may not be fully completed for each crash. Some data may be "unknown" (for example, in 20% of CAS crashes, ethnicity is not recorded or recorded as "unknown"). In all cases where data is unknown, this data was excluded from the analysis.
- Not all crashes are recorded in CAS.
- Tatauranga Aotearoa's (StatsNZ) 2017 Population data is estimated using 'fill-in' information. Therefore, population information may not be as accurate as that based on census data.
- 2013 census data were used because in June 2018 Tatauranga Aotearoa reported a lower-than-expected response for the 2018 Census. While Tatauranga Aotearoa received full or partial information for around 90 percent of individuals and developed methods for using other government administrative data to compensate for the information that was missing, there are still limitations with this information.

These include limitations with how the data helps us understand who lives together in a household, and missing Māori descent and iwi information.

- CAS data may change due to retrospective changes up to approximately 12 months after a crash takes place. Therefore, the current or previous year's data may not be reliable. In the case of this report, CAS data for 2013-2017 was used.

4.6.3 Data matching for ethnicity

As noted above, a major limitation with CAS data is that ethnicity data is based on visual identification by the attending Police Officer, rather than self-identification. Some District Health Boards use a 'Gold Standard' process of self-identification for determining ethnicity that is significantly more accurate than ethnicity information based on third party identification. To help understand the level of accuracy for CAS ethnicity data, Waka Kotahi engaged Midland Trauma Services (MTS) to undertake a data matching exercise which compared CAS records with MTS trauma and ethnicity data.¹⁹ Comparing MTS ethnicity data with CAS ethnicity data provided a method to test the accuracy of ethnicity data in CAS.

MTS were able to match 15.9% of CAS records to their trauma registry. The highest match rate was for serious injury crashes (50.3%): match rates for fatal and minor injury crash were much lower, partly because these cases are less likely to reach a hospital.

Overall, 80% of vehicle occupants who were identified as Māori in CAS were also identified as Māori by MTS. In the matched data, it was more likely for Māori to be misidentified in CAS as non-Māori than vice versa. However, given the low match rates and the possibility that people who were able to be matched might have a different ethnic balance from those who were unmatched, we cannot draw too many conclusions.

The data matching exercise suggests Māori are more likely to be undercounted than overcounted in CAS data. This means the findings in this report are more likely to underestimate than overestimate the impact of road trauma on Māori.

4.6.4 Safe system knowledge summary

Waka Kotahi's approach to road safety is grounded in a Safe System approach which acknowledges that people make mistakes and all parts of the transport system should be designed to minimise the risk of death or serious injury. The *Road to Zero* strategy states:

We need to build a safe road system that is designed for people. This means doing our best to reduce crashes, but acknowledging that crashes will continue to happen. When crashes occur, we can prevent serious harm through safe vehicles, safe speeds and forgiving road design.²⁰

A Safe System approach aims to create a forgiving transport system based on four principles:

- People make mistakes - we need to recognise that people make mistakes and some crashes are inevitable.
- People are vulnerable - our bodies have a limited ability to withstand crash forces without being seriously injured or killed.
- We need to share responsibility - system designers and people who use the roads must all share responsibility for creating a road system where crash forces do not result in death or serious injury.
- We need to strengthen all parts of the system - we need to improve the safety of all parts of the system – roads and roadsides, speeds, vehicles, and road use so that if one part fails, other parts will still protect the people involved.

¹⁹ The MTS hospitalisation data was not used as part of the analysis in this report, it was solely used to examine the accuracy of ethnicity data within CAS. Where matches were identified, alignment of ethnicity information could be tested. MTS supplied Waka Kotahi with an anonymised report based on their analysis. All hospitalisation data was retained exclusively by MTS and not available to Waka Kotahi.

²⁰ New Zealand Government (2019) Road to Zero: New Zealand's Road Safety Strategy 2020-2030. Wellington: Author.

To understand how different elements of the Safe System influence road safety outcomes for Māori, a Safe System analysis was undertaken against each of the four parts of the system outlined in the above principles:

- Safe Roads and Roadsides
- Safe Speeds
- Safe Vehicles
- Safe Road Use.

This Safe System analysis summarises the knowledge from the literature review and the data analysis presented in Section 5, and identifies knowledge gaps that could inform further research and data analysis. The summary is presented in Section 6.

4.6.5 Current and planned initiatives

To identify current or planned initiatives that address Māori road safety outcomes, searches were undertaken on the Waka Kotahi website and OnRamp (internal intranet). These searches turned up several resources in te reo Māori, media releases and internal news items that provided links to groups, teams or individuals who were contacted for more information. Several staff were identified who had a history of working in customer facing roles or had worked with community groups and Māori communities. Conversations with these people led to other paths of enquiry. Eventually we exhausted these connections but placed a post on Workplace (an organisational social media interface similar to Facebook) to ask staff if they knew of any internal current or planned initiatives that specifically targeted Māori in relation to road safety. The relevant initiatives are discussed in Section 7: Current & Planned Initiatives.

Although we became aware of road safety initiatives that specifically target Māori being delivered or supported by partner organisations, resource and time constraints prevented us from exploring or documenting these fully.

4.7 Phase two

Phase 2 will involve building relationships and partnering with Māori to undertake further research and/or to co-design culturally relevant Safe System interventions. Who we partner with and how we co-design interventions or undertake further research is dependent on the results and recommendations outlined in this report and will most likely be an iterative process as more research is undertaken and relationships are built.

Waka Kotahi is one of many central and local government organisations that have responsibilities in relation to improving road safety outcomes. As part of the Waka Kotahi commitment to *Road to Zero* we will work with our central and local government partners and Iwi Māori in a joined-up approach to undertake further research and in co-designing initiatives with Māori.

Along with the Road Safety Team (Safety, Health and Environment), Te Mātangi will take a lead role in developing Phase 2 to ensure a te ao Māori approach is used to engage and partner with Māori going forward.

4.8 Phase three

Phase 3 is dependent on Phase 2 but will likely involve supporting delivery agents/organisations with guidance and resources to deliver interventions designed in Phase 2, and conducting ongoing research, reporting and monitoring to ensure interventions remain relevant and appropriate.

This phase one report provides us with a baseline against which we can assess progress towards improving road safety outcomes with Maori.

5 ROAD TRAUMA AND MĀORI

This section outlines the findings of the data analysis and the literature review. The data are primarily explored by comparing rates of death and serious injury (DSIs) for Māori with those of non-Māori to increase our understanding of the factors associated with greater road safety risk for Māori.

As described in the Methodology section, the majority of the data reported here is based on CAS data from 2013-2017. The goal here is simply to describe that data as it stands, and care should be taken for any interpretation. The focus is on understanding system contributing factors, rather than looking for fault. This data has numerous limitations, including incomplete records, unreliable ethnicity information, and a focus on driver data. While the data analysis addresses some of the data limitations identified in the literature review,²¹ there are further gaps and limitations to be addressed.

5.1 Death and serious injury by ethnicity, age, and gender

The literature review found that:

Māori experience substantially higher rates of road traffic death and serious injury than people of other ethnic groups in Aotearoa New Zealand. For example, Ministry of Transport data based on TCRs from 2016, the most recent year for which data are available, show that of all reported crash casualties where police recorded racial appearance information²², 20% were Māori (MoT data, 2017), despite making up only around 15% of the population (MSD, 2016). Moreover, Māori made up 23% of serious injury and 28% of fatal crash casualties in that year (Figure 30 MoT data, 2017), representing a road traffic fatality rate close to double their relative population size. However, estimates of the extent to which they are over-represented vary substantially.²³

Our analysis of CAS data for the period 2013 to 2017 supports the statement that Māori are over-represented in deaths and serious injuries (DSI) as a result of road crashes. Further, the trend suggests that this over-representation is increasing.

5.1.1 Proportion of death and serious injury relative to population size

Comparing Māori with non-Māori using population numbers shows that population distribution by five-year age band is not the same for both groups (refer to Appendix B: Māori in Aotearoa New Zealand background information). It is therefore important to compare the proportion of DSIs with the proportion of population by five-year age band.

Using CAS data from 2013-2017 to compare the proportion of DSIs to population by age and gender, we see a disproportionate number of DSIs occurring among men aged 15-54 years and women aged 15-29 years regardless of ethnicity (refer to Figure 2 below). This aligns with general DSI trends that show men have a higher rate of DSIs than women, as well as previous research showing young people have the highest risk of road trauma, in both cases regardless of ethnicity.²⁴ While Māori DSIs are more heavily concentrated among young people than non-Māori, this is at least partially explained by their greater population representation at these ages.

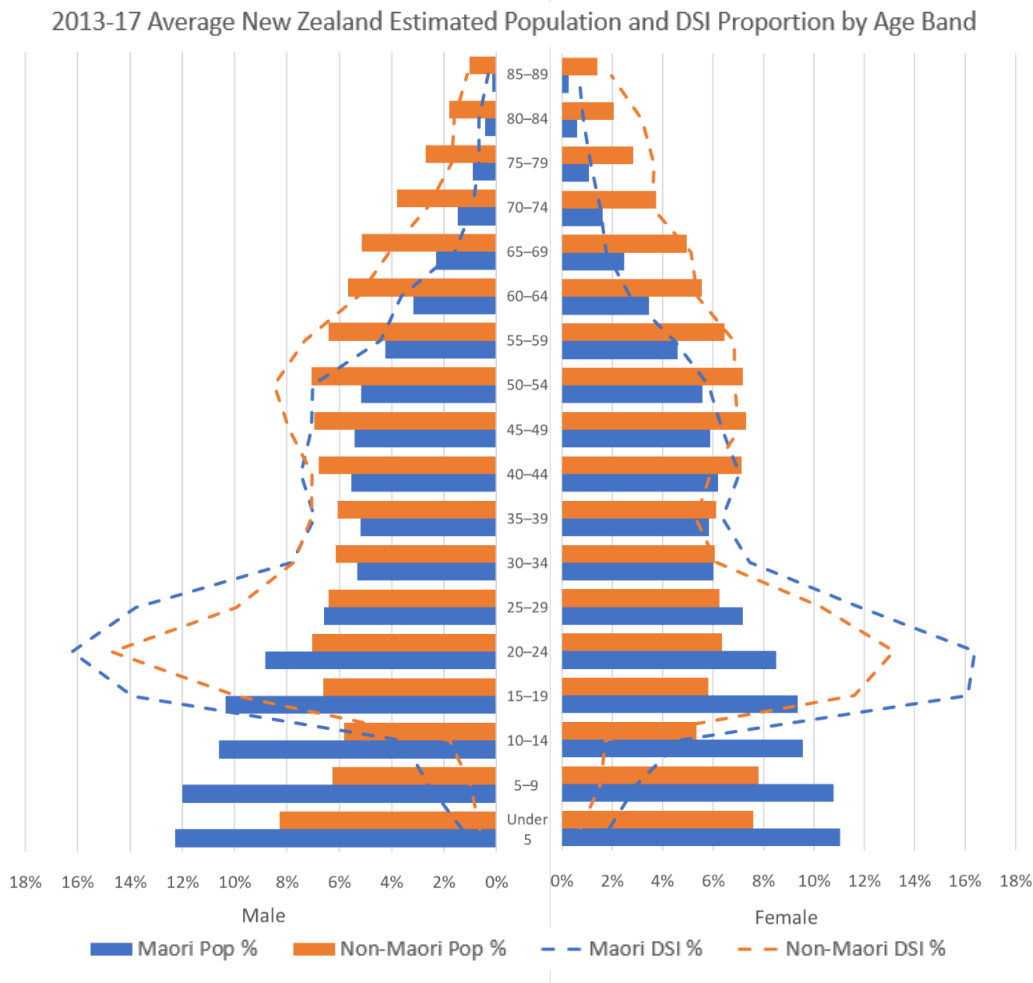
²¹ Mackie Research, 2019. *Road Safety Outcomes for Māori literature review*, pp 4-5 (Refer Appendix C: Road Safety Outcomes for Māori Literature Review).

²² 70% of all crashes involving injury (minor, serious, and fatal) included ethnicity information based on racial appearance.

²³ Mackie Research, 2019. *Road Safety Outcomes for Māori literature review*, pp 4-5 (Refer Appendix C: Road Safety Outcomes for Māori Literature Review).

²⁴ Aaron Schiff, 2019. *Evaluation of the Graduated Driver Licensing System: Summary Report*, pp 3-6e

Figure 2: 2013-17 Average Estimated Male and Female Populations and DSIs by Age



5.1.2 Rates of death and serious injury per 100,000 people

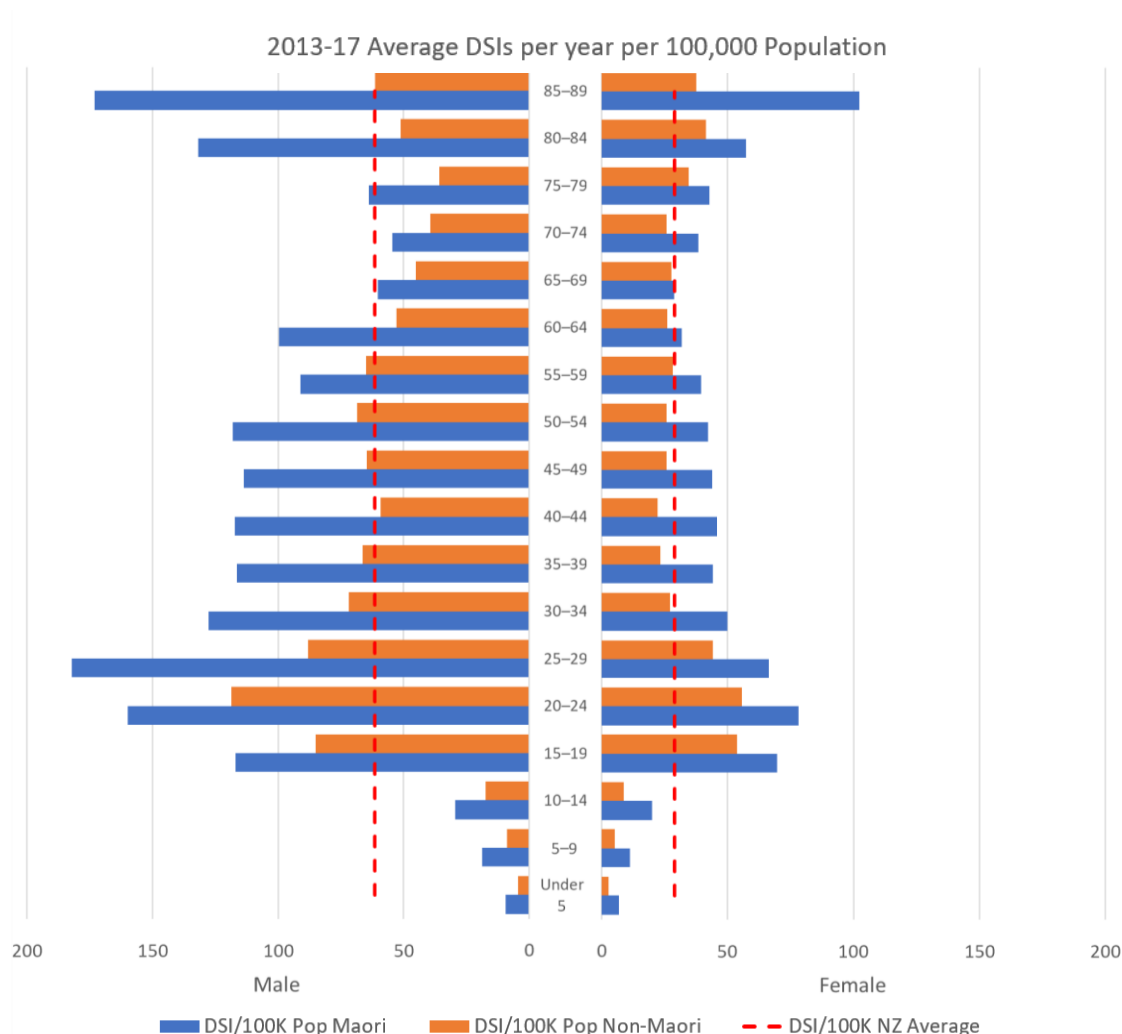
Overall, the average rate of DSI per 100,000 in Aotearoa New Zealand for 2013-17 was 45. Figure 3 below shows that for both Māori and non-Māori, rates for the 15-29 year-old age cohort are both well above the average. While high DSI rates for the 15-29 year-old age cohort may have a some relationship to age (as discussed in section 5.1.1), the DSI rates for Māori are still well above the average rates.

While the rate of DSI for non-Māori decreases to the average rate for those aged 30 years or older, the rate of DSI for Māori continues to remain above average through to 64 years of age for both males and females. Rates of DSI for Māori aged 80 years or more should be disregarded due to the low numbers in this age cohort.

For 2013-2017 the average rate of DSIs per 100,000 population for all Māori men was 87.0; much higher than the average rate of 61.5 for all men. The data presented in Figure 14 below shows that the DSI rates for all males in the 15-29 year-old cohort are above average. However, the DSI rate for Māori men in this age cohort is well above the average rate and higher than for non-Māori men in the 15-29 year-old cohort. For non-Māori men the DSI rate is about average from 30 years onwards but, for Māori men the DSI rate remains above average through to 64 years.

For 2013-2017 the average rate of DSIs per 100,000 population for all Māori women was 40.5; much higher than the average rate of 29.0 for all women. As with men, DSI rates for all women in the 15-29 year-old cohort are above average. However, the DSI rate for Māori women in this age cohort is well above average and higher than non-Māori women in the 15-29 year-old cohort. As with non-Māori men the DSI rate for non-Māori women is about average from 30 years. However, for Māori women the rate of DSI rate remains above average through to 59 years.

Figure 3: 2013-2017 Average DSIs per 100,000 Male and Female Population



The population and DSI statistics outlined above show that DSI numbers and rates for all men aged 15-29 years are high, but Māori men are over-represented within this age cohort. Overall men have higher rates of DSI than women, but Māori men have higher rates than non-Māori men across a wide age spectrum (15-64 years). The highest risk group appears to be Māori men aged 25-29 years who are present in DSI statistics at four times the average Aotearoa New Zealand rate. There is a similar pattern in DSI rates for Māori women, although these rates are about half those of the male counterparts and the 25-29 year cohort does not present the same risk profile for Māori women as for Māori males.

The literature review also found that Māori children are more likely to be killed or seriously injured in crashes as non-Māori children:

Road traffic crashes also cause substantial harm to tamariki Māori, accounting for almost 9 fatalities per 100,000 population as car occupants, and around 2 per 100,000 as pedestrians (CYMRC, 2019). Tamariki Māori are over-represented in these road traffic injury rates relative to non-Māori children, particularly as vehicle occupants and pedestrians (Safekids Aotearoa, 2015). For example, a Child and Youth Mortality Review of mortality data from 2002 to 2017 found that tamariki Māori have fatality rates almost twice as high as non-Māori children for car and pick-up truck/van occupancy, and pedestrian fatality rates approximately double those of non-Māori (CYMRC, 2019). This includes a much higher pedestrian fatality rate than Pacific children, who are also over-represented in pedestrian casualty statistics more generally (CYMRC, 2019; Hosking et al., 2013).

CAS data from 2013-2017 show that, while DSI rates for Māori children do not increase substantially until around age 15, they experience substantially higher DSI rates than non-Māori (Figure 3). However, it is

unclear how closely this correlates with the greater proportion of the Māori population that is aged under 15 compared to non-Māori (Figure 2).

Consistent with the overall reduction in deaths and serious injuries seen during 2018 and 2019,²⁵ the literature review found that:

There is, however, some indication that rates may have started to decrease again in 2018; NZ Police reported a 6% decrease in fatal crashes and a 3% decrease in serious injury crashes involving Māori (irrespective of whether they were a casualty in the crash) between the 2017/18 and the 2018/19 financial years (NZ Police, 2019).²⁶

Further research is required to understand why DSI rates for Māori men aged 25-29 are significantly higher than for non-Māori men in the same age cohort. Analysis of DSI rates in relation to employment and industry type, and vehicle kilometres travelled would also provide a more complete basis for future research.

5.2 Socio-economic factors

There is widespread agreement across the literature reviewed about the relevance of socio-economic factors to road safety outcomes.²⁷ The literature review found that crash DSIs in the general population are much higher for people living in the most deprived areas compared to those living in the least deprived areas, with around 2.5 times the rate of vehicle occupant DSIs and 3 times the pedestrian DSIs. DSI rates among children were noted as strongly influenced by deprivation, though no recent evidence was available.

We discovered significant ethnic differences for rural DSIs if these are split by the Deprivation Index relating to where crashes take place.²⁸ The proportion of rural DSIs for Māori is significantly higher than the proportion of population across all levels of deprivation, but more markedly so in higher deprivation areas. At most levels of area deprivation, Māori DSIs are around 8-13% higher than the Māori proportion of the population, while in the highest deprivation areas, Māori DSIs are 19-26% higher compared to the population proportion that is Māori (Deprivation Indices 8-10). Refer to Figure 4 below.

Figure 4: 2013-2017 Proportion of Rural DSIs and Population by Deprivation Index – Māori and non-Māori

Proportion Rural DSIs (2013 - 17) and Population by Deprivation Index : Māori and Non Māori				
Deprivation Index	Māori		Non-Māori	
	DSIs	Population	DSIs	Population
1	14%	5%	86%	95%
2	15%	7%	85%	93%
3	16%	7%	84%	93%
4	17%	9%	83%	91%
5	21%	11%	79%	89%
6	26%	13%	74%	87%
7	24%	15%	76%	85%
8	29%	18%	71%	82%
9	43%	24%	57%	76%
10	60%	34%	40%	66%
Blank	19%	2%	81%	98%
Total	22%	14%	78%	86%

This is not the case for urban DSIs, where the proportion of DSIs is 3-6% greater than the proportion of population across all deprivation indices for Māori. Refer to Figure 5 below.

²⁵ NZTA, 2019. Road Safety Outcomes Q2 2019/20, <https://www.nzta.govt.nz/resources/road-safety-outcomes>

²⁶ Mackie Research, 2019. *Road Safety Outcomes for Māori literature review*, p6 (Refer Appendix C: Road Safety Outcomes for Māori Literature Review).

²⁷ Mackie Research, 2019. *Road Safety Outcomes for Māori literature review*, p9 (Refer Appendix C: Road Safety Outcomes for Māori Literature Review).

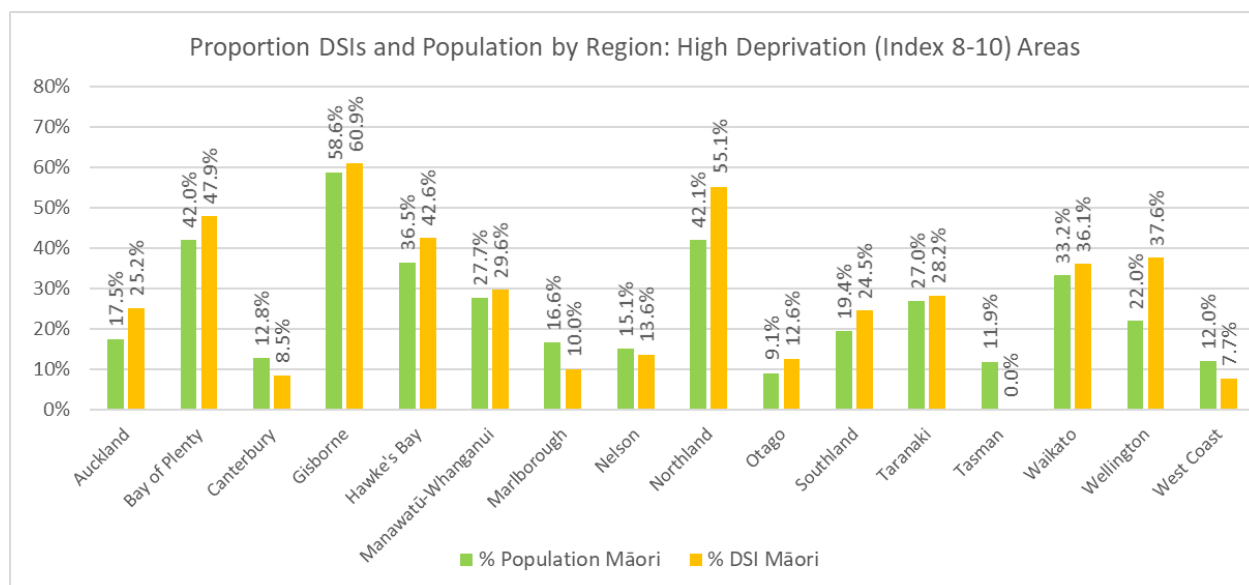
²⁸ The New Zealand Deprivation Index (NZDep) is a census based New Zealand small -area index of relative socio-economic deprivation. It is created from census data and uses a deprivation range from 1 (low) to 10 (high) based on a number of social and economic factors.

Figure 5: 2013-2017 Proportion of Urban DSIs and Population by Deprivation Index - Māori and non-Māori

Proportion Urban DSIs (2013 - 17) and Population by Deprivation Index : Māori and Non Māori					
Deprivation Index	Māori		Non-Māori		
	DSIs	Population	DSIs	Population	
1	8%	5%	92%	95%	
2	12%	7%	88%	93%	
3	12%	7%	88%	93%	
4	15%	9%	85%	91%	
5	17%	11%	83%	89%	
6	16%	13%	84%	87%	
7	19%	15%	81%	85%	
8	23%	18%	77%	82%	
9	30%	24%	70%	76%	
10	39%	34%	61%	66%	
Blank	14%	2%	86%	98%	
Total	21%	14%	79%	86%	

If we look at the Deprivation Index by region, focusing only on high deprivation urban areas (indices 8-10), the data show that, broadly speaking, the proportion of Māori DSIs occurring in high deprivation urban areas approximates the proportion of the population in these areas that is Māori. This appears to further support the link between social deprivation and road safety outcomes. However, there are large variations between regions. Refer to Figure 6 below.

Figure 6: 2013-2017 Proportion of DSIs and Population by Region in High Deprivation (indices 8-10) areas for Māori



In all North Island regions, Māori experience a higher proportion of DSIs relative to the proportion of the population that are Māori. This is particularly the case in Auckland, Hawke's Bay, Northland and Wellington, where the proportion of DSIs that are Māori is 7-16% higher than the proportion of the population that is Māori in high deprivation areas. While a similar trend is apparent in Southland and Otago, for the remainder of the South Island regions, Māori make up a lower proportion of DSIs than of the population in high deprivation areas, especially in Marlborough and Tasman, with proportions of Māori DSIs 7-12% lower than the proportion of Māori population.

It is not clear what influences these variances, but it should be noted that the Deprivation Index relates to place of residence and DSIs (CAS records) are not linked to place of residence e.g. some crashes will happen in a high deprivation area but those involved will live elsewhere. We need to do more work to understand why there is an over-representation of Māori DSIs in rural high deprivation areas, but not in

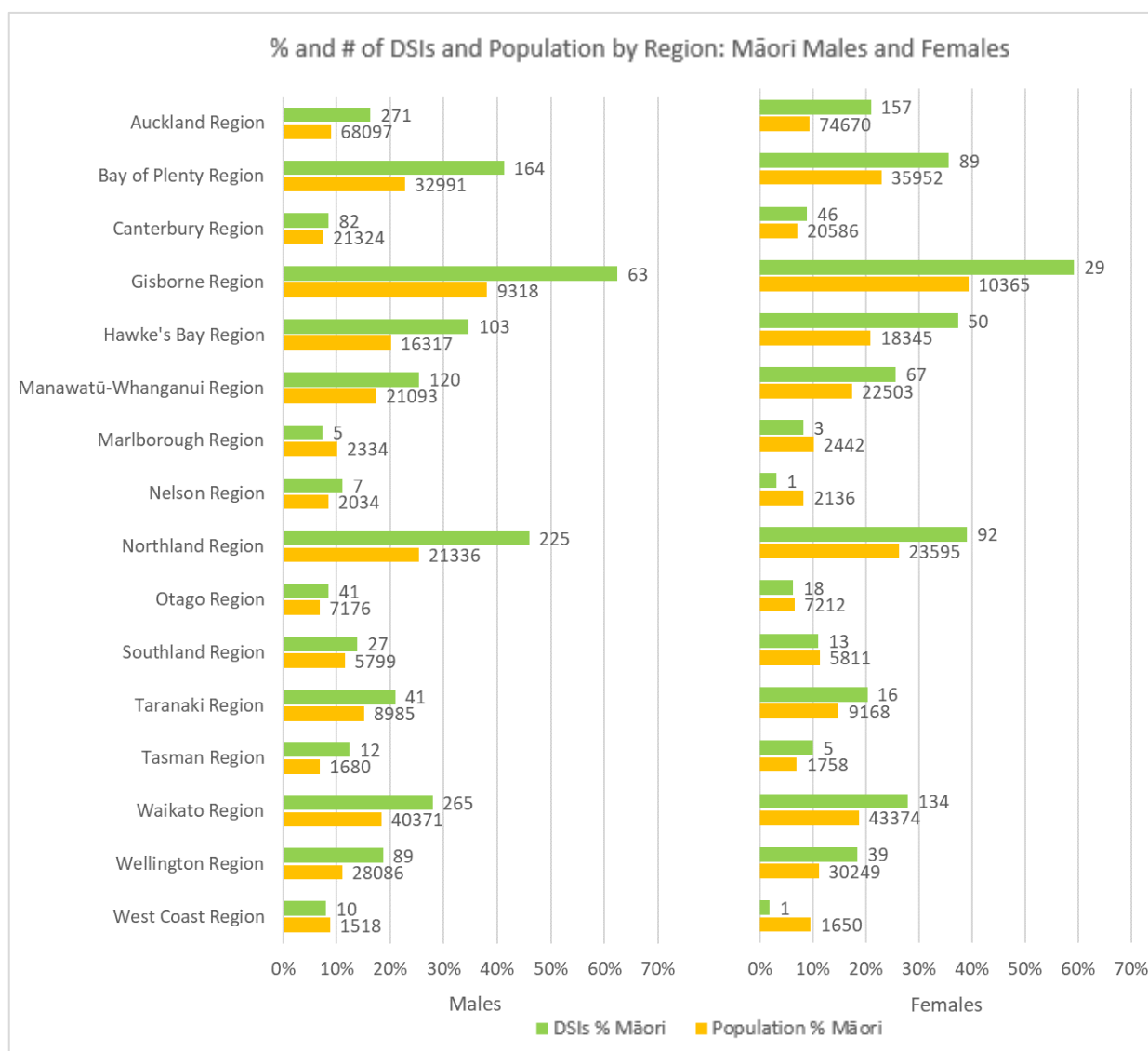
urban high deprivation areas. To understand some of the variances in the data above, we need to explore what relationship, if any, place of residence (by deprivation index) of those involved in crashes has to the location of a crash.

5.3 Geographic distribution

Road traffic injury rates vary across Aotearoa New Zealand, with some regions experiencing much higher per capita rates than others.²⁹

In some regions, Māori make up a much greater proportion of DSIs than of the total population. The three regions with the highest proportions of DSIs in relation to the proportion of the population are Gisborne, Northland and Bay of Plenty as shown in Figure 7 below. This is the case for both men and women.

Figure 7: Percentage and Number of DSIs relative to Population by Region for Māori Males and Females, 2013-2017

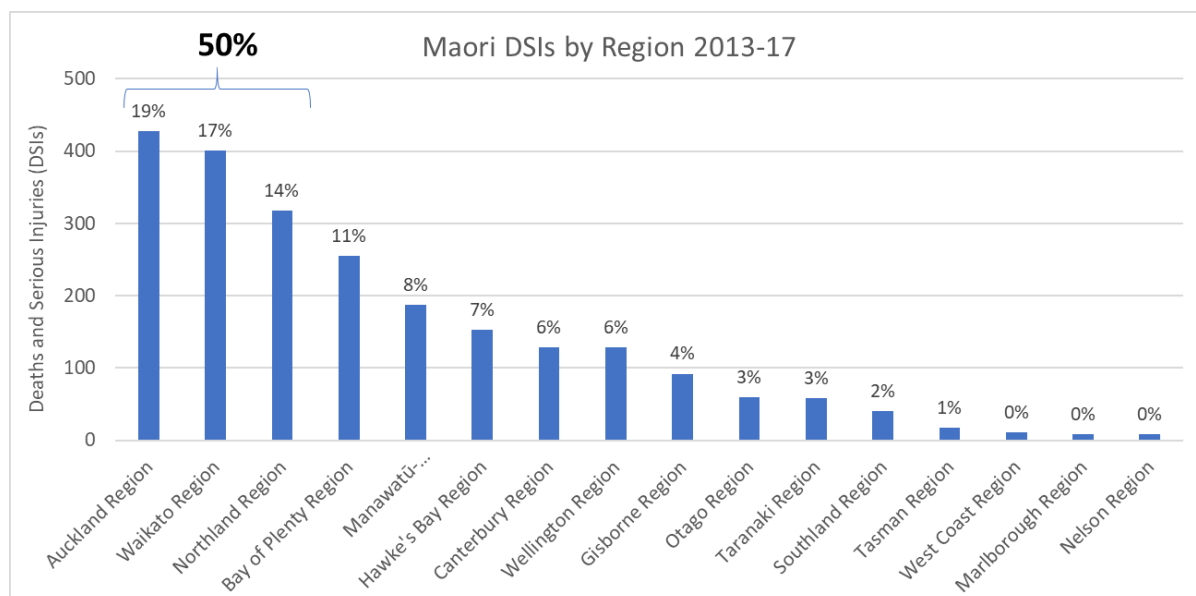


However, if we compare the numbers of DSIs across regions (rather than proportions), Auckland, Waikato and Northland combined contributed to half of all Māori DSIs from 2013-2017 (Figure 8). In Auckland and

²⁹ Mackie Research, 2019. *Road Safety Outcomes for Māori literature review*, p10 (Refer Appendix C: Road Safety Outcomes for Māori Literature Review).

Waikato, this is due at least in part to larger Māori population sizes, which increase exposure to traffic risk and therefore crash death and serious injury.

Figure 8: Māori DSIs by Region 2013 - 2017



This indicates that detailed investigation into the factors contributing to Māori DSI in these locations would provide a clearer understanding of where and how best to focus efforts of addressing road safety outcomes for Māori in Phase 2.

5.4 Road network distribution

5.4.1 Urban and rural roads

The literature review noted that, among the general population, crash fatality rates tend to be higher in rural areas with lower population densities than in urban areas, while serious injury rates tend to be highest in minor urban areas followed by rural areas.³⁰

Based on CAS data from 2013-2017, the location of DSIs in relation to rural roads (defined by 80-110kph speed limits) and urban roads (defined by 5-70kph speed limits) show no significant differences for Māori. There is also no significant variation by gender, though a slightly greater proportion of DSIs occur in rural areas for Māori women compared to non-Māori women. Among both populations, for both men and women, a slightly greater proportion of DSIs occur in rural areas (54-57%) than in urban areas (Figure 9).

Figure 9: 2013-2017 DSIs by Gender, Ethnicity and Rural/Urban Split

DSIs 2013 - 17 by Gender, Ethnicity and Rural/Urban Split				
Urban/Rural	Urban # DSIs	Rural # DSIs	Total # DSIs	% of DSIs that are Rural
Male Maori	679	846	1525	55.5%
Male Non-Maori	2485	3018	5503	54.8%
Female Maori	327	433	760	57.0%
Female Non-Maori	1286	1503	2789	53.9%
Total	4777	5800	10577	54.8%

5.4.2 Speed limits

CAS data from 2013-2017 shows the proportion of DSIs for Māori on 100kph roads was 49%, which is similar to the proportion for non-Māori (47%). Likewise, the proportion of DSIs for Māori on 50kph roads

³⁰ Mackie Research, 2019. *Road Safety Outcomes for Māori literature review*, p10 (Refer Appendix C: Road Safety Outcomes for Māori Literature Review).

was 37%, compared to 38% for non-Māori, showing there is little difference between Māori and non-Māori for distribution of DSIs based on the speed limit of the road.

5.4.3 Crash movement types

Overall the most common types of movements resulting in DSI crashes are the same for Māori and non-Māori, with loss of control on a bend involved in the greatest number of DSIs, followed by loss of control on a straight road, head-on crash, and pedestrian crossing a road. The largest difference between Māori and non-Māori is that a third more Māori DSIs occur as a result of a loss of control on a bend (36%) than for non-Māori (24%). Proportions of DSIs for other movement types are generally similar.

The differences are more pronounced when we compare movement codes with road type. For urban roads (defined by 5-70kph speed limits), 26% of Māori DSIs result from loss of control on bend movements. This compares to 15% for non-Māori. For rural roads (defined by 80-110kph speed limits), 43% of Māori DSIs result from loss of control on bend movements compared to 32% for non-Māori. For most other crash types, Māori DSI rates are similar or lower than those for non-Māori. Refer to Figure 10 and Figure 11 below.

Figure 10: 2013-2017 DSIs by Movement Type – Māori and non-Māori – Urban (defined by 5-70kph roads)

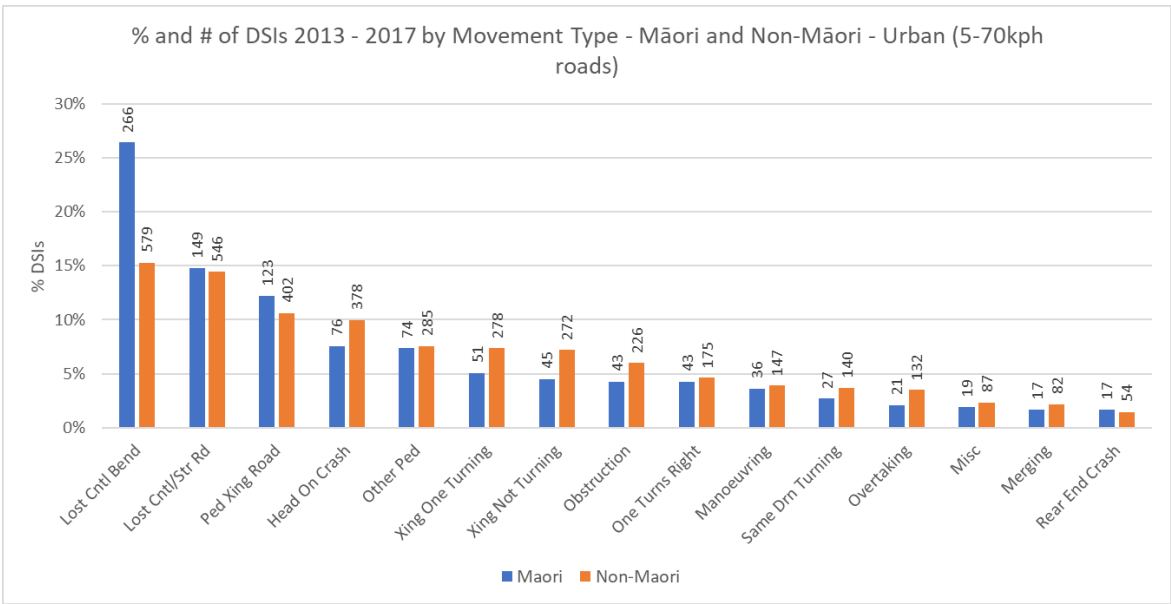
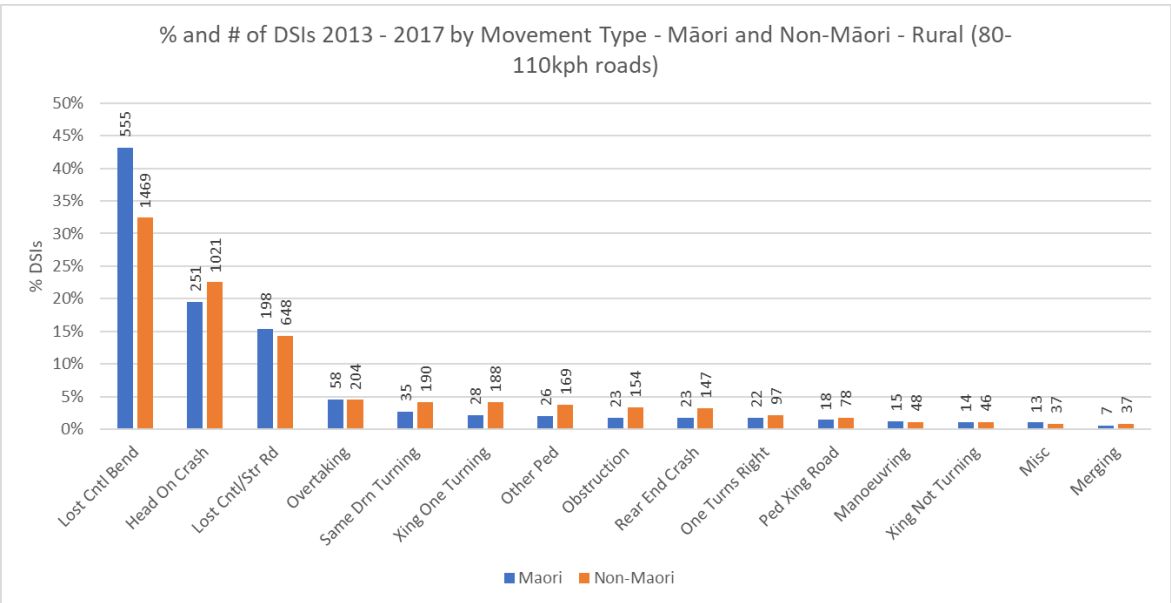


Figure 11: 2013-2017 DSIs by Movement Type – Māori and non-Māori – Rural (80-110kph roads)

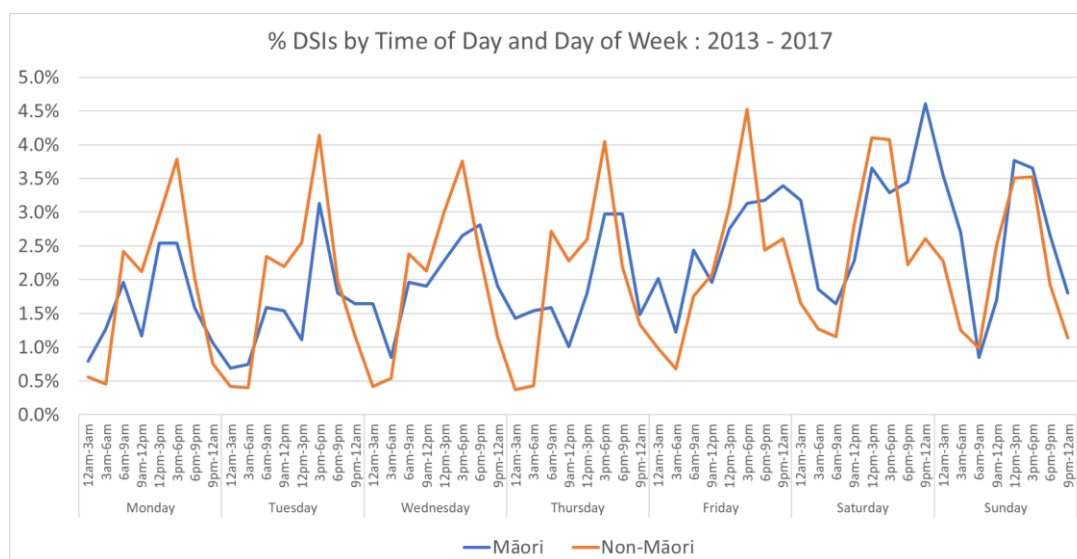


To get a better understanding of why DSI rates for loss of control on bend movements are significantly higher for Māori (especially on urban roads) we need to investigate what contributing factors may be present in these crashes.

5.4.4 Time and day of the week

The 2013-2017 CAS data show differences between Māori and non-Māori in relation to when DSIs occur during the week. For non-Māori, the 3pm-6pm weekday time-bands have the highest proportion of DSIs. While there is a similar 'peak' for Māori during these 3pm-6pm weekday time-bands, the 'peaks' and 'troughs' for proportions of DSIs are not as pronounced for Māori as for non-Māori. Saturday nights from 6pm to after midnight show high proportions of DSIs for Māori; this is not the case for non-Māori. On Sundays from 6am to midnight, DSI proportions are almost identical for Māori and non-Māori (refer to Figure 12 below).

Figure 12: 2013-2017 DSIs by Time of Day and Day of Week- Māori and non-Māori



We need to do further research to understand what is contributing to the differences in DSI rates for Māori and non-Māori in relation to time of day/night and day of week travel, and particularly in relation to Māori DSI rates throughout the night.

5.5 Modes of transport

5.5.1 All Modes

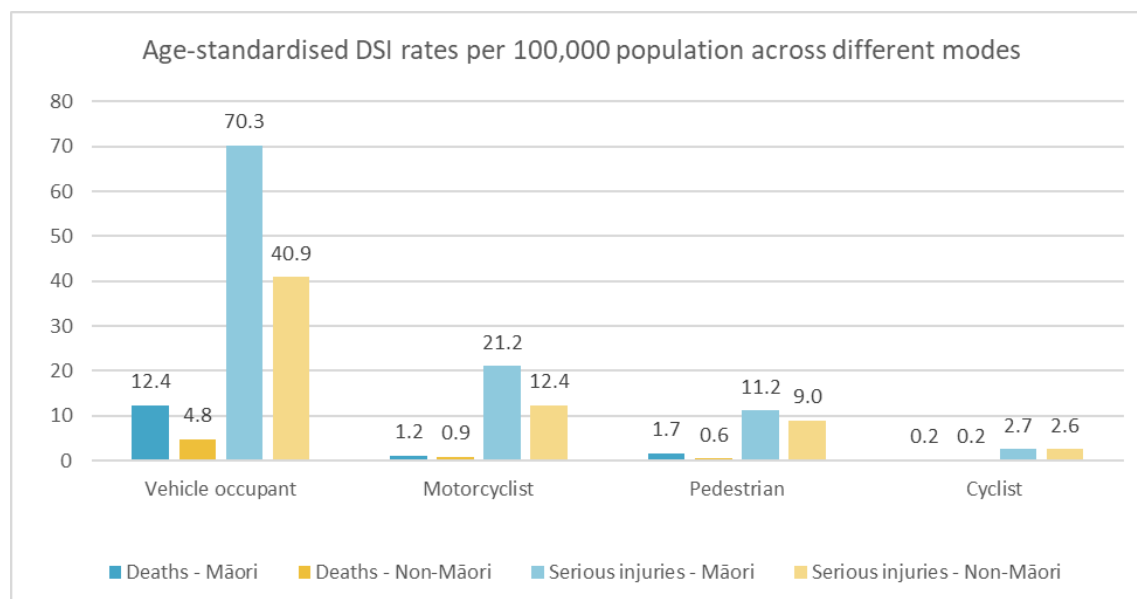
DSI rates vary across different modes and the literature review found that Māori experience higher rates of DSIs than non-Māori as both vehicle occupants and as pedestrians (Figure 13).

... using New Zealand Mortality Collection Dataset and National Minimum Dataset data, one study found that as vehicle occupants, age-standardised Māori fatality rates were 2.6 times as high as for non-Māori between 2005 and 2014. Similarly, hospitalisation rates from 2014-2016 were 1.8 times higher among Māori than non-Māori. For pedestrians, injury rates from the same periods were lower overall than those of vehicle occupants, but with Māori still over-represented. Māori pedestrians had a fatality rate 2.8 times as high as for non-Māori and a hospitalisation rate 1.2 times that for non-Māori (CPHR, 2018a).

Motorcycling injury rates were also higher among Māori than non-Māori in this study, though it should be noted that the European/Other population had comparably high hospitalisation rates to Māori. In contrast, cycling injury rates were similar across

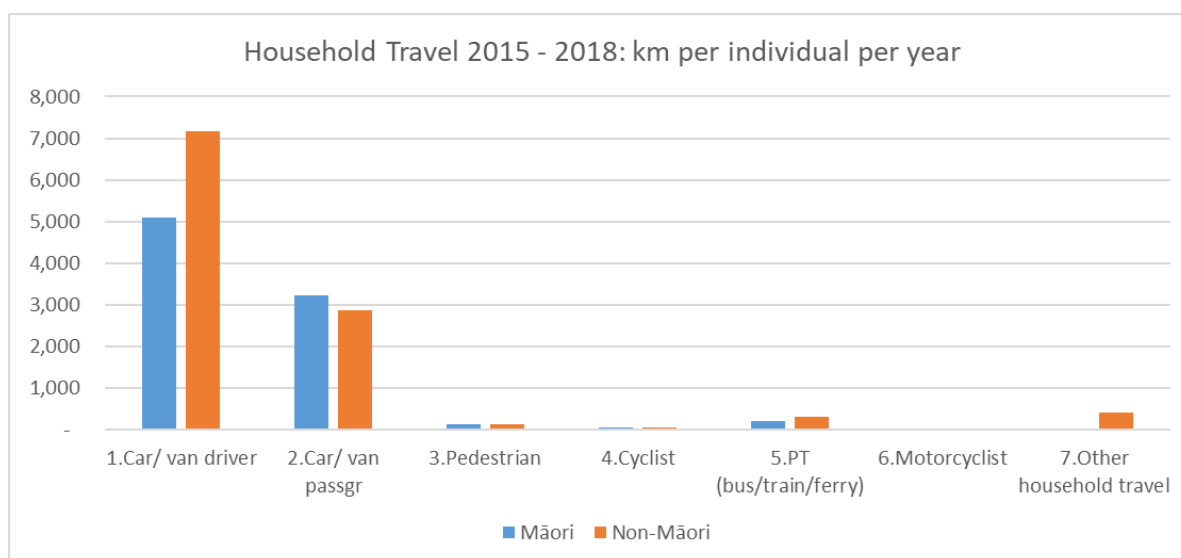
ethnicities, with Māori rates of 0.2 fatalities and 2.7 hospitalisations per 100,000 population similar to those of non-Māori (CPHR, 2018a).³¹

Figure 13: Road Traffic Deaths 2005-2014 and Hospitalisations 2014-2016, age-standardised rates per 100,000 population³²



Information from the household travel survey between 2015 and 2018 indicates that Māori travel less than non-Māori, with Māori travelling on average 9,068 km/year and non-Māori travelling 11,007 km/year. This is the case across all modes, except pedestrians where travel rates for Māori and non-Māori are roughly equal. Overall, car use dominates mode use with 92% travel for Māori by car compared to 91% for non-Māori (Figure 14).

Figure 14: 2015-2018 Household Travel: km per individual per year – Māori and non-Māori



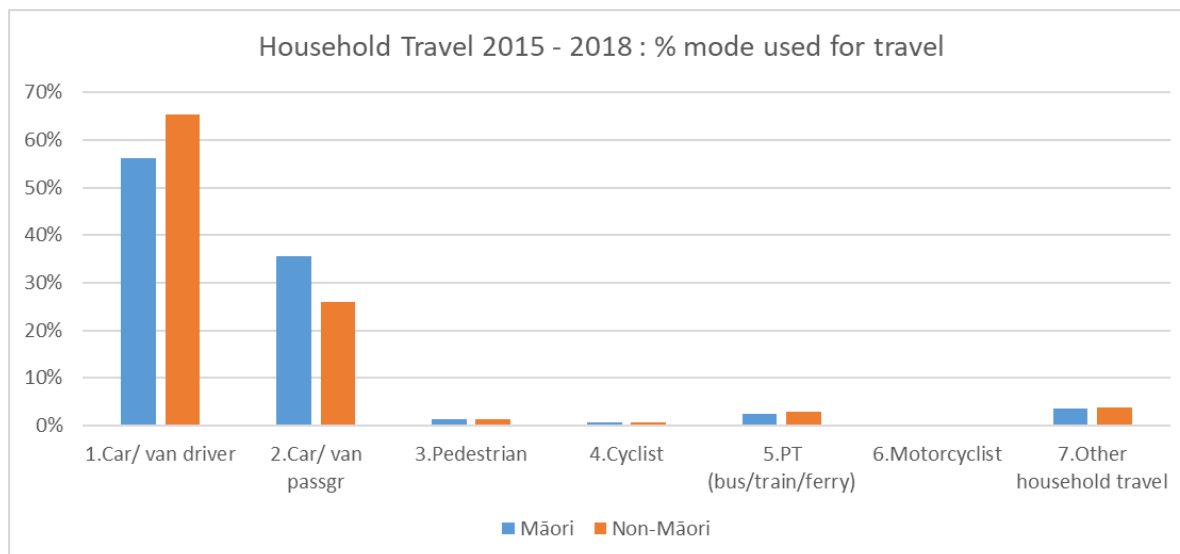
However, the kilometres travelled and proportion of use split between driver and passengers differs for Māori and non-Māori (Figure 15). Māori have higher levels of car passenger use, in line with DSI data presented below for passengers in DSI crashes. This means that when there is a crash the likelihood of a

³¹ Mackie Research, *Road Safety Outcomes for Māori literature review*, pp 6-7 (Refer Appendix C: Road Safety Outcomes for Māori Literature Review).

³² Source: CPHR data, 2018a. Based on New Zealand Mortality Collection Dataset and National Minimum Dataset.

DSI is higher for Māori as, on average, they tend to travel with more occupants (driver and passengers) per vehicle (refer to Section 5.5.2 Light vehicles below).

Figure 15: 2015-2018 Household Travel: % mode used for travel – Māori and non-Māori



Consistent with this household travel data suggesting higher vehicle occupancy rates among Māori, the literature review noted that while Māori are also over-represented as drivers in DSI crashes, this is to a lesser extent than the rate at which they are over-represented as casualties in these crashes.

Regardless of driver fault and of whether there were driver casualties, Māori are over-represented as drivers involved in road traffic crashes, and rates are increasing (NZ Police, 2018a). This is demonstrated by traffic crash report data showing Māori drivers were involved in 17% of all injury crashes³³ in 2016 compared to 12% in 2013 (MoT, 2014; MoT data, 2017). Māori driver representation in serious injury and fatal crashes has also risen since 2013, making up 20% and 23% of drivers involved in serious injury and fatal crashes in 2017 (c.f. 14% and 19% respectively in 2013; MoT, 2014; MoT data, 2017). ... However, the proportion of injury crashes involving Māori drivers remains lower than that involving Māori casualties (NZ Police, 2018a).

It would be useful to explore the results of the Household Travel Survey in more detail to see if it can contribute to our understanding of road safety outcomes for Māori in relation to modes of transport, purpose of travel, and risk factors.

5.5.2 Light vehicles

The literature review found that vehicles older than 14 years are over-represented in Māori DSI crashes compared to the overall national rate of vehicle registration. It suggested there may be links between social deprivation and vehicle safety contributing to high Māori DSI rates.³⁴

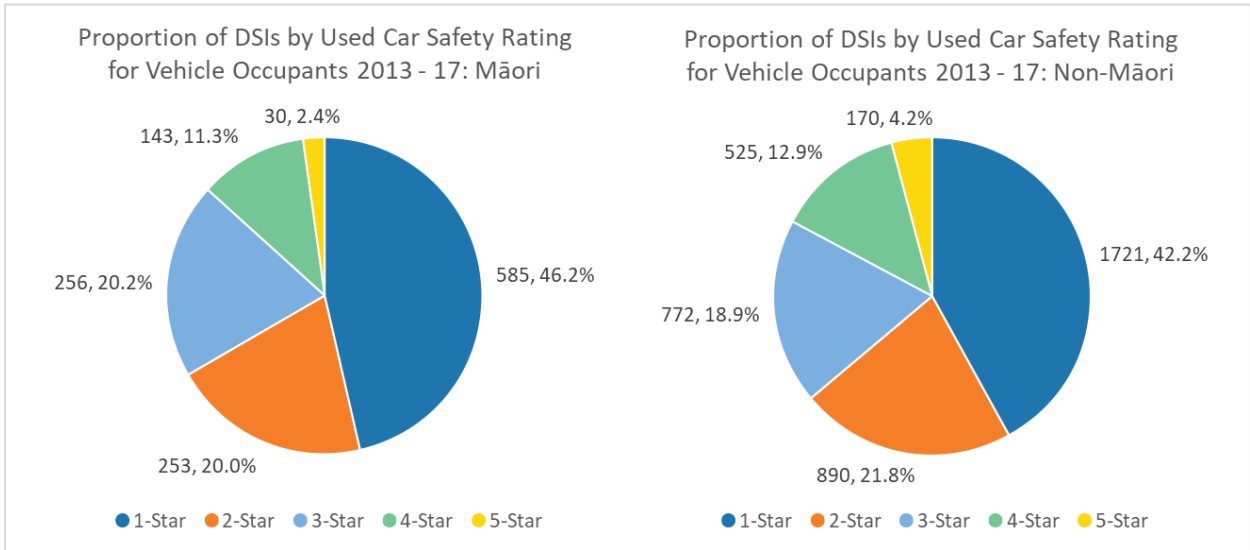
Until recently the age of a vehicle has been used as a proxy for determining the safety of a vehicle. While the age of a vehicle can provide an indication of the availability of safety technology fitted at the time of manufacture (e.g. Electronic Stability Control prevalent from 2009), this does not automatically confer a level of safety performance. Nor does it automatically imply the presence of specific safety features. For example, the presence of an airbag will provide some head protection but if the integrity of the occupant cabin fails, death or serious injury is likely to occur. While 1- and 2-star safety rated vehicles are typically older, there are also older 3- to 5-star safety rated vehicles in the same age brackets. A 5-star vehicle, regardless of age, will provide better protection than a 1-star vehicle. Therefore, it is important to note that age of the vehicle is not an absolute predictor of vehicle safety.

³³ For which racial appearance data is recorded (70%)

³⁴ Mackie Research, *Road Safety Outcomes for Māori literature review*, pp 6-7 (Refer Appendix C: Road Safety Outcomes for Māori Literature Review).

To determine if Māori DSIs are occurring in less safe cars than non-Māori, we manually matched approximately 86% of light vehicles involved in DSI crashes (from 2013-2017 CAS data) to determine their safety rating. The data indicate that there is no significant difference in the proportion of DSI crashes in which 1-star and 2-star safety-rated vehicles are involved for Māori (66.2%) and non-Māori (64.0%). Refer to Figure 16 below.

Figure 16: 2013-2017 Proportion and Number of DSIs by Used Car Safety Rating for Māori and non-Māori – all vehicle occupants

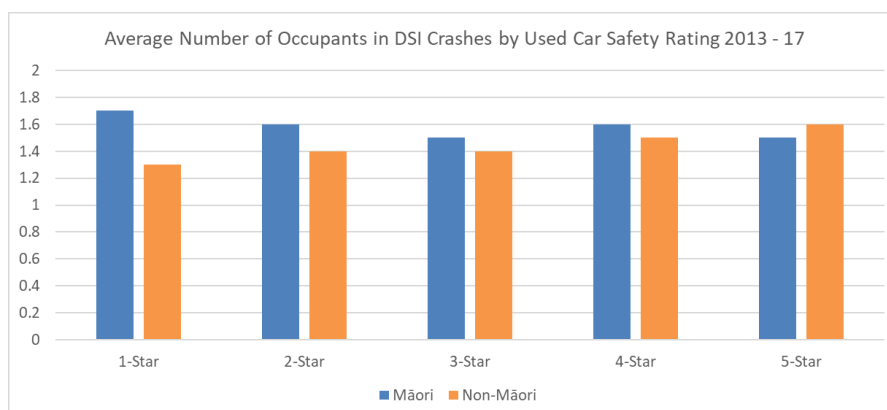


Similarly, for Māori drivers in 1- and 2-star safety-rated vehicles, the proportion of DSIs in crashes was 64.9% compared to 65.2% for non-Māori drivers.

The proportions of DSIs by car safety rating for Māori and non-Māori drivers were further examined to determine if there were any regional differences or differences in road type (rural/urban). The data indicated that there are no significant variances between the proportions of DSIs in 1- and 2-star safety-rated vehicles in relation to region or road type.

A notable difference between Māori and non-Māori occupants (drivers and passengers) in relation to light vehicles was that the average number of occupants in 1- and 2-star safety-rated vehicles involved in DSI crashes is generally higher for Māori. However, the average number of occupants for Māori and non-Māori drivers is similar in higher safety-rated vehicles (3- to 5-star). The number of DSIs for Māori are therefore likely to be higher in crashes involving 1- and 2-star safety-rated vehicles because there are generally more occupants in vehicles that offer them less protection in the event of a crash. The average number of occupants in a 1-star safety-rated vehicle with a Māori driver involved in a DSI crash is 1.7 compared to an average of 1.3 occupants for non-Māori drivers (a 31% difference in occupancy rates). Refer to Figure 17 below.

Figure 17: 2013-2017 Average Number of Passengers in DSI Crashes by Used Car Safety Rating – Māori and non-Māori



This is supported by the literature review, which found the proportion of injury crashes involving Māori drivers remains lower than those involving Māori casualties. This could indicate that a substantial proportion of crashes resulting in Māori casualties do not involve a Māori driver, or that crashes involving Māori drivers result in a higher number of casualties on average, possibly due to higher vehicle occupancy rates.³⁵

5.5.3 Motorcycles and mopeds

While data from the literature review suggest Māori are more likely to be seriously injured or killed as motorcyclists than are non-Māori (though their rates are comparable to the European ethnic group), our analysis has not supported this.

CAS data show there were 2,058 DSIs (where ethnicity was recorded) involving motorcycle and moped riders over the 2013 – 2017 period. A total of 320 of these DSIs (15.5%) were Māori and 1738 (84.5%) were non-Māori. This suggests Māori DSI rates are almost in line with the proportion of the population that is Māori (15.4%). It would be useful to also understand whether Māori motorcycle rates (i.e. vehicle kilometres travelled) are similar to those of non-Māori.

There are significant regional variances in numbers and proportions of DSIs involving Māori motorcycle and moped riders. The highest numbers of motorcycle and moped DSIs for Māori from 2013-2017 occurred in Waikato (67; 23% of all DSIs), Auckland (59; 12% of all DSIs), and Northland (39; 30% of all DSIs). However, the regions with the highest proportions of motorcycle and moped DSIs involving Māori were Gisborne (45%) and Bay of Plenty (36%).

5.6 Licence status

The status, length of time and type of driver licence held have varying levels of associated risk. As Schiff (2019) outlines in the “Evaluation of the Graduated Driver Licensing System: Technical Report”, people on a restricted licence are twice as likely to crash as people with a learner’s or full licence. This risk is even higher within the first few months of a driver gaining a restricted licence. Likewise, people who hold a learner’s licence for an extended period (longer than four years) are at increased crash risk. The age of the driver on a restricted licence also influences risk, with 17- to 18-year old licence holders being at greater risk. Schiff also found that fully licensed drivers are around 23% less likely to crash than drivers with restricted licences after controlling for driver age, gender, region of residence, and amount of time since obtaining a licence.

The literature review found that driving unlicensed is often a factor in road traffic crashes involving Māori and summarised this as likely to contribute to Māori over-representation in crash DSIs. The review also linked unlicensed driving to Māori living in high deprivation or rural areas, and negative experiences of the driver licensing system.

³⁵ Mackie Research, *Road Safety Outcomes for Māori literature review*, pp 8-9 (Refer Appendix C: Road Safety Outcomes for Māori Literature Review).

Several factors related to unlicensed driving were identified in the literature. The first is deprivation, with Māori living in high deprivation areas 5-7 times more likely to drive unlicensed frequently or over substantial distances than non-Māori living in high deprivation areas, compared to a 30%-70% greater likelihood for Māori compared to non-Māori living in low deprivation areas. Māori may additionally experience or anticipate cultural discomfort when accessing licensing services. This was evident in an early Ngāti Kahungunu study in participant references to the barrier of feeling 'whakamā', or unconfident to participate in these kinds of processes without support. More recent qualitative research among South Island rangatahi Māori supports these findings, reporting that access to money and resources, confidence, and sympathetic driving supervisors all influenced their progress through the licensing system.

Māori in rural areas are also more likely to drive unlicensed. This is evident in the findings of a questionnaire completed by Māori learner drivers across Aotearoa New Zealand in the late 2000s, in which two thirds of urban (65%) and 83% of rural-dwelling participants had driven unlicensed on the road before.

Māori males report driving unlicensed more often, over greater distances, and at a younger age than Māori females, however, more females reported having been in a serious traffic crash than males. A 2013 study also found that being female, Māori, and/or from more deprived areas was associated with a lower likelihood of progressing from a learner to a full licence compared to participants who were male, non-Māori, and from less deprived areas.

Driving before having a licence has also been found to be related to other risky behaviours such as cannabis use, hazardous drinking, sensation-seeking, and aggression. Finally, the main reported reasons for driving unlicensed in one study were to learn to drive (36%) and to be the sober driver (14%), and this varied little between urban and rural Māori. Recent research also points to emergencies, being a sober driver, and picking up siblings when parents are unable to as justifications for unlicensed driving, and suggests unlicensed driving among rangatahi Māori is more normalised in rural areas.³⁶

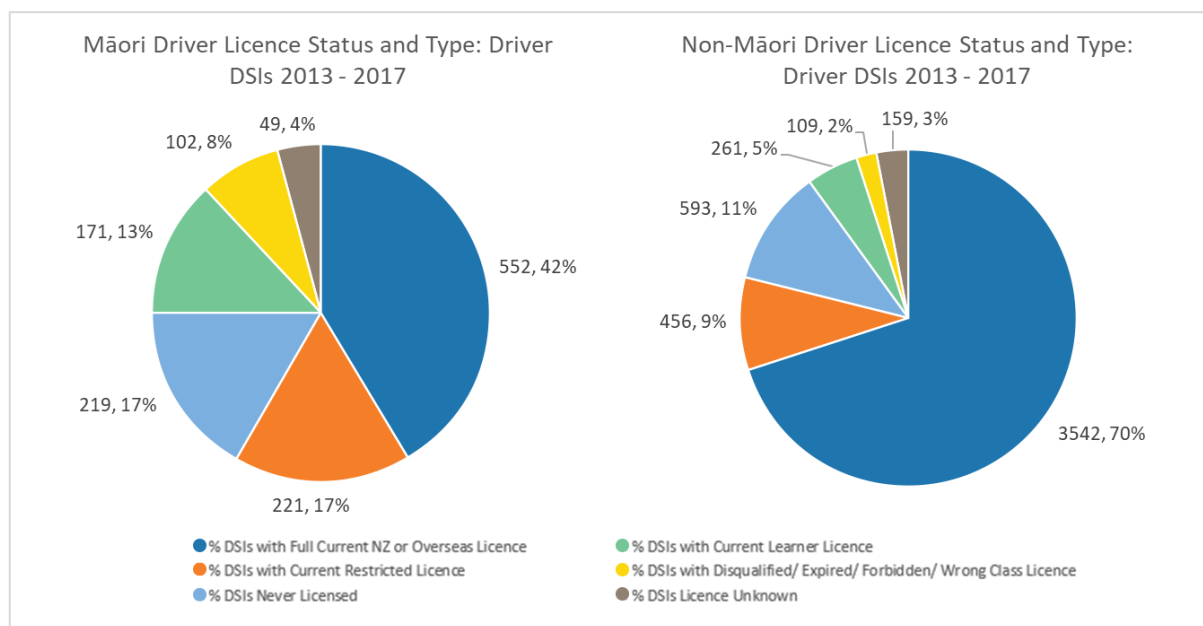
In addition, the literature review notes links between unlicensed driving and police pursuits, with an increasing proportion of police pursuits involving Māori, and a high rate of pursuits involving unlicensed Māori aged 15 and 16 years old.

The driver licence type and status of drivers in DSI crashes from 2013-2017 was analysed to determine if there were any differences for Māori and non-Māori. Note that DSIs here are for the driver only and do not include other DSIs in these crashes (eg vehicle passengers or other road users).

The analysis shows that Māori drivers in DSI crashes have a lower proportion of current full driver licences (42%) than non-Māori (70%) regardless of gender (see Figure 18).

³⁶ Mackie Research, *Road Safety Outcomes for Māori literature review*, pp 12-13 (Refer Appendix C: Road Safety Outcomes for Māori Literature Review).

Figure 18: 2013-2017 Māori and Non-Māori Driver Licence Status and Type: Driver DSIs



Māori drivers in DSI crashes were four times more likely to have never had a driver's licence (8%) compared to non-Māori drivers (2%). Māori drivers in DSI crashes were also more than twice as likely to have a disqualified or expired licence, been forbidden to drive, or be driving on the wrong class of licence (13%) than non-Māori drivers (5%). There is some variation across regions, though the overall trend is the same.

Interestingly, the literature review noted that Māori may perceive the risk of enforcement differently from non-Māori:

Māori participants also more frequently reported believing they would be unlikely to get caught if they exceeded the speed limit by more than 20km/h (54% cf. 44% of the overall sample), though for most other risk-taking beliefs (e.g. around alcohol consumption) their responses reflected those of other participants (Hatfield et al., 2019). Despite few differences in perceived likelihoods of being caught, qualitative data from the study indicates that Māori feel targeted for enforcement, particularly if they are young, drive a vehicle in a poor condition, or wear 'hoodies' (Hatfield et al., 2019). This aligns with the findings of a much earlier qualitative study in the Ngāti Kahungunu rohe in Hawke's Bay, in which participants reported being unfairly targeted by police (Te Taiwhenua o Heretaunga, 2002). Participants in that study also indicated that people who could not afford to comply with vehicle and licensing regulations were also those who were most likely to engage in risky driving behaviour (Te Taiwhenua o Heretaunga, 2002).³⁷

Schiff recommended that further analysis of the reasons for non-progression through the licensing system and the relationship between those factors and crash rates would be useful to determine how road safety outcomes could be improved for this cohort of drivers. Similarly, more research and engagement with Māori are required to explore the relationship between the length of time Māori drivers are on learner's or restricted licences and the constraints they face in accessing driver training, moving between licence classes, travelling to and from licence tests, and other barriers to licensing.

5.7 Restraint use

5.7.1 Seatbelt use

Wearing an appropriate seatbelt or restraint increases the chance of surviving a crash by 40%.³⁸ The literature review found that not wearing a seatbelt or appropriate restraint was a factor in the over-

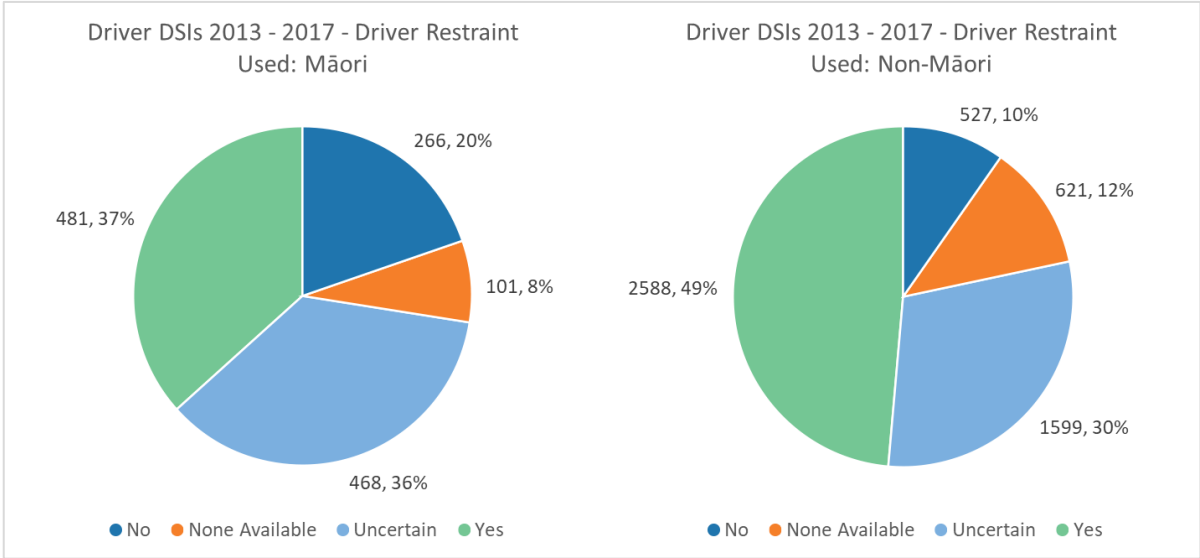
³⁷ Mackie Research, *Road Safety Outcomes for Māori literature review*, pp 12-13 (Refer Appendix C: Road Safety Outcomes for Māori Literature Review).

³⁸ <https://www.nzta.govt.nz/safety/driving-safely/seatbelts/seatbelt-advertising/>

representation of Māori in DSI crashes and that tamariki Māori are also more likely to be restrained with seatbelts rather than the legally required child restraints for under 7-year-olds.³⁹

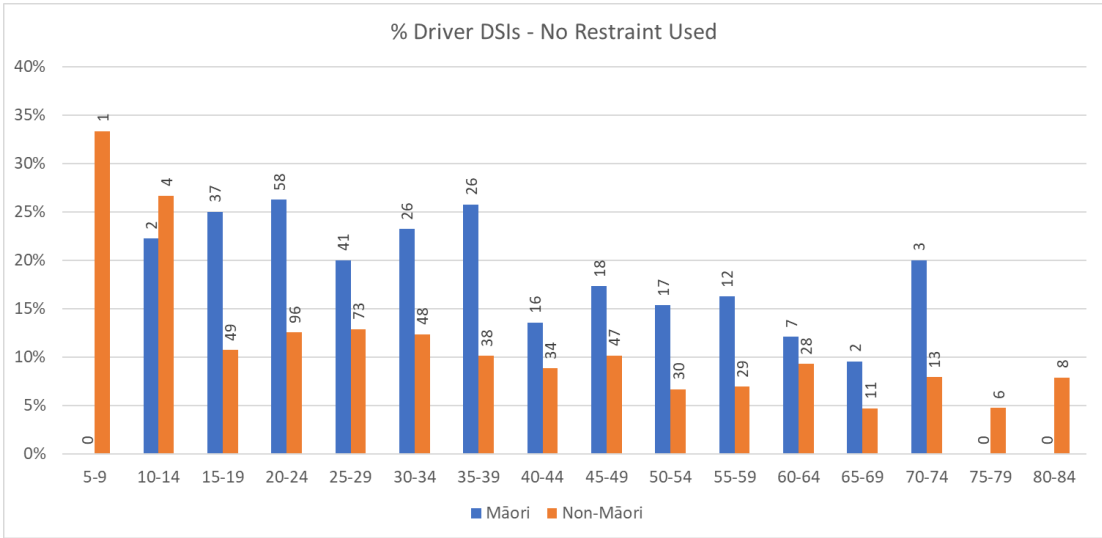
CAS data for 2013 – 2017 was analysed to provide an up to date analysis of restraints as a factor in Māori DSIs. This analysis showed that 20% of Māori driver DSIs were not wearing a seatbelt, compared to 10% for non-Māori. (Note: The ‘None available’ category in the data predominantly refers to a motorcycle or moped DSI). Refer to Figure 19 below.

Figure 19: 2013-2017 Driver DSIs – Māori and Non-Māori Driver Restraint used



There are variances in the proportion of DSIs for drivers not wearing a seatbelt by age band for both Māori and non-Māori. Māori drivers were less likely to wear a seatbelt across all age bands, but especially for ages 15-39. While the variances between age bands are less pronounced for non-Māori, the percentage of DSIs for non-Māori drivers not wearing a seatbelt are also higher for ages 15-39. Refer to Figure 20 below. Note that overall a slightly lower proportion of Māori DSIs (8%) than non-Māori DSIs (12%) occurred in cases where no seatbelt was available.

Figure 20: Driver DSIs 2013-2017 – No restraint used: Māori and non-Māori⁴⁰



³⁹ Mackie Research, *Road Safety Outcomes for Māori literature review*, p 13 (Refer Appendix C: Road Safety Outcomes for Māori Literature Review).

⁴⁰ In the 2013-2017 time period, there were three driver DSIs aged 5-9 years and 15 driver DSIs aged 10-14 years where no restraint was used

The data show that not wearing a restraint is a significant factor in relation to driver deaths. In 2013-2017 44% of Māori driver fatalities were not wearing a seatbelt, compared to 21% for non-Māori driver fatalities. Data for serious injuries showed that 16% of Māori drivers who sustained a serious injury were not wearing a seatbelt, compared to 8% of non-Māori drivers. The data also showed that 35% of Māori passenger fatalities were not wearing a seat-belt, compared to 24% of non-Māori passenger fatalities. It should be noted that the small numbers in the 5-14 age cohorts should be taken into account when considering the significance of the percentages for this cohort.

Again, more research and engagement with Māori is required to understand why Māori are less likely to wear a restraint while driving.

5.7.2 Helmet use

For 2013-2017, data in CAS relating to helmet use by motorcyclists and cyclists is often variable and can be problematic to analyse with any certainty. Investigation into alternative data sets (eg ACC or Worksafe data) may provide insights into Māori road safety outcomes related to helmet wearing.

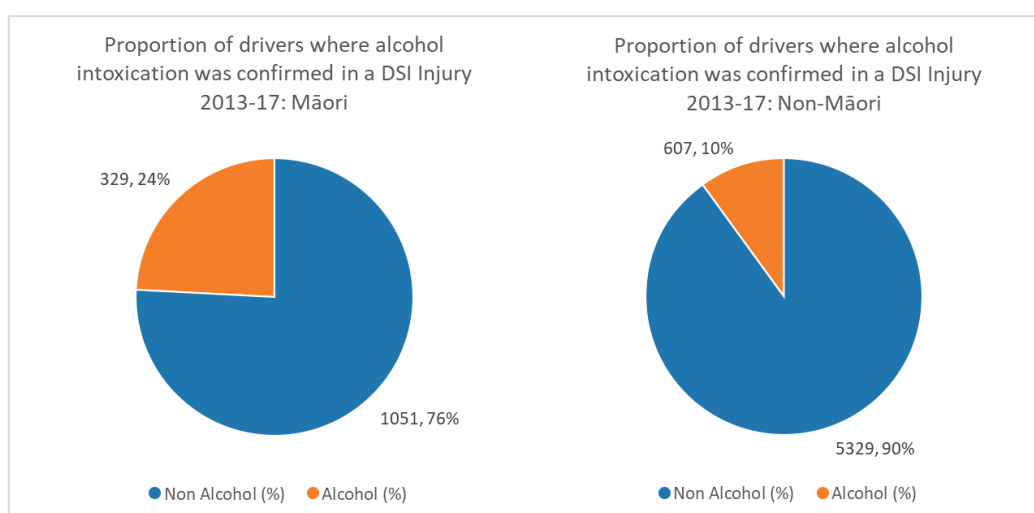
5.8 Impairment

5.8.1 Alcohol and drugs

The literature review found that alcohol and drugs were a factor in approximately 35% of fatal and 12% of serious injury crashes across the total population in 2018.⁴¹ It also found that alcohol use is a factor in more DSIs involving Māori (as casualties and/or drivers) than those involving non-Māori. Alcohol is also linked to other factors, for example in one study it was implicated in around 54% of fatalities where the casualty didn't wear a seatbelt.⁴² There is also some indication that Māori have higher rates of driving under the influence of drugs.

CAS data for 2013 -2017 shows that Māori drivers who were killed or seriously injured in a crash had higher (confirmed) rates of alcohol above the legal limit⁴³ compared to non-Māori drivers. A total of 24% of Māori drivers seriously injured or killed in crashes had alcohol intoxication confirmed, compared with only 10% for non-Māori drivers. Refer to Figure 21 below.

Figure 21: 2013-2017 Proportion of Drivers where Alcohol was a Confirmed Factor in a DSI Injury – Māori and non-Māori



⁴¹ Mackie Research, *Road Safety Outcomes for Māori literature review*, p 13 (Refer Appendix C: Road Safety Outcomes for Māori Literature Review).

⁴² Mackie Research, *Road Safety Outcomes for Māori literature review*, p 13 (Refer Appendix C: Road Safety Outcomes for Māori Literature Review).

⁴³ Alcohol above legal limit: breath alcohol > 250 micrograms (mcg) of alcohol per litre of breath or a blood alcohol > 50mg of alcohol per 100ml of blood

Waka Kotahi and our road safety partners need to engage with Māori to understand how best to address the impact of alcohol use and driving for Māori. It should also investigate whether drug use plays a role in Māori road safety outcomes.

5.8.2 Distraction and fatigue

Fatigue is mentioned in the literature as potentially contributing to Māori road safety outcomes. Ngā Pirihimana o Aotearoa refer to higher reported sleepiness levels among Māori compared to non-Māori, potentially due to shift work; however, this report was not finalised and did not explore any systemic differences in reporting for Māori and non-Māori or if there is an over-representation of Māori in jobs that require shift work. The report also indicated there was an over-representation of Māori (18%) in crashes where fatigue was identified as a contributing factor. The literature reviewed did not report distraction, as a major contributing factor in crashes involving Māori.⁴⁴

For 2013-2017 data in CAS for fatigue and distraction is considered unreliably reported.

Investigation into alternative data sets (eg ACC or Worksafe data and the Household travel survey) may provide insights into road safety outcomes for both Māori and non-Māori in relation to distraction and fatigue. It may also help identify if there is a relationship fatigue and DSI rates for Māori in relation to time of day and day of week travel (refer section 5.4.4). Similarly, research disciplines that look at the impact of circadian rhythms and moon phases may highlight other causal factors in DSIs for Māori.

5.9 Speed

The literature review noted little available information on the influence of speeding on road safety outcomes for Māori:

In 2018, TCR data indicates that speed was a factor in approximately 22% of DSIs (NZTA data, 2019d), although this is likely to be an underestimate, due both to the way in which speed as a factor is defined, and the fact that speed estimates are often provided by the vehicle driver involved in a crash (Hirsch et al., 2018). Nonetheless, between 2004 and 2014, TCR data show Māori were over-represented in fatal crashes where speed was a factor, making up 32% of casualties in these (NZTA, 2015).

This was not explored further in the CAS data analysis and should be noted for further investigation.

The next section summarises the literature review and data analysis using a Safe System lens to identify and categorising gaps in our knowledge and identifying areas that need further explanation or research.

⁴⁴ Mackie Research, *Road Safety Outcomes for Māori literature review*, p 15 (Refer Appendix C: Road Safety Outcomes for Māori Literature Review).

6 SAFE SYSTEM KNOWLEDGE SUMMARY

Waka Kotahi takes a Safe System approach to road safety, recognising that “crashes are inevitable but deaths and serious injuries are not”⁴⁵

In order to better understand the different Safe System elements relevant to road safety for Māori, this section summarises the information from the literature review and data analysis using a Safe System lens and identifies gaps in our knowledge. Note that some knowledge gaps would be best filled using CAS and other quantitative data sources, while others may be most appropriately addressed using other methods. Prioritisation of which knowledge gaps to address should be done in partnership with Māori.

Data sources are noted as follows:

*CAS data 2013-2017

#Household Travel Survey data 2015-2018

^Literature review (Appendix C: Road Safety Outcomes for Māori Literature Review)

Topic	What we know	What else we want to know
General Crash Information		
Data accuracy	<ul style="list-style-type: none"> The Crash Analysis System (CAS) includes ethnicity data for those involved in a reported crash based on Police Officer observation, not necessarily what the people involved might have identified themselves as. 	<ul style="list-style-type: none"> How do we work with road safety partners to find ways to improve ethnicity data in CAS – for example working with hospital/ACC data?
Time and day	<ul style="list-style-type: none"> Māori DSI rates vary less throughout the day than non-Māori DSI rates, with a greater proportion of DSIs occurring in the early morning and a lesser proportion during the day than non-Māori.* The highest risk for Māori DSIs is on Saturday nights (almost 5% all Māori DSIs occurred between 9pm and 12am on Saturdays).* 	<ul style="list-style-type: none"> What other factors are commonly implicated in night-time crashes resulting in Māori DSIs (e.g. land use, crash movements, user factors, environmental factors)? Why do Māori DSI rates vary less during weekdays than those for non-Māori (e.g. employment patterns, regional variations)?
Region	<ul style="list-style-type: none"> DSI rates for Māori are highest in Gisborne, Northland and Bay of Plenty.* The highest overall numbers of Māori DSIs occurred in Auckland, Waikato and Northland, which combined make up 50% of all Māori DSI casualties.* 	<ul style="list-style-type: none"> How do crash factors vary between regions (e.g. time of day, crash movements, land use, user factors)?
Socio-economic factors	<ul style="list-style-type: none"> Māori are over-represented relative to their proportion of the population in crash DSIs at all deprivation levels, but even more so in rural than urban areas (8-26% higher than population proportion in rural areas c.f. 3-6% higher in urban areas).* In rural areas, DSI rates for Māori are higher in areas with higher levels of social deprivation (19-26% higher than population proportion in rural areas with 	<ul style="list-style-type: none"> How representative of place of residence is DSI crash location (i.e. do crash casualties mostly live in the same place as crashes occur)? What factors are involved in Māori DSI crashes occurring in high deprivation areas compared to those occurring in lower deprivation areas (e.g. crash movements, land use, speed limits, vehicle safety, user factors)?

⁴⁵ New Zealand Government (2019) Road to Zero: New Zealand's Road Safety Strategy 2020-2030. Wellington: Author.

	<p>NZDep>8, c.f. 8-13% at all other deprivation levels).*</p> <ul style="list-style-type: none"> • In all North Island regions, Māori experienced a higher proportion of DSIs compared to the proportion of the Māori population living in high deprivation (NZDep>8) areas (i.e. high deprivation does not fully account for DSI rates). This is particularly so in Auckland, Hawke's Bay, Northland and Wellington.* • In parts of the South Island (excluding Southland and Otago), Māori experienced a lower proportion of DSIs relative to the proportion of the population living in high deprivation areas (i.e. fewer DSIs than would be expected based on deprivation levels).* 	<ul style="list-style-type: none"> • Why do Māori in Canterbury and northern South Island regions have lower DSI rates relative to the proportion of the population that is Māori? What protective factors, if any, exist in these places?
Transport mode	<ul style="list-style-type: none"> • Māori and non-Māori experience similar DSI risk for travel by motorbike and bicycle.^ • 92% of household travel for Māori is by light vehicle (c.f. 91% for non-Māori).# • Māori travel less (fewer km) on average than non-Māori as vehicle drivers and public transport users, a similar amount to non-Māori as pedestrians and cyclists, and more than non-Māori as vehicle passengers.# • The proportion of motorcyclist DSI casualties that are Māori approximates the proportion of the population that is Māori.* 	<ul style="list-style-type: none"> • To what extent is crash risk related to vehicle kilometres travelled (VKT) for Māori? • What other road user types are involved in different DSI crash types for Māori and how many (e.g. single vehicle crash/vehicle-pedestrian crash)? • What other factors are implicated in vehicle DSI casualties for Māori (e.g. purpose of travel)? • What other factors are implicated in pedestrian DSI casualties for Māori (e.g. purpose of travel, land use, road function, location type, crossing facilities, speed limit)? • How many km do Māori travel by motorbike per year and how does this relate to the proportion of motorbike DSIs they experience?
Crash movements	<ul style="list-style-type: none"> • The most common crash movements involved in DSIs for both Māori and non-Māori are loss of control on bend (36% Māori DSIs), loss of control on straight road (15%), head-on crash (14%), and pedestrian crossing road (6%).* • Māori DSIs involve a greater proportion of loss of control on bend crashes than non-Māori DSIs (36% c.f. 24%). This crash movement is more common in rural than urban DSIs (43% c.f. 26% for Māori).* • Most other crash types make up a similar or lower proportion of DSIs for Māori relative to non-Māori.* 	<ul style="list-style-type: none"> • What other factors are involved in loss of control crashes resulting in Māori DSIs, particularly those on bends and in rural settings (e.g. land use, location type, road function, speed limit, user factors)?

Roads and Roadsides		
Land use	<ul style="list-style-type: none"> Crash DSIs occurred more often in rural areas than urban areas for both Māori (56%) and non-Māori (55%).* Rural crash DSIs were slightly more common for Māori women (57% of DSIs) than for non-Māori women (54%).* 	<ul style="list-style-type: none"> What land use (e.g. urban residential, commercial; also main/minor/secondary urban) patterns are present in crash DSIs for Māori? What other factors are implicated in rural and urban DSI crashes for Māori (e.g. crash movement, transport mode, user factors)?
Location type		<ul style="list-style-type: none"> What location types are implicated in DSI crashes for Māori (e.g. traffic lane/driveway/footpath, intersection/midblock)?
Road function		<ul style="list-style-type: none"> What road types do DSI crashes involving Māori occur on (e.g. Major urban arterial/minor rural road)?
Road risk		<ul style="list-style-type: none"> What is the risk profile, and road features, of roads where DSI crashes involving Māori occur?
Speed Environment		
Speed limits and advisories	<ul style="list-style-type: none"> Almost half of crash DSIs occurred on 100kph roads and over a third on 50kph roads for both Māori (49% and 37% of DSIs respectively) and non-Māori (47% and 38% of DSIs).* 	<ul style="list-style-type: none"> Does the speed limit match the 'safe and appropriate speed' (SAAS) on roads where Māori crash DSIs occur? What speed limits are most common in crash DSIs for Māori involving non-car transport modes (i.e. pedestrian, cycling, motorcycling)?
Vehicles		
Vehicle safety ratings	<ul style="list-style-type: none"> 1- and 2-star safety-rated vehicles are implicated in similar proportions of Māori drivers (66%) and non-Māori drivers (64%) DSIs.* DSI crashes are more likely to involve multiple occupants for Māori than non-Māori, especially in low-safety-rated vehicles (average 1.7 Māori c.f. 1.3 non-Māori occupants in 1-star-rated vehicles involved in DSI crashes).* 	<ul style="list-style-type: none"> What are Māori ownership rates for different safety-rated vehicles and are DSI crash rates representative of these? What factors influence the number of passengers in vehicles for Māori? Are there other vehicle factors, such as the absence of enough restraints, that may contribute to Māori DSI rates?
Vehicle type		<ul style="list-style-type: none"> What types of vehicles are commonly implicated in DSI crashes for Māori (e.g. sedan/ute/SUV/truck) and to what extent does this relate to crash outcomes?

Road User		
Age and gender	<ul style="list-style-type: none"> Crash DSI rates are much higher among males (87/100,000 population) than females (40.5/100,000) for Māori. The trend is similar for non-Māori but at lower rates (62/100,000 population for <i>all</i> men and 29 for <i>all</i> women).* Crash DSI rates for Māori are much higher between the ages of 15 and 29 for both males and females than at any other age. This is similar to the trend for non-Māori but is more marked. The Māori male rate peaks at over 180/100,000 population at ages 25-29, while for Māori females it peaks at around 78/100,000 at ages 20-24 and is less markedly different from the non-Māori rate. To some extent, this is related to the younger age structure of the Māori population.* 	<ul style="list-style-type: none"> What other factors are involved in DSI crashes for young Māori men (e.g. time of day, transport mode, crash movement, user factors)? Are these different to the factors involved in DSI crashes for older Māori men and for Māori women?
Licensing	<ul style="list-style-type: none"> Under-licensed driving (e.g. no licence, learner licence) is implicated in a greater proportion of DSI crashes involving Māori drivers compared to non-Māori DSIs (42% of Māori drivers involved in DSI crashes held a full licence c.f. 70% non-Māori). * Under-licensed driving is linked to several factors including deprivation, cultural discomfort accessing licensing services, rural settings, male drivers, sober and emergency driving, and risky behaviours such as intoxicant use.^ Police pursuits are likely linked to under-licensed driving with the highest proportion of police pursuits of Māori drivers occurring at driver ages of 15 and 16 years old.^ 	<ul style="list-style-type: none"> What barriers and enablers are there to driver training, testing, and licence progression for Māori? Do these barriers contribute to driving with an inappropriate licence (disqualified, expired, forbidden, wrong class)? To what extent is under-licensed driving implicated in police pursuits for Māori drivers?
Restraint use	<ul style="list-style-type: none"> Not wearing a seatbelt was more common among Māori compared to non-Māori drivers in DSI crashes (20% c.f. 10%).* Non-seatbelt use was more common among young Māori drivers than older Māori drivers in DSI crashes.* Māori children are more likely to be restrained with seatbelts rather than the legally required child restraints for under 7-year-olds.^ 	<ul style="list-style-type: none"> What factors are involved in non-restraint use in DSI crashes for Māori (e.g. crash movement, land use, other user factors)? What are the barriers and enablers to restraint use for Māori drivers? What are the barriers and enablers to legally required restraint use for Māori children?
Helmet use	<ul style="list-style-type: none"> Not enough data on helmet wearing was available.* 	<ul style="list-style-type: none"> To what extent is helmet use a factor in DSI crashes involving Māori cyclists and motorcyclists?
Impairment	<ul style="list-style-type: none"> Alcohol intoxication above the legal limit was confirmed among a greater proportion of Māori than non-Māori drivers killed or 	<ul style="list-style-type: none"> What other factors are involved in DSI crashes involving intoxication and fatigue for Māori drivers (e.g. time of day, crash movement, land

	<p>seriously injured in a crash (24% c.f. 10%).*</p> <ul style="list-style-type: none"> • Data on fatigue is not sufficiently reliably reported in CAS to analyse.* • Drug use may be implicated more frequently in DSI crashes involving Māori than non-Māori.^ • Fatigue may be implicated more frequently in crashes involving Māori drivers.^ • Distraction is not commonly implicated as a contributing factor in crash DSIs for Māori.^ 	<p>use, speed environment, user factors)?</p> <ul style="list-style-type: none"> • To what extent is drug use a factor in DSI crashes for Māori? • To what extent is alcohol involvement in DSI crashes for Māori related to overall rates of drink driving for Māori?
Speeding	<ul style="list-style-type: none"> • Māori casualties are over-represented in DSI crashes in which speeding was a factor, relative to the proportion of the population that is Māori. ^ 	<ul style="list-style-type: none"> • To what extent is speeding a factor in DSI crashes for Māori? What other crash factors are commonly involved (e.g. time of day, crash movement, land use, speed limit, vehicle type and age)?

6.1 Key areas of concern

At this stage, the data to assess performance for Māori road safety across all elements of the Safe System is incomplete. However, there are a number of areas of concern that have emerged from the analysis:

- Regional locations where Māori are either numerous or over-represented in statistics, including Auckland, Waikato, Bay of Plenty, Northland and Gisborne
- Areas with higher rates of deprivation
- Late night weekend driving
- Māori men aged 25-29
- Under-licensed driving
- Not wearing a restraint
- Driving while impaired
- Loss of control on bend crashes
- Less safe vehicles and occupant numbers
- Speed

As outlined above, relatively more is known about general contextual and user factors, and less about the road and speed contexts in which crashes involving Māori happen. For future analyses, widening the scope of crashes to include minor injury crashes may be worthwhile, to understand the system failures that are leading to DSIs compared with less severe crashes.

Areas of concern could then be prioritised based on need as defined by Waka Kotahi, stakeholder organisations, and Māori partners.

7 CURRENT & PLANNED INITIATIVES

Waka Kotahi delivers a wide range of programmes, projects and activities to reduce DSIs and improve road safety outcomes for all road users. Within this there are some initiatives underway that specifically target improving road safety outcomes for Māori. This section provides a snapshot of some Waka Kotahi-led initiatives already happening or planned to reduce DSIs for Māori. It does not include information on initiatives led by other road safety partners, such as Ngā Pirihi mana o Aotearoa, Te Manatū Waka, or local governments.

A step-change that was described earlier in the report is a process (Figure 1) by which Māori will participate in engagement, planning and delivering some of its road safety activities. This is a key initiative that will underpin how Waka Kotahi works with Māori on road safety interventions. Getting the process right is an important foundation for projects that seek to achieve buy-in, partnership, and meaningful outcomes.

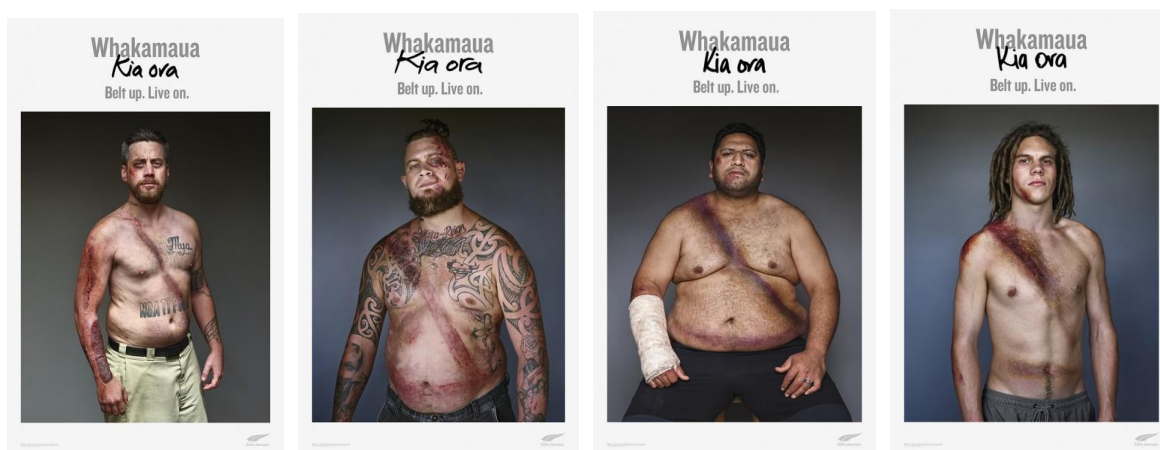
It is also important to consider the range of initiatives that address the Safe System but benefit Māori due to overlap with identified Māori demographic factors, as have been outlined in this report. For example, improving the quality of roads in the Gisborne region will benefit Māori given the high proportion of Māori in the region. The advantage of these kinds of initiatives is that they benefit Māori, without undue focus on users within the Safe System. As with any segment of the Aotearoa New Zealand population, a focus on system factors and not only on user behaviours is important.

Some specific initiatives underway or planned are outlined further below.

7.1 Restraints

Each year, approximately 90 people are killed on Aotearoa New Zealand roads because they didn't wear a seatbelt, and many of these lives could have been saved if the person had belted up. In February 2019, a NZ Government initiative *Belted Survivors* was launched as a national advertising campaign which specifically targeted predominately Māori males aged 20-40 years. Those targeted live rurally or in the regions and are a particularly hard to reach group. Many of the crashes represented by *Belted Survivors* happened late at night after drinking, and in all, seatbelts were not worn.

The aim was to make seatbelts be considered worthwhile rather than an optional extra as is often the case. The challenge was to move thinking from 'seatbelts are an optional accessory' to 'it's a tool worth using' as they save lives. Real-life crash survivors were used for this campaign; both drivers and passengers. Ten males (that are part of our target audience) were recruited. Each had been in a crash where they wore a seatbelt and survived. It is hoped that the role-modelling provided by these survivors, will influence other young men in similar circumstances.



Phase 2 of the campaign, *Life lines* saw more crash survivors tell their story about how they survived because they were wearing a seatbelt. They created a relevant design for a tattoo with a tattoo artist that represented the journey they have been on. It also represented what they have gone on to achieve because

they survived a crash by wearing their seatbelt. The design was tattooed around a scar they had from the crash. Five stories were shared through targeted televisions, cinemas and social media.

Both the *Belted Survivors* and *Life Lines* advertising campaigns include the stories of a range of 20–40 year-old men, including Māori men.

Te Araroa Police and Tairāwhiti REAP along with the support of Gisborne City Council ran a seatbelt workshop in August 2019 in Hicks Bay. Te Araroa Police identified people, particularly in rural areas, not wearing seatbelts while driving a vehicle and adopted a unique stance to dealing with this matter. Instead of being issued with an infringement, drivers were now given the option of attending a workshop focused on seatbelt safety.

The workshop promoted the Waka Kotahi Belted Survivors campaign - many locals saw the advertising and many of them were related to one of the campaign subjects (Kahutia Foster). Kahutia attended the workshop and Waka Kotahi assisted with resources. Additional Belted Survivors billboards were installed in the Hicks Bay/Te Araroa area ahead of the workshop. In addition to the workshop there was a car seat amnesty, safety competitions and family activities.

Waka Kotahi has also produced brochures and a series of videos in te reo Māori focused on the safe use of baby capsules. These capsules protect babies when they are travelling in a car but should not be used as a cot or bassinet outside of the car. We are encouraging parents and caregivers to keep their baby safe by taking them out of their baby capsule when they are not travelling, even if they are asleep when they arrive, and placing them in a safe sleeping environment. If longer trips cannot be avoided, having an adult sit with the capsule ensures the baby is sleeping safely during the journey, as well as stopping every 30 minutes to take baby out of the capsule. The video series includes short videos on the following topics:

- [Installing your child restraint](#)
- [Can my baby sleep in a capsule?](#)
- [Why is rear-facing safest?](#)
- [How do I know if my child restraint meets New Zealand standards?](#)
- [Where is the best place in the car for a child restraint?](#)
- [Can I put a child restraint in the front seat?](#)
- [When can I move my child into a booster seat which uses the adult seatbelt?](#)
- [Is my child ready to ride safely without a booster?](#)
- [My child restraint has been in a collision. Does it need to be replaced?](#)
- [How do I check my child restraint's expiry date?](#)
- [How bulky can my child's clothes be?](#)

The brochures and videos are distributed via child restraint technicians working in the community or they can be accessed on the Waka Kotahi website.

7.2 Driver licensing

Over the past few years Waka Kotahi has engaged with various stakeholders to develop and implement initiatives to improve the uptake of driver training and licensing by disadvantaged groups within the community, including Māori. These initiatives include:

- The Community Driver Mentor Programme, which was established in ten selected economically deprived communities to address the barriers some young learner drivers face when attempting to achieve a driver licence.
- Twenty-five further driver licence programmes part-funded by Waka Kotahi in the National Land Transport Programme 2018-2021 and led by local government across Aotearoa New Zealand.
- A partnership with Te Manatū Whakahiato Ora (the Ministry of Social Development) to fund and provide technical support and training for those most in need to achieve a driver licence. This will target those on a Youth Payment, a Young Parent Payment, those Not in Education, Employment or Training (NEET) and those transitioning from Oranga Tamariki care.

- The Howard League Driver Licence and literacy programme in Hawkes Bay, which was supported for two years until mid-2018. This programme supported those on probation and community sentences to gain a driver licence. An expanded programme is now funded from both the Community Road Safety Fund and the Provincial Growth Fund.

7.3 Research

As part of the National Land Transport Programme, Waka Kotahi invests in an ongoing programme of research. This research programme is aligned with the sector's outcomes framework, with the programme based around:

- Inclusive access
- Healthy and safe people
- Resilience and security
- Economic prosperity
- Environmental sustainability

While the programme has not funded any research specifically around Māori road safety outcomes, Māori are considered as one of several ethnic groups in some research reports focused on other topics. We are investigating a potential research topic to understand and enable inclusive access to transport for Māori in urban areas. Research into this topic will likely also touch on safety outcomes for Māori.

8 CONCLUSION

8.1 Summary

Waka Kotahi and partners are on a journey to better understand road safety outcomes for Māori and, working with Māori, to design meaningful actions that will improve the safety and wellbeing of Māori communities. In this early information synthesis stage, which includes a literature review and data analysis, key areas of concern have been identified and a Safe System framework applied to understand System failures and areas where more information is needed.

The negative effects of colonisation on Māori are ongoing and involve a complex mix of socioeconomic and lifestyle factors, healthcare access issues, structural barriers, and systematic racism^{46,47}. Though recent decades have seen a resurgence of cultural revitalisation and increase efforts to address long-term barriers and challenges to Māori health and wellbeing, Māori continue to experience poorer health and social outcomes than non-Māori. In the realm of road safety, this ultimately manifests as a higher rate of DSIs in road crashes among Māori compared to non-Māori.

Some of the more notable areas of concern from the information analysis to date include a range of user focused issues including the over-representation in DSI crashes of young Māori men, under-licensed driving, restraint non-use, and driving while impaired. Issues from other aspects of the Safe System are much less prominent, but this is most likely due to data limitations. Success in reducing harm for Māori will be more likely when factors from across the Safe System are mitigated.

Road safety outcomes for Māori that are a consequence of high proportions of Māori in a region or high numbers of young people in a community should be differentiated from specific system failures such as higher prevalence of unlicensed driving. This is because the mechanisms for dealing with these issues will differ. While the latter helps to explain the disproportionate road safety burden relative to population size, the former is crucial to bringing down the overall road safety burden for Māori.

8.2 Limitations

There are several limitations to this research, which should be kept in mind when interpreting the report:

- There are several significant data limitations identified that impact on the analysis and findings throughout this report. We have documented these limitations in the Methodology section (4.6.1: Literature review and 4.6.2: Data analysis). We request that they be considered when using this report to inform decisions or when designing interventions that may impact on Māori communities.
- The literature review, data analysis, and the writing of this report was completed by predominantly Pākehā researchers (with Māori researcher peer review), analysts, and advisors with road safety expertise whose worldview will inevitably have influenced the interpretation of the literature, data, and insights. Phase 2 of this project will be co-designed with Māori partners and explicitly incorporate te ao Māori.
- The analysis primarily compares crash death and serious injury outcomes for Māori and non-Māori. While this highlights areas where Māori experience different levels of risk compared to the rest of the population, it does not necessarily identify the most important issues to address. These should be decided in partnership with Māori.
- Statistics are the main focus of this Phase 1 report, but they constitute only one form of evidence about road safety outcomes for Māori. The findings in this report should therefore not be treated as definitive but should be considered in tandem with other forms of evidence from across the sector, and most importantly from Māori.

⁴⁶ Reid, J., Taylor-Moore, K., & Varona, G. (2014). Towards a social-structural model for understanding current disparities in Maori health and well-being. *Journal of Loss and Trauma*, 19(6), 514-536.

⁴⁷ Nuku, K. K. (2013). Challenging Maori health inequities. *Kai Tiaki: Nursing New Zealand*, 19(9), 34.

8.3 Gaps, opportunities and future research

8.3.1 Gaps

The literature review noted that a limitation of existing evidence on factors influencing road safety outcomes for Māori was that it mostly related to road user factors, with comparatively little evidence available on road and roadside, speed environment, and vehicle factors. In our analysis we tried to address some of these topics but found little variation between Māori and non-Māori outcomes. This may be due to the limitations of the dataset, as well as the limited focus of the analysis.

We are aware that existing data analysis on its own cannot provide a complete picture and more work with Māori communities is needed to fully understand the impact of these other factors for Māori. For example, some research noted that Māori cultural behaviours, obligations, and environments (such as long-distance travel and associated fatigue when attending tangi and hui on less safe roads) may be contributing to road safety outcomes. This research is now dated but some of its findings may still be relevant and there is an opportunity to incorporate questions about the impact of cultural behaviours, obligations and environments into any research we commission or undertake to further our knowledge about the impacts of transport and travel on Māori.

8.3.2 Opportunities

- Work with road safety partners to find ways to improve ethnicity data in CAS – for example working with hospital/ACC data
- Focus on addressing the 50% of Māori DSI occurring in Auckland, Waikato and Northland
- Explore contributing factors for loss of control at bend movements to understand why these movements in DSIs are significantly higher for Māori
- Undertake further research into other data sets, such as the Household Travel Survey, to understand what is contributing to the differences in DSI rates for Māori and non-Māori in relation to time of day and day of week travel, modes of transport, purpose of travel and other risk factors, such as average distance or time spent travelling
- Undertake further investigation to provide more in-depth analyses of licencing for Māori compared to non-Māori, particularly length of time at licence stage and age.
- Explore factors involved in pedestrian and cyclist DSIs for Māori – consider focusing on Auckland or urban centres only for pedestrians and cyclists
- Consider how we can take a more holistic and joined-up approach across central and local government to addressing road safety outcomes for Māori, given many of the user factors associated with higher DSIs are linked to social deprivation issues – especially driver licensing.

8.3.3 Future research

As outlined earlier, the next phases of this work should also include a partnership with Māori to undertake research (both quantitative and qualitative) to address the range of further questions that have emerged from the analysis. Section 6 provides a range of questions within a Safe System framework, and as areas of focus emerge, it will be important to search across the system to identify suitable solutions.

Future partnerships should consider Mātauranga Māori principles, and the development of Māori research capability. This will help to bring relevance to further research effort.

8.4 Next steps

Following the indicative process outlined earlier in Figure 1, Waka Kotahi aims to work with Māori partners, alongside our road safety partners, to explore different perspectives on road safety issues and outcomes. This will contribute to a more holistic understanding of the underlying causes of high numbers of DSIs in the Māori population and associated initiatives. While the Safety, Health and Environment group within Waka Kotahi will continue to support and resource work in this area, it is recommended the Te Mātangi take a lead role in developing Phase 2 to ensure a te ao Māori approach is used to engage and partner with Māori going forward.

After presenting this report to Te Mātangi as custodians, the next steps could include:

- Identifying and using information from across the Safe System to help complete the understanding of areas of need
- Use the report to identify and commission research (internal and external) to address knowledge gaps, as prioritised in partnership with Māori
- Establishing the necessary arrangements for the next phase, including learning and planning for how we will engage with Māori to better understand contextual factors that underpin the data and lessons gathered to date.

9 APPENDICES

APPENDIX A: TE ARA KOTAHI / OUR MĀORI STRATEGY

Te Ara Kotahi (our Māori Strategy) provides strategic direction to the Transport Agency on how we work with and respond to Māori as the Crown's Treaty partner, and what this means for how we do business.

The name Te Ara Kotahi symbolises the pathway that Māori and the Crown walk together upon as envisaged by Te Tiriti o Waitangi. It also signifies Te Kotahitanga, the unity and inclusion of all cultures upon the foundation of Te Tiriti o Waitangi.

Te Ara Kotahi outlines five strategic pou (pillars) that support te whakakitenga (the vision). Each pou has captured our intentions for how we will develop in the area of working with Māori. Priorities have been identified under each pou to focus our efforts and to operationalise and drive the implementation of Te Ara Kotahi in the work we do. A programme of work is being undertaken to make this happen.

Te Ara Kotahi belongs to everyone at the Transport Agency – we all have a contribution to make to move us closer to our vision:

- Ko koe ki tēna ko au ki tēnei kīwai o te kete
- The Transport Agency and Māori working together to succeed for a better New Zealand.

[Read Te Ara Kotahi \(our Māori Strategy\) \[PDF, 236 KB\]](#)

Te Ara Kotahi // Our Māori Strategy

MIHI / Welcome

Whāia whāia ki te uru tapu nui o Tāne, Tāne te Waiora, Tāne Whakapiripiri, Tāne ka puta ki te whāiao, ki te ao Mārama, Kumea ake te taura o Te Ara Kotahi ki runga i a tātou katoa e te whānau o Te Waka Kotahi.

No reira, e āku nui, e āku rahi, e āku whakatamarahi ki te rangi, tēnei te mihi mahana i a koutou.

He mihi maioha tēnei ki a koutou ngā kaimahi nāna i tuku whakaaro nāna ano i hanga tēnei mahere rautaki.

He tangi apakura mo tātou kua nunumi ki te Ao moe mai ra i to moe ngarua i roto te ngākau o te Kaihanga e kore rawa ratou i warewaretia, ki a tātou ano te hunga ora tēnā tatou katoa.

INTRODUCTION

The Transport Agency recognises and respects Te Tiriti o Waitangi and will work with Māori to build strong, meaningful and enduring relationships to achieve mutually beneficial outcomes. Te Ara Kotahi (our Māori Strategy) provides strategic direction to the Transport Agency on how we work with and respond to Māori as the Crown's Treaty partner, and what this means for how we do business.

The Transport Agency is responsible for delivering an integrated transport system. We have an important role to play in finding opportunities to better respond to Māori aspirations while delivering transport solutions. We can contribute by working with Māori and other government agencies to support Māori to achieve their aspirations.

Te Ara Kotahi outlines five strategic pou (pillars) that support te whakakitenga (the vision). Each pou has captured our intentions for how we will develop in the area of working with Māori. Priorities have been identified under each pou to focus our efforts. The Action Plan underpinning Te Ara Kotahi will provide clear actions to operationalise and drive Te Ara Kotahi throughout the Transport Agency.

The name Te Ara Kotahi symbolises the pathway that Māori and the Crown walk together upon as envisaged by Te Tiriti o Waitangi. It also signifies Te Kotahitanga, the unity and inclusion of all cultures upon the foundation of Te Tiriti o Waitangi.

TE WHAKAKITENGA - VISION

Ko koe ki tēnā ko au ki tēnei kīwai o te kete
The Transport Agency and Māori working together to succeed for a better New Zealand

NGĀ UARA - VALUES

- **Rangaitatanga** - We recognise and respect the individual autonomy and authority of Māori. We respect each other as partners and therefore value each other's aspirations, positions, roles and expertise.
- **Manaakitanga** - Exercise care and the work we do should be mana enhancing and supportive.
- **Kaitiakitanga** - We recognise that the environment is a taonga that must be managed carefully. We also recognise that Māori have a responsibility and obligation of care over their communities and environments.
- **Whanungatanga** - We foster meaningful and enduring relationships based on good faith, mutual respect, understanding and trust.
- **Te Tiriti o Waitangi** - We recognise, respect and uphold the principles of Te Tiriti o Waitangi.
- **Mana o Te Reo Māori** - Te Reo Māori is highly valued by Māori and NZTA. We will actively promote Te Reo Māori within the NZTA and the work we do.

MĀTĀPONO - PRINCIPLES

- **Huna Kore** - We value a no surprises approach and information flows both ways.
- **Awhatanga** - We will focus on creativity and innovation to achieve better outcomes.
- **Whakapono** - We act with integrity and honesty.
- **Partnership** - We will act reasonably, honourably, and in good faith.
- **Participation** - We will encourage, and make it easier for Māori to more actively participate in NZTA business.
- **Protection** - We will take positive steps to ensure that Māori interests are protected as appropriate.
- **Recognition of Cultural Values** - We will recognise and provide for Māori perspectives, tikanga (customs) Te Reo Māori and kawa (protocols) in the work we do.

NGĀ WHAINGA - OBJECTIVES

The objective of Te Ara Kotahi is to provide the Transport Agency with an overarching strategic framework that:

- connects Māori to the Transport Agency and what we do
- fulfils our statutory obligations to Māori and affirms our commitment to the principles of the Te Tiriti o Waitangi
- embraces Te Reo Māori and Māori values
- contributes to the 'whole of government' approach to provide for Māori aspirations and improve Māori economic, social, cultural and environmental outcomes
- empowers the Transport Agency to respond to Māori aspirations and partner in the work we do for mutually beneficial outcomes
- builds the capability and capacity of the Transport Agency to confidently and effectively engage with Māori
- supports and adds value to the Crown Māori relationship
- provides guidance to the Transport Agency on how to respond to Māori aspirations
- supports the delivery of the of the overarching Transport Agency Strategy

LEGISLATIVE CONTEXT

The Transport Agency must contribute to the Crown's broader vision for a Te Tiriti o Waitangi relationship. Te Tiriti o Waitangi provides for the exercise of kōwhiri (the right of the Crown to govern) while actively protecting tino rangatiratanga (self-determination) of Māori with respect to their natural, physical and spiritual resources.

There are a number of statutes that are relevant to the relationship between the Transport Agency and Māori. The Land Transport Management Act and the Resource Management Act are two key pieces of legislation that outline our responsibilities.

LAND TRANSPORT MANAGEMENT ACT

There is a specific requirement to consult or engage with Māori under the Transport Agency's governing legislation.

The Agency's principal statutory obligations with respect to Māori are found in section 4 of the Land Transport Management Act 2003 (LTMA 2003), which reads that:

In order to recognise and respect the Crown's responsibility to take appropriate account of the principles of the Treaty of Waitangi and to maintain and improve opportunities for Māori to contribute to land transport decision-making processes, sections 18, 18A, 18C, 18H, 49, 59, 65H, 65I, 78, and 100(1) (f) and clause 6 of Schedule 7 provide principles and requirements that are intended to facilitate participation by Māori in land transport decision making processes.

More specifically, section 18H of the Land Transport Management Act states:

18H Māori contribution to decision making:

1. The Agency and approved public organisations must, with respect to funding from the national land transport fund—
(a) establish and maintain processes to provide opportunities for Māori to contribute to the organisation's land transport decision-making processes; and
(b) consider ways in which the organisation may foster the development of Māori capacity to contribute to the organisation's land transport decision-making processes; and
(c) provide relevant information to Māori for the purposes of paragraphs (a) and (b).

There are also other requirements under the Land Transport Management Act to engage and work with Māori.

RESOURCE MANAGEMENT ACT 1991 (RMA)

The RMA is an important statute for the Transport Agency and for Māori. There is a requirement under the RMA for persons exercising powers under the Act to take into account the principles of the Treaty of Waitangi.

Part 2 of the RMA contains a number of specific provisions relating to Māori and these must be considered in RMA processes:

Section 5(2) of the RMA identifies the purpose of the RMA and that includes enabling people and communities to provide for their 'cultural wellbeing'. Sections 6(4) and 6(5) require that "the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, wahi tapu (sacred grounds) and other taonga (treasures)" and "the protection of historic heritage from inappropriate subdivision, use and development" be recognised and provided for.

Section 7(a) requires that 'kaitiakitanga' (guardianship by Māori) be recognised and provided for.

Section 8 requires that the principles of the Treaty of Waitangi are taken into account.

These and other provisions in the RMA are directly relevant to the work of the Transport Agency and its relationship with Māori.

Te Whakakitenga / Vision

Ko koe ki tēnā ko au ki tēnei kīwai o te kete

The Transport Agency and Māori working together to succeed for a better New Zealand

PARTNERSHIP

The Transport Agency recognises and respects Te Tiriti o Waitangi and will promote a partnering approach in its work with Māori.

PRIORITIES

- **TE TIRITI O WAITANGI**
Act in a manner that upholds the principles of Te Tiriti o Waitangi and fulfils the Transport Agency's statutory obligations to Māori.
- **PARTNERING FOR PROSPERITY**
Identify and seize opportunities to partner with Māori.
- **MĀORI CAPACITY AND CAPABILITY**
Foster Māori capacity and capability to contribute to our decision making processes at all levels.

LEADERSHIP & CULTURE

The Transport Agency is respected by Māori and values Te Ao Māori views in the work it does to enhance the delivery of the land transport system.

PRIORITIES

- **LEADERSHIP EXPECTATIONS**
Build a culturally competent leadership that enhances the mana of the Transport Agency.
- **CULTURAL EXPRESSION**
Value and promote Te Reo Māori and tikanga Māori in the work we do.
- **CROSS GOVERNMENT COLLABORATION**
Collaborate with the wider public sector to contribute to the Crown Māori relationship.
- **PERFORMANCE AND ACCOUNTABILITY**
Enhance performance measures, monitoring, evaluation and accountabilities.

ENGAGEMENT

The Transport Agency will engage effectively with Māori to build strong, meaningful and enduring relationships to achieve mutually beneficial outcomes.

PRIORITIES

- **ENGAGING EFFECTIVELY WITH MĀORI**
Support our people to develop strong, meaningful and enduring relationships with Māori.
- **BEST PRACTICE**
Establish policies and guidance that assist the Transport Agency to engage and respond to Māori.
- **MĀTAURANGA MĀORI**
Recognise and provide for cultural heritage, identity and Mātauranga Māori.

EMPOWERED ORGANISATION

The Transport Agency supports its people to have the capability, capacity and confidence to partner and engage successfully with Māori.

PRIORITIES

- **AGENCY CAPACITY AND CAPABILITY**
Build the capacity and capability of the Transport Agency to work confidently with Māori.
- **UNDERSTAND WHO MĀORI ARE**
Better understand who Māori are and obtain information to support how we can deliver better outcomes for Māori.
- **CULTURAL COMPETENCE AND RECOGNITION**
Value and recognise staff cultural competence.

STRONG & VIBRANT MĀORI COMMUNITIES

The Transport Agency supports the development of strong and vibrant Māori communities and will work with Māori to identify opportunities to enhance Māori social, cultural, environmental and economic wellbeing in the work it does.

PRIORITIES

- **CARING FOR THE ENVIRONMENT**
Support Māori to exercise their environmental kaitiaki responsibilities.
- **SUPPORT THE MĀORI ECONOMY**
Support and promote Māori economic and employment opportunities.
- **IMPROVE SOCIAL WELLBEING**
Support the improvement of Māori social outcomes through inclusive access to transport services.
- **IMPROVE MĀORI ROAD SAFETY**
Support initiatives to improve Māori road safety.

Te Tūāpapa / Foundation

Te Tiriti o Waitangi

2019-2021

MAHIA TE MAHI // Action Plan

Mahia te mahi - Let's get working - outlines the work ahead that brings to life Te Ara Kotahi.



PARTNERSHIP

- Develop a plan to foster Māori capacity to contribute to decision making processes.
- Develop user-friendly internal guidance on when the Transport Agency is required to (or it is otherwise desirable to) consult/engage with Māori under relevant legislation and rules (including Resource Management Act, Takatua Moana Act, Land Transport Management Act, and Land Transport Rules), and best practice guidance for how to carry out this consultation/engagement.
- Explore opportunities to partner with Māori in transport investments.



LEADERSHIP & CULTURE

- Ensure any new revision of the Transport Agency Strategy includes reference to Te Tiriti o Waitangi.
- Develop and implement a monitoring and evaluation framework for Māori issues.
- Develop a bilingual signage policy and provide for cultural symbolism for Transport Agency offices.
- Incorporate Te Reo Māori into both internal and external channels and publications.
- Develop and implement a Te Reo Māori Policy.
- Develop resources that explain Transport Agency statutory obligations to the Treaty Parties.
- Contribute to the development of work happening around the State Services Reform Act.
- Provide physical spaces in main offices that serve as whānau rooms that facilitate a culturally cohesive environment of interaction and learning.
- Review position descriptions of senior leaders and ensure that these cover cultural competency expectations.
- Ensure the Transport Agency culture programme explores the use of Māori values and views to enrich the culture programme.
- Develop monitoring and evaluation programme for Māori responsiveness.
- Actively support whānau/wāhanga groups within Transport Agency offices.



ENGAGEMENT

- Develop a process that facilitates Māori involvement in decision making on the National Land Transport Programme (NLT).
- Ensure Māori are engaged during the development of version two of the Long Term View.
- Update the Māori engagement framework.
- Develop regional directory of Māori organisations and other background that supports enduring relationships.
- Explore opportunities to support Māori internship and cadet programmes.
- Explore opportunities for secondment exchanges with Māori organisations.
- Develop a bilingual signage policy for road signs.
- Develop a bridge and infrastructure naming policy.
- Develop a best practice guide, supporting toolkit and case studies (on outcomes achieved to date) for planning, design, build, and maintenance in Mātauranga Māori for Transport Agency programmes, projects and operations and maintenance.
- Develop regional Māori directories and information hubs to support staff engagement.



EMPOWERED ORGANISATION

- Understand our Māori customers and how we can drive better outcomes for them.
- Empower and enable staff to achieve better outcomes.
- Develop robust processes that ensure decision makers apply a customer focus when planning and investing.
- Explore developing a data strategy to support the organisation in understanding our Māori customers.
- Carry out a lessons learnt review on Māori engagement on a range of projects from across New Zealand.
- Establish key accountabilities and processes for decision making on cultural matters.
- Develop key project agreements and MOU templates.
- Investigate the creation of internal 'wi' advisor positions to facilitate 'wi' engagement and support staff.
- Develop protocols that support staff to engage with Māori.
- Create and maintain a Cultural Fees Payment Policy that includes guidance on koha.
- Establish a central portal for Māori issues/support/shared learnings.
- Identify and update existing guidance on Māori matters that need to be refreshed.
- Develop a tool box with guidance to assist staff in Māori matters.
- Create opportunities for staff to link their cultural competency aspirations to their PDPs.
- Develop a learning needs analysis for all learning including:
 - Transport Agency culture
 - core capability
 - other specialist training
 - leadership
- Develop and implement learning programme based on the learning needs analysis.
- Explore opportunities that might be a part of the not good programme.
- Make available tools that support staff to improve Te Reo Māori and pronunciation.
- Important that PDP expectations are clear in senior leader job descriptions.
- Create a plain language toolkit.
- Establish a Te Reo Māori Policy for the Transport Agency.
- Incorporate Te Reo Māori into both internal and external channels and publications.



STRONG & VIBRANT MĀORI COMMUNITIES

- Understand what Māori businesses exist.
- Develop and implement a Social Procurement Framework that provides for Māori participation.
- Facilitate and support opportunities for cross-government collaboration to assist Māori in their aspirations.
- Work with others to obtain and analyse data relating to death and serious injury from road trauma for Māori as an ethnic group.
- Determine what contribution the Transport Agency has to improve Māori road safety.
- Explore opportunities to collaborate with Māori on initiatives that improve Māori road safety, including driver licensing initiatives.
- Ensure Māori perspectives are obtained to inform the Transport Agency's contribution to the Road Safety Strategy development.
- The Transport Agency's investment decision making framework and guidance demonstrate a partnership approach with 'wi'.
- Ensure that wider social and cultural considerations are taken into account when making investment decisions and that the reasoning for decisions is well documented, in particular how decisions around options and alternatives have been considered.
- Explore avenues for Māori aspirations to be considered in our business case approach review.
- Support 'wi' led events through our involvement in robust planning processes. When appropriate we influence our partners and stakeholders to ensure the voice of 'wi' is included and listened to.

APPENDIX B: MĀORI IN AOTEAROA NEW ZEALAND BACKGROUND INFORMATION

Demographic profile

Population size and distribution

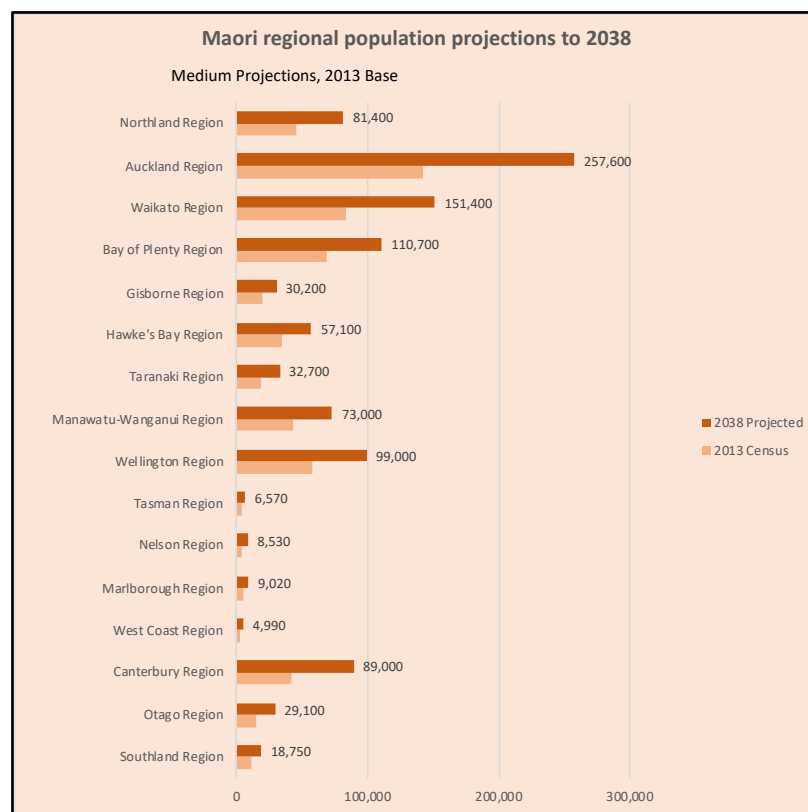
In 2017, the Māori population of Aotearoa New Zealand was estimated as making up 15.4% of Aotearoa's total population. Tatauranga Aotearoa (StatsNZ) population estimates for 2017 determined that 735,900 people were of Māori descent⁴⁸; within a total Aotearoa population estimate of 4,766,900.⁴⁹

In 2013 most Māori (86%) lived in the North Island with the majority based in Auckland, Waikato and the Bay of Plenty whose main centres include the three key growth centres of Auckland, Hamilton and Tauranga.

Tatauranga Aotearoa's population projections indicate that the Māori population will make up 18% of the total Aotearoa New Zealand population by 2038 and that the largest Māori populations will remain in the three key growth centres of Auckland, Hamilton and Tauranga.⁵⁰

The greatest numerical increases in the Māori population are projected to occur in the main centres of Auckland (from 142,767 to 257,600), Waikato (from 83,742 to 151,400), and Canterbury (from 41,907 to 89,000). Refer to Figure 22 below.

Figure 22: Māori Regional Population projections 2013-2038⁵¹



⁴⁸ Statistics New Zealand, 2017. Estimated Resident Population by Age and Sex (1991+) (Annual-Dec): At 14 November 2019, Website: <http://archive.stats.govt.nz/infoshare/Default.aspx> (Accessed 11 February 2020)

⁴⁹ Statistics New Zealand, 2017. Māori Population Estimates. Website: <https://www.stats.govt.nz/information-releases/Māori-population-estimates-mean-year-ended-31-december-2017> (Accessed 11 February 2020)

⁵⁰ Statistics New Zealand, 2017. Māori Population Estimates. Website: <https://www.stats.govt.nz/information-releases/Māori-population-estimates-mean-year-ended-31-december-2017> (Accessed 11 February 2020)

⁵¹ Te Puni Kōkiri, 2017. Tātai Tāngata ki te Whenua: Wāhanga Tuatahi; Te Maha, te Whakatupu, me te Pakeketanga o te Ira Taupori - Future Demographic Trends for Māori; Part One: Population Size, Growth and Age Structure; page 8 - updated from Statistics

Māori are expected to make up about 60% (30,200) of the total Gisborne population in 2038, up from 45% (19,683) in 2013. Other regions expected to have significant increases in the proportion of Māori in the population include Northland, Taranaki, Hawke's Bay and Manawatu-Wanganui.⁵²

The fastest rates of growth for the Māori population are projected to occur largely in the South Island, with both Otago's and Canterbury's Māori population expected to more than double (portion of total population shown in brackets):

- Otago – from 14,388 (7.1%) in 2013 to 29,100 (11.5%) in 2038
- Canterbury - from 41,907 (7.8%) in 2013 to 89,000 (11.9%) in 2038.

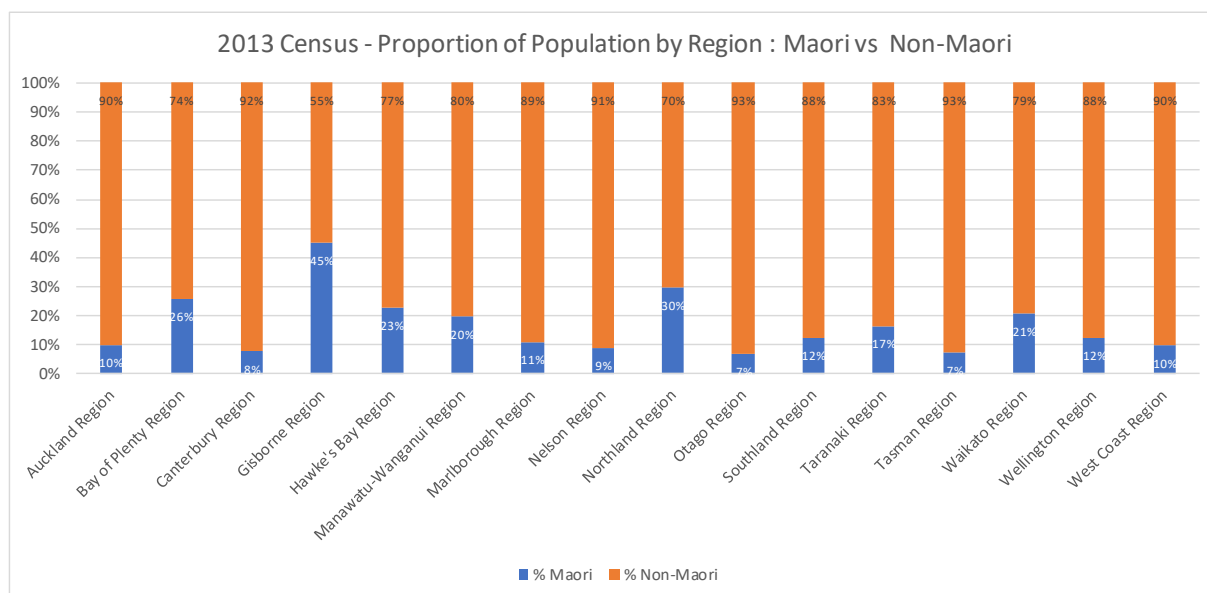
Although overall numbers will remain low, between 2013 and 2038 the Māori population in Tasman, Nelson, Marlborough and the West Coast are also predicted to increase significantly in relation to their proportion of the total regional population.

While these locations are predicted to grow in relation to the proportion of Māori who live there, Auckland will still have the largest Māori population in Aotearoa New Zealand.

Urbanisation

The population proportions of Māori and non-Māori are not uniform across Aotearoa New Zealand. The latest reliable information is from the 2013 Census. These proportions are presented in Figure 23 below.

Figure 23: 2013 Census – Proportion of Māori and non-Māori Population by Region



As at 2013, 84% of Māori lived in urban areas.⁵³ The highest percentages of Māori resided in the main metropolitan centres with 25% residing in the Auckland region.

Tatauranga Aotearoa does not conduct population projections for cities; however, their regional population projections are used as a proxy indicator for urban population growth. As mentioned above the greatest

New Zealand, 2017. Subnational ethnic population projections: 2013(base)–2038 update. Website: <https://www.stats.govt.nz/information-releases/subnational-ethnic-population-projections-2013base2038-update> (Accessed 12 February 2020)

⁵² Te Puni Kōkiri, 2018. Tātai Tāngata ki te Whenua: Wāhanga Tuarua; Te Heke, te Noho Tāone, te Kanorau me te Tuakiri o te Ira Tāngata - Future Demographic Trends for Māori; Part Two: Migration, Urbanisation, Diversity, Identity; page 21 – updated from Statistics New Zealand, 2017. Subnational ethnic population projections: 2013(base)–2038 update. Website: <https://www.stats.govt.nz/information-releases/subnational-ethnic-population-projections-2013base2038-update> (Accessed 12 February 2020)

⁵³ Te Puni Kōkiri, 2018. Tātai Tāngata ki te Whenua: Wāhanga Tuarua; Te Heke, te Noho Tāone, te Kanorau me te Tuakiri o te Ira Tāngata - Future Demographic Trends for Māori; Part Two: Migration, Urbanisation, Diversity, Identity; page 21 – updated from Statistics New Zealand, 2017. Subnational ethnic population projections: 2013(base)–2038 update. Website: <https://www.stats.govt.nz/information-releases/subnational-ethnic-population-projections-2013base2038-update> (Accessed 12 February 2020)

numerical increases in the Māori population between 2013 and 2038, are projected to occur in the main centres of Auckland, Waikato, and Canterbury.

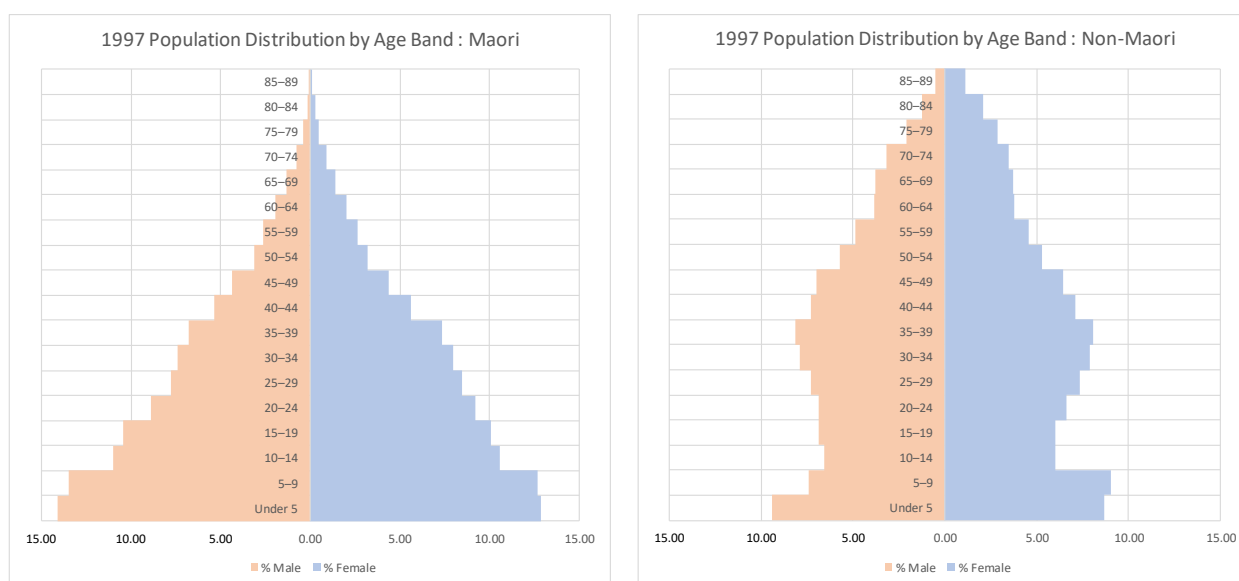
In addition to being a primarily urban population, the Māori population will continue to be largely located in the North Island (projected to grow from 514,812 to 893,100), as opposed to the South Island (projected to grow from 83,457 to 165,960).⁵⁴

Age distribution

The Māori population has a significantly more youthful age structure compared to non-Māori. Within the total 2017 Māori population, 68% were under forty years old compared with only 54% of non-Māori. Approximately 31% of Māori were under 15 years old compared to only 20% non-Māori. In contrast, only 7% of Māori were 65 years and older while 15% of non-Māori were 65 years and older. In 2017, the median age for the Māori population was 25.9 years and 37.3 for non-Māori.⁵⁵

The relative youth of the Māori population in comparison to the non-Māori population is highlighted in the figures below, showing the change in population age distribution for both groups from 1997 to 2017.

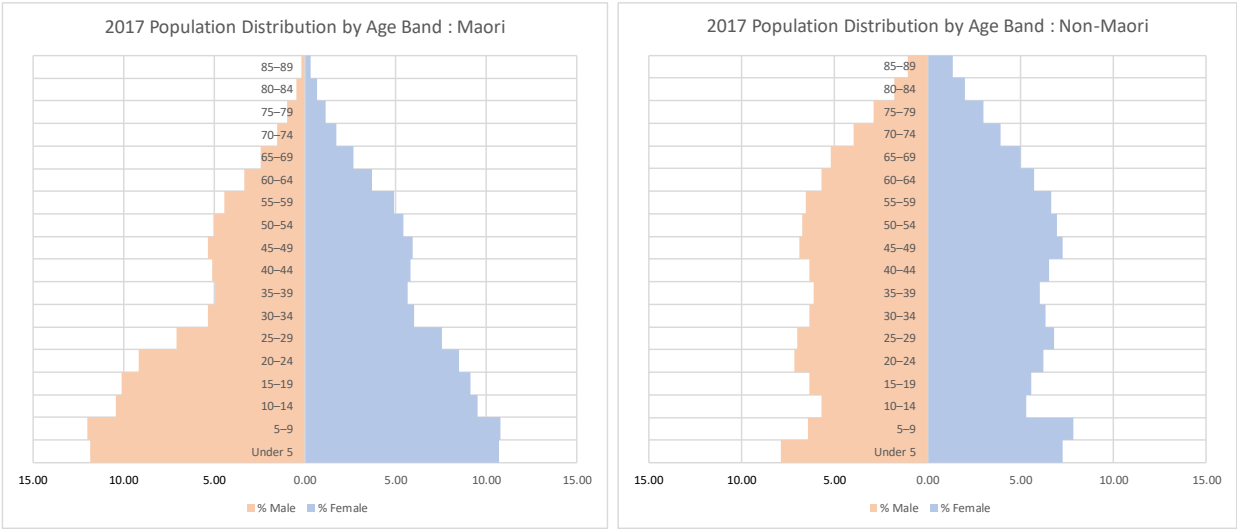
Figure 24: Comparison Population Distribution by Age for Māori and non-Māori 1997



⁵⁴ Te Puni Kōkiri, 2018. Tātai Tāngata ki te Whenua: Wāhanga Tuarua; Te Heke, te Noho Tāone, te Kanorau me te Tuakiri o te Ira Tāngata - Future Demographic Trends for Māori; Part Two: Migration, Urbanisation, Diversity, Identity; pages 19- 20 – updated from Statistics New Zealand, 2017. Subnational ethnic population projections: 2013(base)–2038 update. Website: <https://www.stats.govt.nz/information-releases/subnational-ethnic-population-projections-2013base2038-update> (Accessed 12 February 2020)

⁵⁵ Statistics New Zealand, 2017. Māori Population Estimates. Website: <https://www.stats.govt.nz/information-releases/Māori-population-estimates-mean-year-ended-31-december-2017> (Accessed 11 February 2020)

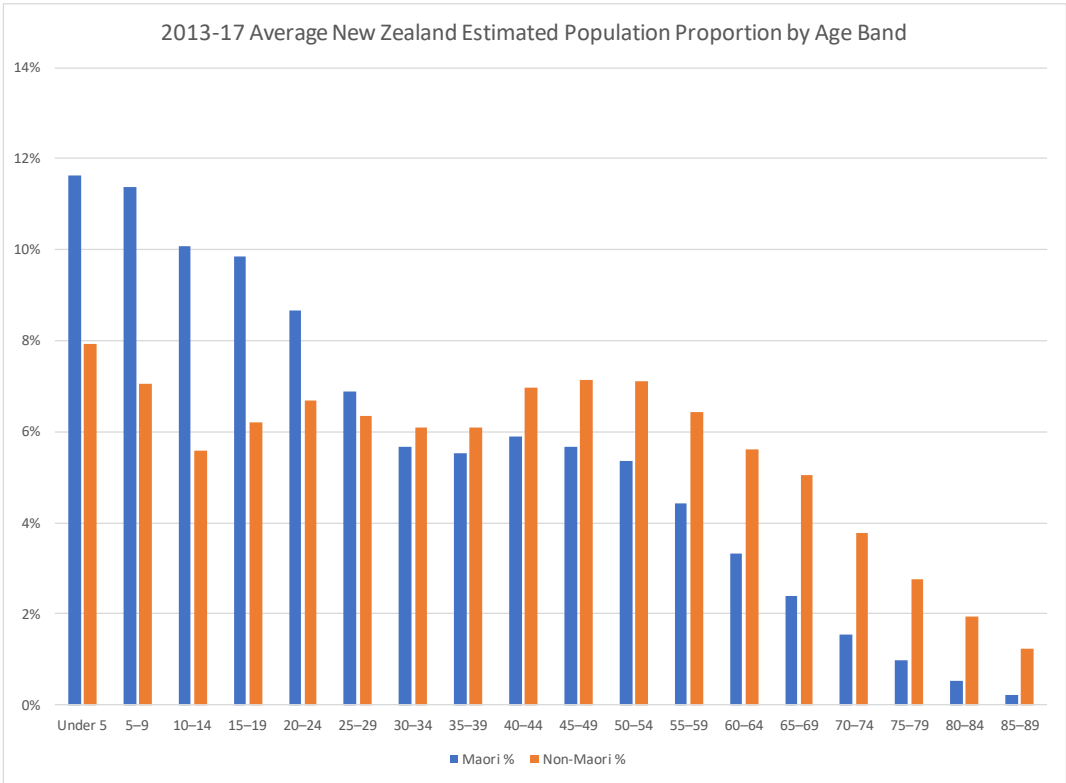
Figure 25: Comparison Population Distribution by Age for Māori and non-Māori 2017



In comparing the two figures above, a large cohort of young people aged 0-9 years in 1997 can be seen moving through the overall population. This age cohort, which is proportionally larger for Māori, was in 2017 aged 20-29 years.

As shown in Figure 26, Māori aged 0-24 years made up a significantly larger proportion of the overall Māori population than the same age cohort within the non-Māori population across the five years from 2013-2017.

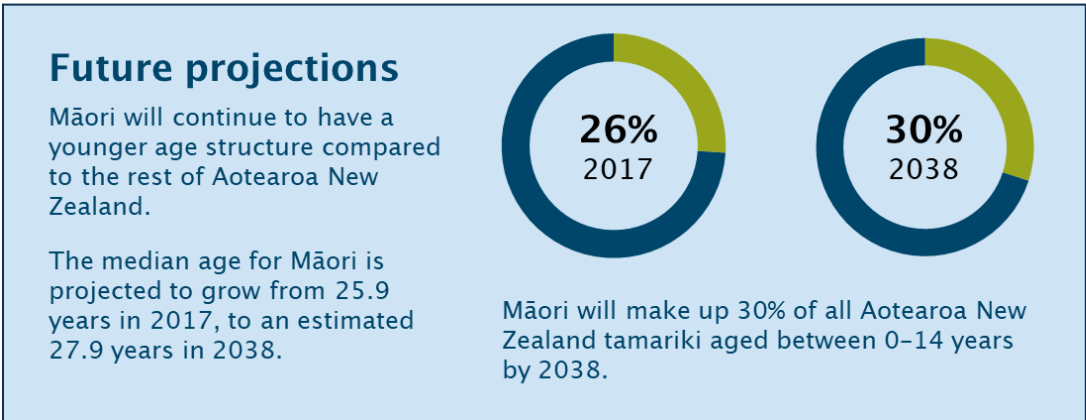
Figure 26: Average Aotearoa New Zealand Estimated Population Proportion by Age Band



Tatauranga Aotearoa's population estimates and projections to 2038 indicate that the youthfulness of the Māori population is expected to persist. By 2038 it is predicted that Māori tamariki (children) aged between

0–14 years will make up 30% of all tamariki aged 0-14 years in Aotearoa New Zealand; an increase from 26% in 2017 (Figure 27).⁵⁶

Figure 27: Future Māori population projections 2013-2038⁵⁷

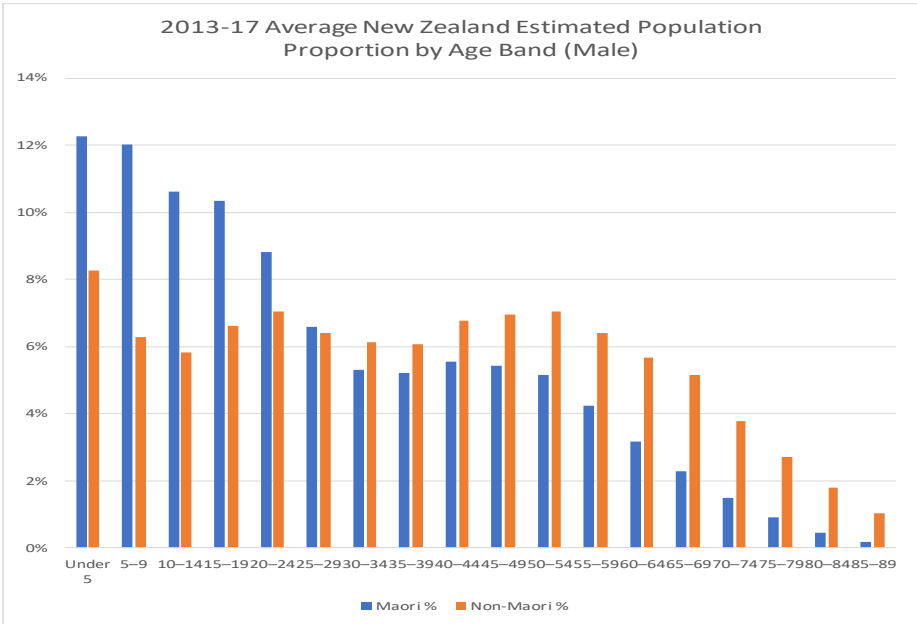


Conversely, the proportion of Māori aged 65 years and over is projected to increase due to both a gradual reduction in birth rates and increased longevity.⁵⁸ The median age for Māori is projected to grow from 25.9 years in 2017, to an estimated 27.9 years in 2038.⁵⁹

Gender

The Māori population is not evenly distributed across age cohorts and this uneven age distribution is evident for both males and females. Figure 28 and Figure 29 show the average proportion of population for Māori and non-Māori by gender across the period 2013-2017. These figures show that Māori have a predominantly younger population than non-Māori for both males and females.

Figure 28: Average Aotearoa New Zealand Estimated Male Population Proportion by Age Band



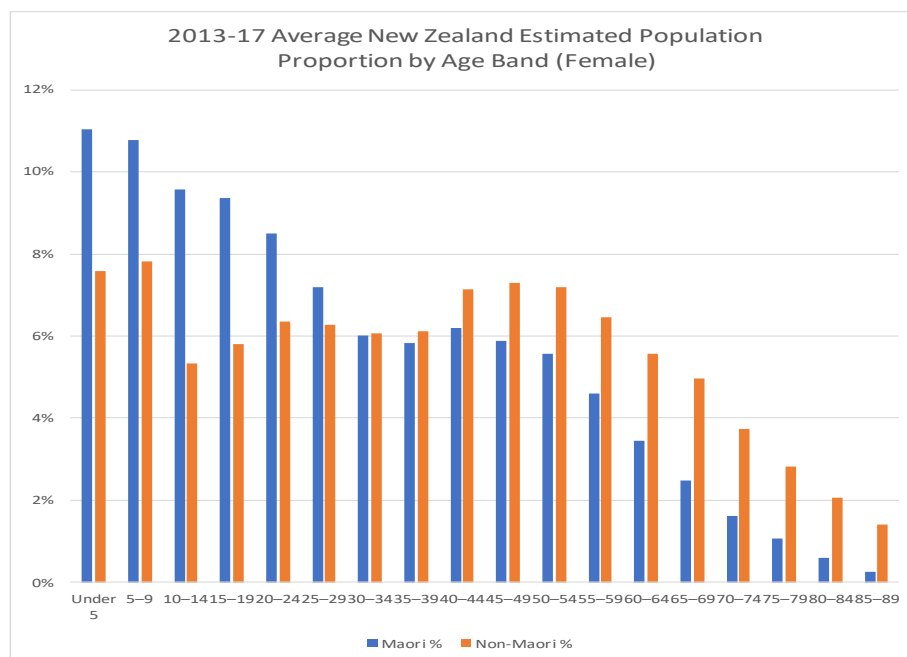
⁵⁶ The 14th data report: 2013–17 of the Child and Youth Mortality Review Committee defines tamariki as 0-14 years of age and rangatahi as 15-24 years of age.

⁵⁷ Replicated using Infographic created by Te Puni Kokiri based on Statistics New Zealand Population projections 2013

⁵⁸ Te Puni Kokiri, 2017. *Tātai Tāngata ki te Whenua: Wāhanga Tuatahi; Te Maha, te Whakatupu, me te Pakeketanga o te Ira Taupori - Future Demographic Trends for Māori; Part One: Population Size, Growth and Age Structure*; page 23 -24

⁵⁹ Te Puni Kokiri, 2017. *Tātai Tāngata ki te Whenua: Wāhanga Tuatahi; Te Maha, te Whakatupu, me te Pakeketanga o te Ira Taupori - Future Demographic Trends for Māori; Part One: Population Size, Growth and Age Structure*; page 24

Figure 29: Average Aotearoa New Zealand Estimated Female Population Proportion by Age Band



Māori health and wellbeing

For any community the determinants of health and wellbeing include health outcomes, education, work, income, and risk factors.⁶⁰

Health outcomes

Māori continue to experience poorer health outcomes than non-Māori. Life expectancy at birth for Māori is 76 years, on average 7.4 years less than for the rest of the population.

During 2013 to 2017 the leading broad category cause of death for Māori tamariki (children) and rangatahi (young people) were medical conditions, followed by unintentional injury (predominantly transport related).⁶¹ The next leading category was intentional injury, which includes suicide and assault. From 2013 to 2017, individual cause of death for Māori was most likely to be from suicide (n=577) or by transport related incidents (n=481).⁶²

Education

In 2013, about a third (33%) of Māori aged 15 years and over had no formal qualifications compared to 21% for the overall population. Māori men were less likely than Māori women to have a formal qualification. In 2013, 63% of Māori men (and 81% of non-Māori men) had a formal qualification, compared with 70% of Māori women (82% of non-Māori women).⁶³

Employment statistics

Māori have generally poorer labour market outcomes compared to the rest of Aotearoa New Zealanders.

⁶⁰ Ministry of Health, 2014. *The determinants of health for Māori children and young people in New Zealand*, Te Ohongo Ake, Ministry of Health.

⁶¹ The 14th data report: 2013–17 of the Child and Youth Mortality Review Committee defines tamariki as 0–14 years of age and rangatahi as 15–24 years of age.

⁶² Child and Youth Mortality Review Committee. 2019. *14th data report: 2013–17*. Wellington: Health Quality & Safety Commission.

⁶³ Statistics New Zealand, 2013. 2013 Quick Stats: About education and training. Website: <http://archive.stats.govt.nz/Census/2013-census/profile-and-summary-reports/qstats-education-training.aspx> (Accessed 13 February 2020)

In 2017, there were 303,400 Māori employed in the labour market. While Māori in employment represent only 12.0% of total national employment, Māori are over-represented in the unemployed (28.1%) and underutilised (23.5%) categories. There were nearly a third of youth in the 'not in employment, education or training' category. Compared to the rest of the workforce:

- Māori workers are younger and 21% of 15-24 year old Māori are employed compared to 14.5% of New Zealand Europeans within the same age group.
- Māori have higher proportion of workers in lower skilled occupations, and in industries particularly vulnerable to changes in technology and economic cycles (e.g. manufacturing, wholesale and retail trade and construction).

The 2017 Māori unemployment rate was 9.1% and was over double the national unemployment rate of 4.4%. The unemployment rate is particularly high for Māori youth ((20.4%) and the 'not in employment education or training' category for Māori women ((12%).⁶⁴

Income and standard of living

In 2013, over a third of children and over a quarter of adults in Māori households⁶⁵ were in households with low equivalised household incomes (under \$15,172), compared to a quarter of children and adults in other households.

11% of residents of Māori households had no access to a motor vehicle, compared to 6% of residents of other households.

People in Māori households were less likely to have access to telecommunications than those living in other households: 21% had no internet, 25% no telephone, 12% no mobile phone, and 2% had no access to any telecommunications.

Deprivation

The NZDep2018 index of deprivation shows Māori (25.4%) and Pacific peoples (37.2%) have the highest percentage of people living in the most deprived decile areas (decile 10) in New Zealand (Table 1).

Table 1: NZ Index of Deprivation across different ethnic groups in 2018

	Gender	European	Māori	Pacific Peoples	Middle Eastern/ Latin American/ African	Asian	Other Ethnicity
Deprivation index decile 10	Male	6.0%	25.9%	37.8%	8.2%	7.4%	7.0%
	Female	6.1%	24.8%	36.6%	8.4%	8.1%	6.7%
	Total	6.0%	25.4%	37.2%	8.3%	7.7%	6.8%

The deprivation scores are calculated by combining the census data in Table 2 (calculated as proportions for each small area).

Table 2: Descriptions of deprivation dimensions

Dimension of deprivation	Description
Communication	People with no access to the internet at home
Income	People aged 18-64 receiving a means tested benefit
Income	People living in equivalised households with income below an income threshold
Employment	People aged 18-64 unemployed
Qualifications	People aged 18-64 without any qualifications
Owned home	People not living in own home
Support	People aged <65 living in a single parent family

⁶⁴ Ministry of Business, Innovation & Employment, 2017. *Māori in the labour market 2012–2017*. Website: <https://www.mbie.govt.nz/business-and-employment/employment-and-skills/labour-market-reports-data-and-analysis/other-labour-market-reports/Māori-labour-market-trends/> (Accessed: 13 February 2020).

⁶⁵ Defined as households with at least one Māori resident.

Living space	People living in equivalised* households below a bedroom occupancy threshold
Living condition	People living in dwellings that are always damp and/or always have mould greater than A4 size

*Equivalisation: methods used to control for household composition⁶⁶

Cultural identity

Te Kupenga 2013 was Tatauranga Aotearoa's first survey of Māori well-being. Te Kupenga gives a picture of the social, cultural, and economic well-being of Māori in Aotearoa New Zealand, including information from a Māori cultural perspective.

While 90% of Māori stated that their culture had some degree of importance to them, only 73% of Māori identified an affiliation with at least one iwi (tribe). This characterisation was consistent across all Māori aged 15 years and over.

Taking into account how statistics on Māori are currently collected and the recently acknowledged challenges for the latest 2018 census⁶⁷ there were 98 iwi affiliations recorded for 2013. The ten largest iwi and the growth in their affiliations since 2001 are shown in Table 3 below. It should be noted that many people will affiliate with more than one iwi.

Table 3: Ten largest iwi in 2013⁶⁸

Ten largest iwi in 2013

Iwi	2001	2006	2013
Ngāpuhi	102,981	122,214	125,601
Ngāti Porou	61,701	71,907	71,049
Ngāi Tahu / Kāi Tahu	39,180	49,185	54,819
Waikato	35,781	33,429	40,083
Ngāti Tūwharetoa	29,301	34,674	35,877
Ngāti Maniapoto	27,168	33,627	35,361
Tūhoe	29,259	32,670	34,887
Ngāti Kahungunu ki Te Wairoa	14,661	20,982	21,060
Te Arawa	16,713	23,316	19,719
Ngāti Kahungunu, region unspecified	24,729	18,459	18,285

Source: Statistics New Zealand. (2013). Retrieved from <http://www.stats.govt.nz/Census/2013-census/profile-and-summary-reports/quickstats-about-maori-english.aspx>

Refer to Appendix D: Iwi and their Rohe (Territory or Boundaries) for a map depicting the geographical location of iwi and their rohe.

⁶⁶ Data is compiled from 2018 NZDep2018 Statistical Area 2 (SA2) data combined with NZ Stat data: Ethnic group by age and sex for the census usually resident population count 2018 using SA2 groupings.

⁶⁷ As referenced in Section 4.6.2: Data analysis, the 2018 census had a number of limitations, particularly and missing Māori descent and iwi information.

⁶⁸ Infographic created by Te Puni Kokiri based on Statistics New Zealand Population projections 2013

APPENDIX C: ROAD SAFETY OUTCOMES FOR MĀORI LITERATURE REVIEW

Citation: Thorne, R., Legg, K., Blewden, M., & Mackie, H. (2019). Road safety outcomes for Māori: Literature review. Auckland, New Zealand. A report prepared by Mackie Research for the Waka Kotahi / New Zealand Transport Agency.

EXECUTIVE SUMMARY

The Māori population has historically been over-represented in death and serious injury (DSI) outcomes resulting from road traffic crashes (Blakely et al., 2007; Hosking et al., 2013). However, there is a lack of more recent statistical evidence describing current road safety outcomes for Māori, and their determinants.

The aim of this literature review was to synthesise the literature on current road safety outcomes for Māori, and the factors that influence these. To this end, academic and grey literature relating to Māori road safety outcomes was reviewed, and findings relating to current outcomes and their determinants synthesised.

The key findings are as follows:

- Māori experience higher rates of road traffic DSIs across all age groups than non-Māori. Overall road traffic mortality rates are estimated at between 60% and 200% higher for Māori compared to non-Māori.
- Among children, Māori crash fatality rates are close to double those of non-Māori.
- DSI rates in the Māori population increased between 2014 and 2017 and increased faster than in the non-Māori population.
- Māori experience the highest road traffic risk when they travel as vehicle occupants (with age-standardised fatality rates 2.6 times and hospitalisation rates 1.8 times those of the non-Māori population) and as pedestrians (fatality rates 2.8 times and hospitalisation rates 1.2 times the non-Māori population rates).
- Young Māori males between the ages of 14 and 25 are likely to be most at-risk.
- Māori are also over-represented as drivers in road traffic crashes (regardless of whether or not the driver was at fault), but to a lesser extent than they are over-represented as crash casualties.
- Social deprivation is a key determinant of road safety outcomes for Māori, with living in the highest deprived areas associated with a 2-3 times higher risk of road traffic hospitalisation or death compared to living in the least deprived areas.
- Crashes occurring in rural areas have the highest fatality rates, but most serious injury crashes occur in minor urban areas, particularly those with high levels of deprivation.
- Compared to the proportion of Māori in the total population, and regardless of driver fault or not, Māori are three times more likely to be involved in a crash involving drivers who are unlicensed, and twice as likely to be involved in a crash involving drivers who are unsupervised on a learner licence.
- Driving a vehicle older than 14 years, driving under the influence of alcohol, speeding, and not wearing an appropriate restraint are all factors that are over-represented in crashes involving Māori, but there is little recent data available on these.
- Most of the evidence on factors influencing road safety outcomes for Māori relate to road user factors, with comparatively little evidence on road and roadside, speed environment, and vehicle factors.
- Many of the user factors associated with higher DSIs are linked to social deprivation issues – especially licensing.
- There is a lack of discussion and data on exposure to road safety risk (for example through average distance or time spent travelling).
- Most of the available literature looks at individual factors associated with high road safety outcomes for Māori, with comparatively little which examines how different factors combine to influence overall outcomes.

Overall, it was found that Māori experience disproportionately high rates of death and serious injury on the road, and that these are influenced by a range of factors, many of which are linked to high levels of social deprivation. Several gaps in the literature were identified, particularly relating to the roads and roadsides, speed environment, and vehicle elements of the Safe System, as well as to the ways in which different road safety risk factors interact to influence outcomes. It is recommended that further information is collected in these areas, in order to be able to effectively address the underlying causes of road traffic trauma experienced by Māori.

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INTRODUCTION

Background

The Māori population has historically been over-represented in death and serious injury (DSI) outcomes resulting from road traffic crashes relative to their proportion of the Aotearoa New Zealand population (Blakely et al., 2007; Hosking et al., 2013). However, no recent attempts have been made to comprehensively describe the road safety issues affecting Māori, and the New Zealand Transport Agency ('The Transport Agency') does not have a clear understanding of current road safety outcomes for Māori, nor of the factors contributing to them.

As a New Zealand Government agency, The Transport Agency must contribute to Crown obligations to work in partnership with Māori, ensure equal participation at all levels, protect Māori interests, and reflect the views and aspirations of Māori in decision-making that directly affects them. Understanding and working to address inequitable road safety outcomes for Māori is necessary for The Transport Agency to fulfil its obligations under Te Tiriti o Waitangi, as well as to contribute to sector knowledge of Māori road safety issues and deliver on its Māori Strategy 'Te Ara Kotahi'. Finally, it will help The Transport Agency to achieve its position that no DSIs are acceptable on the land transport system, and that action across all elements of the Safe System should be taken to reduce them.

The Transport Agency is therefore looking to establish what issues or opportunities it needs to support Māori to address, and to build long-term partnerships with Māori to address them. This involves attempting to identify and understand both the transport system issues and the wider systemic issues that influence road safety outcomes for Māori, while not stigmatising Māori with a dialogue that is negatively reinforcing. The project comprises two phases of work; phase one, which focuses on information gathering and analysis; and phase two, the shape of which will be determined in partnership with Māori. Indicatively, phase two is likely to involve partnering with Māori to undertake further research and/or design interventions. This literature review forms one strand of phase one of this project.

Purpose

The purpose of this literature review is to develop an understanding of current road safety outcomes for Māori, and the factors that may be influencing these. Together with reviews of the position of Māori in society, and of current road safety initiatives being undertaken, this work will help The Transport Agency to build an understanding of the road safety issues and opportunities it can support Māori to address, and lay the groundwork for phase two of the project.

Scope

The scope of this literature review focuses on current road safety outcomes for Māori, and their determinants. To that end, the review has been guided by the following two questions:

1. What are the current road safety outcomes for Māori?
2. What factors influence these outcomes?

METHOD

Literature identification

This literature review predominantly uses material provided by The Transport Agency. A brief literature scan was also undertaken to ensure completeness of the dataset, and further relevant articles and reports referenced within the literature were added as they were identified.

81 references were provided by The Transport Agency in a 'Māori Road Safety Outcomes Research Catalogue' spreadsheet, including brief notes on most of them from a prior internal review. Based on the reference name and notes, Mackie Research identified 49 of these as likely to be within scope for the review. The Transport Agency then provided the files or links for these 49 references.

A brief literature search was conducted in ScienceDirect and Google Scholar using the keywords “Māori”, “road”, “road safety”, “NZ”, “pedestrian”. A grey literature search using the same terms was also conducted on Google. All relevant articles and reports were added to the Māori Road Safety Outcomes Research Catalogue.

Further relevant literature identified as part of the review process was also added to the Māori Road Safety Outcomes Research Catalogue.

Literature review

Each relevant reference in the Māori Road Safety Outcomes Research Catalogue was reviewed, and information about study methods, relevance to the review, and key findings added to the catalogue. These notes were then synthesised and used to draft the literature review report.

The report was organised according to how key themes in the literature answered the two study questions. While a Safe System⁶⁹ approach to the analysis was not explicitly taken, it did inform consideration of how the contributing factors influence road safety outcomes.

LITERATURE REVIEW FINDINGS

Introduction

The wider context

Deaths and serious injuries (DSIs) from road traffic crashes are a major cause of health, social, and financial loss in Aotearoa New Zealand (MSD, 2016). In 2018, a total of 377 people were killed in road crashes, while a further 2598 were reported as seriously injured, and rates have been increasing since 2014 (NZTA, 2019c). In 2013, when road crash injury rates were at their lowest, health loss due to transport injury was responsible for 3.4% of all health loss among males, and 1.5% among females in Aotearoa (MoH, 2016). Accident compensation claims relating to road traffic crashes numbered around 36,000 per year in 2011 and cost an average of \$444 million (NZ Police, 2018b), and claim numbers are increasing (ACC, 2019).

The Māori population is disproportionately affected by road traffic trauma (MoT data, 2017) relative to their population size (15% of the Aotearoa population; MSD, 2016). In 2006, road traffic trauma was the leading cause of injury-related health loss among Māori, with a burden estimated to be double that for non-Māori (MoH & ACC, 2013). It was also the primary cause of injury-related death in rangatahi Māori (Māori youth) and tamariki Māori (Māori children) between 2007 and 2011 (Simpson et al., 2015). This has far-reaching implications for the wellbeing of Māori.

Since colonisation, Māori have experienced inequities across a range of outcomes relating to health, education, justice, and other sectors (for an example, see Waitangi Tribunal, 2005). As with these inequitable outcomes for Māori in other areas, inequities in road safety outcomes are indicative of larger structural issues, such as racism and social deprivation. While it is beyond the scope of this literature review to explore the wider systemic issues influencing road safety outcomes for Māori beyond what is observed in the literature, it is important to highlight that many of the risk factors discussed on the next pages are closely linked to these underlying determinants.

It should also be noted that the impact of the current road safety system has impacts on Māori beyond those relating to DSIs, such as contributing to Māori entry into the justice system. This occurs through a system which requires financial investment to be compliant with traffic laws, such as driver licensing, vehicle registration, and Warrants of Fitness. Financial penalties are then frequently used to enforce traffic laws, so drivers who are unable to afford the costs of licensing and vehicle maintenance often end up being issued fines for non-compliance. NZ Police explain this means that “through compounding fines and demerits, it is possible for people to enter the justice system solely based on their lack of financial stability and ability to fulfil their legal obligations for operating a motor vehicle” (NZ Police, 2019, p.8).

⁶⁹ A Safe System approach recognizes that people make mistakes, and that the transport system should be designed so as to reduce the risk of death and injury when these mistakes happen. It involves four ‘pillars’: Safe roads and roadsides, safe vehicles, safe speeds, and safe road use (NZTA, 2012).

This is a particular issue among the Māori population. For example, NZ Police data show that the most common type of offences committed by Māori are Traffic and Vehicle Regulatory Offences (7.6% of all offending by Māori; NZ Police, 2018a, and that between mid-2015 and mid-2016, 23% of reoffending by Māori related to traffic offences (NZ Police, 2018d). First-time offending by Māori is also more likely to be resolved in court (rather than, for example, by paying fines) compared to first-time offending by people of other ethnic groups (NZ Police, 2019). Furthermore, police officers have been found to issue greater numbers of traffic infringements in deprived areas, especially relating to vehicle regulations (NZ Police, 2019). For instance, in Canterbury, this resulted in Māori drivers being fined at a rate close to three times both their relative population size and their crash risk (NZ Police, 2017). Unsurprisingly then, qualitative data suggest many Māori feel they are unfairly targeted by police for traffic-related offences (Te Taiwhenua o Heretaunga, 2002; Hatfield et al., 2019). Not only does this cause significant harm to those affected, but it can undermine community trust and confidence in police and the justice system (NZ Police, 2019). Thus, while this report focuses primarily on death and injury within the road transport network, the wider impacts of the transport system on health and social outcomes for Māori should be kept in mind.

Overview

This report summarises evidence from existing literature on current road safety outcomes for Māori and the factors that influence these. It includes academic and grey literature which has been published online, or that has been provided by The Transport Agency for the purposes of writing this review. The literature has been synthesised to contribute to effective and appropriate road safety strategies for Māori. All efforts have been made to present the literature in a way that does not stigmatise Māori nor perpetuate negative stereotypes. Similar care should be taken with any subsequent use of the information presented.

Where possible, evidence relating to vehicle drivers involved in road traffic crashes has been separated from that relating to road traffic casualties (noting there is substantial overlap between these two types of crash involvement). This is in order to differentiate between the harm resulting from road traffic crashes and the road user factors that potentially contributed to the occurrence, nature, and severity of the crash.

Please note that many of the datasets reported have known accuracy issues. In particular, traffic crash reports (TCRs) saved in the Crash Analysis System (CAS) are often missing ethnicity data, for example in 2016 ethnicity was recorded in only 70% of TCRs⁷⁰ (MoT data, 2017). Moreover, the 'ethnicity' of people involved in crashes is determined by police who attend the scene of the crash, and is most often based on racial appearance, rather than self-identified ethnicity (NZ Police, 2019). Reporting of crash injuries may also be lower among Māori than non-Māori (Alsop et al., 2001) and Māori hospitalisation rates are likely to be underestimated (Cormack & Ricci, 2009). In addition, in some cases, for example with the most recent NZ Police data referred to, it is not always clear from which dataset the statistics originate, although it is most likely from TCRs. Where possible, original data sources are stated.

Māori road safety outcomes

Māori road traffic crash casualties

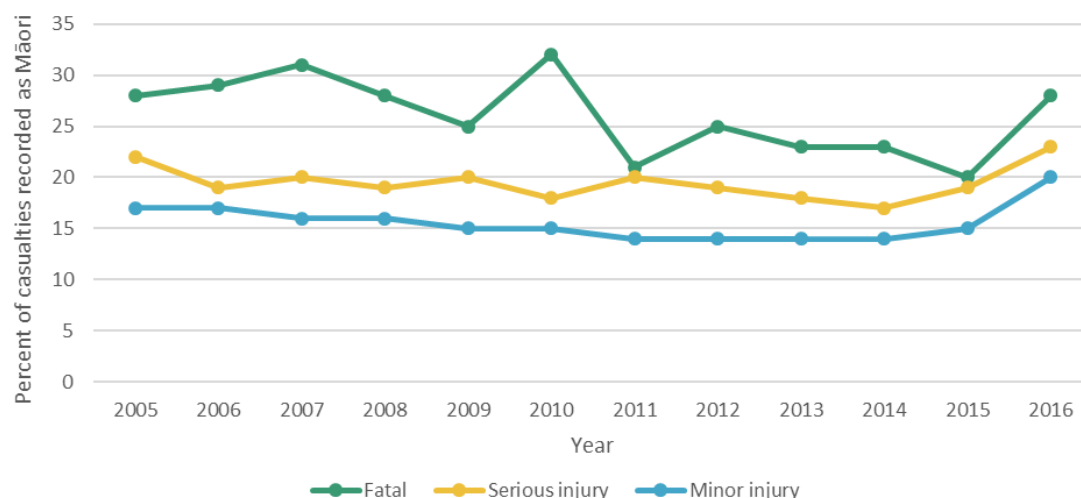
Overall trends

Māori experience substantially higher rates of road traffic death and serious injury than people of other ethnic groups in Aotearoa New Zealand. For example, Ministry of Transport data based on TCRs from 2016, the most recent year for which data are available, show that of all reported crash casualties where police recorded racial appearance information⁷¹, 20% were Māori (MoT data, 2017), despite making up only around 15% of the population (MSD, 2016). Moreover, Māori made up 23% of serious injury and 28% of fatal crash casualties in that year (Figure 30; MoT data, 2017), representing a road traffic fatality rate close to double their relative population size.

⁷⁰ Note that up until 2016, ethnicity recording rates were closer to 90%. The cause of this drop in ethnicity recording is unclear.

⁷¹ 70% of all crashes involving injury (minor, serious, and fatal) included ethnicity information based on racial appearance.

Figure 30: Māori road traffic crash casualties 2005-2016 as a percent of all casualties for which ethnicity was recorded in TCRs



Source: MoT, 2017 (Motor Vehicle Crashes in New Zealand data from 2005-2016).

However, estimates of the extent to which they are over-represented vary substantially. For example, NZ Police report a rate of 65.2 motor vehicle crash injuries and 11.9 fatalities per 100,000 population among the Māori population in 2017, compared to 53.7 and 7.1 per 100,000 among the non-Māori population respectively (NZ Police, 2018a). This represents a 21% higher rate of injury and 68% higher rate of death among Māori compared to non-Māori. Meanwhile, taking variations in population age structure into account, the Ministry of Social Development calculated an age-standardised rate of over three times the number of motor vehicle crash fatalities among the Māori population in 2012 (17.6 per 100,000 population) compared to the non-Māori population (5.6 per 100,000; MSD, 2016).

Though rates also vary from year to year, overall trends show rates of motor vehicle crash deaths decreasing substantially among both Māori and non-Māori from the 1980s until at least the early 2000s (Blakely et al., 2007). However, since 2014, this trend has started to reverse (Figure 31). Traffic crash report data show that Māori made up a smaller proportion of casualties in all crashes (15%), as well as in fatal (23%) and serious injury (18%) crashes, in 2013 compared to 2016 (MoT, 2014; MoT data, 2017). NZ Police data also show year-on-year increases in crash fatalities and serious injuries among both Māori and non-Māori between 2014 and 2018 (NZ Police, 2018a; NZ Police, 2018c).

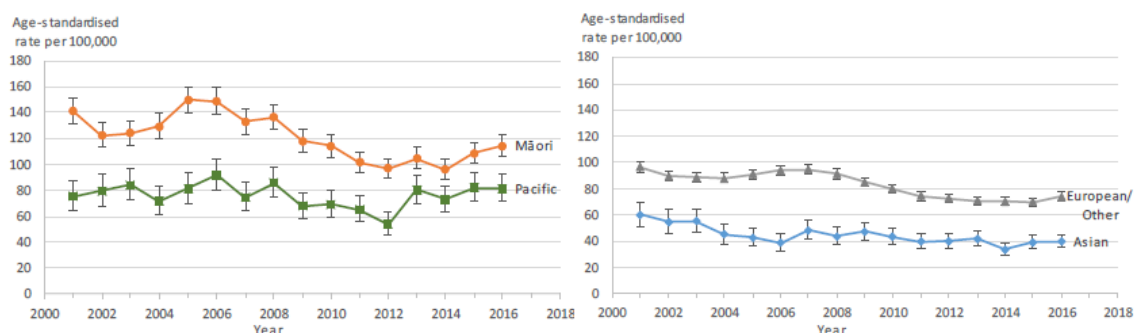
Figure 31: Number of Māori road traffic crash casualties 2005-2016 (as recorded in TCRs)



Source: MoT, 2017 (Motor Vehicle Crashes in New Zealand data from 2005-2016).

Additionally, while these rates are increasing among the non-Māori population as well, they are increasing faster in the Māori population, which is widening existing inequalities (NZ Police, 2019). For example, hospitalisation data from the National Minimum Dataset point to an increase in road traffic crash hospitalisations among Māori between 2014 and 2016, but not among Pacific, European, and Asian ethnic groups (Figure 32; CPHR, 2018b). There is, however, some indication that rates may have started to decrease again in 2018; NZ Police reported a 6% decrease in fatal crashes and a 3% decrease in serious injury crashes involving Māori (irrespective of whether they were a casualty in the crash) between the 2017/18 and the 2018/19 financial years (NZ Police, 2019).

Figure 32: Road traffic injury hospitalisations over time, by ethnic group, 2001-2016 (age-standardised rate per 100,000)



Source: CPHR, 2018b, p.3. Based on National Minimum Dataset. Note prioritised ethnic groups have been used.

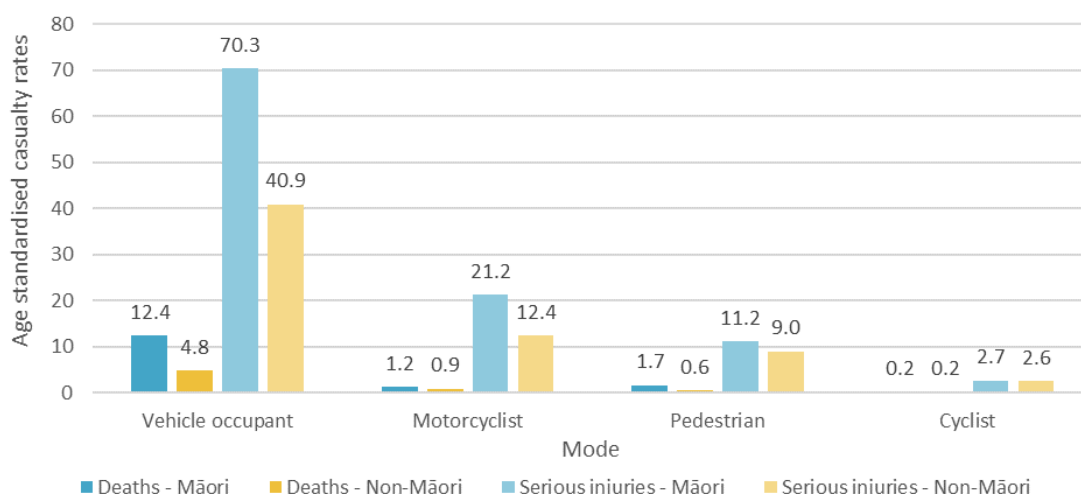
Mode

Crash death and serious injury rates vary across different mode types, with Māori experiencing higher rates of death and serious injury than non-Māori as vehicle occupants and as pedestrians. For example, using New Zealand Mortality Collection Dataset and National Minimum Dataset data, one study found that as vehicle occupants, age-standardised Māori fatality rates were 2.6 times as high as for non-Māori between 2005 and 2014 (Figure 33; CPHR, 2018a). Similarly, hospitalisation rates from 2014-2016 were 1.8 times higher among Māori than non-Māori. For pedestrians, injury rates from the same periods were lower overall than those of vehicle occupants, but with Māori still over-represented. Māori pedestrians had a fatality rate 2.8 times as high as for non-Māori and a hospitalisation rate 1.2 times that for non-Māori (CPHR, 2018a).

Motorcycling injury rates were also higher among Māori than non-Māori in this study, though it should be noted that the European/Other population had comparably high hospitalisation rates to Māori. In contrast,

cycling injury rates were similar across ethnicities, with Māori rates of 0.2 fatalities and 2.7 hospitalisations per 100,000 population similar to those of non-Māori (CPHR, 2018a).

Figure 33: Road traffic deaths 2005-2014 and hospitalisations 2014-2016, age-standardised rates per 100,000 population



Source: CPHR data, 2018a. Based on New Zealand Mortality Collection Dataset and National Minimum Dataset.

Gender

As with the general population, Māori males are much more likely than Māori females to be a casualty in a road traffic crash, with males representing 67% of all serious injury and 78% of all Māori fatal crash casualties in 2017 (cf. 70% in the total population; MoT, 2014; MoT data, 2017; NZ Police, 2018a). This is also apparent in age-standardised data, with Māori males having the highest crash hospitalisation (154/100,000 cf. 79/100,000 among Māori females) and fatality (15.9 cf. 5.9/100,000) rates of any gender/ethnic group (CPHR, 2018b; CPHR, 2018c). Since 2013, NZ Police report Māori males as having experienced a 40% increase in road traffic deaths and serious injuries (NZ Police, 2018a).

Age

Few papers report on the burden of road traffic death and injury across different age groups among Māori compared to other ethnic groups. However, it is likely that young Māori make up a large proportion of Māori crash casualties, especially young Māori men. This is because traditionally, people in the general population aged between 15 and 29 years old have the highest rates of crash casualties, for example, making up 39% of all injury and 34% of all fatal crash casualties in 2016 (MoT data, 2017). Given the much younger age structure of the Māori population compared to the non-Māori population (Simpson et al., 2015), it follows that an even greater proportion of road traffic deaths and injuries among the Māori population would involve Māori casualties under the age of 30. It may also partially explain why Māori are over-represented in crash data (though it does not explain all the inequality, as evidenced by differences in the age-standardised rates outlined previously). Historical data support this conclusion, with one study linking traffic crash report, hospital in-patient, and mortality data to show that 82% of Māori all road traffic casualties between 1980 and 1994 were under the age of 34 (Sargent et al., 2004). A more recent Auckland study also found that road traffic injury death and hospitalisation rates peaked between ages 15 and 24 among all broad ethnic groups, but at a higher rate for rangatahi Māori than all others (487.8 deaths and hospitalisations per 100,000 compared to 352.6 for youth of European/Other ethnicity and 309.4 among Pacific youth; Hosking et al., 2013). In contrast, the study found similar rates of crash hospitalisations and fatalities between Māori and other ethnic groups among adults aged 65 and older (Hosking et al., 2013).

Road traffic crashes also cause substantial harm to tamariki Māori, accounting for almost 9 fatalities per 100,000 population as car occupants, and around 2 per 100,000 as pedestrians (CYMRC, 2019). Tamariki Māori are over-represented in these road traffic injury rates relative to non-Māori children, particularly as

vehicle occupants and pedestrians (Safekids Aotearoa, 2015). For example, a Child and Youth Mortality Review of mortality data from 2002 to 2017 found that tamariki Māori have fatality rates almost twice as high as non-Māori children for car and pick-up truck/van occupancy, and pedestrian fatality rates approximately double those of non-Māori (CYMRC, 2019). This includes a much higher pedestrian fatality rate than Pacific children, who are also over-represented in pedestrian casualty statistics more generally (CYMRC, 2019; Hosking et al., 2013). These crashes causing injury to children have historically tended to occur on school days from 8-9am, 3-4pm, and 5-6pm, with one Auckland study finding 71% of crashes occurred between 3pm and 7pm (Newbury et al., 2008).

One relatively common crash type affecting tamariki Māori has been driveway injuries and fatalities, with tamariki Māori found to be almost three times as likely to be injured in this way compared to children of other ethnic groups in 1992-1994 (Roberts et al., 1995). Driveway crashes have continued to be a major cause of child fatalities, occurring at an average of 5 per year (Kenny, 2014). Tamariki Māori are also more likely to be injured in cycling crashes that do not involve motor vehicles but have similar injury rates to children from other ethnic groups with regard to other types of road traffic incidents that do not involve motor vehicles (Safekids Aotearoa, 2015).

The Child and Youth Mortality Review also found that child pedestrian deaths peak in the general population between 1 and 4 years of age, and again between 15 and 24 years old (CYMRC, 2019), while another study observed the highest child injury (excluding death) rates between ages 5 and 14 (Safekids Aotearoa, 2015). Car occupancy fatalities rise dramatically from around age 14, and peak at age 18 in the general population (CYMRC, 2019). Māori-specific rates across different child age groups and modes were not available.

Māori drivers in road traffic crashes

Overall trends

Regardless of driver fault and of whether there were driver casualties, Māori are over-represented as drivers involved in road traffic crashes, and rates are increasing (NZ Police, 2018a). This is demonstrated by traffic crash report data showing Māori drivers were involved in 17% of all injury crashes⁷² in 2016 compared to 12% in 2013 (MoT, 2014; MoT data, 2017). Māori driver representation in serious injury and fatal crashes has also risen since 2013, making up 20% and 23% of drivers involved in serious injury and fatal crashes in 2017 (c.f. 14% and 19% respectively in 2013; MoT, 2014; MoT data, 2017). These numbers follow a similar pattern to the Māori crash casualty statistics reported above, with Māori drivers more likely to be involved in injury crashes than non-Māori, and with the outcome of these crashes more likely to be fatal or serious. However, the proportion of injury crashes involving Māori drivers remains lower than that involving Māori casualties (NZ Police, 2018a). This could indicate that a substantial proportion of crashes resulting in Māori casualties do not involve a Māori driver (for example, a Pākehā driver hitting a Māori pedestrian), or that crashes involving Māori drivers result in a higher number of casualties on average, for example, due to higher vehicle occupancy rates.

Māori drivers are also over-represented among drivers classified by NZ Police as 'high-risk'⁷³. A Ministry of Transport study of traffic crash reports from 2006 to 2010 found that Māori drivers make up 35% of drivers identified as high-risk, compared to 54% of European and 6% of Pacific drivers (MoT, 2012). Data are not available on the reasons for classification of Māori drivers specifically as high-risk, however, they are likely to relate to the licensing and alcohol issues discussed later in this review.

Gender

Male drivers are much more likely to be involved in road traffic crashes than are female drivers in the general population. In 2016, male drivers were involved in a total of 56% of all injury crashes (excluding fatal) and 73% of fatal crashes (MoT data, 2017). Male drivers were also found to be 'at fault' in 75% of serious injury and fatal crashes between 2006 and 2010 (MoT, 2012). Māori-specific data on driver genders are not available, however, the pattern is likely to be similar, with Māori male driver rates of crash

⁷² For which racial appearance data is recorded (70%)

⁷³ High-risk drivers included unlicensed and disqualified drivers, drivers identified as evading enforcement or racing or showing off at the time of the crash, drivers recorded with a blood alcohol level of at least fifty percent over the adult legal limit (i.e. 120 mg/100 ml), repeat alcohol offenders, and repeat speed offenders.

involvement increasing with crash severity, in line with rates of Māori crash casualties for men compared to women.

Age

Young drivers aged 15 to 29 have the highest crash rates in the general population and were involved in 35% of fatal and 37% of serious injury crashes in 2016 (MoT data, 2017). NZ Police report that traffic crash report data indicate drivers in this age group made up 39% of at-fault drivers involved in crashes between 2014 and 2019, while at-fault Māori drivers in this age group represented 44% of all crashes involving Māori (NZ Police, 2019). Taking into account the younger age distribution of the Māori population combined with higher crash rates among younger drivers, young Māori drivers are likely to be particularly at risk of involvement in crashes resulting in death or serious injury.

Factors influencing road safety outcomes

Social deprivation

Deprivation and road traffic risk

There is widespread agreement in the literature on the relevance of social deprivation levels to road safety outcomes, and to those of Māori in particular. National data show that, between 2010 and 2014, road traffic fatalities were higher among people living in areas of high deprivation (CPHR, 2018a). People living in the most deprived areas (NZDep>8) were found to have age-standardised vehicle occupant mortality rates 2.3 times (7.7 cf. 3.3/100,000 population), and hospitalisation rates 2.6 times (84 cf. 32/100,000), those of people living in the least deprived areas (NZDep<3; CPHR, 2018b; CPHR, 2018c). Differences in pedestrian hospitalisations were even greater, at 3 times the rate in the most deprived compared to the least deprived areas (15 cf. 5/100,000 population; CPHR, 2018b).

Similarly, in Auckland between 2000 and 2008, combined crash fatality and hospitalisation rates were found to increase by 3-11% with every decile increase in the New Zealand Index of Deprivation (NZDep) of the casualty (Hosking et al., 2013). This was predominantly a result of increasing car occupant and pedestrian crash casualty rates, while motorcyclist and cyclist casualty rates varied little with increasing deprivation (Hosking et al., 2013). Earlier research on Māori motor vehicle crash casualties found that those from the four most deprived deciles (7-10) made up 70% of all Māori crash casualties, while just the top two most deprived deciles (9-10) comprised 40% (Sargent et al., 2004).

The relationship between deprivation and traffic risk varied by age group in Auckland, with adults aged 25-64 showing the strongest relationship (11% average increase in traffic risk per NZDep decile increase), followed by children aged 14 and under (9% increase) and youth aged 15-24 (6% increase; Hosking et al., 2013). The same study also observed a higher road traffic risk for tamariki Māori than other ethnicities, at 65% greater than the risk for European/Other children (Hosking et al., 2013). The strong relationship between deprivation and traffic risk for children is echoed in earlier studies of child crash casualties, where census and mortality records demonstrated a 36% higher crash injury risk for children aged up to 14 in low-income compared to high-income households (data from 1981-1996; Shaw et al., 2006). Crash injury risks in driveways has also been calculated as up to four times higher among low-income than high-income groups in a study of child driveway fatalities between 1992 and 1994 (Roberts et al., 1995). Meanwhile, at the other end of the scale, the Auckland study noted the crash injury risk in adults over 65 was less strongly related to social deprivation at a 3% average increase in traffic risk per decile increase (Hosking et al., 2013).

Deprivation and drivers

For vehicle drivers involved in road traffic crashes (regardless of whether they were a casualty, or deemed at fault), NZ Police noted a greater likelihood of involvement in fatal and serious injury crashes across all ethnicities among drivers living in a deprived area, especially those on a learner licence (NZ Police, 2019). This relationship is even stronger among Māori drivers, with 40% of learner drivers responsible for fatal or serious injury crashes living in more deprived areas (NZDep >7), compared to 21% of European learner drivers (NZ Police, 2019). Drivers in deprived areas that have large Māori populations

are also over-represented in infringement issuing data (for which ethnicity is not currently recorded), accounting for more than half of total infringements in four police districts (NZ Police, 2019).

Location

Road traffic injury rates vary across Aotearoa, with some regions experiencing much higher per capita rates than others. Regions with higher fatality rates tend to be those that are predominantly rural, likely due to the higher speed environments resulting in more severe crash outcomes. For example, NZ Police report the highest absolute numbers of fatal crashes occurring from 2014 to 2019 in the Bay of Plenty, Northland, and Waikato police districts (NZ Police, 2019). These districts also have the highest rates of fatal crashes per Māori population (NZ Police, 2019). Age-standardised per capita measures tell a slightly different story, with more sparsely-populated District Health Board (DHB) regions such as West Coast (17.5/100,000 population), Tairāwhiti (12.7) and South Canterbury (12.4) having the highest road traffic mortality rates between 2009 and 2014 (CPHR, 2018c). This aligns with mortality data from 2009 to 2014 showing increasing rates of crash fatalities with decreasing population density. Rural areas had the highest rate of crash fatalities at 12.6 per 100,000 population (age-standardised), compared to 3.8 in main urban areas (CPHR, 2018c). However, Māori are still disproportionately represented in more urban areas such as the Auckland region, where 18% of crash fatalities are Māori, though they make up only 11% of the regional population (Auckland Transport, 2019).

In contrast, serious road traffic injuries tend to be focused in areas that have large Māori populations and high levels of social deprivation, in addition to having a low population density. For example, overall crash hospitalisation rates were highest in the Northland (144.3/100,000 population, age-standardised), Tairāwhiti (144.5) and Bay of Plenty (108.2) DHB areas (CPHR, 2018b). Similarly, for 2014 to 2019, the highest absolute numbers of serious crashes were reported in the Bay of Plenty, Counties Manukau, and Waikato police districts, while the highest per Māori population rates occurred in the Northland, Counties Manukau, and Waikato police districts (NZ Police, 2019). Moreover, serious road traffic injuries occurred at the highest rates in minor urban areas in 2016 (124/100,000 population, age-standardised), followed by rural (106), secondary urban (98), and main urban areas (67; CPHR, 2018b).

Crash rates for different mode types also vary across the country among the general population, and likely also among Māori. Vehicle occupants and motorcyclists had the highest (non-age-standardised) rates of hospitalisation in the West Coast and Northland DHB areas in 2016 (CPHR, 2018b). However, while vehicle occupant fatalities between 2009 and 2014 showed a similar pattern to the hospitalisations, occurring at the greatest rates in the West Coast, MidCentral, Tairāwhiti, Northland, and Lakes DHB areas, motorcyclist fatalities were more common in the South Canterbury, Wairarapa and Taranaki DHB areas (CPHR, 2018c). Interestingly, the Auckland DHB area had one of the lowest pedestrian mortality rates between 2009 and 2014, but the highest rate of pedestrian and cyclist hospitalisations in 2016 (CPHR, 2018b; CPHR, 2018c).

Regional trends relating to Māori crash outcomes appear to have remained relatively stable over the past decades. Data from the 1980s and 1990s shows that Māori were under-represented in South Island DSI crashes during this period (LTSA, 2002). Broadly speaking, this appears still to be the case, with NZ Police reports showing the Māori population making up around 7-9% of serious crash casualties in the South Island police districts (NZ Police, 2019) compared to around 9% of the total South Island population (Stats NZ, 2013). NZ Police records also show Māori over-representation as serious crash casualties has remained relatively stable across most police districts over the six years to June 2018, though there is some evidence of a decrease in the Tasman and Bay of Plenty districts, and an increase in the Counties Manukau and Waikato districts (NZ Police, 2019).

Earlier studies of Māori crash casualties in the 1980s and 1990s suggested that the Māori population's higher representation in rural areas relative to non-Māori contributed to higher DSI levels among Māori (LTSA, 2002), although over half of crashes occurred in or near urban areas (Sargent et al., 2004). This appears still to be the case; more recent Auckland research indicated that outcomes are worse for those living in rural areas with more high-speed roads (Hosking et al., 2013), though the majority of death and serious injury crashes involving Māori actually occur on local urban roads (Auckland Transport, 2019). Māori over-representation in DSIs therefore appears to be an issue in both urban and rural areas, with rural DSI crashes occurring less frequently than urban ones but resulting in somewhat more severe outcomes.

Driver licensing

Driving unlicensed is a common factor in road traffic crashes involving Māori and is likely to contribute to their over-representation in crash DSIs. Irrespective of ethnicity, unlicensed drivers are substantially more likely to be involved in DSI crashes than licensed drivers, with one Auckland study from 2005 estimating an 11 times higher likelihood of being involved in a serious injury crash (Blows et al., 2005). Unlicensed (or under-licensed) Māori are over-represented in crash DSI statistics. For instance, NZ Police report that of all learner-licensed drivers responsible for road traffic crashes between 2014 and 2019, almost a third were Māori, while of all unlicensed drivers responsible for crashes, nearly half were Māori (NZ Police, 2019). Unlicensed Māori drivers have also been found 2.3 times more likely to be involved in a crash (regardless of fault or whether they were also a casualty) compared to unlicensed European drivers (NZ Police, 2019). Similarly, a cohort study of newly licensed young drivers between 2006 and 2008 found that 75% of Māori participants had driven before having their licence, and Māori were 2.2 times more likely to drive unlicensed than non-Māori (Begg et al., 2012). In addition, Māori drivers have been found less likely to do defensive driving courses than non-Māori (32% cf. 51%; Begg et al., 2015), suggesting they tend to have less professional driver training than non-Māori overall.

Several factors related to unlicensed driving are identified in the literature. The first is deprivation, with Māori living in high deprivation areas 5-7 times more likely to drive unlicensed frequently or over substantial distances than non-Māori living in high deprivation areas, compared to a 30%-70% greater likelihood for Māori compared to non-Māori living in low deprivation areas (Begg et al., 2012). NZ Police outline how the existing driver licensing system privileges those with ready access to a vehicle, a mentor, English literacy, and a form of identification, all of which are less likely to be accessible to people living in deprived circumstances (NZ Police, 2019). Māori may additionally experience or anticipate cultural discomfort when accessing licensing services. This was evident in an early Ngati Kahungunu study in participant references to the barrier of feeling 'whakamā', or unconfident to participate in these kinds of processes without support (Te Taiwhenua o Heretaunga, 2002). More recent qualitative research among South Island rangatahi Māori supports these findings, reporting that access to money and resources, confidence, and sympathetic driving supervisors all influenced their progress through the licensing system (Beanland, 2019).

Māori in rural areas are also more likely to drive unlicensed. This is evident in the findings of a questionnaire completed by Māori learner drivers across Aotearoa New Zealand in the late 2000s, in which two thirds of urban (65%) and 83% of rural-dwelling participants had driven unlicensed on the road before (McDowell et al., 2009). Rural participants were also more likely to drive before age 15 (70% cf. 54% urban) and to get their licence already at age 15 (47% cf. 33% urban) (McDowell et al., 2009).

Māori males report driving unlicensed more often, over greater distances, and at a younger age than Māori females (Begg et al., 2012; McDowell et al., 2009), however, more females reported having been in a serious traffic crash than males (47% cf. 37%; McDowell et al., 2009). A 2013 study also found that being female, Māori, and/or from more deprived areas was associated with a lower likelihood of progressing from a learner to a full licence compared to participants who were male, non-Māori, and from less deprived areas (Gulliver et al., 2013). Driving before having a license has also been found to be related to other risky behaviours such as cannabis use, hazardous drinking, sensation-seeking, and aggression (Begg et al., 2012). Finally, the main reported reasons for driving unlicensed in one study were to learn to drive (36%) and to be the sober driver (14%), and this varied little between urban and rural Māori (McDowell et al., 2009). Recent research also points to emergencies, being a sober driver, and picking up siblings when parents are unable to as justifications for unlicensed driving, and suggests unlicensed driving among rangatahi Māori is more normalised in rural areas (Beanland, 2019).

Police pursuits

Closely related to unlicensed driving are police pursuits, which are likely to involve relatively high speeds. NZ Police report that the number of pursuits of Māori drivers increased by 95% between 2014 and 2018, compared to a 71% increase in total pursuit events (NZ Police, 2019). Māori drivers involved in pursuit events (i.e. fleeing police) tended to be slightly younger than for non-Māori, especially for pursuits which result in DSIs (NZ Police, 2019). Māori aged 15 years old were the most common group of fleeing drivers, followed by Māori aged 16 years old, indicating a high likelihood they were fleeing because they were driving unlicensed (NZ Police, 2019).

Vehicles

Older vehicles are over-represented in crashes with serious or fatal outcomes (De Pont, 2016), and low-income households may be less likely to be able to afford newer, safer vehicles (NZ Police, 2019). Young people are also more likely to drive older vehicles, which, combined with their higher crash risk, substantially increases the likelihood of injury (Keall & Newstead, 2011). Traffic crash reports from 2014 to 2019 show that 55% of crashes involving Māori (either as a casualty or driver, or both) involved a vehicle over 14 years old (NZ Police, 2019). This is higher than the 45% of older vehicles registered in 2019 (NZ Police, 2019). NZ Police also report that lack of warrant of fitness and lack of registration are two of the top three infringement types issued in high deprivation areas (NZ Police, 2019). This suggests lower vehicle safety levels compared to people from other ethnic groups and from lower deprived areas contribute to higher crash DSI rates for Māori, indicating people living in high deprivation areas may be driving less safe vehicles than in lower deprivation areas.

Restraints

Not wearing an appropriate restraint while driving substantially increases the likelihood of road traffic crashes resulting in death or serious injury, and Māori are less likely to use them than non-Māori. An estimated 18% of road traffic fatalities in 2014 could have been avoided if they had worn seatbelts (De Pont, 2016). However, between 2011 and 2016, 35% of Māori fatalities were estimated to have involved a vehicle occupant not wearing a seatbelt, compared to between 19% and 30% of all road traffic fatalities (Hirsch et al., 2017). In the 16-25-year age group, rangatahi Māori made up an even greater proportion of non-seatbelt-wearing fatalities (45%; Hirsch et al., 2017). Similarly, NZ Police reported that in at least 31% of Māori road traffic fatalities in 2017, the vehicle driver was known to not be wearing a seatbelt, and this is likely to be an under-estimate, as in a third of cases no restraint information was recorded (NZ Police, 2018a). The same report suggests tamariki Māori are also more likely to be restrained with seatbelts rather than the legally required child restraints for under 7-year-olds (NZ Police, 2018a).

Alcohol

Alcohol and drug-affected drivers are a factor in approximately 35% of fatal and 12% of serious injury crashes across the total population in 2018 (NZTA, 2019b; NZTA, 2019c). Alcohol use is also linked to other safe system factors, for example in one study it was implicated in around 54% of fatalities where the casualty wore no seatbelt (Hirsch et al., 2017), and (while legal), alcohol consumption by pedestrians is also linked to crash involvement (Hirsch et al., 2018). Alcohol is a contributing factor in more Māori than non-Māori road traffic DSIs, though the current proportion of crashes resulting in Māori fatalities that involve alcohol is not available. Earlier studies suggest that between 1988 and 2000, alcohol was a factor in 35% of road traffic crashes involving Māori, compared to 25% for non-Māori (LTSA, 2002). However, there is some evidence that Māori rates of driving under the influence of alcohol have decreased somewhat over the subsequent decade (NZ Police, 2018a). More recent TCRs show Māori were casualties in 36% of fatal road traffic crashes where alcohol was a factor between 2004 and 2014, and in 38% where both alcohol and speed contributed (NZTA, 2015). These rates point to an ongoing over-representation of Māori casualties in alcohol-related crashes relative to their proportion of the Aotearoa population (15%).

Speeding

There is relatively little information available in the literature on speeding as a factor in road traffic crashes resulting in Māori DSIs. In 2018, TCR data indicates that speed was a factor in approximately 22% of DSIs (NZTA data, 2019d), although this is likely to be an underestimate, due both to the way in which speed as a factor is defined, and the fact that speed estimates are often provided by the vehicle driver involved in a crash (Hirsch et al., 2018). Nonetheless, between 2004 and 2014, TCR data show Māori were over-represented in fatal crashes where speed was a factor, making up 32% of casualties in these (NZTA, 2015). In addition, though a comprehensive study of crashes resulting in Māori casualties from 1980-1994 did not specifically mention speed as a factor, it did note that 'loss of control' was involved in 40% of crashes (Sargent et al., 2004), which may indicate the involvement of speeds too fast for the road conditions.

Risk-taking

Various studies have attempted to assess risk-taking behaviours, the findings of some of which are of relevance to Māori road safety outcomes. These include that younger drivers (regardless of ethnicity) are more likely to enjoy or to find speeding and driver risk-taking acceptable than are older and more

experienced drivers (Cantwell et al., 2012). A survey of attitudes to driver licensing among Māori learner drivers also found that, while two thirds or more respondents agreed that learner drivers should be supervised at all times and should use 'L' plates for their own safety, a substantial number also felt it likely they would not comply with these rules, especially those who lived rurally (36% urban cf. 42% rural felt it likely they would drive unsupervised, and 43% urban cf. 47% rural that they would drive without 'L' plates; McDowell et al., 2011).

Meanwhile, another study found slightly fewer Māori participants reported that they have in the past or would in the future change their driving behaviour following a licence suspension compared to non-Māori (Hatfield et al., 2019). Māori participants also more frequently reported believing they would be unlikely to get caught if they exceeded the speed limit by more than 20km/h (54% cf. 44% of the overall sample), though for most other risk-taking beliefs (e.g. around alcohol consumption) their responses reflected those of other participants (Hatfield et al., 2019). Despite few differences in perceived likelihoods of being caught, qualitative data from the study indicates that Māori feel targeted for enforcement, particularly if they are young, drive a vehicle in a poor condition, or wear 'hoodies' (Hatfield et al., 2019). This aligns with the findings of a much earlier qualitative study in the Ngati Kahungunu rohe in Hawke's Bay, in which participants reported being unfairly targeted by police (Te Taiwhenua o Heretaunga, 2002). Participants in that study also indicated that people who could not afford to comply with vehicle and licensing regulations were also those who were most likely to engage in risky driving behaviour (Te Taiwhenua o Heretaunga, 2002), which may be one reason for the previously discussed link between deprivation and poor road safety outcomes. Finally, when examining pedestrian risk-taking behaviour among 13 to 16-year-olds, a 2009 study found that Māori participants were more likely to report playing on the road (e.g. to play 'chicken') and to engage in unsafe crossing behaviour (e.g. crossing road without looking) than were European and Asian participants (Sullman et al., 2009). While none of these studies directly examine risk-taking behaviours, they do point to some potential differences in willingness to take risks on the road between Māori and non-Māori, some of which may be related to deprivation.

Other factors

A few other various factors are mentioned in the literature as potentially contributing to Māori road safety outcomes. One of these is fatigue, with NZ Police referring to higher reported sleepiness levels among Māori compared to non-Māori, potentially due to shift work, and an over-representation of Māori (18%) in crashes where fatigue was identified as a contributing factor (NZ Police, 2018a). Distraction, however, does not appear to be a major contributing factor in crashes involving Māori (NZ Police, 2018a). Another is Māori cultural behaviours and obligations; participants in the Ngati Kahungunu study from 2002 identified long-distance travel to tangi and hui as a road safety risk, particularly as drivers were often tired from the events (Te Taiwhenua o Heretaunga, 2002). Road safety risks at tangi and hui were also seen to be exacerbated by the nearby road environment. Study participants often pointed to the presence of busy, high-speed roads outside marae, which severed them from their urupā and made children feel unsafe (Te Taiwhenua o Heretaunga, 2002). A lack of cycling facilities was also seen to contribute to road safety issues for children and youth in the area (Te Taiwhenua o Heretaunga, 2002). Meanwhile, an Auckland study from 1996 observed that tamariki Māori reported crossing more roads on average than non-Māori, non-Pacific children (but fewer roads than Pacific children; Roberts et al., 1996). This indicates tamariki Māori may experience a higher level of exposure to road traffic risk, which could contribute to their over-representation in road traffic crash DSIs. However, aside from these earlier studies, there is little literature available on the role of roads and roadsides factors in Māori road safety outcomes.

Discussion and Conclusion

The aim of this literature review was to synthesise the evidence in the literature around road safety outcomes for Māori, and the factors that contribute to these. Overall, the Māori population was found to experience a level of harm from road traffic crashes approximately double that of the non-Māori population. This is influenced by a range of interlinked factors, the strongest of which is levels of social deprivation.

Factors associated with the highest risk of road traffic DSIs among Māori, as among the general population, were being male, aged between 15 and 24, and living in areas with high deprivation. In addition, while rural crashes were found more likely to result in fatal outcomes, serious injury crashes were much more common in minor urban areas. Māori were found to be more at-risk relative to non-Māori as vehicle occupants,

particularly for youth aged 14-25, and as pedestrians, especially for children. Other crash factors which were implicated more frequently in crashes involving Māori compared to those not involving Māori were unlicensed and under-licensed driving, intoxication, speeding, and lack of restraint use. However, licensing aside, there was relatively little recent evidence on the involvement of these factors.

Drawing on the literature at a basic level, the main reasons for the finding that Māori are at substantially greater risk of road traffic DSIs are: that the Māori population is younger overall, so there are more Māori in the 15-24 age group (who experience the highest traffic risk irrespective of ethnicity); that Māori are over-represented in rural and in high deprivation areas, where road traffic risk is higher; that they are more likely to drive unlicensed and to drive older, less safe vehicles; and that they are more likely to drink and drive, and less likely to wear a seatbelt or use child restraints.

However, this does not take wider contextual determinants into account, such as financial stability, access to alternative transport modes like public transport, and trust in the justice system. In addition, most of the literature reviewed focused on road user factors, with comparatively little consideration of other Safe System and societal components. This results in a focus on how Māori behave differently on the road compared to non-Māori, which implies that personal responsibility is the main determinant of crash DSIs and ignores more systemic issues which may be revealed by examining some of the wider Safe System and socio-technical factors influencing crashes.

A noticeable absence in the literature was information on Māori exposure to risk. For example, there were no recent estimates of crash or DSI rates per distance or time travelled; most estimates focused on the level of Māori representation in different types of crashes, or on comparing rates of DSIs per capita across different groups. It is therefore feasible that some of the difference in road traffic DSI rates between Māori and non-Māori relates to exposure levels, for example, if Māori tend to commute further or to drive more for work, that would increase their exposure to road traffic risk.

The finding that social deprivation has the strongest association with DSIs in the Māori population is important. It is clearly linked to Safe System factors such as driver licensing and vehicle safety, but also likely to roads and roadsides factors such as road quality and pedestrian and cycling infrastructure, and to speed environments. However, Māori over-representation in crash DSIs is not purely explained by their over-representation among people living in deprived circumstances; there is evidence of an effect over and beyond deprivation. This is not explored in the literature reviewed for this report but deserves further investigation in future.

More information is also needed to understand the social context within which Māori operate, and all the disadvantages that come with a system that is not designed for them. For example, there was some indication in the literature for a link between road regulation compliance costs (such as licensing and vehicle registration), perceived racism in the enforcement system, and likelihood of engaging in risky driving behaviour. These kinds of issues would benefit from exploration through a robust and culturally appropriate process.

Finally, it is important to note that historically, there has been some backlash from Māori with regard to the proliferation of reports comparing Māori to non-Māori outcomes in different sectors. This is a complicated issue, as equity-promoting policies are not able to be implemented if the focus is not clear, so data demonstrating disparities is needed. On the other hand, continually focusing on negative outcomes can be stigmatising and unhelpful. It is important that both sides are considered in deciding how best to address the issues and opportunities identified as part of this project, and that care is taken in the presentation and use of this information.

Overall, while it was possible to identify multiple Safe System factors that separately influence road safety outcomes for Māori, few studies looked at the relationships between these factors and how they come together. There was also a relative paucity of qualitative data to explain why Māori were more likely to, for example, drive unlicensed or not wearing a seatbelt. Understanding how these factors come together and why is ultimately what matters in people's lives and is necessary to effectively work towards a Safe System for Māori.

Study limitations

This review has several limitations, which are outlined below:

- The review relied on literature that had either been published or was available to The Transport Agency to share and does not provide a complete picture of sector knowledge on the topic.
- Many of the estimates used in this review are based on TCR data, which have known accuracy issues, particularly with regard to ethnicity information, which is based on racial appearance judgements and is missing on a substantial proportion of TCRs (NZ Police, 2019). The estimates referred to should therefore be used as rough approximations only.
- Data relating to road safety outcomes over the past five years was scant, so possible reasons for the increase in Māori DSIs since 2014 were not able to be examined.
- The use of different measures over different time periods make it difficult to directly compare rates across the studies reviewed in this report. In addition, the most recent data was largely available from NZ Police documents, which often did not state the data source, though much is likely to be from TCRs. Where available, information about the way rates were measured has been provided throughout the review.
- While many of the available statistics break DSI data down by ethnicity, few did so in combination with other relevant variables, such as age, gender, and region. This makes it difficult to tease out common factors implicated in road traffic crashes involving Māori, and how these factors relate to one another.
- The study was carried out by Pākehā researchers, whose worldview will inevitably have influenced the interpretation of the literature.
- Statistics, which are the main focus of this review, constitute only one form of evidence around road safety outcomes for Māori. The findings of this review should therefore not be treated as definitive but should be considered in tandem with other forms of evidence from across the sector, and most importantly from Māori.

Recommendations

The findings of the literature review point to a few key areas that would benefit from further exploration in phase two of the project. These recommendations are as follows:

- Explore Māori perspectives on road safety issues and outcomes in order to understand the underlying causes of high levels of road traffic DSIs in the Māori population.
- Carry out a Safe System analysis of DSI crashes involving Māori casualties to further explore common vehicle, roads and roadsides, and speed environment factors implicated in these crashes, and develop typologies of how these come together to result in death and serious injury. Ideally, this would involve looking at TCRs, serious crash unit reports, hospitalisation, and mortality data, in order to achieve a high level of accuracy around ethnicity information.
- Conduct a high-level TCR analysis of crash factors implicated in crashes involving Māori casualties compared to those involving non-Māori by mode type over time, to examine trends and changes that may explain the recent increase in crash DSIs.
- Investigate ways to reduce or mitigate the financial costs of compliance with road regulations to avoid penalising people who are unable to afford these.
- Focus future initiatives on reducing road safety risk exposure for Māori males, youth, and children.

References

- Accident Compensation Corporation [ACC] (2019). Motor Vehicle Accident Claims. Wellington: ACC.
- Alsop, J., & Langley, J. (2001). Under-reporting of motor vehicle traffic crash victims in New Zealand. *Accident Analysis & Prevention*, 33(3), 353-359.
- Auckland Transport (2019). Vision Zero for Tāmaki Makaurau - A Transport Safety Strategy and Action Plan to 2030. Auckland: Auckland Transport.
- Beanland, V. (2019). Rangatahi Māori perspectives on and experiences with Graduated Driver Licensing in New Zealand. Presentation at Transport Knowledge Conference 2019, Wellington: NZ. Abstract available from: <https://www.transportknowledgeconference.nz/220pm-abstracts.html>
- Begg D, Brookland, R (2015) Participation in driver education/training courses during graduated driver licensing, and the effect of a time-discount on subsequent traffic offenses: Findings from the New Zealand Drivers Study
- Begg D, Sullman M, Samaranayaka A (2012) The characteristics of young pre-licensed drivers: Evidence from the New Zealand Drivers Study
- Blakely, T., Tobias, M., Atkinson, J., Yeh, L. C., & Huang, K. (2007). Tracking disparity trends in ethnic and socioeconomic inequalities in mortality, 1981-2004. Wellington: MoH.
- Blows S, Ivers RQ, Connor J, Ameratunga S, Woodward M, Norton R. (2005) Unlicensed Drivers and Car Crash Injury. *Traffic Inj. Prev.*, Vol. 6(3), pp. 230–234.
- Cantwell, S. J., Isler, R. B., & Starkey, N. J. (2012, October). Pushing New Zealand roads to the limit: Chosen speeds of young and inexperienced drivers across differing road conditions. In Australasian Road Safety Research Policing Education Conference, Wellington, New Zealand.
- Centre for Public Health Research [CPHR] (2018a). Road traffic injury deaths and hospitalisations. Environmental Health Indicators New Zealand (EHINZ) fact sheet. Wellington: Massey University. <http://www.ehinz.ac.nz/indicators/transport/road-traffic-injury-deaths-and-hospitalisations/>
- CPHR (2018b). Road traffic injury hospitalisations in New Zealand. Environmental Health Indicators New Zealand (EHINZ) fact sheet. Wellington: Massey University. <http://www.ehinz.ac.nz/assets/Factsheets/Released-2018/Road-transport-injury-hospitalisations-2001-2016.pdf>
- CPHR (2018c). Road traffic injury mortality in New Zealand. Environmental Health Indicators New Zealand (EHINZ) fact sheet. Wellington: Massey University. <http://www.ehinz.ac.nz/assets/Factsheets/Released-2018/Road-transport-injury-mortality-2000-2014.pdf>
- Child and Youth Mortality Review Committee [CYMRC] (2019). 14th Data Report: 2013-17. Wellington: Health Quality & Safety Commission.
- Cormack, D., & Harris, R. (2009). Issues in monitoring Māori health and ethnic disparities: an update. Te Rōpū Rangahau Hauora a Eru Pōmare.
- De Pont, J. (2016). Why do People Die in Road Crashes? A report prepared by TERNZ and Mackie Research for the Ministry of Transport.
- Gulliver, P., Begg, D., Brookland, R., Ameratunga, S., & Langley, J. (2013). Learner driver experiences and crash risk as an unsupervised driver. *Journal of safety research*, 46, 41-46.
- Hatfield, J, T Senserrick, S Boufous, L Mooren, A Williamson, C Sakashita and S Job (2019) Human factor considerations for a licensing point system. NZ Transport Agency research report 657. Wellington: NZTA.

- Hirsch, L., H. Mackie, R. Scott, and R. Thorne (2018). Understanding the Safe System context behind pedestrian road trauma in New Zealand. Auckland, New Zealand, prepared by Mackie Research for NZ Transport Agency.
- Hirsch, L., Waters, G., Scott, R. Mackie, H. and de Pont, J. (2017). Vehicle occupants not wearing a seat belt: An analysis of fatalities and traffic offences in New Zealand. A report prepared by Mackie Research, RIDNZ and TERNZ for the AA Research Foundation.
- Hosking, J., Ameratunga, S., Exeter, D., Stewart, J., & Bell, A. (2013). Ethnic, socioeconomic and geographical inequalities in road traffic injury rates in the Auckland region. *Australian and New Zealand journal of public health*, 37(2), 162-167.
- Keall, M. D., & Newstead, S. (2011). Passenger vehicle safety in Australasia for different driver groups. *Accident Analysis & Prevention*, 43(3), 684-689.
- Land Transport Safety Authority [LTSA] (2002). Background information on Māori in road crashes. Wellington: LTSA.
- McDowell, A., Begg, D., Connor, J., & Broughton, J. (2009). Unlicensed driving among urban and rural Māori drivers: New Zealand Drivers Study. *Traffic injury prevention*, 10(6), 538-545.
- McDowell, A., Begg, D., Connor, J., & Broughton, J. (2011). Road safety attitudes and opinions of newly licensed Māori car drivers: New Zealand Drivers Study. *Australian and New Zealand journal of public health*, 35(1).
- Ministry of Health (2016). Health Loss in New Zealand 1990–2013: A report from the New Zealand Burden of Diseases, Injuries and Risk Factors Study. Wellington: Ministry of Health.
- Ministry of Health and Accident Compensation Corporation (2013). Injury-related Health Loss: A report from the New Zealand Burden of Diseases, Injuries and Risk Factors Study 2006–2016. Wellington: Ministry of Health.
- Ministry of Social Development [MSD] (2016). The Social Report 2016: Te Purongo Oranga Tangata. Wellington: MSD.
- Ministry of Transport [MoT] (2012). High-risk drivers in fatal and serious crashes: 2006-2010. Wellington: MoT.
- Ministry of Transport (2014). Motor Vehicle Crashes in New Zealand 2013: Yearly report 2014. Wellington: MoT.
- Ministry of Transport (2017). Motor Vehicle Crashes in New Zealand. Wellington: MoT. <https://www.transport.govt.nz/mot-resources/road-safety-resources/roadcrashstatistics/motorvehiclecrashesinnewzealand>
- Newbury, C., Hsiao, K., Dansey, R., & Hamill, J. (2008). Paediatric pedestrian trauma: the danger after school. *Journal of paediatrics and child health*, 44(9), 488-491.
- NZ Police (2017). Road Policing Fines by Driver Suburb of Residence. Intelligence Report CND/IR/170811. Wellington: NZ Police.
- NZ Police (2018a). Road Safety Sector Knowledge Profile – Iwi Māori. Draft reference paper to Māori Road Policing Working Group. Wellington: NZ Police.
- NZ Police (2018b). Improving road safety outcomes for Māori: ACC claims by volume and cost. Wellington: NZ Police.
- NZ Police (2018c). Māori over-representation as crash casualties (graphs). Wellington: NZ Police.
- NZ Police (2018d). 25% Reduction in Reoffending by Māori by 2025 (In Confidence). Wellington: NZ Police.
- NZ Police (2019). Māori and Road Safety: Intelligence Report NIC/IR/190919 (In Confidence). Wellington: NZ Police.

- New Zealand Transport Agency [NZTA] (2012). Embedding the Safe System approach to road safety. <https://www.nzta.govt.nz/resources/safe-system/>
- NZTA (2015). Official Information Act release: Attachment 2. Wellington: NZTA
- NZTA (2019b). Alcohol and drugs. <https://www.nzta.govt.nz/safety/driving-safely/alcohol-and-drugs/>
- NZTA (2019c). Road safety outcomes. <https://www.nzta.govt.nz/resources/road-safety-outcomes/>
- NZTA (2019d). Road safety outcomes: Regional quarterly report as of September 2019. <https://www.nzta.govt.nz/resources/road-safety-outcomes/>
- Roberts I, Norton R, Taua B (1996) Child pedestrian injury rates: the importance of “exposure to risk” relating to socioeconomic and ethnic differences, in Auckland, New Zealand. *J. Epidemiol. Community Health* 1996; 50: 162–5.”
- Roberts, I., Norton, R., & Jackson, R. (1995) Driveway-related child pedestrian injuries: a case-control study.
- Safekids Aotearoa (2015). Child Unintentional Deaths and Injuries in New Zealand, and Prevention Strategies. Auckland: Safekids.
- Sargent, M., Begg, D., Broughton, J., Stephenson, S., Wright, C., & Baxter, J. (2004). Motor vehicle traffic crashes involving Māori. *NZ Med J*, 117(1188), U746.
- Shaw C, Blakely T, Crampton P, Atkinson J. (2006) Shaw C, Blakely T, Crampton P, Atkinson J. The contribution of causes of death to socioeconomic inequalities in child mortality: New Zealand 1981–1999. *New Zealand Medical Journal*. 2005;118(1227):U1779.
- Simpson, J., Wicken, A., Duncanson, M., Adams, J., & Oben, G. (2015). *Te Ohonga Ake The Determinants of Health for Māori Children and Young People in New Zealand Series Two*. Te Ohonga Ake series for the Ministry of Health. Dunedin: NZ Child & Youth Epidemiology Service, University of Otago.
- Stats NZ (2013). Population estimates tables at 30 June 1996, 2001, 2006, and 2013. http://archive.stats.govt.nz/tools_and_services/nzdotstat/tables-by-subject/population-estimates-tables-30-jun-96-01-06-13.aspx
- Sullman, M. J., & Mann, H. N. (2009). The road user behaviour of New Zealand adolescents. *Transportation research part F: traffic psychology and behaviour*, 12(6), 494-502.
- Te Taiwhenua o Heretaunga (2002). Road safety issues for Māori: A needs assessment. Land Transport Safety Authority (LTSA) Community Project. LTSA: Wellington.
- Waitangi Tribunal (2005). *Hauora: Report on Stage One of the Health Services and Outcomes Kaupapa Inquiry*. Wai 2575: Waitangi Tribunal Report 2019. Waitangi Tribunal: Wellington.

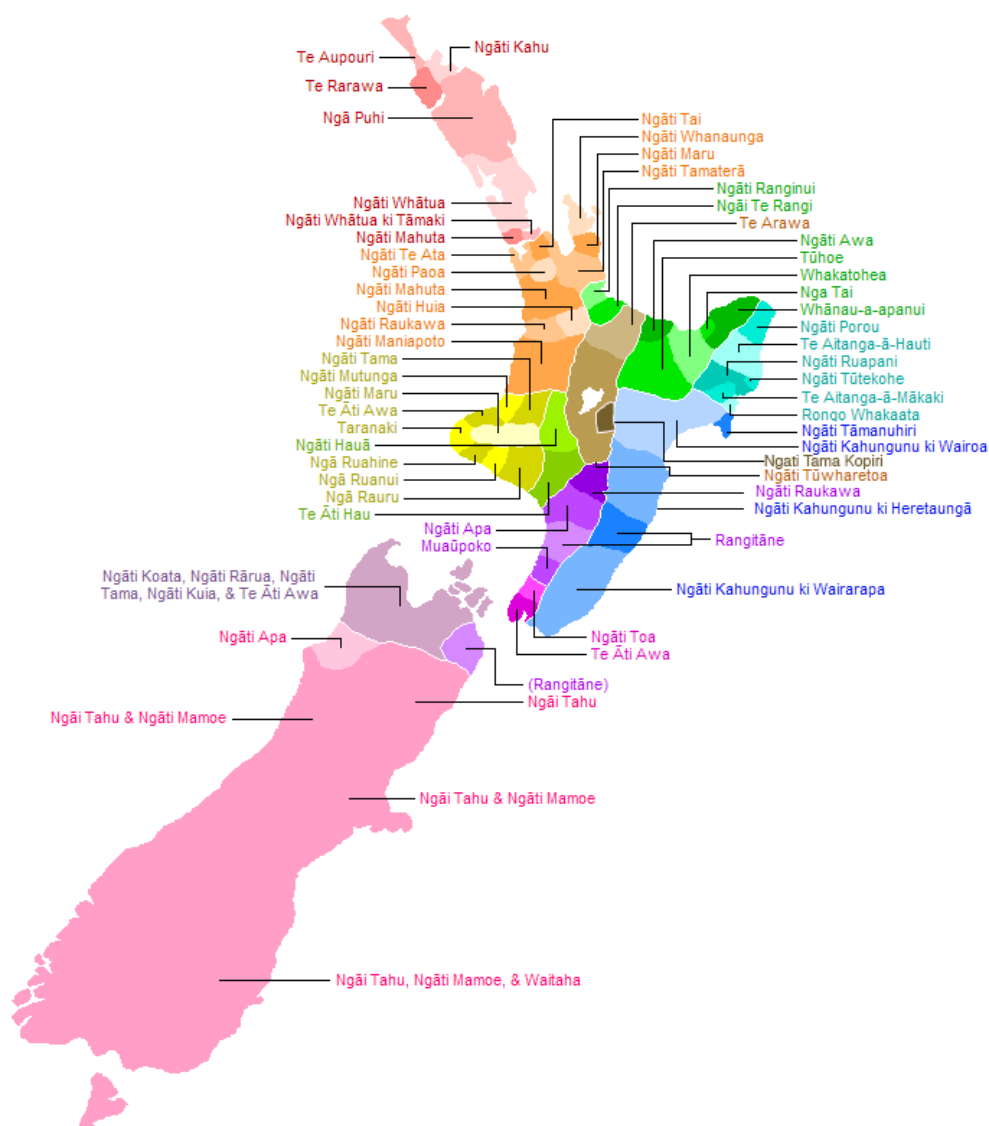
APPENDIX D: IWI AND THEIR ROHE (TERRITORY OR BOUNDARIES)

In 2013, Ngāpuhi (125,601 people) was the largest iwi people of Māori descent identified with. The second-largest iwi was Ngāti Porou (71,049 people). Ngāi Tahu was by far the largest South Island iwi (54,819 people) and is the third largest iwi overall.

A total of 110,928 people of Māori descent did not know their iwi (1 in 6) and one in ten did not identify 'Māori' as their ethnicity in the 2013 census.

Note these numbers do not include Māori living overseas. A significant number of Māori live in Australia and there has been a rapid increase over the last four decades. Approximately 26,000 people of Māori descent were recorded in the Australian 1986 census⁷⁴ compared to more than 140,000 in 2016⁷⁵.

Figure #: Map of iwi and their rohe (territory or boundaries)⁷⁶



⁷⁴ Pool, I. (2012). Population change - Māori population change. Te Ara - the Encyclopaedia of New Zealand, updated 13-Jul-12. Retrieved from <http://www.TeAra.govt.nz/en/population-change/page-6>

⁷⁵ Australian Bureau of Statistics. (2017). 2016 Census

⁷⁶ Iwi map created by Wikipedia, based on Te Puni Kokiri definitions identified in the Māori Fisheries Act 2004

APPENDIX E: GLOSSARY

Key Documents

Te Tiriti o Waitangi	Treaty of Waitangi
Te Ara Kotahi	Waka Kotahi, Our Māori Strategy
Te Reo Rangatira	Waka Kotahi, Our Te Reo Māori Policy
Te Kupenga 2013	Tatauranga Aotearoa's first survey of Māori well-being

Government Agencies

Ngā Pirihimana O Aotearoa	NZ Police
Tatauranga Aotearoa	Stats New Zealand (StatsNZ)
Te Manatū Waka	Ministry of Transport (MoT)
Waka Kotahi	New Zealand Transport Agency (NZTA)
Manatū Hauora	Ministry of Health (MoH)
Tāhū o te Ture	Ministry of Justice (MoJ)
Te Manatū Whakahiato Ora	Ministry of Social Development (MSD)
Te Kaporeihana Āwhina Hunga Whara	Accident Compensation Commission (ACC)
Mahi Haumara Aotearoa	WorkSafe

Place names

Aotearoa	New Zealand
Te Ika-a-Māui	North Island
Te Waipounamu	South Island
Rakiura	Stewart Island

Region names

Te Tai Tokerau	Northland
Tāmaki-makau-rau	Auckland
Waikato	Waikato
Te Moana-a-Toi	Bay of Plenty
Te Tai Rāwhiti	Gisborne
Te Matau-a-Māui	Hawke's Bay
Taranaki	Taranaki
Manawatū-Whanganui	Manawatu-Wanganui
Te Whanga-nui-a-Tara	Wellington
Te Tai-o-Aorere	Tasman
Whakatū	Nelson
Te Taihu-o-te-waka	Marlborough
Te Tai Poutini	West Coast
Waitaha	Canterbury
Ōtākou	Otago
Murihiku	Southland

Towns and cities

Ahuriri	Napier
Akaroa	Banks Peninsula
Aorangi	Fielding
Aparima	Riverton
Areketanara	Alexandra
Awakairangi	Lower Hutt
Hakatere	Ashburton
Hauraki	Thames
Hāwera	Hāwera
Heretaunga	Hastings

Horowhenua	Levin
Kaiwaewae	Featherston
Te Kaokaoroa o Patetere	Tokoroa
Kawatiri	Westport
Kemureti	Cambridge
Kirikiriroa	Hamilton
Kororāreka	Russell
Māwhera	Greymouth
Murihiku	Bluff
Ngāmotu	New Plymouth
Ōtautahi	Christchurch
Ōtepoti	Dunedin
Parāwai	Thames
Rahui-Pōkeka	Huntley
Rakiura	Stewart Island
Rotorua-nui-a-Kahu Matamōmoe	Rotorua
Taitoko	Levin
Takuirā	Dargaville
Tāmaki-makau-rau	Auckland
Taniwaka	Dannevirke
Taupō-nui-a Tia	Taupō
Tauranga-moana	Tauranga
Te Ahi-kai-kōura-a-Tama-ki-te-rangi	Kaikoura
Te Hokianga-a-Kupe	Hokianga
Te Oha-a-Maru	Oamaru
Te Oreore	Masterton
Te Papa-i-Oea	Palmerston North
Te Reinga Wairua	Cape Reinga
Te Tihi-o-Maru	Timaru
Te Whanga-nui-a-Tara	Wellington
Tūranga-nui-a-Kiwa	Gisborne
Uawa	Tolaga Bay
Waiharakeke	Blenheim
Waihopai	Invercargill
Whakatiki	Upper Hutt
Whakatū	Nelson
Whanganu	Wanganui
Whāngarei	Whāngarei

Words used in the report

iwi	tribal
kaupapa Māori	a philosophical doctrine, incorporating the knowledge, skills, attitudes and values of Māori society
kāwanatanga	government, dominion, rule, authority, governorship
Māori	Māori
mea homai	gift
Pākehā	people living in Aotearoa of non-Māori and non-Polynesian heritage
rangatahi	young people / youth (15-24 years old)
rangatiratanga	self-determination
rohe	territory or boundaries of tribal groups
tamariki	child (0-14 years old)
te ao Māori	a Māori world view
te reo Māori	indigenous language of Aotearoa New Zealand
whānau	family
whakapapa	ancestry or descent

Abbreviations

ACC	Te Kaporeihana Āwhina Hunga Whara / Accident Compensation Commission
CAS	Crash Analysis System
CRSF	Community Road Safety Fund
DSI	deaths and serious injuries
GDLS	Graduated Driver Licensing System
MoH	Manatū Hauora / Ministry of Health
MoJ	Tāhū o te Ture / Ministry of Justice
MoT	Te Manatū Waka / Ministry of Transport
MSD	Te Manatū Whakahiato Ora / Ministry of Social Development
NZTA	Waka Kotahi New Zealand Transport Agency
StatsNZ	Tatauranga Aotearoa / Statistics New Zealand
TCRs	Traffic crash reports