

3-Domains screening toolkit for medical assessment of older drivers

Feasibility study in Australian general practice

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Background and objective

Some general practitioners (GPs) find the older driver medical assessment challenging, citing clinical uncertainty and concerns about communicating the need for further testing or driving cessation while maintaining a trusting therapeutic relationship. A screening toolkit could help support GP decision making and communication about fitness to drive. The aim of this study was to investigate the feasibility, acceptability and utility of the 3-Domains screening toolkit for the medical assessment of older drivers in Australian general practice.

Methods

A prospective mixed-methods study was conducted in nine general practices in south-east Queensland. Participants were older drivers (age ≥ 75 years) attending annual driving licence medical assessment, GPs and practice nurses. The 3-Domains toolkit comprises three screening tests (Snellen chart visual acuity, functional reach, road signs recognition). We evaluated the feasibility, acceptability and utility of the toolkit.

Results

Practices used the toolkit in 43 older driver medical assessments (age 75–93 years; combined predictive score 13–96%). Twenty-two semistructured interviews were conducted. Older drivers felt reassured by the thorough assessment. GPs said the toolkit fitted into practice workflows, informed clinical judgement and supported conversations about fitness to drive while preserving therapeutic relationships.

Discussion

The 3-Domains screening toolkit is feasible, acceptable and useful for the medical assessment of older drivers in Australian general practice.

THE MEDICAL ASSESSMENT of older drivers is an important role for general practice, but some general practitioners (GPs) find the role challenging, citing clinical uncertainty and concerns about communicating the need for further testing or driving cessation while maintaining a trusting therapeutic relationship.^{1–5} Austroads has recently released *Assessing Fitness to Drive (2022)*, with updated standards and an implementation strategy that includes increasing awareness and education to ‘build confidence in addressing fitness to drive and embed early conversations into routine management of health conditions’.⁶

A screening toolkit that was feasible in general practice could help support GP decision making and communication about fitness to drive in older age. Although several screening toolkits have been developed previously, their uptake in practice has been limited.^{7–10} Screening for visual acuity has long been required for older driver medical assessment in Australia, but no formal assessment of motor or cognitive function is required or regularly used in practice, despite a plethora of screening tests being available.^{11,12} To be feasible in Australian general practice, given the fast pace of practice with time pressures and multiple competing demands, any screening toolkit needs to be relatively quick and straightforward to administer, readily accessible and to require no expensive equipment or prolonged training.¹³

The 3-Domains screening toolkit for older driver medical assessment has been developed with these factors in mind. The 3-Domains toolkit uses three tests that are relatively easy to administer and require no expensive equipment or special training to assess across the three functional domains essential for driving, namely Snellen chart visual acuity (sensory), functional reach¹⁴ (motor) and the road signs recognition test, a component of the Stroke Drivers Screening Assessment¹⁵ (cognitive). The toolkit uses an online calculator (<https://medical-school.uq.edu.au/3-domains-screening-toolkit-online-calculator>) to combine the three test scores and generate a predictive score of likelihood (%) that the older driver would pass an on-road driving assessment based on Belgian data.¹⁰ In the Belgian study, the three toolkit tests correctly classified two-thirds of older drivers for on-road driving assessment outcome (ie the three

tests combined predicted the likelihood of passing the on-road test), with functional reach being a better predictor than other tests of motor function, including the timed get-up-and-go test, and the road signs recognition test being a better predictor than other cognitive tests, including the Mini-Mental State Examination, clock drawing and trail making tests.¹⁰ A study to refine the 3-Domains toolkit predictive equation for older Australians is ongoing.

In this study we sought to investigate the feasibility, acceptability and utility of the 3-Domains screening toolkit for the medical assessment of older drivers in Australian general practice.

Methods

Design and setting

This was a prospective mixed-methods feasibility study using a concurrent quantitative and qualitative approach in purposively sampled and recruited general practices in south-east Queensland during 2021 that tested the 3-Domains screening toolkit during the medical assessment of older drivers (age ≥ 75 years). A pragmatic mixed-methods design was considered the best method for assessing the feasibility, acceptability and utility of the screening toolkit. General practices were recruited using existing networks, including the practice-based research network co-ordinated by The University of Queensland General Practice Clinical Unit.

Participants

Participants were older drivers presenting to their GP for their annual driving medical assessment, GPs and practice nurses. Older drivers were approached by practice administrative staff with study details. Older drivers provided consent to performing the toolkit tests and indicated whether they were also willing to be approached for an interview about the toolkit. The researcher approached older drivers who indicated a willingness to be interviewed, one from each practice. Not all older drivers who indicated a willingness to be interviewed were approached for interview. All participating GPs and nurses were approached for interview.

Intervention

The 3-Domains screening toolkit comprises three in-office tests and an online calculator. The three tests in the 3-Domains screening toolkit are as follows:

- a visual acuity test, performed using a Snellen chart (six divided by the line on the Snellen chart where the smallest letters are identified)
- a functional reach test, a reliable measure of balance, in which the older driver stands up straight with one arm

extended forward and reaches forward as far as possible (cm)¹⁴

- a road signs recognition test, a component of the Stroke Drivers Screening Assessment,¹⁵ in which the older driver matches 12 pictures of road signs with 12 pictures of road situations over three minutes (maximum score 12). The three test scores are entered into the online calculator to generate a combined predictive score that indicates the likelihood (%) that an older driver with

Table 1. Characteristics of older drivers (n = 43) and median (interquartile range) 3-Domains toolkit predictive scores (likelihood of passing on-road assessment)

	n	Predictive score (%)
Sex		
Female	21	86 (83–92)
Male	22	85 (58–91)
Age (years)		
75–79	19	87 (78–93)
80–84	18	85 (79–87)
≥ 85	6	78 (58–88)
Living situation		
Lives alone	8	88 (84–96)
Lives with partner who does not drive	13	86 (77–91)
Lives with partner who drives	20	84 (76–88)
Lives with family	1	52 (52–52)
Uses public transport		
No	17	85 (73–93)
Yes	21	85 (81–91)
No. medications^A		
0	3	91 (73–96)
1–6	14	84 (80–86)
>6	12	86 (77–94)
No. hospital admissions in past year		
0	22	86 (81–96)
1	13	83 (75–87)
>1	7	86 (41–99)

^AMissing data for 14 participants.

these test scores would pass a specialist on-road driving assessment based on the Belgian data¹⁰ (because the predictive equation has not yet been refined for older Australians). No defined cut-off for passing the test was used.

At an outreach visit, the research officer (MM) provided practices with laminated A4 toolkit instructions, a Snellen chart, an adhesive measuring tape and laminated picture cards of 12 road signs and road situations for the road signs recognition test. The research officer saved the link to the online calculator on each GP's desktop toolbar and demonstrated how to use the calculator. The research officer advised that either the practice nurse or the GP could record the tests, depending on practice workflows and preference, and that the GP could use the scores to support decision making or communication about fitness to drive.

Main outcome measures

The characteristics of older drivers were collected, along with their toolkit test scores and combined predictive score. Descriptive data, including median values and interquartile ranges, are presented.

Qualitative data were collected through a series of semistructured interviews. One researcher (MM) conducted all interviews guided by an interview schedule that included several open-ended questions with flexible prompts (Appendix 1, available online only). Interviews were conducted by telephone or via Zoom videoconferencing depending on participant preference. The

researcher, a female university student, had no prior relationship with participants and minimal prior experience with qualitative research. Interviews with practice nurses and GP participants explored their views on the feasibility and utility of the three toolkit tests, the combined predictive score and the barriers and facilitators to use in routine practice. Interviews with older driver participants explored acceptability of the toolkit tests and views on the predictive score. Interviews continued until no new data were apparent on interview. Interviews were audio recorded, deidentified and transcribed verbatim. Interviews were reviewed and uploaded to computer-assisted qualitative data analysis software (NVivo; QSR International). Transcripts were not returned to participants for comment. Transcripts were coded into discrete nodes by two authors (MM, TS) and grouped according to patterns, similarities and differences into emergent themes using the general inductive approach.^{16,17} A final list of themes and subthemes was developed, and findings are reported according to the Consolidated Criteria for Reporting Qualitative Research (COREQ).¹⁸

This study received ethics approval from The University of Queensland Institutional Human Research Ethics Committee (Approval no. 2020002119).

Results

Eleven practices were recruited between October 2020 and June 2021. Of these,

two failed to engage and were excluded. The nine participating practices included three urban, five suburban and one rural practice; three were large practices with seven or more full-time equivalent GPs, five were medium-sized practices with three to six GPs and one practice was a small, single-doctor practice. Practices used the toolkit for the medical assessment of 43 older drivers. The characteristics of the older drivers are presented in Table 1. There were similar numbers of male and female older drivers, with age ranging from 75 to 93 years. Table 2 sets out the toolkit test scores and combined predictive scores. The median predictive score (likelihood of passing on-road driving assessment) was 83% (range [minimum–maximum] 13–96%).

Twenty-two semistructured interviews were conducted with nine older drivers (four female; age 76–86 years; predictive score 41–96%; all assessed by their GP as fit to drive), five practice nurses (all female; 2–31 years in practice) and eight GPs (four female; 1–32 years in practice). Interviews lasted 15–25 minutes and were conducted via Zoom or telephone between April and November 2021. The interviews revealed three main themes: feasibility in routine practice (Table 3), acceptability to older drivers (Table 4) and utility of the toolkit (Table 5).

Feasibility in routine practice

In some practices, the practice nurse recorded the toolkit tests and calculated the combined predictive score prior to the medical assessment by the GP, whereas in other practices, the GP used the toolkit during their assessment. In two practices, the functional reach test was initially measured incorrectly (from shoulder rather than knuckle). The researcher clarified the toolkit instructions, which prevented further incorrect measurements.

The GPs expressed concern about time constraints and needing to allow additional time for the toolkit. A suggested solution was including the toolkit as part of an annual older person health assessment, with the nurse recording the toolkit tests before the GP assessment. Practice nurses reported that the toolkit

Table 2. Older driver scores for 3-Domains screening toolkit tests and calculated predictive score (likelihood of passing on-road driving assessment [%]; median, IQR and range), n = 43

	Median (IQR)	Range
Visual acuity ^A	0.8 (0.7–1.0)	0.3–1.0
Functional reach ^B (cm)	28 (24–33)	18–48
Road signs recognition test (/12)	12 (8–12)	1–12
Predictive score ^B (%)	83 (75–87)	13–96

^AMeasured using a Snellen chart (six divided by the line where the smallest letters were identified).

^BMissing data for 10 participants due to incorrect measurement (measured from shoulder rather than knuckle).

IQR, interquartile range.

fitted readily into their practice workflows. The nurses said that the older drivers enjoyed recording the tests and liked the extra attention, although some found the timing of the road signs recognition test a bit stressful. The practice nurses said that some older drivers had difficulty picking up the laminated cards, and suggested an improvement could be to make this test available online. The nurses commented that the road signs recognition test required space to set out the cards, and the functional reach test required wall space to fix the measuring tape, which was sometimes challenging. The nurses also reported some challenges finding the online calculator, unless the link to

the calculator was saved to their desktop. Further, in some practices, there was difficulty communicating the toolkit test results from the nurse to the GP. Suggested solutions were to have the toolkit tests included in practice management software or to record toolkit test scores on the state driving licence medical assessment form (in addition to the visual acuity score).

Acceptability to older drivers

Older drivers reported that they felt thoroughly assessed having completed the tests and reassured that they were still fit to drive. They thought it important that older drivers were thoroughly assessed. They said that the road signs recognition test provided

a refresher. The older drivers focused on the individual tests; some did not know their combined predictive score and did not recall discussing it with their GP.

Utility of the toolkit

The GPs reported that 3-Domains toolkit package provided ready access to screening tests, enabling a more thorough assessment. Most GPs were not routinely using screening tests to assess cognitive or motor function, although some GPs sometimes used a cognitive screening test available via their practice management software. The GPs said that the road signs recognition test was a useful test of cognitive functioning relevant to driving and had face validity with older drivers. The GPs said that the screening tests were useful to inform clinical judgement, sometimes revealing previously unsuspected limitations, especially the functional reach test. However, some GPs questioned the relevance of functional reach for driving and expressed preference for some other test of motor function.

The GPs liked the toolkit generating an objective score. The GPs said that the score often confirmed their assessment, although the less experienced GPs said that having an objective score also increased their confidence in decision making. The GPs liked being able to show the score to the older driver, using the score as a communication tool to support conversations about fitness to drive or the need for further on-road testing while maintaining trusting therapeutic relationships. Some GPs were not aware of and did not discuss the combined score with the older driver. Sometimes GPs assessed an older driver with a low predictive score as medically fit to drive. Some GPs suggested that a dichotomous pass/fail outcome rather than a predictive score of likelihood of passing an on-road test would be more useful.

Discussion

The findings of this study suggest that the 3-Domains screening toolkit is feasible in Australian general practice when practice nurses record the test results prior to the GP assessment. The toolkit is acceptable

Table 3. Views of GPs and practice nurses on the feasibility of the 3-Domains screening toolkit for the medical assessment of older drivers in general practice

Subtheme	Example quotations
Fitted with practice nurse workflows	<i>It fitted in the time frame that we normally do have for nurse time. [PN4]</i> <i>[We] get them to come in 20 minutes earlier for their doctor's appointment, then I would take them in and run through the test with them and just do the three assessments, then just document in my notes and then pass the results on to the doctor. [PN5]</i>
GP time	<i>It typically took like 15 minutes to half an hour ... because there's quite a lot of explanation. [GP3]</i>
Part of health assessment	<i>I think it's a useful addition. I think it's mostly useful if we just slot it in with the health assessment that we aim to do anyway and then make their driver's licence conditional on people coming in and doing the health assessment. [GP7]</i>
Room to set out the road signs recognition test	<i>I just had to work out my bench space, like make sure I had bench space a bit better ... So we just made sure we had a good height bench for them to be able to match up the road signs. [PN4]</i> <i>I've got nothing but good things to say. The only thing I would comment on was the pictures on the road signs, to make them a bit more clear maybe. [PN5]</i> <i>It would be nice if it was computerised. [GP4]</i>
Clarifying instructions	<i>There is some confusion about ... what is the measurement, how to record it [functional reach]. [GP2]</i>
Finding the online calculator	<i>Yes, the online calculator was really good. It was just finding it through the emails. It wasn't saved as a favourite, so I couldn't just open up and ... go, but it was very simple. [PN3]</i> <i>It was very easy to use. I just put it on, because I saved it onto my desktop and just did it through that. [GP1]</i>
Practice communication flows	<i>I'm not entirely sure what my patient actually scored at the end of the day. [GP6]</i>

GP, general practitioner; PN, practice nurse.

to older drivers, who feel reassured that having performed the tests and ‘passed’ they are still fit to drive, and is useful to GPs, in particular less experienced GPs, informing clinical judgement to increase confidence in decision making; the combined predictive score (likelihood of passing on-road assessment) supported conversations about fitness to drive. The toolkit provides GPs with readily accessible tests that are relatively quick and easy to perform, enabling assessment across the three functional domains essential for driving (sensory, motor, cognitive). Suggestions to improve the uptake of the toolkit in practice included incorporating the toolkit tests and calculator into practice management software, having the toolkit tests available

online, having a motor and cognitive test compulsory for driving assessment as visual acuity is compulsory, and having the practice nurse conduct the tests during an annual older person health assessment.

Some GPs would prefer some other test of motor function, as they thought that functional reach was not relevant, despite this test being the best predictor of on-road driving test outcome in the Belgian study.¹⁰ The motor function test that best predicts driving test outcome in the Australian context is not yet known. Results are awaited from the ongoing validation study to refine the predictive equation for older Australians and to determine the motor test that best predicts on-road driving test outcome.

Some GPs were unaware of the combined predictive score, suggesting further modification is needed to clarify the toolkit instructions or to improve the communication of this score from the practice nurse to the GP. Some GPs also reported preference for a pass/fail outcome rather than a predictive score. However, as with other predictive tools, such as those predicting cardiovascular disease risk, any screening toolkit will only ever be capable of generating a likelihood. Efforts to increase understanding about the limits of predictive equations might help.

The strengths of this study were that it included a range of general practices from a research network (large and small, urban and rural); older drivers, practice nurses and GPs; and GPs with a wide range of years in practice. Another strength of the study is that we were able to iteratively update the toolkit instructions to improve clarity. A limitation of the study is that we interviewed only older drivers who were assessed as fit to drive. Older drivers assessed as not fit to drive might have had a different perspective. Another potential limitation of the study is that it was performed in Queensland, and the findings might not be generalisable to other Australian states and territories. However, although there is some variation in the medical assessment of older drivers across Australia,¹³ there is no reason to suspect that the three toolkit tests would be any more or less useful for informing GP clinical judgement in different jurisdictions. Another limitation of the study is that we used a predictive equation based on Belgian data.¹⁰ We cannot say whether GPs would find a predictive score validated for older Australians more useful to inform clinical judgement.

The findings of this study suggest that the 3-Domains screening toolkit is feasible, acceptable and useful for the medical assessment of older drivers in Australian general practice, adding to and packaging the tools available to GPs. Work is ongoing to refine the toolkit’s predictive equation and determine the best predictive tests for older Australian drivers in Queensland. Future work could test the effect of a validated toolkit on GP referrals for specialist on-road driving assessment.

Table 4. Views of GPs, practice nurses and older drivers on the acceptability of the 3-Domains toolkit for the medical assessment of older drivers in general practice

Subtheme	Example quotations
Reassured by thorough assessment	<p><i>I do have one patient in particular who said, ‘Look, I don’t even know why we didn’t do something like this before. It makes me feel a lot happier knowing that someone is paying a bit more attention to actually whether I am fit to drive or not’. [GP1]</i></p> <p><i>The overwhelming comment was, ‘Oh yeah excellent, that’s great. We really should have something like this’. So I think the patients were quite keen. [GP3]</i></p> <p><i>I think it’s going to pull a lot of people up short, and stop and think about their driving ... If you haven’t got those functions, you shouldn’t be on the road. [OD9]</i></p> <p><i>I found them all really happy to be part of a research study and they were also happy to do a little bit of brain work. [PN1]</i></p>
Increasing awareness	<p><i>In some parts it was like a little refresher, a little refresher course. And when you drove away, by the time you got home, you were looking at the different signs. It just drew your attention to it. [OD4]</i></p> <p><i>That last one about the signs ... I think that makes you more aware, it just highlights it. It’s there at the back of your mind, but it brings it to the forefront I think. ‘Be aware of what’s around you.’ [OD9]</i></p>
Preparing for a future	<p><i>It’s preparing people like me ... that some day comes along and you’re not good enough [to drive] anymore. If you’re prepared, well it’s not a shock. [OD1]</i></p>
GP concern about reputational damage	<p><i>‘Well, if you go there that practice makes you do all of these extra tests.’ [GP4]</i></p> <p><i>Patients are always anxious when they come for their driver’s licence anyway. [PN4]</i></p>

GP, general practitioner; OD, older driver; PN, practice nurse.

Table 5. Views of GPs as to the utility of the 3-Domains screening toolkit for the medical assessment of older drivers in general practice

Subtheme	Example quotations
Informing clinical judgement	<i>It highlighted some physical limitations in terms of the functional reach that we weren't aware of. [GP7]</i>
Enabling more thorough assessment	<i>It's just a more detailed assessment ... Because they just come in and they say to you, 'Can you renew this?', and not much is written down. But we do very minimal assessment and then we head them off on the roads for another 12 months. So I think any increase is good. [GP8]</i> <i>Before the toolkit, I probably didn't really use any specific screening tools myself. [GP1]</i>
Increasing confidence	<i>I think it just gives us that little bit more confidence with making those decisions around driving. [GP5]</i> <i>It'd give me that little bit more confidence to say, 'Look, I'm not confident with signing off your driver's licence, you need an OT on-road assessment'. [GP8]</i> <i>Yeah, I felt confident in my decision because it's quite a thorough pro forma. It really goes through I think everything. [GP6]</i>
Communicating about fitness to drive	<i>... a way of saying, 'Well actually yes, you've done really well', or 'Actually no, this is a bit concerning. We may need to look at this a little bit further'. [GP1]</i> <i>If you've done a test and they've scored poorly, I think the patients probably would be more accepting of it. It's in black and white: 'This is the score which is acceptable, and this is the score that you did'. You know? [GP4]</i> <i>Unless they came back as clearly '10% likely', yeah that would be an interesting conversation to have actually, it's like, 'Look you're very unlikely to pass an on-road test. You've got a choice of going to an on-road test versus giving it up now' type of thing. [GP8]</i>
Maintaining relationships	<i>The key problem with the current system is that if you stop someone from driving because of a functional problem, potentially you're seen as the bad one ... even if it's brought up by family in the first instance, you still have to go, 'Yep, I agree with your family'. Whereas if they have something that's perceived as quite objective, then that's really ... it's good. [GP3]</i>

GP, general practitioner; OT, occupational therapist.

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Competing interests: KAW has received support from The Royal Australian College of General Practitioners (RACGP) Foundation and Motor Accident Insurance Commission and grants from the Medical Research Future Fund. MM, TLS and GS have received support from an FRACGP grant.

Funding: The researchers gratefully acknowledge the Motor Accident Insurance Commission and the RACGP Foundation for their support of this project. The funder had no role in the study. The researchers were independent from the funder.

Provenance and peer review: Not commissioned, externally peer reviewed.

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Acknowledgements

The researchers gratefully acknowledge the older drivers, general practices, GPs and practice nurses for participation in the study, and James Matthews and Rory Melville for their assistance.

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