TRANSPORT KNOWLEDGE

CONFERENCE 2024

Transport's Role in Economic and Social Prosperity

Victoria University of Wellington
Te Herenga Waka

11 DECEMBER 2024

ABSTRACT BOOK

Abstracts are ordered by the surname of the presenting author

TE MANATŪ WAKA
MINISTRY OF TRANSPORT

CONFERENCE PROGRAMME

8.00am	**Registration desk opens**
8.45am	MC Welcome & Housekeeping | Opening Address
9.00am	**Keynote address 1** *Prof. David Levinson – University of Sydney*
9:30am	**Keynote address 2** *Geoff Cooper – NZ Infrastructure Commission* **Toward a National Infrastructure Plan**
10:00am	**Keynote address 3** *Stephanie Ward – KPMG New Zealand* **Delivering value for money from infrastructure investment**
10.30am	**Morning Tea**

Parallel Session One

	Data and Modelling Room: MZ01	**Transport Planning and Evaluation** Room: MZ02	**Safety** Room: G24	**Urban Outcomes** Room: 102	**Health** Room: LT2
	Understanding travel behaviour	**Funding and Investment**	**Modelling Safety**	**Te Ara Mua session**	**Health**
11.00am	Understanding Travel Behavior Through Mobility Data: Insights into Travel Patterns **Conrad MacCormick** *Nicholson Consulting*	Sector Investment Pipeline: Building an Investment Plan **Christine Vaughan** *NZ Transport Agency*	Towards a Rational Road Crash Forecast Model to inform road safety policy **Urie Bezuidenhout** *Davinci Research*	Te Ara Mua Future Streets: 10 years of understanding suburban street and social change for health, equity and sustainability *University of Otago* This session includes five presentations: *1. Results from the three Kaupapa Māori–* ***Kimiora Raerino,*** *2. Final results from the quantitative measures* ***– Alex MacMillan,*** *3. Road user behaviour around schools (video data analysis) –* ***Hamish Mackie, Melody Smith,*** *4. E-bike trial –* ***Karen Witten, Alistair Woodward,*** *5. Cost-benefit modelling of Auckland-wide implementation –* ***Jamie Hosking, Alex MacMillan***	Modelling equity and population health impacts of decarbonising the transport sector in Aotearoa/NZ **Caroline Shaw** *University of Otago*
11.25am	Using Snapper card data to unveil public transport commuter patterns in Wellington Region **Stephen Christie** *Wellington Transport Analytics Unit*	International trends in optimizing the revenue instrument mix in road network funding **Peter Carr** *Eroad Ltd*	Assessing Travel Time benefits to through traffic vs improved safety outcomes for local communities **Doug Wilson** *University of Auckland*		Population health impacts of light vehicle electrification: A modelling study in Aotearoa/New Zealand **Caroline Shaw** *University of Otago*
11.50pm	Impacts of NZ half-price fares policy on urban public transport patronage - Wellington case study **Ian Wallis** *Ian Wallis Associates Ltd*	Funding Methods for Sustainable Transport Projects: A Case Study of Value Capture in Wellington **Logan Silson** *Massey University*	Building a model for safety effects when travel modes change - it's complicated… **Glen Koorey** *Viastrada*		Classifying unsealed roads by relative risk of exposure to fine particles in road dust **Jenny Simpson** *Tonkin & Taylor*
12.15pm	**Lunch**				

Parallel Session Two

	Data and Modelling Room: MZ01	**Transport Planning and Evaluation** Room: MZ02	**Safety** Room: G24	**Urban Outcomes** Room: 102
	Heavy vehicles and freight	**Economic impacts**	**Perceptions and road safety**	**Accessibility and urban outcomes**
1.10pm	Introduction to the Freight Information Gathering System (FIGS) **Christina Poeltl** *Ministry of Transport*	Wider economic benefits **Wentao Yang** *NZ Transport Agency*	Perceptions of Public Transport, Cycling and Walking Among Auckland Drivers **Kathryn Ovenden** *Auckland Council*	What is new? Tracking our e-travel with the New Zealand Household Travel Survey **Jennifer McSaveney** *Ministry of Transport*
1.35pm	How far do heavy vehicles travel? Determining VKT from RUC data **Ainsley Smith** *Ministry of Transport*	Knowing New Zealanders - Evidence of transport's enablement of economic and social prosperity **Carol Christie** *NZ Transport Agency*	Opinions about road safety: Findings from the Pōneke/Wellington Transport Survey 2023 and 2024 **Sandra Mandic** *Wellington City Council*	Establishing a methodology for integrated transport accessibility measures **Eilya Torshizian** *Principal Economics Limited*
2.00pm	Using Motor Vehicle Register data to understand the Heavy Vehicle Fleet **Jasmine Anthony** *Ministry of Transport*	Monetising the benefits of transport resilience **Bryce Hartell** *NZ Transport Agency*	Unlocking the influence of distance on Wellingtonians' work and school transport choices and safety perceptions **Rajan Ghosh & Tessa Pocock** *Wellington City Council*	Integrating Mass-Rapid Transit and Urban Outcomes **Amy Thompson** *Auckland Transport*
2.25pm	Modelling heavy vehicle imports **Thoa Hoang** *Ministry of Transport*	Determining the Carbon footprint of land transport infrastructure in Aotearoa New Zealand **Sam Turner** *Beca*	Free Reflective Gear Increases Active Traveller Perception of Visibility and Safety **Mel Ansell** *Greater Wellington Regional Council*	Transport's role in third spaces supporting community wellbeing of disabled people and older residents **Shanthi Ameratunga** *The University of Auckland*
2.50pm	**Afternoon Tea**			
3.20pm	**Keynote address 4** *Stuart Donovan, Motu Economic and Public Policy Research* **Looking at the role of transport through a spatial and urban economic lens**			

	Parallel Session Three			
	Data and Modelling Room: MZ01	**Transport Planning and Evaluation** Room: MZ02	**Safety** Room: G24	**Urban Outcomes** Room: 102
	Monty agent-based modelling	**Innovative data-based approaches**	**Enhancing road safety**	**Micromobility**
4.00pm	Computing Kiwis - creating representative agents for transport simulation **Shrividya Ravi** *Ministry of Transport*	National Network Performance: Simplifying Benefits Analysis **Hrishikesh Kodthuguli** *NZ Transport Agency*	Is targeting blackspots an efficient method for achieving death and serious injury reduction **Ian Robertson** *WSP*	Evaluating Shared Micro-mobility in Wellington City: The Tension Between City Vibrancy and Safety **Danial Jahanshahi** *Wellington City Council*
4.20pm	Predicting the past with Monty: a credibility study **Joao Costa** *Ministry of Transport*	Enhancing Transport Investment Planning through an AI powered Intervention Catalogue **Sandy Fong** *NZ Transport Agency*	Optimising road user behaviour at passive rail crossings: Enhancing safety **Joel Burton** *WSP*	Health, wellbeing, and social benefits of a marae-led e-bike support programme **Emma Osborne** *University of Otago Wellington*
4.50pm	**Please join us on the for networking drinks and nibbles | Mezzanine Level, Conference Venue** *(Please note; Beverages will be an eftpos only bar)*			

ABSTRACTS

TRANSPORT'S ROLE IN THIRD SPACES SUPPORTING COMMUNITY WELLBEING OF DISABLED PEOPLE AND OLDER RESIDENTS

Shanthi Ameratunga[1], Janine Wiles[1], Anneka Anderson[1], Bridget Doran[2], Mythily Meher[1], Malakai 'Ofanoa[1], Dolly Paul[1], Roshini Peiris-John[1], Julie Spray[1], Julie Wade[1], Esther Willing[3], Karen Witten[4]
[1]The University Of Auckland, [2]MR Cagney Ltd, [3]University of Otago, [4]SHORE & Whariki Research Centre, Massey University

Third places are shared spaces of interaction that are neither homes (first), or workplaces or schools (second spaces), but are places where people spend time and connect with others, e.g., community centres, libraries, parks, beaches, shops, cafés, pubs, hair salons/barbershops, and sites of worship. While these can serve as buffers against isolation and stress and are important features of age-friendly communities, research evidence on the relationships between third spaces and transport systems is scant.

We examined the experiences of older and/or disabled people traveling to and being in third places in Auckland using qualitative data from the community-based participatory Inclusive Streets project. Of the 62 participants engaging in seated/go-along interviews and photovoice, a third were Māori and a third of Pacific ethnicities. Interview data and interactive community hui provided culturally and socio-economically diverse participant perspectives of third places across a variety of physical and social settings alongside transport-related opportunities and challenges in getting there.

The findings demonstrated (a) the importance of third spaces in reducing isolation and supporting social wellbeing among older and/or disabled people, fostering a collective sense of belonging, inclusivity, and trust, and (b) critical transport system barriers, levers and policies requiring attention to enhance these opportunities.

FREE REFLECTIVE GEAR INCREASES ACTIVE TRAVELLER PERCEPTION OF VISIBILITY AND SAFETY

Laura Keown[1], **Mel Ansell**[1], **Maddy McVie**[1], Jill Corrin[1], Hilleke Townsend[1]
[1]Greater Wellington Regional Council

Reflective gear giveaways by councils are well-received, but does wearing this gear make active travellers feel safer? Greater Wellington Regional Council evaluated the impact of this year's gear giveaway on recipients' reported visibility and safety.

Background: New Zealanders report that safety concerns are their largest barrier to travelling actively. Councils in the Greater Wellington region give away thousands of high visibility waterproof backpack covers and reflective slap bands each year to address this barrier.

Methodology: The evaluation comprised of two surveys, one at the time of gear collection (n=160) and a follow-up four weeks later (n=54).

Results: Most respondents who collected gear were already using active transport regularly. Women were more likely to collect gear. Gear was predominately used for cycling, but a significant proportion was also used for walking/running. 94% of people perceived their visibility to increase while wearing the gear and 91% felt safer. Reflective gear did not significantly increase regularity of active travel.

Conclusions: Reflective gear giveaways by councils in the Wellington region increase active travellers' perceived visibility and safety. Improved perceptions of visibility and safety likely reflect a real-world difference in the number of experiences users have with feeling unseen and unsafe while travelling actively.

USING MOTOR VEHICLE REGISTER DATA TO UNDERSTAND THE HEAVY VEHICLE FLEET

Jasmine Anthony[1], Thoa Hoang, Mieke Welvaert
[1]Ministry Of Transport

The Ministry of Transport has recently developed a Heavy Vehicle Imports Model (HVIM) to project the share of heavy vehicle imports by energy source using the Motor Vehicle Register (MVR) data. The MVR holds registration information about vehicles such as their make, model, import status, body type, manufacturing date as well as information about vehicle owners and the level of vehicle use. In this presentation, we will discuss our findings of the characteristics of these heavy vehicles and what data we used for structuring the development of our model. We carried out our analysis using R studio to visual how different vehicle characteristics such as vehicle type, import status, road user charge class, gross vehicle mass or the number of axles looked across the heavy vehicle fleet. We will discuss how our understanding of the heavy vehicle fleet affected the development of the HVIM and how the model can be expanded to include other heavy vehicle types.

Towards a Rational Road Crash Forecast Model to inform road safety policy

Urie Bezuidenhout[1]
[1]Davinci Research, [2]University of Auckland

An analysis of historical crash data in New Zealand over the past 40 years revealed an interesting irregular cyclic pattern. Since 1987, these patterns have mirrored broader trends in road safety and crash reduction seen in many other developed countries. The consistent reduction of 10 fatal crashes per year is attributed to sustained improvements in road infrastructure and vehicle safety, rather than policy initiatives and campaigns, which have a marginal effect at best. The irregular seasonality observed in the data is also better explained by recessionary periods, such as the stock market crash in 1987, the Global Financial Crisis around 2010, and the recent recession from 2023 to 2024.
The long-term trend does not align with the shorter-term trends when compared with wider road safety policy initiatives. In some instances, historical cumulative and more recent targeted policies seem to have little to no effect, leading to almost paradoxical outcomes.

What seems to be significantly more influential in describing the cyclic trends are selected economic-related variables. These variables explain the long-term downward trend in fatal and serious injury crashes in New Zealand since 1987, as well as the shorter-term changes in the trend cycle. This provides a powerful policy evaluation tool.

OPTIMISING ROAD USER BEHAVIOUR AT PASSIVE RAIL CROSSINGS: ENHANCING SAFETY

Joel Burton, Dr Jared Thomas, Dr Rachael Gow
[1]WSP

Between 2010 and 2020, 52 fatal and serious motor vehicle crashes occurred at rail level crossings (LC) in Aotearoa. Previous research indicates that 54% of these crashes occurred at LC's who's only control measures were 'STOP' signs.
This research aimed to provide an evidence-base to improve guidance for passive LC's which only had controls like signs or delineation (compared to active LC's, with barrier arms, warning lights and bells) to reduce the likelihood of vehicle-train crashes. Another focus was to fill the gap in knowledge about the behaviour of drivers turning into these passive LC's from a road running parallel to the track.
Several hypotheses were developed from existing literature and recent crash analyses. These were tested using data from a mixture of cameras, radars, and lidars, which captured drivers head turning behaviour, vehicle speeds, and stop sign compliance. This data was collected at six LC's leading to a total of 3,362 observations.
The results showed that direction of approach, sign types present, whether crossing at night, and vehicle type all had significant impacts on the crossing behaviour. Based on this research a series of recommendations to improve LC safety were made for potential implementation by KiwiRail.

INTERNATIONAL TRENDS IN OPTIMIZING THE REVENUE INSTRUMENT MIX IN ROAD NETWORK FUNDING

Peter Carr[1]
[1]Eroad Ltd

Jurisdictions around the world are grappling with the challenge of convincing their publics to pay for much needed repairs and improvements to infrastructure. This is at the same time that traditional revenue tools are beginning to fail, in part through changes in demand, in part through failures in governance and stewardship, but also because of the emergence of other priorities that can mean 'raising revenue' is not necessarily the only expectation publics have of any new tax.

This paper presents the results of looking across years of investigation and use of 20 genera of revenue tools from 5 distinct families, representing the mix of user pays, proxy, and non-transport tools, and including relatively modern innovations like retail delivery fees, and kilowatt-hour taxes on electric vehicles. (Financing tools were out of scope because they still need revenue tools to make them work.)

The research identifies a set of common good practices and equally common failures to adhere to them. It concludes with suggestions as to why policy can fail to follow good practice and the nature of the pitfalls a policy process should be mindful of to have a better chance of avoiding this.

USING SNAPPER CARD DATA TO UNVEIL PUBLIC TRANSPORT COMMUTER PATTERNS IN WELLINGTON REGION

Stephen Christie[1], Hamish Clark[1]
[1]Wellington Transport Analytics Unit

This study presents an analysis of Metlink's Snapper card transactional data from Wellington's public transport network. Using data from March 2024, we examine key aspects of public transport usage, including:

1. Bus-to-rail and rail-to-bus transfers: Number and percentage of transfers at selected locations.

2. Geographical distribution of transferring passengers: Transferring passengers' bus boarding locations in the morning and alighting locations in the evening.

3. Frequency distribution of Snapper card usage: Categories of users based on weekly travel patterns, including daily commuters (5 or more days per week), regular users (3-4 days per week), etc.

4. Characteristics of usage frequency categories: Distribution across passenger type (adult, tertiary, etc.) and geography.

The study employs analytics techniques to process and interpret the large volume of Snapper card transactions. Our findings reveal the characteristics of passengers who most often transfer rail-to-bus and bus-to-rail, including their origin and destination geography, and the frequency distribution of public transport use.

This research contributes to a deeper understanding of public transport in the region, offering valuable insights for urban planners, transport authorities, and policymakers. Among other applications, the analysis can inform targeting of initiatives to enhance the efficiency and accessibility of the region's public transport network.

KNOWING NEW ZEALANDERS - EVIDENCE OF TRANSPORT'S ENABLEMENT OF ECONOMIC AND SOCIAL PROSPERITY

Carol Christie[1]
[1]New Zealand Transport Agency Waka Kotahi

Building our understanding of how New Zealanders use the transport system, and their perceptions of different components of the system, is vital to identify transport's impact on economic and social enablement.
The Waka Kotahi Insights team manage six research trackers that monitor key transport behaviors and perceptions.
Evidence from these trackers is woven into a story of how transport is connecting New Zealanders, through the journey lenses of: economic vs. social travel; time taken vs. expectations; factors impacting journey experience e.g. safety, surface condition; perceptions of modes e.g. value, security; modes used vs. preferred modes and feasibility; value for money and affordability of journeys.
Insights will also be shared about economic and social consequences when beneficial journeys are unable to be undertaken.
This session will provide unique evidence and insights into the factors that contribute to New Zealanders movement to access jobs, essential services and social opportunities.

PREDICTING THE PAST WITH MONTY: A CREDIBILITY STUDY

Joao Costa[1], Jade Mackay[1], Mac Townsend[1]
[1]Ministry of Transport

The best way to establish model credibility is to routinely and reliably predict events before they happen. In most realms, including transport, this is not possible for technology less than 5 years old. A way for new technology to demonstrate credibility is to successfully predict the outcome of past events using the information available at the time.

In this presentation we investigate the ability of our Agent-Based Model, Monty, to analyse some recent cases. We look at the data output as if newly built infrastructures were new to the network and match with real usage data.

ENHANCING TRANSPORT INVESTMENT PLANNING THROUGH AN AI POWERED INTERVENTION CATALOGUE

Dr. Vikash Kumar1, **Sandy Fong1**
1NZTA - Waka Kotahi

NZTA and its partners employ the Business Case Approach (BCA) to strategically plan investments through the NLTP. The BCA is a comprehensive five-step process, with the Economic Case step being pivotal. This step involves evaluating available options, assessing the effectiveness of investments, and determining desired outcomes. The challenge lies in thoroughly exploring all options and their impacts, which distinguishes a robust business case from an average one. This process is highly contextual, relying on the expertise and knowledge of involved personnel, often constrained by limited existing data.

To address this challenge, we are creating an AI-enabled Intervention Catalogue. This tool compiles data from various national and international repositories, enabling developers to query transport interventions and their effects. By integrating traditional and advanced natural language processing techniques, we harmonize data from diverse sources, types, qualities, and contexts into a unified repository. The tool's intuitive user interface, developed in collaboration with end users, caters to multiple personas, allowing them to access information in their preferred format.

As the central agency responsible for national transport planning, NZTA is uniquely positioned to provide this data to both its business case planners and of local authorities, thereby improving the quality and consistency of business cases.

MONETISING THE BENEFITS OF TRANSPORT RESILIENCE

Bryce Hartell[1]
[1]NZ Transport Agency

Recent severe weather events have highlighted the importance of transport resilience, but until recently New Zealand has lacked a standardised approach to monetising the benefits of enhanced transport resilience. Earlier this year the NZ Transport Agency published a new resilience procedure in their Monetised benefits and costs manual (MBCM). This presentation will explore this new methodology and the corresponding simplified procedure which has just been published.

MODELLING HEAVY VEHICLE IMPORTS

Thoa Hoang[1], Jasmine Anthony, Mieke Welvaert
[1]Ministry Of Transport

There is a high demand (from both private and public sectors) for vehicle fleet projections for a wide range of modelling and policy applications. We will present a new Heavy Vehicle Import model (HVIM) recently developed by the Ministry to reassess how we construct our forward picture of fleet composition accounting for emerging changes in energy sources. The total cost of ownership (TCO) remains a critical factor in heavy trucks purchase decisions and they vary across different vehicle weight classes and import statuses. The HVIM analyses and compares the TCO of heavy vehicles of different energy sources across six gross vehicle mass (GVM) weight groups, considering both new and used vehicles. Furthermore, the model advances existing TCO methodologies by incorporating detailed activity-based driving profiles (real data on vehicle kilometres travelled and vehicle age), road user charge exemptions, and extensive information regarding operational costs. Results indicate that the uptake of heavy electric trucks follows the technological S-curve, but the speed of adoption varies with vehicle characteristics.

EVALUATING SHARED MICRO-MOBILITY IN WELLINGTON CITY: THE TENSION BETWEEN CITY VIBRANCY AND SAFETY

Danial Jahanshahi[1], Sandra Mandic[1], Rajan Ghosh[1], Tessa Madden[1], Joe Hewitt[1]
[1]Wellington City Council

This research evaluates various aspects of shared micro-mobility, including usage, safety, user cost, accessibility, environmental impact, and public opinions to understand the advantages and disadvantages to inform policy recommendations. Various data sources were used covering the period 2021 to 2023.
Over the evaluation period, approximately 800 scooters were available daily and 2.5 million shared e-scooter trips were made. Most trips occurred in central Wellington and were up to 2 km or 10 minutes in duration. Shared micro-mobility schemes can contribute positively to urban mobility and vibrancy, provide environmentally-friendly alternative transport options, contribute toward reduced car dependency and lower parking demand. However, there was a minimal contribution to mode shift given limited device availability, usage, and trip purpose where nearly half of users ride for fun or recreation. Main disadvantages of shared micro-mobility were safety concerns, encountering devices as pedestrians, and complaints about inappropriate parking. Despite such challenges, half of non-users supported the schemes to continue operating in Wellington city.
To address the tension between city vibrancy and safety, a balanced approach is recommended to maximise benefits while mitigating safety concerns, including enhancing infrastructure, better parking management, improving geo-fencing systems, continuous monitoring and evaluation, and policy settings responsive to new information.

NATIONAL NETWORK PERFORMANCE: SIMPLIFYING BENEFITS ANALYSIS

Hrishikesh Kodthuguli[1]
[1]NZTA

Assessing the benefits of transport infrastructure projects is often complex and costly, especially within the current Land Transport Benefits Framework, which requires detailed data gathering and analysis.

This framework provides a consistent set of benefits and measures to assess the impacts of transport investments, with a focus on key outcomes like economic prosperity, ensuring efficient and reliable movement of people and goods. The National Network Performance project addresses these challenges by developing a pre-built network model populated with transport data, streamlining and improving the quality of benefits analysis.
This network model, built on Open Street Maps data, represents the transport network as a network model and is regularly updated to reflect new infrastructure. Travel time data from TomTom is integrated into the model, while traffic volumes are calculated by applying a propagation model to approximately 1,000 traffic management system (TMS) sites with historical data backdated five years. This dataset enables straightforward calculation of key metrics such as vehicle kilometres and vehicle hours travelled, which are essential for evaluating economic benefits, particularly under the productivity and efficiency of movement of goods and people cluster of the Land Transport Benefits Framework.

By having this comprehensive network and dataset in place, the same data can be reused across multiple projects, reducing costs and simplifying the process of performing economic benefits analyses. This approach makes it more economical to evaluate realised benefits across projects, providing a consistent, data-driven foundation for decision-making within the economic prosperity outcome of the framework.

BUILDING A MODEL FOR SAFETY EFFECTS WHEN TRAVEL MODES CHANGE - IT'S COMPLICATED...

Glen Koorey[1]
[1]Viastrada

Different travel modes have different relative risks, but currently, there is limited understanding of how shifting travel between modes (particularly from private motor vehicles to public transport or active transport) might impact road safety outcomes. Recent NZTA research by ViaStrada investigated the interaction of vehicle travel and crash risk, and developed a model to test the safety implications of various mode-shift scenarios.

A simple model would just compare relative casualty numbers with travel usage for each mode to get a basic comparison of risk (e.g. DSIs per kilometre or hour travelled). However, there are several other interacting and competing effects that also should be factored in, including:

- changes in distances now travelled using new modes
- additional "first/last mile" travel made in conjunction with new public transport trips
- improvements to transport infrastructure that can both increase the use and reduce the risk of different modes
- internal and external risk to different road users involved in crashes
- effects on crash severity of congestion, speed limits, and various Safe System measures

Not all of these factors were built into this initial model, so the research makes several recommendations for future enhancement, and for strengthening the data underpinning it.

UNDERSTANDING TRAVEL BEHAVIOUR THROUGH MOBILITY DATA: INSIGHTS INTO TRAVEL PATTERNS

Conrad MacCormick[1]
[1]Nicholson Consulting

Understanding the economic and social benefits of transport requires insights into who is traveling and why. While detailed travel diaries can provide this information, they can often be costly and impractical. Mobility data – such as cell phone or GPS pings – can help identify movement patterns; yet discerning the reasons behind travel remains complex.

As part of building an individual-based model for predicting the spread of infectious diseases – like COVID-19 – we used data derived from electronic transactions to identify and characterise patterns in the long-range trips that people make (i.e. to a destination beyond their home Territorial Authority (TA)). Although trip destinations are reported at a broader TA level, origins are available at the more detailed SA2 level, enabling us to leverage information about the population in Aotearoa who are travelling.

Our analysis spans early 2019 to late 2020, meaning we can observe a range of travel scenarios influenced by COVID-19 movement restrictions: business-as-usual; essential travel-only; and a period of elevated domestic tourism when domestic travel was unrestricted but cross-border travel was not possible. By comparing movement patterns across these scenarios, we gain valuable insights into the nature of travel: who is traveling, where to, and why?

OPINIONS ABOUT ROAD SAFETY: FINDINGS FROM THE PŌNEKE/ WELLINGTON TRANSPORT SURVEY 2023 AND 2024

Sandy Mandic[1], Danial Jahanshahi[1], Rajan Ghosh[1], Tessa Pocock[1], Joe Hewitt[1]
[1]Wellington City Council

Road crashes with injuries make Wellington city streets unsafe and have high social cost. Road safety concerns present a barrier to active transport and limit mode choice. Using data from the Pōneke/ Wellington Transport Survey completed by Wellington city residents in 2023 (n=3,401) and 2024 (n=885), this research examined residents' opinions about road safety, including optimal speed limits for city streets, safety perceptions, and benefits of lowering speed limits. The majority of residents supported lower speed limits on residential streets (55%), arterial streets (58%), and in areas around schools (57%) and expressed preference to emphasise road safety (46%) over shorter travel time when setting speed limits. Most residents thought that city streets were safe for people walking whereas riding a bike was perceived to be considerably less safe. Residents who frequently walked or biked for transport or used public transport placed a greater emphasis on road safety (compared to shorter travel time), supported lower speed limits, perceived higher safety concerns for people walking and biking, and anticipated greater benefits from lowering speed limits compared to frequent private vehicle users. Future efforts, policies, investments, and interventions aimed at minimising road safety concerns should consider safety perceptions of all road users.

TE ARA MUA FUTURE STREETS: 10 YEARS OF UNDERSTANDING SUBURBAN STREET AND SOCIAL CHANGE FOR HEALTH, EQUITY AND SUSTAINABILITY IN NGĀ HAU MĀNGERE AND BEYOND

Alex McMillian[1]
[1]Ōtākou Whakaihu Waka University Of Otago

Te Ara Mua, and its follow-on, ACTIVATION, have been groundbreaking transdisciplinary research projects based in Ngā Hau Māngere, Tāmaki Makaurau Auckland. They grew out of international and national evidence about the health and environmental effects of car-dominated urban design, and limited natural experiment studies about effective interventions to encourage mode shift to walking, biking and wheeling (active travel). We put this evidence together into a complex systems model of the influences and outcomes of active travel. Beginning in 2013, we started with a co-designed street change and cultural landscape intervention at a neighbourhood scale. The intervention was accompanied by a robust approach to measuring health, equity and sustainability outcomes. Following $11M of investment towards the changes in 2016, we have been assessing long-term outcomes and influencing institutional structures, investments and policy. In the past 3 years we have been extending our action research to: explore the impacts of the intervention on everyday mobility experiences; implement further social and institutional changes needed for a just transition towards walking and wheeling; and undertake a three-phase e-bike trial. We will present insights from our quantitative, qualitative, Kaupapa Māori, and cost-benefit modelling research, followed by and opportunity for panel questions and open discussion.

Please note that the timing of presentations in this session may not be aligned with those in other sessions

The session will include the following:

Brief introduction to Te Ara Mua Future Streets – Hamish Mackie

1. Results from the three Kaupapa Māori– Kimiora Raerino
2. Final results from the quantitative measures – Alex Macmillan
3. Road user behaviour around schools (video data analysis) – Hamish Mackie, Melody Smith
4. E-bike trial – Karen Witten, Alistair Woodward
5. Cost-benefit modelling of Auckland-wide implementation – Jamie Hosking, Alex Macmillan

Synthesis and implications – Alex Macmillan

Panel discussion

Relevant conference themes: Safety and health; User choice and behaviour; Modelling, economics and evaluation

WHAT IS NEW? TRACKING OUR E-TRAVEL WITH THE NEW ZEALAND HOUSEHOLD TRAVEL SURVEY

Jennifer McSaveney[1], **Shane Thompstone**[1]
[1]Ministry Of Transport

To better comprehend how our transport system works and how it can improve, we need to understand how, when, where and why New Zealanders travel. The New Zealand Household Travel Survey is our primary source of this information, looking at our travel behaviour as we go about our daily lives. But aspects of our daily lives can change in little ways (eg the introduction of e-scooters, e-bikes and EVs), and we need to adapt to this. In this presentation we will present the surveys latest developments, and take a quick dive into some of the areas we have introduced new questions and or variables for in the past few years.

HEALTH, WELLBEING, AND SOCIAL BENEFITS OF A MARAE-LED E-BIKE SUPPORT PROGRAMME

Emma Osborne[1], Cheryl Davies[1,2], Caroline Shaw[1]
[1]University of Otago, [2]Tū Kotahi Māori Asthma Trust

E-biking can support population health, physical activity and transport choice, particularly in settings where other forms of cycling are challenging. E-bike access can reduce transport costs and increase choice, particularly in transport-disadvantaged settings. HIKO is an e-bike programme providing long-term e-bike loans and wrap-around cycling support in Wainuiomata, Wellington, through a marae-led provider.

Focus groups and interviews were conducted with 26 participants over 12 months. Data were analysed thematically, using Te Pae Māhutonga, a framework for health, wellbeing and socioeconomic participation.

Participants used their e-bikes for recreational and transport cycling. E-biking supported physical and mental health (especially for older adults and people with chronic health conditions), cultural identity, and access to natural environments. E-biking had benefits for social and economic participation, including reduced transport costs and as an affordable way of being active. The programme also led to increased cycling and other active travel for participants' family members.

Appropriately designed e-bike support programmes have an important role in broadening equitable access to cycling. This study underscores the importance of considering the needs of families when designing cycling programmes, infrastructure and policies. It also highlights the role of health as a motivation for taking up e-biking.

PERCEPTIONS OF PUBLIC TRANSPORT, CYCLING AND WALKING AMONG AUCKLAND DRIVERS

Kathryn Ovenden[1]
[1]Auckland Council

An online survey of Auckland residents was undertaken that received 2799 responses. The survey collected information about a participant's recent driving trip and their perceptions of undertaking this trip by a non-car mode (public transport, cycling or walking).

Participants reported more negative perceptions of public transport (PT), cycling and walking compared with driving. These results show little variation across demographic characteristics or features of the driving trip (e.g. reason for trip). Participants report a lack of ease, the amount of time taken, and a lack of reliability as key reasons for PT being less convenient than driving. For cycling, safety from traffic was the main reason reported for not being a possible mode of transport for them.

Large proportions of Auckland drivers expressed negative sentiments towards driving with half agreeing driving is stressful and 42% disagreeing with the statement 'I love driving in Auckland'. These results varied across age with younger participants expressing more negative sentiments towards driving. Results suggest that people don't drive because they love doing so; they drive because other options are poorly provided for. This finding is valuable, and it should inform the design of infrastructure and behaviour change initiatives.

UNLOCKING THE INFLUENCE OF DISTANCE ON WELLINGTONIANS' WORK AND SCHOOL TRANSPORT CHOICES AND SAFETY PERCEPTIONS

Tessa Pocock[1], Rajan Ghosh[1], Danial Jahanshahi[1], Sandra Mandic[1], Joe Hewitt[1], James Ford, Samhita Bose
[1]Wellington City Council

Distance from home to work or school influences travel behaviours. Using data from the Pōneke/Wellington Transport Survey 2023-24, this research compared commuters (n=1671) and primary/intermediate school children's (n=216) travel modes, preferences, reasons (work only), and safety perceptions across three different distance categories.

As distance to work and school increased, usage of and preference for active transport modes decreased in favour of private vehicles and public transport. Reasons for commuters' mode choice differed by transport user group and distance. For example, among regular walkers who lived closer to their work, physical and mental health, cost, and climate change were frequently reported reasons for mode choice.

Perceptions of traffic and personal safety also varied with distance. As home-to-work distance increased, safety perceptions for walking decreased. For biking, safety perceptions remained low regardless of distance, and safety concerns increased as distance increased. Similarly, as home-to-school distance increased, parental perceptions of traffic safety decreased and were lowest for biking compared to scootering and walking. Parental perceptions of personal safety for walking were significantly lower for primary/intermediate children living further from school.

Findings emphasise the importance of considering distance when examining mode choice and safety perceptions for travel to work and school.

INTRODUCTION TO THE FREIGHT INFORMATION GATHERING SYSTEM (FIGS)

Christina Poeltl[1]
[1]Ministry Of Transport | Te Manatū Waka

Effective and efficient freight movement is a key enabler for the success of the New Zealand economy. Freight movement is complex and multimodal with rail, sea, air and road playing important roles to keep the transport aspects of our supply chain functioning. The Ministry of Transport regularly collects a number of freight related datasets as part of its Freight Information Gathering System (FIGS).

FIGS is the primary source of information in New Zealand on imports and exports and on how, when, where and what kind of freight is moved in New Zealand. It has been instrumental for developing transport policy, monitoring the efficiency of freight movements and helps with transport infrastructure investment decisions.

This presentation will provide an overview of the regular publications we produce using those datasets and discuss their potential application in more detailed analysis and forecasts, using the example of how the imports of oil have changed across a range of major NZ ports due to the closure of Marsden Point Oil Refinery.

COMPUTING KIWIS - CREATING REPRESENTATIVE AGENTS FOR TRANSPORT SIMULATION

Shrividya Ravi[1], Lucie Jilkova[1]
[1]Ministry Of Transport

The Ministry of Transport's Agent-Based Model (ABM), code named Monty, is a newly mature tool for testing transport policy. It can be used to understand impacts of supply side changes (roads, new bus schedules) as well as demand side changes (new land use, working from home). But who are these agents? What do they do? How can we make them represent New Zealanders?

In this talk, we will present a high level overview of how representative New Zealanders are generated for Monty and some of the detailed insights we can access with such granular input.

IS TARGETING BLACKSPOTS AN EFFICIENT METHOD FOR ACHIEVING DEATH AND SERIOUS INJURY REDUCTION

Ian Robertson[1]
[1]WSP

For over 30 years, reducing death and serious injury on our roads has been a key objective for all Road Controlling Authorities (RCAs). Historically, blackspots have been central to identifying and targeting road safety improvements. While other more holistic approaches have been considered over the past 15 years, there appears to be a renewed emphasis on crash locations. This presentation examines the effectiveness of using blackspots to identify and potentially treat current death and serious injury hotspots within regions and analyses common trends in historical blackspot life cycles to evaluate the effectiveness of interventions.

This investigation utilizes current and historical Crash Analysis System (CAS) data to identify blackspots and the proportion of road trauma occurring within various regions. It tracks historical blackspot trends to examine their life cycles and askes is this the most appropriate approach?

The findings of this research aim to assist RCA staff in approaches to reducing road trauma, ultimately helping everyone get home safely.

MODELLING EQUITY AND POPULATION HEALTH IMPACTS OF DECARBONISING THE TRANSPORT SECTOR IN AOTEAROA/NZ

Caroline Shaw[1], Anja Mizdrak[1], Ryan Gage, Melissa McLeod, Rhys Jones, Alistair Woodward, Linda Cobiac

[1]University of Otago Wellington, [2]University of Auckland , [3]Griffith University

Background: Health co-benefits are cited as a key potential advantage of transport decarbonisation policy. Methods: We modelled the health, health system and environmental impacts of two pathways to net zero for transport developed by the New Zealand Climate Change Commission; further behaviour change (a balanced approach) and further technology change (focused on vehicle electrification). Household transport related health impacts were modelled through the pathways of physical activity, air pollution (PM2·5 and NO2) and injury for the New Zealand population from 2018 to 2050. Findings: Both pathways show improvements in population health, reductions in health system costs and reduced lifecycle greenhouse gas emissions compared to baseline, although health gains were substantially larger in the Behaviour pathway. Health gains were 20-30% larger for Māori than non-Māori in both pathways. Healthy life years gained by Māori and non-Māori altered substantially depending on assumptions about the equity of the implemented pathway. Interpretation: Decarbonising transport may improve overall population health, save the health system money and reduce health inequities between Māori and non-Māori. Pathways that increase physical activity have a larger impact on population health than those which rely on low emission vehicles. Equity in transport policy has a significant impact on health equity.

POPULATION HEALTH IMPACTS OF LIGHT VEHICLE ELECTRIFICATION: A MODELLING STUDY IN AOTEAROA/NEW ZEALAND

Caroline Shaw[1], Ryan Gare[1], Melissa McLeod[1], Rhys Jones[2], Michael Keall[1], Alistair Woodward[2], Linda Cobiac[3]
[1]University of Otago Wellington, [2]University of Auckland , [3]Griffith University

Background: electrification of the light vehicle fleet is a core component of decarbonisation policy globally. Electrification of the light vehicle fleet will likely impact on a range of pathways to population health many of which have not been closely studied. Methods: we used a transport-health multistate lifetable model for Aotearoa/New Zealand to model potential changes in vehicle fleet and transport behaviour patterns from electrification in Aotearoa/New Zealand. We modelled potential health, health equity, health system cost and environmental impacts of this transition through the pathways of physical activity, injury and air pollution (tailpipe and non-tailpipe). Results: Compared to a scenario of 2018 vehicles and travel patterns projected forward, under the electrification scenario modelled by 2050 there would be a 21% increase in per capita kilometres travelled by car, a loss of 270 health adjusted life years (95%UI -1000 to 500) and health system costs incurred of $44 million 2018 dollars (95%UI -12 to 110). Conclusion: These results suggest that the electrification of the light vehicle fleet has mixed impacts and there may not be a net benefit for population health. We suggest researchers and policy makers take a cautious approach to claims that light fleet electrification will benefit population health.

FUNDING METHODS FOR SUSTAINABLE TRANSPORT PROJECTS: A CASE STUDY OF VALUE CAPTURE IN WELLINGTON

Logan Silson[1], Imran Muhammad[1]
[1]School of People, Environment and Planning, Massey University

New Zealand has significant funding barriers to transform its car focussed transport system to a sustainable transport system. This research explores key funding models to enable sustainable transport projects in New Zealand by investigating value capture being used in Wellington. This research analysed relevant central government, regional council, and territorial authority documents and conducted three semi-structured interviews, one at each governance level. The research found that the current funding system is unable to cope with large and complex public transport projects. There are a multitude of sources for innovative funding, including value capture, but this funding source is highly political on who pays, why do they pay, how do they pay, and where is value being created. The research identified existing tools that function in ways like value capture, but these tools are not being used to their full potential. The research concludes that a sustainable transport system in New Zealand requires new funding sources and value capture has the potential to raise a significant amount of funds. The research suggests that value capture tools should be part of a 'funding stack', informed through planners engaging with communities and supported with guidance on using value capture effectively.

CLASSIFYING UNSEALED ROADS BY RELATIVE RISK OF EXPOSURE TO FINE PARTICLES IN ROAD DUST

Jenny Simpson[1]
[1]Tonkin & Taylor Ltd

A research project has recently been completed to develop a national emissions and exposure model to determine community exposure to, and the social costs of, unsealed road dust in New Zealand. One of the workstreams was to produce a tool for assigning road dust risk categories to unsealed roads to assist in prioritising road surface improvements projects.
The geospatial tool integrates population exposure to fine particle pollution from unsealed roads, and other geospatial datasets, to generate mapped dust risk categories taking into account:

- health social costs, adjusted for socio-economic deprivation
- percentage of heavy commercial vehicles
- presence of sensitive human receptors (schools, childcare centres, marae or hospitals)
- horticultural land use (orchards, vineyards or other perennial crops).

The mapped national dust risk categories provide an initial screening assessment mainly based on the health social costs of exposure to fine particle pollution. Given the limitations of the geospatial datasets, a more detailed site-specific assessment may still be required, for example, to judge the significance of the presence of potentially sensitive human or ecological receptors.

HOW FAR DO HEAVY VEHICLES TRAVEL? DETERMINING VKT FROM RUC DATA

Ainsley Smith[1], Thoa Hoang, Jasmine Anthony, Mieke Welvaert
[1]Ministry Of Transport

Heavy vehicles exhibit diverse travel patterns. Better understanding these patterns at a granular level of detail will support a wide range of policy analyses and modelling. In this presentation, we discuss the potential ways to calculate annual travel distances for heavy vehicles, with a focus on using road user charge data. Our findings indicate that the annual distance travelled by trucks is significantly greater (10 times) than that travelled by buses annually. Additionally, truck travel varies considerably across different gross vehicle mass classes and over time. This session will explore how to use the Motor Vehicle Register (MVR) data to estimate travel distances for heavy vehicles and discuss the observed travel trends.

INTEGRATING MASS-RAPID TRANSIT AND URBAN OUTCOMES

Amy Thompson
[1]Auckland Transport

Quality land use and transport integration adds to the human experience, whilst capturing the benefits of transport investment. Stations should be more than just points of transit, but places which can connect people to jobs, recreation, learning, living and retail activities.

While the importance of land use and transport integration is articulated throughout key national strategies and policies, securing quality outcomes when designing and consenting mass rapid transit is particularly challenging in New Zealand.

To fully leverage off transport investment and realise urban benefits and patronage, stations must be more than just platforms. However the statutory powers of transport providers are constrained to transport infrastructure, with limited tools to enable or deliver associated urban outcomes, and capture wider urban benefits. This can result in the prioritisation of transport-driven outcomes ahead of quality integrated outcomes during optioneering and decision making.

This session will focus on the work Auckland Transport has been doing to influence the design and delivery of mass-rapid transit projects to enable quality integrated developments. Lessons will be shared from major transport projects such as Eastern Busway, Auckland Light Rail and City Rail Link, with recommendations for a future process that would better support integrated land-use and transport outcomes.

ESTABLISHING A METHODOLOGY FOR INTEGRATED TRANSPORT ACCESSIBILITY MEASURES

Eilya Torshizian[1], Eugene Isack[1]
[1]Principal Economics Limited

This report comprehensively reviews the available methods and data sources for constructing multi-dimensional access measures for New Zealand and then estimates their value. We used a combination of Open Street Map, TomTom, GTFS Static and Real-time together with a range of data from Stats NZ, the Ministry of Transport's Household Travel Survey. and spatial information from Land Information New Zealand (LINZ) to construct access measures at the granular Statistical Area 1 (SA1). For the routing engine, we used R5 and Pandana. We obtained 80 distance decay curves for each purpose of travel. Disaggregated by nine travel destinations, four travel times, four age groups and five income quintiles, we constructed 2,899 access measures. To summarise these measures and provide access measures useful for decision-making, we used Principal Component Analysis (PCA) and constructed ten combined access measures by purpose. We then fit this into a regression analysis of welfare using Stats NZ's General Social Survey and Census data. We applied Fujiwara's (2013) methodology to derive willingness to pay estimates for the aggregated accessibility measures (by purpose). Our results suggest that the common administrative access measures fail to explain social welfare. The multi-dimensionality of access requires considering different aspects of access in decision-making.

DETERMINING THE CARBON FOOTPRINT OF LAND TRANSPORT INFRASTRUCTURE IN AOTEAROA NEW ZEALAND

Sam Turner[1]
[1]New Zealand Transport Agency, [2]Beca, [3]Dr Theuns Henning

Recent research commissioned by Waka Kotahi delves into the carbon footprint of New Zealand's land transport infrastructure, providing crucial insights on the whole-of-Life emissions cost (and value) of the network. The study reveals that the upfront carbon emissions of our road network amount to 37,250 ktCO□e, with an additional 890 ktCO□e emitted annually for maintenance. Similarly, the rail network has an upfront impact of 15,380 ktCO□e and 220 ktCO□e per year for upkeep.
While these figures are significant, they represent a sunk cost. The real opportunity for reducing emissions lies in how we maintain and optimize our current transport network. By focusing on reducing maintenance emissions and considering both embodied and enabled vehicle emissions in our investment decisions, we can make meaningful strides towards a more sustainable future.
Join us as we explore these findings and discuss actionable strategies to transform our transport infrastructure into a model of sustainability.

SECTOR INVESTMENT PIPELINE: BUILDING AN INVESTMENT PLAN

Christine Vaughan[1], **Avi Majumsdar**[1]
[1]NZTA Waka Kotahi

NZTA Waka Kotahi administers over $6 billion of public investment in land transport each year, plus $1.6 billion per annum local authority share, and direct Crown funds with the total investment estimated to be up to $32.9 billion over 2024-27. To inform future investment choices, NZTA has developed a sector investment pipeline, providing a comprehensive geospatial view of all significant current and planned land transport investments that central and local government intend to invest in, out to 30 years. The sector investment pipeline is designed to provide decision makers with information about forward investment intentions and gaps across the land transport sector to deliver long-term certainty, enable more effective planning, and reduce project costs.

IMPACTS OF NZ HALF-PRICE FARES POLICY ON URBAN PUBLIC TRANSPORT PATRONAGE - WELLINGTON CASE STUDY

Ian Wallis[1], Reza Chalabianlou[2]
[1]Ian Wallis Associates Ltd, [2]Greater Wellington Regional Council

Impacts of NZ half-price fares policy on public transport patronage – Wellington Bus case study
Ian Wallis (IWA Consultants) & Reza Chalabianlou (GWRC)

- This presentation reports on the authors' analyses of changes in bus patronage in the Wellington region resulting from the half-price fares (HPF) policy introduced in early 2022 as part of the NZ Government's Covid recovery initiatives.
- Our analyses were based primarily on the comprehensive patronage database maintained by GWRC. Our main results for adult fare-paying passengers (summarised below) are expressed as patronage (%) changes and associated price (fare) elasticities. These estimates are disaggregated between weekday peak, weekday off-peak and weekend periods.
- Our estimates are very largely consistent, in absolute and relative terms, with the weight of international evidence on fare elasticities for urban bus service.
- The project proved challenging analytically, particularly because of the changes in key 'external' factors affecting patronage over the analysis period – including (i) gradual recovery of patronage following the Covid outbreak; and (ii) increasing popularity of 'working from home'.
- We note that several earlier NZ attempts to estimate the impacts of the HPF policy have adopted more 'synthetic' (modelling) approaches (not using GWRC's comprehensive patronage database). in our view, these attempts have been generally less successful in quantifying the patronage and associated elasticity impacts (overall and by time period) of the HPF policy.

Results Summary (Wellington Bus Services): Impacts of HPF scheme on adult (fare-paying) patronage and resulting fare elasticities

	Weekday Peak	Weekday Off-peak	Weekend
Patronage change (%)	+17%	+19%	+30%
Price (fares) elasticity	-0.28	-0.30	-0.45

Note: Provisional results only – may be adjusted by time of Conference.

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{Conference topic suggested: Modelling, economics and evaluation
Contact details: Ian Wallis, ian@ianwallis.org, mob 021 475 131]
[Ref: Conf Papers, TKC 2024 HPF Impacts; Draft 051124]

ASSESSING TRAVEL TIME BENEFITS TO THROUGH TRAFFIC VS IMPROVED SAFETY OUTCOMES FOR LOCAL COMMUNITIES

Doug Wilson[1]
[1]Transportation Research Centre, University Of Auckland

This presentation explores key rural road safety policy implications through a case study from the Rangitīkei District Council Region of Taihape on State Highway 1 (SH1). Winiata Marae and whanau, located on SH1, face significant safety risks accessing local social, economic and cultural opportunities due to high speed, mostly through-purpose state highway traffic (including 22.4% heavy commercial vehicles). The study evaluates the benefits of slightly increased travel times against improved safety outcomes by reducing approach speeds to Taihape Town.

Daily, approximately 1,450 trucks pass the marae at around 100km/h, with urban speed limits (50km/h) starting just 1.5km north of the marae. The western side of SH1 houses elderly kaumatua and school-aged children, who cross SH1 and the North Island Main Trunk Railway without safe pedestrian or cycling facilities.

The NZ Crash Analysis System (CAS) data from 2014-2023 reveals 22 crashes in this 2km section, including 1 fatal, 3 serious, 8 minor injury, and 10 non-injury crashes, with causes mainly being loss of control, rear-end collisions, and overtaking. The presentation concludes with ethical considerations of economic benefits versus social costs and harm to local communities.

WIDER ECONOMIC BENEFITS

Ian Melsom[1], **Wentao Yang**
[1]NZTA

This session will cover some of the background to the development of wider economic benefits (WEBs), what are WEBs, how are WEBs included in the economic analysis, and what are the potential impacts of their inclusion in the economic calculations.

The session will cover the types of WEBs to consider (including productivity, employment impacts, and output gains under imperfect competition), the difference between static and dynamic WEBs, when should WEBs be considered, and what is a realistic change to the BCR calculations as a result of including WEBs.