Vision and Driver Licensing: Cross-jurisdictional comparison of standards and policies and evidence from international research

June 2015

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Purpose

The purpose of this paper is a) to compare New Zealand's driver licensing vision standards and policies with those in other jurisdictions; and b) to provide a high-level overview of international evidence about the relationship between vision and driving safety. This analysis is provided in relation to private light vehicles only.

Summary

New Zealand's vision standards for drivers are similar to other jurisdictions. However, New Zealand requires vision testing for non-commercial drivers more often and at an earlier age than a number of other comparable jurisdictions. The inclusion of detailed vision requirements in legislation rather than administrative standards is also unusual.

International research reports weak evidence of a relationship between driving safety and the measures of vision that are usually tested (visual acuity and visual field), while there is better evidence of a relationship between safety and aspects of vision that are not usually tested (such as processing speed and divided attention). There are stronger relationships between the usual measures of vision and aspects of driving performance that relate to being a responsible road user, such as reading traffic signs and identifying hazards. However, the literature points out that the relationship between measures of visual capability, performance of driving-related tasks and safety is not clear or well-understood. Intervening factors such as cognitive processing, compensatory techniques and self-regulation by drivers (e.g., driving only in the day or in familiar areas) all complicate these relationships.

Several studies have attempted to evaluate the effect on road safety of vision testing policies. All published studies are from the United States and all specifically focus on older drivers. There is some evidence of a small positive impact of vision testing on older driver road safety, although this is difficult to separate from requirements for in-person renewal. No study was identified that specifically evaluates the safety benefits of repeated vision testing for younger, non-commercial drivers.

This paper concludes that there is little apparent justification for vision to be re-tested at every stage of the graduated driver licensing system. Policies on vision testing at licence renewal for younger, non-commercial drivers could be reviewed in light of objectives to develop more online services.

Background

Vision (eyesight) testing is an important part of New Zealand's driver licensing regulatory regime. Clause 13 of the Land Transport (Driver Licensing) Rule 1999 makes vision testing a standard requirement for any person wishing to apply for or renew a licence or endorsement. Clause 38 of the Rule sets out the visual acuity and visual field standards that a licence applicant or holder must meet and the means by which they can be met. A person wishing to obtain or renew a licence or endorsement must either have their vision tested by a licensing agent or provide a certificate from a medical practitioner or optometrist issued no more than 60 days before the licensing transaction.

These legislated requirements are linked to the business model for driver licensing that has prevailed since 1999, when the Rule came into force. The great majority of licensing transactions occur at a driver licensing agent, where specialised equipment owned by the agent network permits a relatively quick and easy procedure to test visual acuity and visual field, at a relatively low marginal cost per transaction. If an applicant does not pass this screening test they are required to provide a certificate from a medical practitioner or optometrist in order to complete the licensing transaction.

However, while this business model is in itself relatively efficient, the fact that it is enshrined in legislation acts as a barrier to undertaking licensing transactions in other ways. For instance, it does not allow a licence to be renewed online, by mail or through an alternative counter-based service, unless the applicant provides an eyesight certificate, which would make the transaction significantly more costly and administratively more complex. It also restricts the way theory and practical tests can be carried out, since it means a test must be conducted from the agent's premises or the licence applicant must visit an agent shortly before taking the test.

This model can also place an increased compliance burden on customers who fail the screening test at the licensing agent despite meeting the eyesight standards (for instance, because of imperfect binocular fusion caused by one eye being stronger than the other).[1] Data from 2013 indicates that of 595,000 routine eyesight tests carried out at licensing agents, 19,000 resulted in failure (3.3%). In 10,000 (55%) of these cases, a licence was subsequently granted without conditions (suggesting that the person provided an optometrist's certificate showing they met the standards without correcting lenses). In total, 45,000 eyesight certificates were provided in 2013, not including medical certificates, suggesting that a significant number of people proactively obtained an optometrist's certificate in anticipation of failing the test at the licensing agent. The cost of an optometrist's certificate costs starts at $25.

Because a vision test is required at *every* licensing transaction, a learner driver proceeding through the Class 1 GDLS may have to have three vision tests within two years (someone who also acquires a motorcycle licence may have to have up to five tests over a similar period). Given that under the legislation an optometrist's certificate is only valid for 60 days, a person who is unable to complete the agent's screening test may need to obtain multiple optometrist certificates (e.g., see McDonald, 2014). It seems unlikely that the requirement for multiple vision tests over a short period of time is based on the actual risk of a person's vision changing during this period. Therefore, it could be argued that these requirements are unnecessary.

[1] This results in some people only being able to see two columns of letters, instead of three, when looking through the lens

In light of these criticisms the Ministry of Transport and the Transport Agency have discussed modifying the legislated vision requirements in order to reduce the customer compliance burden and allow the development of alternative service models. A Cabinet paper on driver licensing in 2011 contained an appendix suggesting that legislative change would include "removal of vision testing requirements". However, this was not accompanied by detailed analysis and did not discuss options for which provisions would be removed or what would replace them.

The current targeted driver licensing review has an explicit focus on updating the legislation and reducing the customer compliance burden while maintaining safety. This is an opportune time to systematically reconsider aspects of the driver licensing system that may be outdated or inappropriate, including requirements for vision testing. The following questions are pertinent:

- Are New Zealand's vision standards appropriate?
- When should drivers' vision be tested?
- What, if anything, should be established in driver licensing legislation with regard to vision standards and vision testing?

This document provides background information that will help address these questions. The first section looks at how New Zealand's vision standards and policies for driver licensing compare to other jurisdictions in Australia, the United Kingdom, Canada and the United States. The second part provides a high-level overview of international evidence about the relationship between vision and driving safety.

The discussion covers licensing requirements for private light vehicles only. Most jurisdictions have separate licensing standards for commercial drivers which often require a comprehensive medical examination that includes vision testing.

Vision standards and testing requirements in New Zealand and other jurisdictions

Appendix 1 provides a summary of vision standards for driving a private light vehicle in New Zealand, Australia, the United Kingdom and the United States. In the great majority of jurisdictions visual acuity of 0.5 (6/12) on the Snellen scale is the standard required for a private driver licence. A number of jurisdictions may grant a conditional licence below this threshold based on a detailed assessment but also set an absolute minimum standard; for example, in Australia this is 0.25 (3/12). Most jurisdictions also have visual field requirements: New Zealand's standard of 140 degrees is the same as in 15 states of the United States, while Australia requires 110 degrees and the United Kingdom 120 degrees, which is the European standard. [2]

New Zealand's establishment of vision standards in legislation appears to be unusual. In most Australian states, legislation has broad provisions for the licensing authority to require applicants to undergo medical or other tests (including vision tests) to establish their physical and mental fitness to drive. The actual vision standards are those set out in the publication *Assessing Fitness to Drive* produced by the national AustRoads authority. New Zealand's equivalent is *Medical Standards of*

[2] Australia and the UK also require that there be no significant defects in the centre of the visual field; this is also a requirement in New Zealand but is set out in medical standards for driving fitness (as in Australia) rather than in legislation.

Fitness to Drive, which includes a more detailed discussion of vision standards for driving – meaning that New Zealand's requirements are partly established in legislation, and partly in standards.[3]

In the United Kingdom, the only legislated requirement is the 'number plate test' – a driver must be able to read the licence plate of a vehicle registered after September 2001, in good light, at a distance of 20 metres. This has been criticised as non-standard: some licence plates can be easier to read than others because of the type of letters or condition of the plate (Chisholm, 2008). Wider vision standards for drivers are established by an expert committee that provides advice to the licensing authority (Royal College of Ophthalmologists, undated).

The great majority of jurisdictions require eyesight to be tested when a person first enters into the driver licensing system. In Australia a vision test is usually required to obtain a learner permit. Information available on the websites of driver licensing authorities suggests that in most places the initial vision test does not have to be repeated at subsequent stages of the GDLS. New Zealand's policies are therefore unusual in this respect. [4]

Policies on re-testing vision at licence renewal vary across jurisdictions. Appendix 2 provides a summary of re-testing policies in 16 English-speaking jurisdictions in New Zealand, Australia, the United Kingdom, the United States and Canada. This also shows whether each jurisdiction allows licence renewal other than in person (i.e. online, by phone or by mail). New Zealand is one of 5 jurisdictions that require vision testing at every renewal, along with New South Wales, Australian Capital Territory, Northern Territory and the state of New York. Seven jurisdictions have age-related vision testing requirements which commence between the ages of 70 and 80. Victoria and the United Kingdom have no mandatory vision testing at renewal and an assessment is required only if a condition affecting safety to drive is declared or reported.

Jurisdictions that do not require vision testing at licence renewal for younger, non-commercial drivers are more likely to offer renewal online or by other alternative means. New York is unique in offering licence renewal online or by post but also requiring a vision certificate. British Columbia is the only jurisdiction that does not require vision testing for younger drivers and does not also offer an alternative renewal option (although Tasmania only offers short-term renewal by post for people temporarily out of state). New Zealand is one of only four jurisdictions that require every renewal to be in person. However, it is worth noting that New Zealand's standard licensing period is the equal longest of any jurisdiction and is much cheaper on a pro rata basis than in Australia.

International evidence on vision and driving safety

There is an extensive literature on the relationship between driving safety and different aspects of vision. The following provides a brief overview based largely on the meta-analysis undertaken by Owsley and McGwin et al (2010).

[3] Australia's medical standards appear to be implemented as a matter of policy by the various licensing authorities, whereas in New Zealand they are referred to in the Driver Licensing Rule, giving them the status of legislation.

[4] Detailed information has not been obtained from each jurisdiction and about exactly how and when vision is tested as part of the respective graduated driver licensing system. This information could be obtained by more detailed follow up.

Visual acuity

As already noted, visual acuity is the universal measure of fitness for driver licensing. Owsley and McGwin note that road signs in the United States are designed with the assumption that drivers have at least 6/9 vision and therefore requiring this level of visual acuity can help ensure that a person can make appropriate decisions within safe timeframes. However, despite a large number of studies there is no conclusive evidence of a strong relationship between visual acuity and road safety as measured by crash involvement: in addition to a number of studies showing significant but weak associations, other studies have shown no significant association.[5] However, stronger relationships have been shown between visual acuity and driving performance, in both on-road and simulator studies.

Owsley and McGwin consider various possibilities for the lack of a clear relationship between visual acuity and crash involvement. One is that skills such as reading road signs are important for being a good citizen of the road, but are not necessary for avoiding crash involvement. Another consideration is that visual acuity testing does not measure the visual skills necessary for the safe operation of a motor vehicle. Visual acuity is measured in a static, well-lit setting, while driving takes place in a dynamic, cluttered environment A third possibility is that people with severe visual acuity problems may fail to renew their licence or self-regulate by not driving or by driving only in the day time or in familiar areas.

Visual field

Visual field standards are also very common for driver licensing but, as with visual acuity, the evidence about the relationship within driving safety is not conclusive. While a number of studies have found significant relationships between visual field defects and crash involvement, others have not. A number of studies accounted for driving exposure but their results are equally inconsistent as those that did not. One problem is the lack of a consistent definition of visual field impairment – Owsley and McGwin comment that in some studies only the extremes of the visual field were determined, with no account being taken of central field defects. In some studies, the comparison was of people with and without glaucoma (which is characterised by visual impairment). However, if people with glaucoma have a higher crash risk, it cannot be assumed that this is because of visual impairment – in one study, the relationship between glaucoma and crash risk persisted when the results were adjusted for visual impairment suggesting that some other factor was responsible.

Monocularity

As can be observed in Appendix 1, different jurisdictions have different rules about whether someone with vision in only one eye can be granted a driver licence (in New Zealand, a person with vision in only one eye can be granted a driver licence if they meet the visual acuity and visual field standards). Many of the studies in the literature relate to commercial drivers, which cannot necessarily be generalised to private vehicles. One study found that drivers with vision in only one eye performed worse in some driving functions such as sign reading, but had comparable performance in other functions. Overall, there is no consistent evidence that monocular drivers have a higher crash risk than binocular drivers.

[5] A study by Rubin et al (2007) included 208 drivers with visual acuity of worse than 6/12 in at least one eye, which they comment would not have allowed them an unrestricted licence in Maryland.

Contrast sensitivity

Deficits in contrast sensitivity (which is a particular problem for night vision) are common in older people with conditions including cataracts or diabetic retinopathy. Owsley and McGwin report that the literature on the relationship between contrast sensitivity and road safety is "divergent" – while some studies have found a significant relationship between a higher crash risk and contrast sensitivity and/or a clinical history of cataracts, other studies have found no such relationship. The authors suggest the failure to establish a relationship in prospective studies may be because severely impaired drivers fail to get their licence renewed and/or self-regulate. There is a more consistent relationship between contrast sensitivity and driving performance as measured in on-road tests: two studies found that contrast sensitivity, measured in good light, was a better predictor than visual acuity of being able to make out objects while driving at night. Other studies showed improved driving performance following cataract surgery, which improved contrast sensitivity. In addition, the authors note that contrast sensitivity appears to be a confounding variable in studies that *have* found a relationship between visual acuity and crash risk.

Visual processing and divided attention

Drivers need to take in and process information by simultaneously using central and peripheral vision in a dynamic, unpredictable environment. This ability can be measured through a task called useful field of view (UFOV) which tests the time needed to discriminate a target in central vision while simultaneously locating a target in the peripheral field. The UFOV test is a computer-based test undertaken by trained staff and takes at least 15 minutes (Visual Awareness, 2009). A number of studies have found significant relationship between UFOV scores and road safety. Rubin et al (2007) note that "the UFOV has shown the strongest association with crash involvement of any vision-related test" while Owsley and McGwin conclude that "visual attention and visual processing speed are critical considerations in the evaluation of safe driving skills and may be better screening tests than visual sensory tests (e.g., visual acuity) for identifying crash-prone older drivers" (p.2353). Problems with visual processing speed and divided attention have also been associated with poorer driving performance in a number of different settings.

Stereo acuity, colour vision and glare disability

Owsley and McGwin discuss a number of other aspects of vision in their meta-analysis, and some of these are also the subject of driver licensing in some jurisdictions. Both stereoacuity (depth perception) and colour vision are assessed in a number of states of the United States but not in Australia or New Zealand. A few studies have found that depth perception is associated with more, or more serious accidents for commercial drivers, but the authors note that these cannot be generalised to drivers of personal vehicles; also, large sample studies of older drivers have found no relationship between stereoacuity and crash risk. Colour vision deficiency can affect a driver's ability to quickly respond to colour-coded traffic signals; however, there is no evidence of a link between colour vision deficiencies and crash risk. There has also been no clear relationship demonstrated between crash risk and glare disability, despite concerns that this is a threat to older driver safety. The authors note that this may relate to methodological problems in defining glare.

Compensatory techniques

Functional vision inherently involves some level of cognitive processing. Higher-level cognitive functions are also involved in mediating between visual capabilities and driving performance, including some that are susceptible to improvement through practice or training. Owsley and McGwin note a number of studies have shown that the visual processing skills of novice drivers are noticeably different from experienced drivers in terms of fixation patterns, flexibility of search strategy, attention engagement/disengagement, and scanning. In addition, research indicates that eye movement can compensate for visual field loss. Further, while the UFOV test has been strongly linked to driving safety, it is also a training tool and performance can be improved over time.

The authors conclude that further research is required on eye and head movements, scanning, visual search and attention during driving. This could not only help in the rehabilitation of drivers with visual impairment but also inform training for novice drivers.

Vision testing policies and driving safety

There have been several attempts to evaluate the relationship between vision screening policies and road safety. These are all based on data from the United States and all are specifically focussed on older drivers. Because there are only a few such studies, they are summarised individually.

Shipp (1998) assessed the impact of vision screening policies on road fatality rates for drivers over 60 years old in the 48 contiguous states of the United States during 1989-91. Ten states had no vision screening requirements at licence renewal while the remainder tested one, two or three aspects of vision.[6] In an initial statistical test, the author found no significant relationship between road fatality rates and vision screening policies. However, in a regression model including demographic, socioeconomic and rurality factors, vision screening policies were significantly associated with lower fatalities. The final model estimated that 222 fewer fatalities (-12.2%) would have been expected in 8 of the 10 states without vision testing policies, had such policies been in place.

Grabowski et al (2004) looked at the relationship between road fatalities among older drivers (>65 years) and state laws including vision testing, in-person renewal, road tests and licence renewal frequency, controlling for demographic and socioeconomic factors and laws on drink-driving, speed and seatbelts. One model included elderly fatalities only, while another also included daytime road fatalities for middle-aged drivers (25-64) to control for unobserved variation across states and time. Across both models, states with in-person licence renewal had significantly lower fatalities for drivers over 85 years of age (-17%). In the first model, vision testing policies were associated with a significantly lower fatality rate (-8%) for drivers aged 65-74.

McGwin et al (2008) reviewed evidence of the impact of a law change in Florida which introduced vision testing at licence renewal for drivers over 80 in 2004. The article compares the crash fatality rates for all drivers and those over 80 in the period before (2001-03) and after (2004-06) the implementation of the new requirements. Comparisons were also made to fatality rates in neighbouring states Alabama and Georgia. Between these time periods, the fatality rate among all drivers increased by 6%, while the fatality rate for drivers over 80 decreased significantly by 17%. No significant changes were observed in neighbouring states.

[6] These were some combination of visual acuity (all states that tested vision), visual field and depth perception.

The authors of these studies consider possible reasons for a protective effect of vision testing for older people, despite the lack of clear association between crash risk and the visual capabilities that are tested. One possibility is that the vison screening test denies licence renewal to unsafe drivers, although this is not supported by the available evidence about the relationship between safety and visual acuity, and McGwin et al note that in the Florida case only a small percentage of applicants were eventually unable to obtain their licence. An alternative is that the vision screening test alerts people to problems with their vision which are then addressed by correcting lenses, other interventions and/or self-regulation of driving. A further possibility is that screening tests cause the voluntary cessation of driving among people who believe they cannot pass the test, although McGwin et al note that this may include some who are higher-risk drivers and some who are not. Finally, the benefits of vision testing requirements have not been separated from requirements from in-person renewal. Authors note that a requirement to attend a licensing authority office to renew a licence may be sufficient to identify those who have obvious impairment, who may either be denied a licence or referred for a medical assessment.

It is worth noting that if vision screening does have an impact on safety, this is at the margins. In the model developed by Shipp (1998), the predicted rate of older driver fatalities in states *without* a vision screening test ranged from 8 per 100,000 in Connecticut to 47 per 100,000 in Alabama. Owsley and McGwin conclude that "because ecologic studies [of the type summarised] are based on population-level rather than individual-level data, the results from such studies must be interpreted with caution and cannot be considered definitive" (p.2356).

Conclusions

The relationship between vision and driving safety is complex. Different aspects of vision interact, and are further mediated by cognitive processing, compensatory techniques such as eye and head movement, and self-regulation such as driving only during daylight hours or in familiar areas. The tests for visual acuity and visual field, by themselves, are not reliable predictors of who is more likely to have a road crash, although there is better evidence that they are related to some – but not necessarily all – aspects of driving performance. As noted by Owsley and McGwin, some combination of visual acuity, visual field and contrast sensitivity tests may yet result in more effective vision screening. There is also emerging evidence that the abilities measured by the useful field of view (UFOV) test are more clearly related to driving performance and road safety. However, these more intensive tests are likely to be most appropriate in clinical situations when a higher level of risk has already been identified. At the moment, they are unlikely to be cost-effective as screening tools for the general population.

Almost all jurisdictions require a vision test at entry to the licensing system. This seems appropriate, as it is a time when a person must pass various tests to demonstrate their fitness to drive. However, no other jurisdiction has been identified that requires repeated vision tests at every stage of the graduated driver licensing system, as New Zealand does. New Zealand's approach does not appear to be based on an assessment of need for the test but rather on an assumption about how driver licensing services will be delivered.

Policies on retesting vision at licence renewal vary quite widely across different jurisdictions. The studies from the United States suggest that there may be some benefit in vision testing at licence renewal for older drivers, although this is likely to be quite small. Despite this, the tendency seems to be to remove rather than extend age-related testing requirements, with South Australia recently joining Victoria in not requiring age-related vision or medical testing.

Fewer jurisdictions require vision testing at licence renewal for younger drivers, and there have been no published studies which assess whether this has any safety benefit. For repeated vision testing in younger non-commercial drivers to improve safety, it would have to identify vision problems that have developed since a person entered the licensing system, which a person has not noticed or addressed, and which have not come to the attention of a medical practitioner. Given that many of the more serious vision problems are age-related, the main change likely to occur between licence renewals in younger drivers is in visual acuity; as already noted, this does not have a clear or straightforward relationship to crash risk.

Should New Zealand wish to remove vision testing at renewal for younger, non-commercial drivers in order to develop more online services, there is unlikely to be conclusive evidence for or against this but the risk is likely to be small. In order to evaluate whether such a change would have any impact, an Australasian cross-jurisdictional study similar to those in the United States could be designed. This could compare the crash risk for drivers aged 25-69 in jurisdictions that test vision at licence renewal (New Zealand, New South Wales, Australian Capital Territory, Northern Territory) with those that do not (Queensland, Tasmania, Victoria, South Australia and Western Australia). Whether or not such as study finds any association, its results would be unlikely to be conclusive.

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Driver licensing authority websites

Australian Capital Territory http://www.rego.act.gov.au/licence

British Columbia http://www.icbc.com/driver-licensing/Pages/default.aspx

California http://www.dmv.org/ca-california/renew-license.php

Florida http://www.dmv.org/fl-florida/drivers-license.php

Illinois http://www.dmv.org/il-illinois/drivers-license.php

New South Wales http://www.rms.nsw.gov.au/licensing/index.html

New York http://www.dmv.org/ny-new-york/drivers-license.php

New Zealand http://nzta.govt.nz/licence/index.html

Northern Territory http://www.transport.nt.gov.au/mvr/licensing

Ontario https://www.ontario.ca/driving-and-roads/drivers-licence

Queensland http://www.tmr.qld.gov.au/Licensing.aspx

South Australia http://www.sa.gov.au/topics/transport-travel-and-motoring/motoring/drivers-and-licences

Tasmania http://www.transport.tas.gov.au/licensing

United Kingdom https://www.gov.uk/browse/driving/driving-licences

Victoria https://www.vicroads.vic.gov.au/licences

Western Australia http://www.transport.wa.gov.au/licensing/my-drivers-licence.asp

APPENDIX 1: VISION STANDARDS FOR PRIVATE DRIVERS IN NEW ZEALAND AND OTHER JURISDICTIONS

Aspect of vision	New Zealand	Australia	United Kingdom [7]	United States [8]
Visual acuity	0.5 with either both eyes or one eye (in legislation).	0.5	0.5 (must be able to read a licence plate at 20 metres while stationary).	0.5 in all but three states (Georgia requires BCVA of 0.33 in at least one eye).
Visual field	140 degrees with either both eyes or one eye (in legislation). No significant pathological field defect encroaching within 20 degrees of the point of fixation (medical standards).	110 degrees extension within 10 degrees above and below the horizontal midline. No visual field loss within 20 degree radius of fixation or other field loss likely to affect performance.	Minimum horizontal field of 120 degrees and no significant defect within 20 degrees of fixation.	34 states require 105 to 150 degrees (140 in 15). Some have single-eye requirements of 55 to 105 degrees. Utah and Kentucky have vertical visual field requirement of 20-25 degrees. 16 states have no requirements.
Monocularity	Allowed if a person meets acuity and visual field requirements.	No unconditional licence. Conditional licence can be considered if acuity and visual field requirements met.	Individuals with one eye must inform the DVLA. Individuals can drive once adapted if they meet the acuity and visual field standards	Insufficient information.
Diplopia (double vision)	A person may drive if the condition is managed with prisms or occlusion, the visual acuity and field requirements are met and the person has adapted to the condition.	No unconditional licence. Conditional licence may be considered subject to annual review and management with corrective lenses or an occluder.	Cease driving on diagnosis but acceptable if controlled by spectacles or patching.	Insufficient information.
Colour vision	No requirements.	No requirements.	No requirements.	Massachusetts and Ohio have colour vision requirements. 9 states have requirements for commercial and / or new drivers.
Stereoacuity (depth perception)	No requirements.	No requirements.	No requirements.	A number of states test depth perception. Mississippi restricts drivers who fail depth perception test to 45 mph.
Contrast sensitivity	Daytime driving only may be recommended.	No requirements.	No requirements.	No requirements.
Visual processing speed	No specific requirements [9]	No specific requirements. [10]	No requirements.	No requirements.

[7] Summarised in Chisholm, Catharine. (2008). Visual requirements for driving. Clinical overview: driver's vision, 25 January 2008. http://www.optometry.co.uk.
[8] US requirements cross-referenced between http://virtualmentor.ama-assn.org/2010/12/hlaw1-1012.html; and AMA's Physician guide to assessing and counselling older drivers. (2003) [5] – cited in Colenbrander and de Laey (2005).

and divided attention				
Motion perception	No requirements.	No requirements.	No requirements.	No requirements.
Glare disability	Daytime driving only may be recommended.			Insufficient information.

[9] Processing covered in *Medical Aspects of Fitness to Drive* under 'psychomotor and cognitive conditions' and attention under 'excessive daytime sleepiness'
[10] Attention covered in *Assessing Fitness to Drive* under neurological conditions, psychiatric disorders, sleep disorders and substance abuse.

APPENDIX 2: VISION TESTING AT LICENCE RENEWAL IN NEW ZEALAND AND OTHER JURISDICTIONS

Jurisdiction	Vision testing requirements at licence renewal	Licence renewal online, by phone or by mail	Maximum renewal period	Cost of renewal
Northern Territory	Vision testing five yearly.	Yes (if an eyesight test isn't due).	10 years	$156
Australian Capital Territory	Vision test at every renewal, 5-yearly from age 50 and annually after 75.	No.	5 years	$167.10 AUD
New Zealand	**Vision tested at every renewal.**	**No.**	**10 years**	**$43.90**
New South Wales	Vision tested at every renewal.	No.	5 years	$170 AUD
New York	Vision tested at every renewal.	Yes (must provide vision certificate).		$64.50-80.50 USD
California	Vision testing required at renewal in person (every three renewals) and every renewal from age 70 (every 5 years).	Yes.	5 years	$33 USD
Illinois	Vision testing at in-person renewal (every other) and every renewal from age 75.Licence duration is reduced from 4 to 2 years at age 80.	Yes.	4 years	Free (>87 years) - $30 USD (21-68 years)
Tasmania	Vision testing annually from age 75.	Yes (by mail, for 1-2 years using photo kit application form).	5 years	$55.88 (senior) - $106.20
Queensland	No vision test before 75.	Yes (if digital photo and signature provided in past 9 years).	5 years	$154 AUD
South Australia	Vision test annually from age 70 (but from September 2014 age-related medical and vision testing will be removed).	Yes (if no photo required).	10 years	$217 AUD
British Columbia	Medical review required from age 80.	No.	5 years	$75 CAD
Western Australia	Vision testing annually from age 80 (current web site suggests that requirements for testing at 75 and 78 have recently been removed).	Yes.	5 years	$64.30 (pensioner or senior) - $128.70 AUD
Ontario	Vision testing every two years from 80.	Yes, if not requiring a new photo (every 10 years).	5 years	$80 CAD
Florida	Vision testing required at age 80 and licence duration reduced from 8 to 6 years.	Yes (online; mail for active military members only).	8 years	$48 USD
Victoria	Vision only tested if declared or reported.	Yes (by phone or mail).	10 years	$253.60 AUD
United Kingdom	Vision only tested if declared or reported.	Yes.	10 years	Free (over 70) - £20 GBP