

# Improving Driver Knowledge and Competency at Different Life Stages

**Dr Glen Koorey**  
Director &  
Principal Transportation Engineer  
ViaStrada Ltd, Christchurch  
February 2026



# My fellow research colleagues who couldn't be here today...

- Hamish Mackie



- Rebecca Luther



- Sam Wrightson



- Megan Gregory

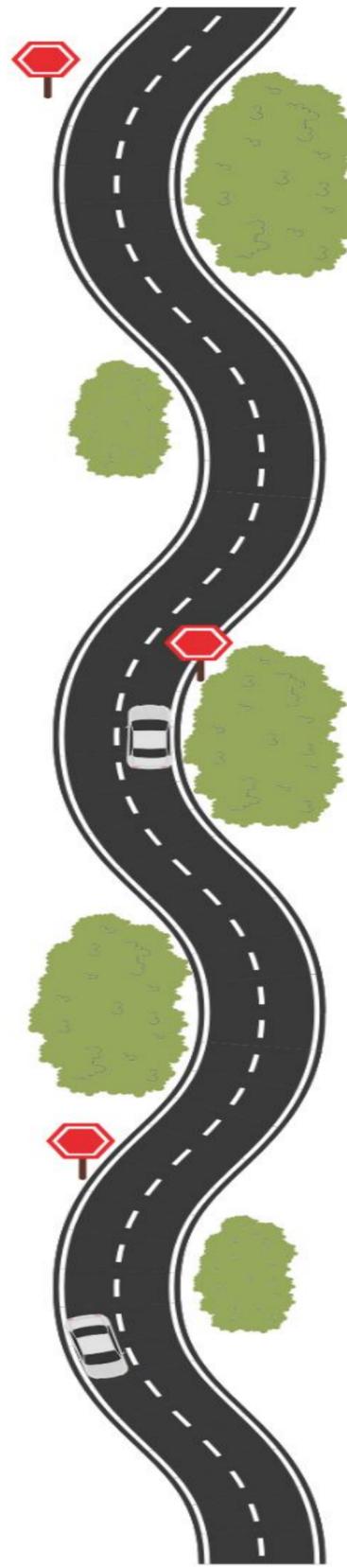


- Luca Ware



# Recap: Driver Licensing Rules

*Note recent Govt announcements re licensing changes from Jan 2027...*



## Initial Licensing

- **Learner Licence** (min age **16**) - Theory test
- **Restricted Licence** (min age **16 ½**) - held learner licence for **6 months** and passed a practical test
- **Full Licence** (min age **17 ½**) - held restricted for **18 months** and **passed a second practical test** - hazard perception



## Full Licensed Drivers (~18 to 75 years)

- Licences must be renewed every **10 years** to age **75**
- Drivers are responsible for maintaining their fitness to drive, including vision and health



## Older Drivers (75 years and over)

- Age **75-79**: Licence must be renewed every **2-5 years** (determined by doctor). Must provide a medical certificate.
- Age **80+**: Licence must be renewed every **2 years**. Must provide a medical certificate and may need to complete a driving test if directed by doctor



## Tourists or Drivers Who Have Spent Time Overseas

- Tourists can drive on their overseas licence if it is in English or with an International Driving Permit for up to **18 months**
- There are **no requirements** for NZ drivers who have spent time overseas to complete any additional testing

# Background

It is possible that road users' knowledge and behaviours may not stay 'fit for purpose' after their initial testing for several reasons:

- Knowledge from driver training may not be **fully retained** over time
- Road users may fail to keep up to date with the introduction of **new road rules and traffic control devices (TCDs)** or changing road user patterns

*This may lead to incorrect, panicked, or unsafe behaviours when drivers are presented with a situation they are unfamiliar with... →*

➔ Providing drivers with the opportunity to ensure they **remain competent** throughout their driving life course could be a key contributor to safe behaviours





# Research Scope & Purpose

The project aimed to:

- Understand **how driver competency and knowledge changes** as drivers progress through different life stages
  - from initial training and licensing
  - in response to existing and changing road rules and traffic environments
- Assess potential solutions for **maintaining sufficient knowledge** through time

*Outputs are a research report and factsheet summarising the results of the research*



**Research Foundation**

# Research Project Stages



Review academic and “grey” literature:

- Determine whether **diminishing knowledge over time** has been identified as an issue
- Identify **current best practice** for developing and maintaining driver knowledge

- Identify key changes in **road rules, signage, road markings, and traffic environments** in the last few decades
- Note also the level of **publicity** associated with each change

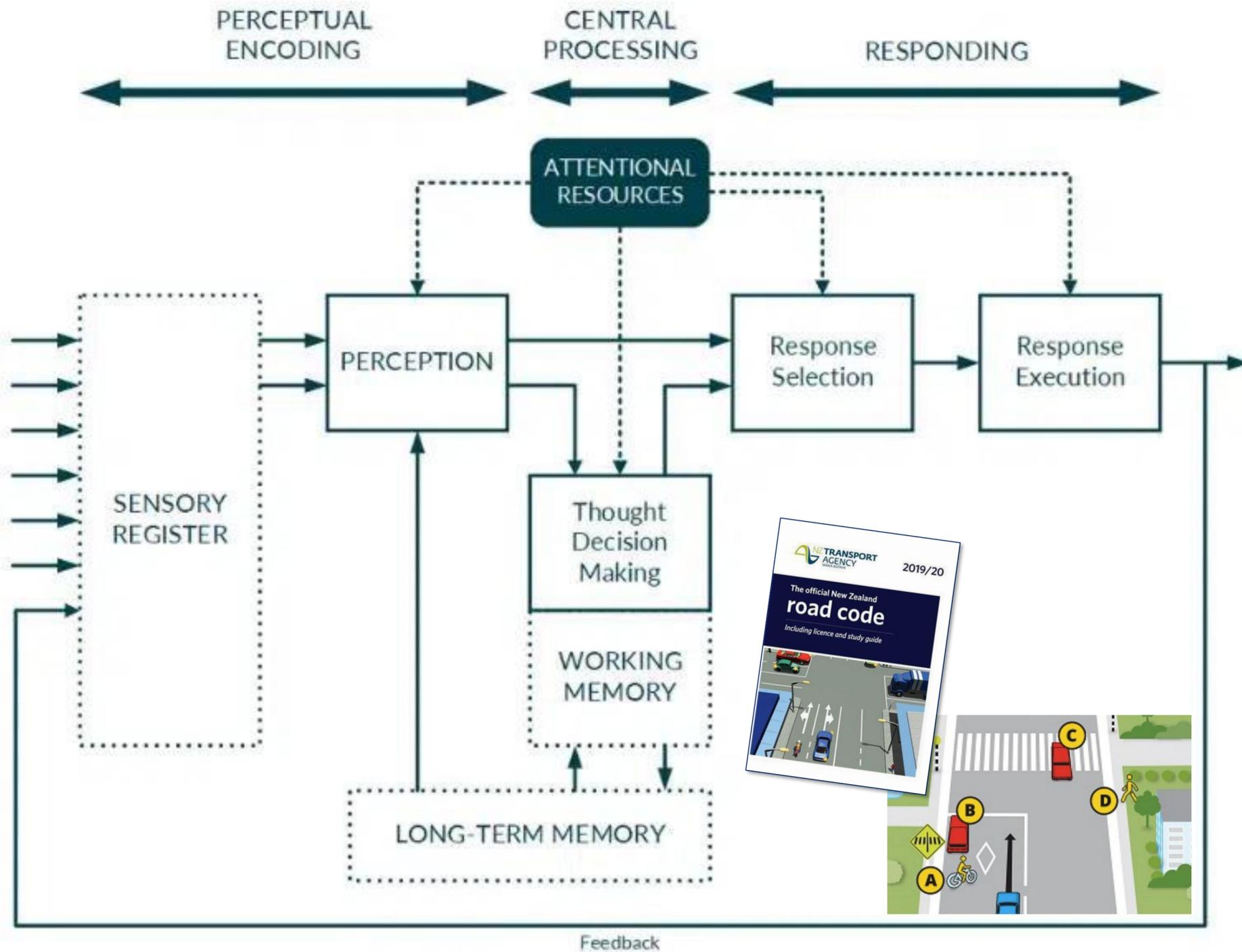
- Test NZ drivers’ **knowledge of rules and other changes**
- Assess **differences in knowledge** by demographics, license type, time since last training, and crash history

- Discuss the opportunities to **develop or enhance driving knowledge** throughout the driving lifecycle

- Present some **options to improve driver knowledge** to NZ drivers and test their willingness and interest in undertaking the different options

*Will discuss each of these stages followed by Conclusions/Recommendations*

# Literature Review: Driver Info Processing



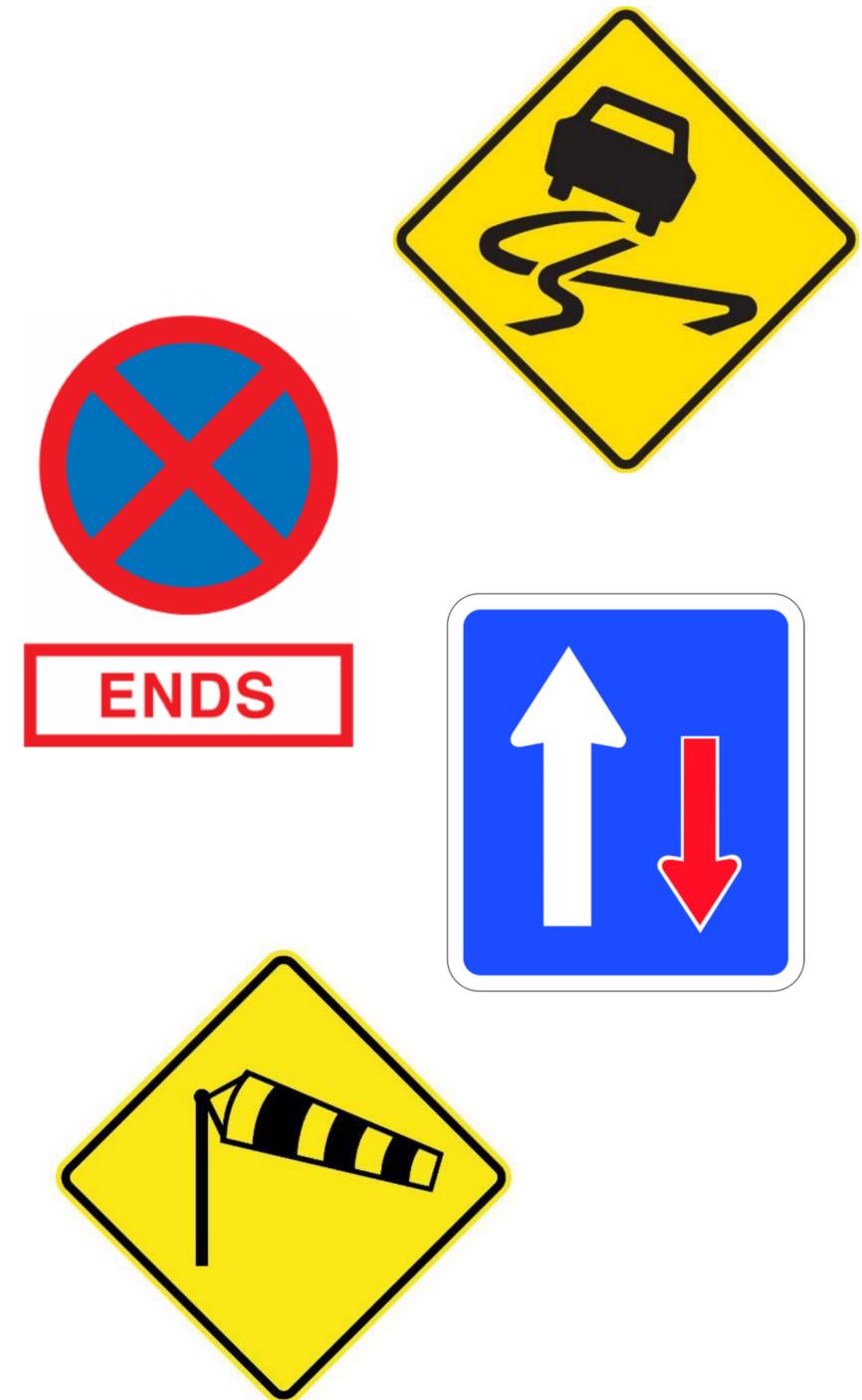
# Literature Review: Driver Knowledge

- Research shows comprehension of signs can be quite low:

*Charlton & Baas (2006) found comprehension as low as 50% for some NZ signs in dynamic situations (simulated driving)*

*Anowar (2010) found nearly 90 per cent of Alberta drivers are so unclear on the basic rules of the road they would fail the learner's licence test (cited in CBC News)*

- Some signs are particularly troublesome
  - e.g. windsock signs - probably less intuitive
- Drivers don't seem to keep up with changes by their own initiative



# Literature Review: Driver Knowledge Gaps

- There are a range of reasons why knowledge gaps could be present:
  - Failure to learn at **initial** licensing
  - Not understanding the **full extent** of the rule
  - Forgetting **infrequently** encountered rules/signs/markings
  - Not properly integrating **new** rules/signs/markings
  - International drivers or those returning from long stays **overseas**
  - **Health** issues, age, impairments, personal accidents

*Research doesn't tell us if driver knowledge is **lower** at any point in the driving lifecycle, or if any of the reasons above are an issue*

# Literature Review: Building Knowledge

We found that:

- **Training interventions:** *Few* licensing systems check core driving knowledge (rule, signs, markings) **throughout** the driving lifecycle. Knowledge is included in **advanced** driver and **older** driver training
  - *Some research suggests that even **short interventions** can be effective (e.g. recall training using flash cards)*
- **Driver assessments:** *Some* knowledge assessments are available
  - *e.g. the Traffic Sign Recognition Test was trialled as an older driver assessment*
- **Communications campaigns:** *Few* knowledge-focused campaigns have been thoroughly evaluated
- **Signage & marking design:** There is considerable guidance available on **ergonomic** sign and marking design

# Key Road Changes Summary

## Changes to road rules

- 1994 - Requiring all cyclists to wear an approved helmet
- 1997 - Introducing painted (flush) medians
- 2004 - Increasing the speed limit for heavy vehicles towing trailers to 90km/h
- 2005 - Introducing bus/cycle/transit “special vehicle lanes”
- 2009 - Prohibiting the use of handheld mobile phones while driving
- 2011 - Increasing the minimum age for driver licensing from 15 to 16 years old
- 2012 - Changes to the give way rules at intersections
- 2014 - Reducing the maximum legal alcohol limits to 250µg/L breath and 50mg/L blood
- 2023 - Introducing offences and penalties for driving while under the influence of drugs

## Changes to traffic signs, markings, and signals

- 1988 - Introducing new symbolic road signs
- 1990 - Introducing red and amber traffic signal arrows
- 1995 - Introducing shared zones
- 1998 - Introducing new traffic signals for bus, bicycles, and pedestrian crosswalks
- 2005 - New cycle/bus/transit lane signs and markings
- 2011 - Introducing countdown pedestrian signals
- 2016 - Introducing cycle sharrow markings
- 2019 - Revoking the use of Limited Speed Zone (LSZ) signs
- 2022 - Introducing Rural Intersection Speed Zone variable speed limit signs

*Public notification ranged from major campaigns to minimal information*

# Driver Knowledge Survey – Summary

- A draft set of questions was developed for a public survey, based on:
  - Existing Road Rules and Traffic Ctrl Devices (*NZ Road Code*)
  - Recent key changes to Road Rules and TCDs
- Prime Research was contracted to obtain a suitable sample of 500+ respondents, with info on:
  - General demographics (age, gender, location)
  - Licence details and driving history (incl. living overseas)
  - Crash history (up to 5 crashes with full/partial blame)
  - Driver knowledge & understanding questions

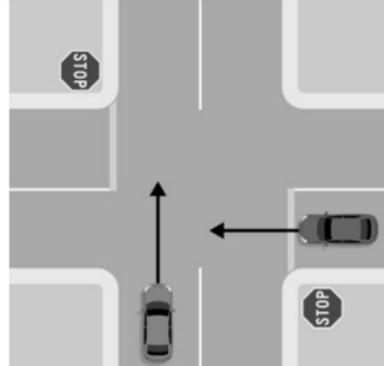


*Aimed to get sample reasonably matching NZ demographics*

# Driver Survey – Knowledge questions

- 24 different multi-choice questions presented

If you are travelling straight through at a STOP controlled cross-road junction and another vehicle is travelling across from your right, who must give way?

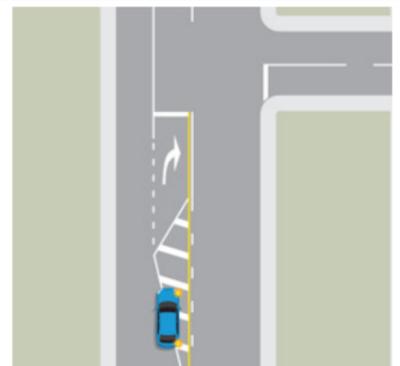


- You must give way to the other car
- **The other car has to give way to you**
- You must come to a complete stop and then continue

What is the least distance of clear road you MUST have in front of you when you have finished passing another vehicle?

- 50 m
- **100 m**
- 200 m

If you are about to turn right from a right-turn bay, can you drive over the white diagonal lines leading up to it?



- **Yes**
- No

What should you do when you see this sign?



- It's a "Limited Speed Zone", where the maximum speed limit is 100 km/h, but only 80 km/h if dangerous conditions such as bad weather exist
- It's a "Limited Speed Zone", where the maximum speed limit is 100 km/h, but only 50 km/h if dangerous conditions such as bad weather exist
- **This is no longer a legal sign**

Can you drive in, park/stop in, or cross a painted cycle lane?



- Yes, you can drive along a cycle lane
- Yes, you can stop or park in a cycle lane
- **No, except within 50m of entering/leaving a side road, driveway, or parking space, and the way is clear of any cyclist**

What are the maximum allowable breath and blood alcohol limits for fully licensed drivers over 20 when driving?

- 400µg/L breath or 80mg/L blood
- **250µg/L breath or 50mg/L blood**
- 150µg/L breath or 30mg/L blood

You are driving along a rural road and you see one of these signs start to flash. What should you do?



- Continue travelling at the same speed limit, but keep an eye on side traffic
- Slow down and give way to any side road traffic pulling out
- **Slow down to 60 km/h until you have passed the intersection ahead**

Can you drive through a shared zone?



- No, you can't
- **Yes, you can, but you should drive slowly and give way to pedestrians (who in turn, should not hold up traffic)**
- Yes, you can, and you have right of way

# Survey Results – Test Scores

(535 respondents)

- Highest score of **23/24**, lowest score of **5/24**
  - Average score **16.3 (~68%)**
- Slight discernible difference in terms of “old” vs newer rule questions

	Age of rule	No. of qn's	Ave score
NEW	<15 yrs ago	8	62.5%
MID	15-25 yrs ago	6	62.5%
OLD	>25 yrs ago	10	75.8%

- Some differences in terms of question *types*

- Give way decisions
- Meaning of signs/TCDs
- Choice of behaviour
- Max./min. value →

	No. of qn's	Ave score
Give Way	6	81.6%
Meaning	8	63.5%
Choice	7	69.4%
Value	3	49.9%

What is the maximum legal speed for a vehicle towing a trailer?	<ul style="list-style-type: none"> <li>• 80 km/h</li> <li>• 90 km/h</li> <li>• 100 km/h</li> </ul>
---	--

Score/24	No. of respondents	Percentage
4	0	0.0%
5	1	0.2%
6	1	0.2%
7	3	0.6%
8	4	0.7%
9	6	1.1%
10	4	0.7%
11	16	3.0%
12	15	2.8%
13	34	6.4%
14	37	6.9%
15	53	9.9%
16	89	16.6%
17	74	13.8%
18	75	14.0%
19	61	11.4%
20	37	6.9%
21	17	3.2%
22	7	1.3%
23	1	0.2%
24	0	0.0%

# Survey Results – Test Score Patterns

- **No** hugely discernible trends in test scores vs:
  - Years held licence, Place of residence, Driving frequency
- Better scores for questions with a higher **relative safety** outcome

Rel. safety	No. of qn's	Ave score
Low	6	61.2%
Moderate	11	64.5%
High	7	79.4%

- **Slight** trends in test scores vs:
  - **Ethnicity** (may also affect residence)
  - **Years held licence vs NEW questions**

Total	Ave Score	Ethnicity
346	16.5	European
43	16.0	Māori
28	15.9	Pacific
89	16.0	Asian
29	15.8	Other

Total	Ave Score	Yrs held licence
32	4.8	<1 year <<
47	5.0	1-2 yrs
59	5.1	3-5 yrs
81	5.2	6-10 yrs
36	5.2	11-15 yrs
46	4.7	16-20 yrs <<
74	4.8	21-30 yrs <<
52	4.9	31-40 yrs
108	5.1	>40 years
535	5.0	

- **Clearer** trends in test scores vs:
  - **Licence type**
  - **When returned o'seas** (small samples though)

Total	Ave Score	Licence type
52	15.9	NZ Learners
45	16.3	NZ Restricted
423	16.5	NZ Full
10	11.5	Valid o'seas licence <<
5	17.6	Converted o'seas

Total	Ave Score	Returned from o'seas
19	14.9	In the past year <<
17	15.7	1-2 years ago <<
26	14.8	3-5 years ago <<
33	16.1	6-10 years ago
116	16.5	>10 years ago
324	16.5	Never >1 year o'seas

# Survey Results – Crash Patterns

Based on #crashes / est. years with licence (ave: **0.12/yr**) →

- Relationship between **test scores** and crash frequency

- Issue for those who scored low → *(albeit small sample)*

Grouped scores	Accs / Yr	
<10	0.35	15 <<
10-14	0.07	106
15-19	0.12	352
20+	0.17	62

Yrs held lic.	Ave yrs
<1 year	0.5
1-2 yrs	1.5
3-5 yrs	4
6-10 yrs	8
11-15 yrs	13
16-20 yrs	18
21-30 yrs	25
31-40 yrs	35
>40 years	45

- Relationship between **years held licence** & crash freq'y →

- Typical pattern matches the literature re. driver experience

Accs per Yr	Yrs held lic.	
0.75	<1 year	<<
0.35	1-2 yrs	<<
0.14	3-5 yrs	
0.08	6-10 yrs	
0.03	11-15 yrs	
0.06	16-20 yrs	
0.03	21-30 yrs	
0.02	31-40 yrs	
0.02	>40 years	

- Relationship between **licence type** and crash freq'y →

- Relationship for learner/restricted as expected
- A concern for *(the few)* overseas/converted licence holders

Accs per Yr	Lic. type	
0.19	NZ Learners	
0.26	NZ Restricted	<<
0.09	NZ Full	
0.33	Valid o'seas licence	<<
0.41	Converted o'seas	<<

# Driver Knowledge Survey – Takeaway thoughts

- Years held a licence ***not necessarily*** a strong determinant of knowledge about Road Rules and TCDs
  - Encouraging that people did better with **more safety-critical** situations
  - Low knowledge of Rules/TCDs may be linked with higher crash risk?
  - Useful to remind people of **value-based** and **less safety-critical** Rules?
- Some groups identified worth ***targeting*** for updating/training:
  - Overseas licence holders (or converted from overseas)
  - People recently returned from living overseas
- Newer Rules and TCDs had ***lower*** rates of correct answers
  - Need to regularly remind people of newer changes to Rules/TCDs?

# If not Driver Knowledge, what affects Performance?

- Rather than knowledge/comprehension, it may be that driver **attitudes/behaviours/skills** influence drivers' safety performance more
- From recent NZAA survey on young driver licensing/behaviour\*:

- Relative Risk Score based on assumed frequency of reported **poor driving behaviours**

*e.g. drink-driving,  
speeding, mobile  
phone use, drugs,  
no seatbelts, etc*

<i>Sample size</i>	<i>Relative Risk Score</i>	<i>Ave no. tickets</i>	<i>Ave no. crashes</i>	<i>Combined total</i>
90	<b>0</b>	0.21	0.09	<b>0.30</b>
201	<b>Between 1 and 9</b>	0.28	0.21	<b>0.50</b>
325	<b>Between 10 and 49</b>	0.38	0.30	<b>0.67</b>
261	<b>Between 50 and 199</b>	0.62	0.44	<b>1.06</b>
130	<b>Between 200 and 499</b>	0.74	0.72	<b>1.45</b>
24	<b>500+</b>	0.88	0.71	<b>1.58</b>

\* Analysed in ViaStrada partial report for AA: "Driver training and licensing progression: Effect on crash risk and traffic offences", Nov 2025

# Workshops: Options to Improve Driver Knowledge

Literature review and driver knowledge survey helped identify some potential options for developing driver knowledge

- These were further developed and then tested in workshops with **two** groups:
  - New Zealand **subject matter experts** (SMEs) including driver educators and programme managers, road safety professionals from local government, human factors and behavioural science specialists, and academics ( $n=12$ )
  - New Zealand **general road users** to test the acceptability of options and their willingness / interest in participating in different interventions. Participants recruited by Prime Research and the sample aimed to reflect the driving population ( $n=12$ )
- Workshops were recorded and qualitative data from discussions and activities were analysed to **identify themes** and illustrative quotes

## Subject matter experts:

- Consider driver-knowledge improvement options within a **safe-system** view
- Learners may have higher **'theoretical' knowledge** but poor **applied knowledge**, while experienced drivers may have the **opposite**
- Regions with significant street layout changes (even with no road rule changes) found drivers experienced **stress / higher cognitive load processing** the infrastructure added to intersections

## General road users:

- General perception that NZ drivers have **poor knowledge** of rules/behaviours
- There is **low motivation** for drivers to improve their knowledge in the absence of a specific requirement for them to do so
- Little guidance or knowledge about when/how **older drivers** should transition away from driving

# Potential Options to Improve Driver Knowledge

1. Knowledge communications campaigns (online & other media)
2. Knowledge checks at older driver training
3. Knowledge checks during advanced driver training (including commercial)
4. Optional knowledge refreshers for repeat offenders
5. Compulsory online knowledge refresher at re-licensing
6. Compulsory knowledge refresher at relicensing medical checks
7. Compulsory online knowledge refresher and formal knowledge test at relicensing
8. Compulsory online knowledge test for visitors/tourists

# Options to Improve Driver Knowledge

## 1. Knowledge communication campaigns

about road rule / design changes

Home / New Zealand

## Give way rules about to change



NZ Herald

20 Feb, 2012 05:30 AM 4 mins to read

## Get There Together road safety campaign

The Get There Together campaign aims to encourage greater respect between everyone using our streets, including cyclists, drivers, and pedestrians. Levelling the playing field between all types of road users will help us build a safer and more inclusive city.

## 2. Knowledge checks included in advanced driver training qualifications

### Defensive Driving PLUS



The theory component of the course includes the essential principles for being a safer company driver:

- Risk management
- Searching and scanning techniques
- Identification and response to hazards
- Vehicle handling and coping strategies
- Economical driving techniques
- Law changes
- Updated driving procedures.

## 3. Optional knowledge refreshers or courses

Could include incentives such as reduced cost of vehicle registration



CAR INSURANCE

## Driver Improvement Course Incentives To Lower Your Car Insurance



**AGE CONCERN**  
**STAYING SAFE**

A REFRESHER COURSE  
FOR OLDER DRIVERS



# Options to Improve Driver Knowledge cont'd

## 4. Knowledge refreshers / courses for road offenders (e.g. speeding)



NMAC (National Motorway Awareness Course)

NRRAC (National Rider Risk Awareness Course)

NSAC (National Speed Awareness Course)

SCC (Safe & Considerate Cycling Course)

SCD (Safe and Considerate Driving Course)

WDU (What's Driving Us? Course)

YBYL (Your Belt Your Life Course)

## 5. Compulsory online knowledge refresher at re-licensing that is not linked to whether you retain your license

**Renewing your driver's license and required to take a knowledge exam? Take eLearning to satisfy the knowledge test requirement.**

This pass-only, no-fail, interactive online course has seven short sections with quizzes after each section. You can take it using a computer, laptop, tablet or smartphone and it takes about 20 to 30 minutes to complete.

California, US



## 6. Compulsory knowledge test at re-licensing linked to whether you retain your license



You need to get at least 32 questions right

If you are sitting a theory test for a car or motorcycle licence, you need to get at least 32 questions right to pass.

## Effectiveness

### Low:

- No targeted strategy to reach driver groups
- Provides knowledge content and perhaps optional self-assessment with no testing or verification
- Limited underpinning theory or supporting evidence

### Moderate:

- Planned strategy to reach specific groups
- Provides knowledge content and assessment with completion verified but with no assurance of learning
- Based on theory, but with limited supporting evidence

### High:

- Planned strategy that ensures reach to all target groups
- Provides knowledge and controlled assessment with verification of learning quality
- Based on theory with strong supporting research

## Feasibility

### Difficult:

- Planning required over years with high-cost infrastructure or digital systems needing specialist support
- Many extra staff needed with ongoing training required
- Driver knowledge verification required and linked to license retention

### Moderate:

- Some planning required (months) with moderate-cost infrastructure or digital set-up (e.g. website development)
- Some extra staff & training support needed
- Training completion verified but not linked to license retention

### Easy:

- Minimal planning with low-cost infrastructure and setup
- Few extra staff needed with little training
- No driver knowledge verification required

## Acceptability

### Low:

- Significant concerns. Unlikely to be supported by the public
- No or low public interest in undertaking the intervention
- Risks, or impacts outweigh benefits

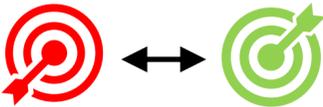
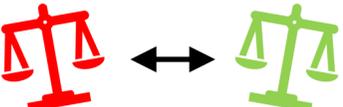
### Moderate:

- Some concerns, but manageable  
Mixed public support
- Some public interest in taking the intervention
- Benefits and drawbacks are relatively balanced. Acceptable with adjustments

### High:

- Few or no concerns. Strong public support
- Strong public interest in undertaking the intervention
- Benefits clearly outweigh risks

# Feedback: Potential Options to Improve Driver Knowledge

	Effectiveness	Feasibility	Acceptability
1. Knowledge communications campaigns			
2. Knowledge checks in driver training (older or commercial drivers)			
3. Optional knowledge refreshers/courses			
4. Knowledge test for tourists / new migrants with visas / NZers returning to NZ			
5. Compulsory knowledge refresher at relicensing (not linked to licence retention)			
6. Compulsory knowledge test at relicensing (linked to licence retention)			

# Some Conclusions

- Literature review:
  - **Slight** evidence that drivers lose comprehension over time
  - Very **limited** evidence on how well drivers adapt to new rules/TCDs
- Driver Knowledge Survey:
  - Years held a licence is **not** a strong determinant of knowledge about Road Rules and TCDs
  - **Older** Rules/TCDs had more correct answers than Newer ones
- Potential Intervention measures:
  - A **range of options** identified, incl. educational programmes, communication campaigns, sign/marking design, driver testing
  - Some options in NZ for **building/refreshing** core driving skills & knowledge, although mostly targeted at pre-licence/older drivers
  - Didn't appear to be much knowledge refresher content available in **post-learner licence** training and education



# Next Steps - Recommendations

- Better understand the **implications of knowledge deficits** in crash risk
  - May require a more **detailed interrogation of crash literature** or assessment of crash records and statements by the relevant parties
  - Alternatively, **more deeply exploring drivers' experiences** and where they have difficulty understanding how to negotiate various situations (e.g. safely overtaking a cyclist when limited road space exists)
- Ensure road environments & TCDs are **easy to understand and intuitive**
  - Minimises the **impacts of knowledge deficits**
  - Pay particular attention to the **design and placement** of signs, markings, and other roadside features, esp. in complex environments
- Promising **knowledge interventions** for the NZ context include:
  - Knowledge **communication campaigns**
  - Compulsory **knowledge refresher** at relicensing
  - Focused **refreshers/training/tests** of Rules, TCDs, and difficult driving scenarios for overseas visitors or NZers who have lived overseas
  - Making initial licence education and testing **broader in its focus**



# Thank You! Any Questions?

