

## Diagnosis of cognitive impairment and the assessment of driving safety in New Zealand: a survey of Canterbury GPs

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### Abstract

**Aim** To assess how GPs in Canterbury determine the driving ability of their older patients with cognitive impairment.

**Methods** A 10-item questionnaire was sent to 514 Canterbury GPs via the mail system of three Primary Health Organisations. GPs could either post or fax back responses anonymously and were also able to add their own comments.

**Results** 185 GPs returned completed questionnaires (36% response rate). Six of 10 items were rated in the middle of the response range, indicating a middling level of agreement. All but three GPs reported using a cognitive screening test and most talked to their patients about the need to plan for driving cessation. GPs did not frequently report referring for on-road driving assessments and many commented they would appreciate a more structured guideline with specific recommendations.

**Conclusion** There is room for improvement in the amount of information provided to GPs about how to best assess older patients with cognitive impairment for fitness to drive. Recommendations of specific cognitive screens and a flowchart format would be a valuable addition.

As the population of New Zealand ages, a higher proportion of drivers will be 65 years or older.<sup>1</sup> A greater proportion of drivers will therefore suffer from diseases of old age including cognitive impairment. Illnesses associated with cognitive impairment include the various dementias, Parkinson's disease, multiple sclerosis, stroke, and depression.

While some causes of cognitive impairment are irreversible and progressive, such as the various dementias, others may resolve over time or with treatment, such as impairment due to stroke or depression.

Prevalence rates for dementia have been reported between 13% and 43% in the 80 to 89 age group, increasing exponentially per year within this age range, with rates between 40% to 65% in those aged over 90.<sup>2-4</sup>

As a group, drivers with dementia are 10.7 times more likely to be involved in a crash<sup>5</sup> and have almost 2.5 times as many crashes that result in insurance claims compared to an age-matched control group.<sup>6</sup> Nonetheless, many people with early dementia are able to pass an on-road driving assessment, with observed pass rates ranging from 35% to 73%.<sup>7-10</sup>

The difficulty for driving safety is in determining which drivers are likely to have their cognitive impairment improve with treatment, which cognitively impaired drivers are currently safe to continue driving, and which drivers need to stop immediately and permanently (i.e. those with a deteriorating dementia).

A number of researchers have recommended that people with moderate and severe dementia cease driving and suggest that people with mild dementia may be able to continue driving with appropriate monitoring and assessment.<sup>11,12</sup> Statements have also been made that results of neuropsychological tests cannot be used reliably to determine which drivers with dementia are safe and unsafe on the road.<sup>11,13</sup>

Following a review of the driving and dementia literature, The American Academy of Neurology identified the Clinical Dementia Rating (CDR) as the most useful measure of overall cognitive decline in people with dementia.<sup>13</sup> This tool is a clinician rated scale that assesses the level of cognitive impairment and classification into categories of None, Very Mild, Mild, Moderate, and Severe.

The American Academy of Neurology also lists other risk factors including caregiver ratings of poor driving, the incidence of traffic offences and crashes, and changes in driving patterns such as reduced mileage and situational avoidance.<sup>13</sup> These recommendations are ranked by order of the strength of relationship to on-road driving outcomes based on the literature review. A flowchart is provided for clinicians to aid in decision making and this article is readily available at <http://www.neurology.org/content/74/16/1316.full.pdf+html>

In New Zealand, compulsory on-road driving assessments for drivers aged 80 and over ceased in December 2006. GPs are charged with making decisions regarding driving safety for their older patients, including those with cognitive impairment.

The task of making decisions about driving is made more difficult because cognitive impairment must first be adequately assessed and diagnosed. This process takes longer than a standard GP appointment allows, and should include talking to a reliable informant about noticed changes in cognition and behaviour. The New Zealand Transport Agency (NZTA) provides a guide for medical practitioners for assessing driving safety in a number of medical conditions including dementia (*Medical Aspects of Fitness to Drive*<sup>14</sup>).

This guide provides no statistics to highlight the increased risks of crashes in those with dementia, and makes no mention of dementia severity and how it relates to driving safety. The guide suggests the use of tests of cognitive function, but does not recommend any. It also suggests the use of a test of road signs provided in an appendix as a way to determine if problems related to driving ability exist. This test has no recommended cut point to detect a problem and to the author's knowledge has not been tested for reliability or validity for detecting on-road driving problems.

A New Zealand article<sup>15</sup> published by a group of driving researchers, driving specialist occupational therapists, an old-age psychiatrist, and a GP representative provided a detailed review of older driver licensing practice and assessment in New Zealand, including a section for drivers with cognitive impairment.

The authors suggested that older drivers be routinely assessed for cognitive impairment when they present to their GP for a medical fitness to drive certificate. The authors also suggested that driving ability was assessed every 6 months, and that GPs did not use the road sign test provided in the NZTA's *Medical Aspects of Fitness to Drive*<sup>14</sup> handbook due to a lack of information about its validity for determining driving ability. The authors instead suggested use of a standardised version of the Mini Mental State Examination (MMSE).

In the current study, the author (PAH) and Christchurch GP and member of the Primary Care Liaison Team for Older Persons Health at the CDHB, Dr Michael Thwaites, arranged for a questionnaire to be delivered to all GPs in the Canterbury region to assess the issues of diagnosing cognitive impairment and driving assessment.

Canterbury GPs are in a privileged position in that 400 medical driving assessments per year are funded by the DHB at the Driving and Vehicle Assessment Service at Burwood Hospital. In almost all other DHBs these assessments must be paid for privately.

The goal of this survey was to assess how GPs were diagnosing cognitive impairment and determining driver safety, and also to find areas of perceived need for additional education or guidance from the NZTA.

## Method

A questionnaire was constructed by the author and reviewed by Dr Michael Thwaites and Police Constable Wayne Stevenson, and is replicated in Table 1. Questions 3, 9, and 10 focused on how GPs diagnosed and managed cognitive impairment in their older patients.

Question 3 referred to the Cognitive Impairment Pathway, which is part of the Health Pathways online resource compiled by specialists at the Canterbury DHB and targeted at primary care physicians. The remaining questions addressed self-rated knowledge and confidence related to making decisions about driver safety, as well as questions about the use of resources such as the NZTA's *Medical Aspects of Fitness to Drive*<sup>14</sup> and formal driving assessments.

The response choices for the questions deliberately did not allow for a non-specific rating, such as "Neither confident nor unconfident", thus requiring respondents to take an affirmative or negative side in their response. The response choices also did not indicate specific timeframes or request estimates of numbers of patients seen by GPs. One reason for this was that asking for more specific details may have meant a lower response rate due to a perceived or actual increased amount of time required to complete the questionnaire. Another reason was that reported numbers may not be particularly accurate and may present a summary that appeared more precise than it actually was.

Thus, the outcome of the survey would provide a general but non-specific summary of thoughts and practices of GPs in relation to cognitive impairment and driving. Respondents were encouraged to write any additional comments on the back of the form.

**Table 1. Text of questionnaire sent to GPs**

1.	How well informed do you feel about the driving risks of older adults with cognitive impairment? <i>Very well informed; Well informed; Uninformed; Very uninformed</i>
2.	How satisfied are you with the information provided by the New Zealand Transport Agency in the <i>Medical Aspects of Fitness to Drive</i> handbook for determining driving safety in older adults with cognitive impairment? <i>Very satisfied; Somewhat satisfied; Slightly satisfied; Not at all satisfied; Have not read it</i>
3.	How frequently do you use the CDHB's Cognitive Impairment Pathway (on the Health Pathways portal) for diagnosing and managing the care of a patient with mild cognitive impairment or dementia? <i>Often; Sometimes; Seldom; Never; I had not heard of it</i>
4.	How confident do you feel in making a decision about driver licence relicensing or revocations in older drivers with cognitive impairment? <i>Very confident; Confident; Not so confident; Not at all confident</i>
5.	How frequently do you refer older drivers with cognitive impairment for a medical driving assessment at Burwood Hospital? <i>Often; Sometimes; Seldom; Never</i>
6.	How frequently do you refer older drivers with cognitive impairment for an On-Road Safety Test (such as performed by the AA)? <i>Often; Sometimes; Seldom; Never</i>
7.	How frequently do you raise the issue with patients with cognitive impairment (or their family members) of planning for driving cessation? <i>Often; Sometimes; Seldom; Never</i>
8.	When informed by the New Zealand Transport Agency of potential medical driving impairment for an older patient, how important is it to receive detailed information about the driving incident that triggered this report? <i>Very important; Important; Of little importance; Not important; I have never received a notification from NZTA</i>
9.	How frequently do you conduct a cognitive screen (such as the Mini Mental State Exam or Montreal Cognitive Assessment) with an older adult showing signs of cognitive impairment? <i>Often; Sometimes; Seldom; Never</i>
10.	Please indicate which screening tests you use, if any, to assess for cognitive impairment in older patients (please check all that apply). <ul style="list-style-type: none"><li>• <i>None</i></li><li>• <i>Mini Mental State Exam (MMSE)</i></li><li>• <i>Modified Mental State Exam (3MS)</i></li><li>• <i>Montreal Cognitive Assessment (MoCA)</i></li><li>• <i>Addenbrooke's Cognitive Examination (ACE-R)</i></li><li>• <i>IQ Code (short or long versions)</i></li><li>• <i>Other (please identify)</i></li></ul>

514 GPs from three Primary Health Organisations (PHO) in Canterbury were posted questionnaires in late 2012 through the secure mail delivery network of their PHO. 410 were sent to GPs under Pegasus Health PHO, 40 to GPs under Christchurch PHO, and 64 to GPs under Rural Canterbury PHO.

The 10-item questionnaire was delivered in an envelope with a one page covering letter introducing the survey, asking for anonymous responses, and stating that the results could be used both as part of a submission to the NZTA, as well as submission to a peer-reviewed journal. GPs could reply either using the included envelope or by faxing their questionnaire back to the author.

Descriptive statistics of frequency, median, and mode were reported. Statistics were calculated using SPSS Statistics version 17.0 software. Response options were coded into nominal values.

Questions 1, 4, 5, 6, 7, and 9 had four response options, coded as values 1 through 4 in order of presentation on the form (see Table 1). Questions 2, 3, and 8 had five options, coded as the values 1 through 5. For these three questions, the first four asked for a subjective rating, whereas the last question acted as a way for the rater to note if they had not come across this situation (e.g. the response “I had not heard of it” for the question regarding use of the *Medical Aspects of Fitness to Drive*<sup>14</sup> handbook).

When descriptive statistics were calculated for questions 2, 3, and 8 the number of responses rated 5 was first noted, with descriptive statistics performed only for the responses rated 1 through 4. Additional comments on the back of the form were recorded and presented in a qualitative manner.

## Results

185 GPs responded (36% response rate). The number responding to each question is shown in the second column of Table 2. For questions 2, 3, and 8 the number from the third column must be added to the second column to determine the number of respondents. Missing values were excluded from the analysis for that question. Descriptive statistics for questions 1 to 9 are presented in Table 2.

**Table 2. Results of questionnaire for each question**

Question number	N	N noting they could not rate this item (%)	Median (mode)
1	179	–	2 (2)
2	160	21 (11.6%)	3 (3)
3	156	25 (13.8%)	2 (2)
4	184	–	3 (3)
5	184	–	2 (2)
6	184	–	3 (4)
7	184	–	2 (1)
8	131	53 (28.8%)	1 (1)
9*	185	–	1 (1)

Due to differences in interpretation in this question (see text below) this result cannot be accurately interpreted.

Twenty-five respondents reported they had not heard of the CDHB’s Cognitive Impairment Pathway on the Health Pathways information portal (question 3). Of the



remaining respondents, the median rating for using the Cognitive Impairment Pathway information was *Sometimes*.

Question 9 asked how frequently respondents conducted a cognitive screening test with an older patient suspected of cognitive impairment. It became clear from participant comments that this question was being interpreted in two different ways. The intention was to gauge how frequently a GP performed screens within their practice in general, but some respondents took the question to refer to how often tests were repeated on specific individuals. Because of this lack of clarity, responses to this question could not be accurately interpreted.

Question 10 asked respondents to note which cognitive screening tests they used within their practice for assessment of older patients with suspected cognitive impairment. The frequency for each response is found in Table 3.

**Table 3. Numbers of respondents endorsing the use of different cognitive screening tests**

Cognitive test	N (%)
Mini Mental State Exam <sup>16</sup> (MMSE)	131 (71%)
Montreal Cognitive Assessment <sup>17</sup> (MoCA)	100 (54%)
Modified Mental State Exam <sup>18</sup> (3MS)	29 (16%)
IQCODE <sup>19</sup> (short or long version)	11 (6%)
None	3 (2%)
Addenbrooke's Cognitive Examination <sup>20</sup> (ACE-R)	0
Other	
– SIMARD-MD <sup>21</sup>	8 (4%)
– GP-Cog <sup>22</sup>	5 (3%)
– 6CIT <sup>23</sup>	3 (2%)
– Road Sign Test <sup>14</sup>	2 (1%)
– Hopkins Verbal Learning Test <sup>24</sup>	1 (1%)
– Abbreviated MMSE	1 (1%)

Only three respondents reported that they did not use a cognitive screening test. The most commonly used test was the MMSE with 131 responses. The MoCA was the next most common at 100. No respondents reported using the ACE-R. Twenty respondents reported using a different screen from those listed: eight used the SIMARD-MD, five used the GP Cog, three used the 6CIT, two used the Road Sign Test from the NZTA *Medical Aspects of Fitness to Drive*<sup>14</sup> handbook, and one each used the Hopkins Verbal Learning Test and an abbreviated version of the MMSE.

For question 1, respondents median score for their knowledge of driving risks for older adults with cognitive impairment was *Well Informed*. For question 2, twenty-one respondents (11.6%) reported that they had not read the NZTA *Medical Aspects of Fitness to Drive*<sup>14</sup> guidelines for drivers with cognitive impairment. Remaining respondents satisfaction with this resource was *Slightly Satisfied*.

For question 4, respondents rated their level of confidence in making decisions about driving in patients with cognitive impairment as *Not so Confident*. For question 5, respondents rated the frequency of their use of a medical driving assessment at

Burwood Hospital as *Sometimes*. Thirteen respondents (7%) rated this as *Never*. For question 6 respondents rated the frequency of their use of an On-Road Safety Test, such as offered by the Automobile Association as *Seldom*, with 60 respondents (32.4%) reporting they never referred for this assessment.

For question 7 respondents rated how frequently they raised the issue of planning for driving cessation with patients with cognitive impairment or their families as *Sometimes*. Question 8 asked how useful it was to receive information about a driving incident that sparked an NZTA request for review of a patient's driving ability. Fifty-three respondents (28.8%) reported that they had not received such a request. The remainder rated this as *Very Important*. It is possible that some people rated this option even if they hadn't personally received a report from NZTA.

Thirty-one respondents added additional comments to the back of their questionnaires. Comments were sorted into a number of super-ordinate categories based on theme. Ten responses were comments on a GP's own practice, or about finding a specific resource useful (such as a cognitive screening test).

Eleven comments expressed dissatisfaction with the current NZTA guidelines or with the use of cognitive screens. In this category, several GPs stated that cognitive screens were not sensitive enough, or did not relate to real-world driving. Several respondents asked for more specific guidelines from the NZTA. Some respondents stated that they believed that all patients with dementia should stop driving.

Two respondents voiced concerns about patients declining to pay for the On-Road Safety Test. One respondent noted a situation where the issue of driving led to the break-down in the patient-GP relationship and subsequent change of GPs for the patient. Six respondents voiced criticism of being able to tell a person's on-road safety from any office-based test, and a few called for a reintroduction of compulsory on-road testing of all older drivers. One respondent noted that the waiting list for medical driving assessments at Burwood Hospital was too long (around 8–12 weeks at the time of writing).

## Discussion

Almost all GPs reported using a cognitive screening test with their patients with cognitive impairment, but only *Sometimes* utilised the guidelines of the CDHB's Cognitive Impairment Pathway. The most commonly used cognitive screen was the MMSE.

The MMSE is a useful tool for detecting the presence of moderate or severe dementia and to measure decline over time, but it has poor sensitivity for detecting people with mild cognitive impairment or mild dementia.<sup>17,25</sup> The second most commonly used test was the MoCA. This is most likely due to its recommendation as a screening tool in the CDHB's Cognitive Impairment Pathway.

The Short IQCODE is also recommended in the Pathway, but only 11 respondents reported using this measure, which requires administration to an informant. Only two respondents used the Road Sign Test recommended and provided in the *Medical Aspects of Fitness to Drive*<sup>14</sup> handbook.

The SIMARD-MD<sup>21</sup> was used by eight respondents, although some studies have criticized its use, suggesting it has no advantage over other already available approaches to predicting driver safety,<sup>26</sup> and that it was adapted from an existing screen for cognitive impairment which does not necessarily translate to usefulness in predicting driving ability.<sup>27</sup>

The remaining questions relating to driving decisions showed that GPs often rated themselves in the intermediate levels of feeling confident, informed, or satisfied. This indicates room for improvement in provision of information about how cognitive impairment affects driving ability and guidelines for helping with decision-making regarding driving ability (more about this below). Questions 5 and 6 showed that GPs rated their use of driving assessments, either medical or not, in the *Seldom* to *Sometimes* range, with the On-Road Safety Test not being used by a third of respondents.

These results suggest that many GPs are making decisions about driving ability without the use of on-road assessments. This makes it important that GPs receive information about the additional evidence-based predictors of driving ability that are not currently included in the *Medical Aspects of Fitness to Drive*.<sup>14</sup> This information will be even more important for GPs in the majority of DHBs where on-road medical driving assessments are not publicly funded.

Question 7 showed that GPs rated a discussion of future driving cessation occurring with a patient or their family member *Sometimes*. It is positive that these discussions are taking place. Ideally this conversation should occur with every driver with a progressive dementia as all will become unsafe drivers at some point.

GPs felt strongly that requests for assessment of patients from the NZTA should include detailed information about the driving incident that triggered the notification. This has implications for police officers who are present at driving incidents/crashes that precipitate the generation of a report. Police officers need to know what information is useful to report to NZTA about a crash and the older driver involved in a crash.

There are several limitations to this survey. As mentioned in Methods, specific timeframes and estimates of numbers of patients seen were not requested in order to make the questionnaire quicker to complete and thus increase the response rate, as well as to avoid reporting of numbers that might appear more precise than they were. Therefore, questions that asked about frequency of a behaviour (questions 3, 5, 6, 7, and 9) can only be used to make general statements that lack specificity. For example, GPs may have chosen different timeframes to think about frequency, e.g. 12 or 6 months, or may have relied on an internal hunch about frequency without a specific timeframe. Another factor affecting frequency is the number of older patients in a GPs practice who present with cognitive impairment, e.g. fewer older patients will lead to less need to consider driving ability.

Another issue is the response rate of 36%. Due to the high workload of GPs the questionnaire was designed to be easily completed in less than five minutes, and also provided two ways to return; by mail and by fax. Reasons for the low response rate are unknown but are likely multifactorial. These could include that the survey was still too long for some GPs to find time to complete, that GPs did not consider it a



worthwhile use of their time, or that it was sent out at a time of year when time was in short supply (it was distributed in November which could be considered a time of build up to the festive season).

A low response rate may increase the likelihood of a biasing in results. Perhaps GPs with higher rates of cognitively impaired older people in their practice were more likely to respond. Also, some respondents commented about recent education sessions they had attended related to driving and cognitive impairment, and those who attended may have been more likely to respond to the survey. Perhaps those GPs who rarely performed assessments of driving ability with their older patients did not feel confident in rating their knowledge on the subject.

In summary, the questionnaire provided information about the knowledge and confidence in assessing driving ability in cognitively impaired older adults. GPs may benefit from the provision of more detailed information about how cognitive impairment affects driving, and many would appreciate a more systematic way to assess driving safety than currently offered by the *Medical Aspects of Fitness to Drive*<sup>14</sup> handbook.

The author would like to see statistics about the increased crash rates of older adults with cognitive impairment included in *Medical Aspects of Fitness to Drive*. GPs may also benefit from the recommendation of specific cognitive tests with high reliability and validity that both aid in assessing the presence and severity of dementia as well as making estimates about level of impairment and how this relates to driving ability.

Furthermore, the author would like to see some tests with greater sensitivity to mild cognitive impairment and mild dementia recommended, such as the 3MS or MoCA, and others, such as the MMSE, to have their limitations detailed. Since GPs do not always choose to refer for an on-road assessment, information should be provided about worthwhile research-based predictors of poor driving such as caregiver report of marginal or unsafe skills, a history of crashes or traffic citations, reductions in mileage, avoidance of certain driving situations, and aggressive and impulsive behaviour.<sup>13</sup>

Lastly the author believes a flowchart similar to that published by The American Academy of Neurology<sup>13</sup> and adapted for New Zealand regulations and conditions would be a valuable addition.

**Competing interests:** Nil.

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