
DriveSafe DriveAware for Touchscreen (Version 2)

A Screening Tool for Cognitive Fitness to Drive

ADMINISTRATION MANUAL



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Version History

Release Date	Description
25-JAN-2024	Initial Version 2 release
16-MAY-2024	Updated to reflect changes in DSD-2 app version 2.2 (5) - sync changes, offline mode indicator. Manual also now includes a description of home screen information panels and more detail about the benefits of regular sync-ing of data.

About the Editors

Beth Cheal, PhD, MAppSc(OT), BAppSc(OT) is a lecturer in the occupational therapy program at the Western Sydney University. The topic of her PhD, completed at University of Sydney (USyd), was the conversion of DriveSafe DriveAware, a cognitive fitness-to-drive screen, into a touchscreen test for medical practitioners, occupational therapists, and other health professionals to administer when screening drivers that may be medically at-risk. Beth is an occupational therapy driving assessor who has worked in driver assessment and rehabilitation since 2000. Beth has coordinated training for health professionals and driving instructors in this area since 2006 (via USyd and Institute of Driver Health).

Belinda Johnston, MRes(Clinical Medicine), MSc(SHE), BAppSc(OT) is an occupational therapy driving assessor and researcher. Her MRes, completed at Macquarie University, assessed the test-retest reliability of DriveSafe DriveAware (iPad version).

Joan O'Donnell, PhD, MSc(Med), BAppSc(OT) completed her PhD at Macquarie University examining the functional outcomes of cerebrovascular neurosurgery. Joan is an occupational therapy driving assessor and trainer and an honorary lecturer at the University of Sydney.

Melanie Rooney, BAppSc(Cartography), GradDip(Computing) has a proven record of success in the digital and information technology sectors and 20 years of experience in various areas such as Content Management Systems, Digital Technology, Platforms, Architecture, Business and Product Strategy, Sales, and Management.

Welcome

The DriveSafe DriveAware for touchscreen (Version two) (DSDA-2) is an industry-leading, iPad®-administered, standardised driving assessment providing clinicians with quantitative results. The DSDA-2 was developed to determine a patient’s ability to manage the cognitive aspects of driving. The test can be administered effectively and efficiently by medical practitioners, occupational therapists, psychologists, registered nurses, and other health professionals.

This manual outlines the standardised method for administration to ensure that results are accurate and meet the published psychometrics.

This manual contains **Quick Guides** at the front of the manual for ease of access, that outline the:

- a) DSDA-2 - Demonstration and Practice Administration
- b) DSDA-2 - Self-Administered Method
- c) DSDA-2 - Administrator-Assisted Method

Chapter 1 comprises the DSDA-2 test purpose and background, how to purchase and download the test, and who should administer and take DSDA-2.

Chapters 2 and 3 contain detailed information regarding the DSDA-2 administration.

Chapter 4 contains information regarding the DSDA-2 scoring and reporting.

Chapter 5 provides a link to information regarding the psychometric properties and predicative validity of the DSDA, including a list of journal publications.

Please contact DriveSafe Diagnostics if you have any questions regarding DriveSafe DriveAware, the manual, or any other products or services provided by DriveSafe Diagnostics.

Contact:

Email: support@drivesafediagnosics.com
Product Website: www.drivesafedriveaware.com
Company Website: www.drivesafediagnosics.com
Telephone: +61 402544119

QUICK GUIDE A

DSDA-2 Demo and Practice Administration

Procedure

Test Set-Up

- Place tablet on a stand angled to 20 degrees, on a table.
- Ensure brightness and volume are set to full (no glare / adequate image contrast).
- Seat patient in an upright chair at the table.
- Place the tablet directly in front of the patient (midline and within comfortable reach).
- Offer opportunity to use headphones and/or stylus if difficulties noticed in hearing or touching the screen during the familiarisation process (decision to use is the patient's).

Demonstration Section

- If the patient struggles to move the arrow say: **Touch the arrowhead and move your finger to show which way the car was driving.** You may also demonstrate this but allow the patient to try first.
- **'Repeat demo' may be selected only once.** Repeat the demonstration only if the patient is having significant difficulty and you think it may be beneficial to repeat the demonstration.

Practice Section

- **'Practice again' can be selected only once.** Repeat the practice only if you think it may be beneficial in the patient achieving independence.
- **If the patient is not able to complete at least 1 of the 3 practice intersections independently** (i.e., enter the three pieces of information without assistance), use the **Administrator-Assisted Method'** (Quick Guide B).

Note: Only use the phrases written in **red** when administering the DSDA-2. The test can be discontinued at any time by tapping the top left corner of the screen twice.

For more information on the DSDA-2 Demonstration and Practice Administration see Chapter 3 – Administering DSDA-2.

QUICK GUIDE B

DSDA-2 Self-Administered Method

DriveSafe Procedure

- If the patient asks for assistance only say: **Sorry, I cannot provide assistance during the test. Just do your best.**
- Provide no assistance with test functions, verbal prompting, or feedback on performance.

DriveAware Procedure: Self-Administered Questions

- Provide no prompting or assistance during the two self-administered questions. If the patient asks for help, say: **Sorry, I cannot provide assistance during the test. Just touch the response that seems most correct to you.**

DriveAware Procedure: Clinician Interview

- Read the first 4 questions verbatim to the patient. Tap the response that is closest to the one provided by the patient. Enter your clinician rating for the last question (this question is not read aloud).

Intersection Rules (Optional)

- You may provide assistance on the practice item if the patient asks for help, such as demonstrating how to number vehicles or select 'undo'. You may repeat instructions but only as written (e.g., **you need to number all the vehicles**). The patient can repeat the practice item as many times as they like. If the patient asks for help only say: **Sorry, I cannot provide assistance during the test. Just do your best.**

Note: Only use the phrases written in **red** when administering the DSDA-2. The test can be discontinued at any time by tapping the top left corner of the screen twice.

For more information on the DSDA-2 Demonstration and Practice Administration see Chapter 3 – Administering DSDA-2.

QUICK GUIDE C

DSDA-2 Administrator-Assisted Method

Test Set-up

- Sit beside the patient for easy access to the tablet.
- Mute the tablet sound.
- Take over data entry.
- Do not prompt for responses and only use the words provided in red.
- If unwanted/additional responses are triggered, delete them. Take over responding to all pop-up messages. Aim: Allow a smooth flow and limit disruption.

DriveSafe Procedure

Verbatim Instructions

- Startup: **You will see images of an intersection. Try to remember:**
 - 1. Which objects you saw**
 - 2. Where they were located and**
 - 3. Which way they were going.****Are you ready to start?**
- During Countdown: **Get ready to look**
- If additional help needed to understanding test requirements: **Try to remember the objects you saw before they disappeared. Tell me what you saw.**
- If tries to enter responses before objects disappear: **Wait until the objects are gone.**
- When objects disappear: **Now tell me what you saw.**
- When finished each item: **Are you ready to move on?**

Entering Responses

- Enter patient responses exactly as stated (based on the 3 categories: location, object and direction).
- If a category is excluded by the patient do not enter it.
- Pointing and gestures are acceptable to indicate location and direction.
- State: **Is this what you mean?** if clarification is needed (adjust response entry as required).

QUICK GUIDE C (cont.)

DriveAware Procedure

Self -Administered Questions

Read the DriveAware questions exactly as written and ask the patient to respond. Allow the patient to see the screen and read the text. The patient or administrator may tap the selected response.

If the patient asks for help, say: **Sorry I cannot provide assistance during the test. Just tell me the response that seems most correct to you.**

Clinician Interview

Read the first 4 questions verbatim and tap the response that is closest to the one given. Enter your clinician rating for the final question (this question is not read aloud).

Intersection Rules (Optional)

- Read any instructions or error messages verbatim as written on the screen, with no additional words.

Ask: **Which car goes first?** You or the patient may tap the selected car (as works best). Continue for the remaining vehicles: **Which car goes second? Which car goes third? Which car goes fourth?**

Note: Only use the phrases written in **red** when administering the DSDA-2. The test can be discontinued at any time by tapping the top left corner of the screen twice.

For more information on the DSDA-2 Administrator Assisted Method see Chapter 3: Administering DSDA.

CHAPTER ONE: Introduction

Purpose

The DriveSafe DriveAware for Touch Screen – Version 2 (DSDA-2) was developed to determine a patient's ability to manage the cognitive aspects of driving. The tool can be administered effectively and efficiently by medical practitioners, occupational therapists, psychologists, registered nurses, and other health professionals. The DSDA-2 trichotomises patients by means of two evidence-based cut-off scores, based on the likelihood of passing an on-road assessment: likely to pass, likely to fail or further testing required.

The DSDA-2 is a cognitive screening tool that measures two areas that are critical for safe driving:

1. awareness of the driving environment; and
2. awareness of one's own abilities related to driving.

The DSDA-2 can be administered when ability to manage the cognitive aspects of driving may be impaired by a medical condition, injury, or age-related changes, as it accurately predicts which patients with a cognitive impairment require further testing and/or referral for a practical driver assessment. Occupational therapists who specialise in driver assessment and rehabilitation can include the DSDA-2 in their off-road clinical assessment of fitness-to-drive.

The DSDA-2 consists of three subtests:

1. DriveSafe
2. DriveAware
3. Intersection Rules (Optional)

Note: Intersection Rules is based on Australian and New Zealand road rules and may not be suitable for other jurisdictions.

The DSDA-2 is largely self-administered by most patients. The DriveSafe subtest, two DriveAware subtest questions, and the optional Intersection Rules subtest, are self-administered. The remaining five questions from the DriveAware subtest are administered by the health professional in a brief interview. The Intersection Rules subtest provides a brief screen of knowledge regarding right-of-way rules at intersections and qualitative information, such as ability to follow instructions and plan responses. This subtest is optional and does not contribute to the predictive validity of the DSDA-2. It can be skipped to reduce test time.

Brief Background

The DSDA was developed by researchers at the University of Sydney, Australia. The DSDA and its precursor tests have been used by occupational therapy driving assessors for over 30 years. The test is unique compared to other cognitive driver screens because it does not attempt to break down the driving task into component skills (e.g., memory or visual-perception) but takes a top-down, whole-task approach (Cheal et al., 2023). Previous research provides evidence of the test's construct validity, internal reliability (Hines & Bundy, 2014; Kay et al., 2008, 2009a, 2009b), and test-retest reliability (Johnston et al., 2021; O'Donnell et al., 2019). The original, desktop computer version of the DSDA identifies safe drivers with a sensitivity of 91% to 93%, identifies unsafe drivers with a specificity of 96%, and correctly classifies 90% of drivers (Hines & Bundy, 2014; Kay et al., 2009a).

The DSDA was converted to touchscreen by Pearson in 2015 then updated and re-released by DriveSafe Diagnostics in 2024 as DSDA-2. The test components and psychometric properties are unchanged between iterations. The DSDA for touchscreen (version one) was examined in a prospective study with 134 older and cognitively impaired drivers ages 18 to 91 (mean age 68) across Australia and New Zealand (Cheal et al., 2023). Rasch analysis provided evidence for the construct validity and internal reliability of data gathered. Optimal upper and lower cutoff scores were set to place drivers into one of three categories: likely to pass an on-road assessment, likely to fail an on-road assessment, and further testing required. Specificity of the touchscreen DSDA was 86%, sensitivity was 91%, positive predictive value was 92% and overall accuracy of classification was 88% (Cheal et al., 2023). Further information regarding the DSDA psychometric properties and related research is available via <https://drivesafedriveaware.com/about-the-product>.

Testing Time

The DSDA-2 test time is brief depending on the patient and whether the optional Intersection Rules subtest is included. The DriveSafe subtest and self-administered DriveAware questions take approximately 6 to 10 minutes to complete excluding the instructions and initial practice screens. The DriveAware clinician interview takes around 3 to 5 minutes to administer. The optional Intersection Rules subtest takes an average of 3 to 5 minutes to complete. Administration time can be longer for patients with moderate to significant cognitive impairment.

Test Components

The DSDA-2 is only available on iPad®. The following test components are required to administer the test as it was standardised:

- iPad with iOS operating system 11 or later (an iPad mini or iPhone® cannot be used). **NOTE:** All iPads from Fifth Gen onwards can be updated to 11+.
- The DSDA Version 2 App downloaded from the Apple® App Store.
- Tablet stand angled to 20 degrees.
- Stylus (optional depending on patient preference and ease of use).
- Headphones (optional, depending on sound distractions in the room, hearing impairment,

and patient preference).

- Desk or table.
- Suitable upright chair (e.g., office or kitchen chair).

Downloading and Getting Started with DSDA-2

Download the DSDA-2 from the Apple Store directly onto the iPad as per instructions at:

- <https://drivesafedriveaware.com/getting-started>

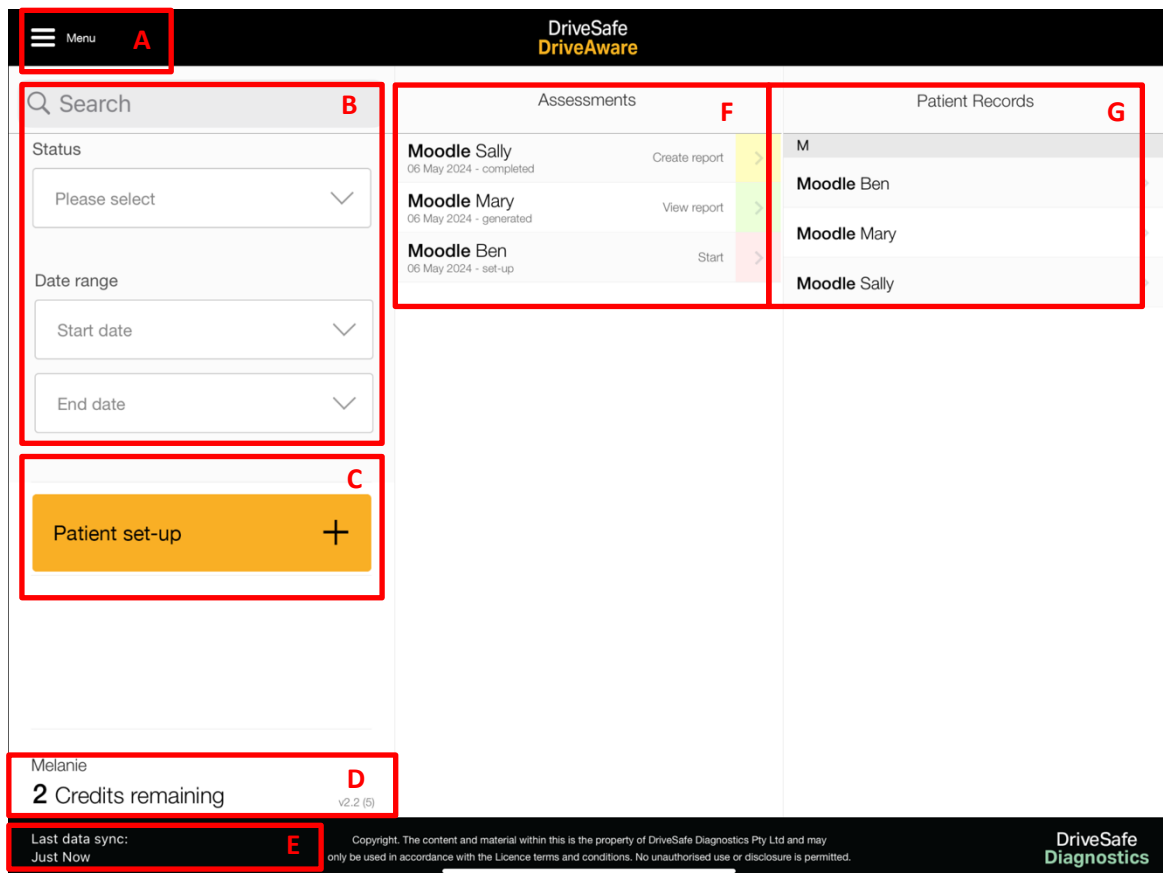
Apply for an Administrator account as per instructions here:

- <https://drivesafedriveaware.com/applying-for-an-account>

You will receive an email stating that your account is pending approval. Once your account has been approved, you will receive three (3) free “credits” to generated test reports.

Next, log into the DSDA-2 app with your Administrator username and password. You will be prompted to create a 4-digit PIN. The PIN security ensures that the account holder or administrator only ever has access to the DSDA test. If the patient attempts to access other information within the test after it has begun, the test locks and can be unlocked only by entering the PIN. Keep the PIN private and never give it to the patient. The practitioner administering the test is the only person who can enter the PIN.

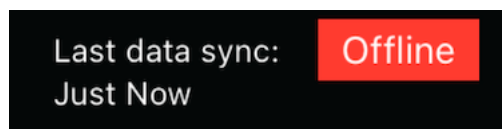
When logged on, the home screen of the DSDA-2 app will appear as below, with different information presented in panels. These panels are labelled in this manual and explained here as panels A, B, C, D, E, F and G.



Home screen information panels explained:

- Panel **A** The DSDA-2 app menu – clicking on the 3 horizontal lines will present all menu items (see “Menu options” section below).
- Panel **B** Allows you to search for specific patients according to assessment status and dates.
- Panel **C** Allows you to add a new patient.
- Panel **D** Shows you:
- the **number of unused test credits remaining**. NOTE: If you have not connected to the internet and sync-ed your data with the server, this number may not be current.
 - the **version of the DSDA-2 app that you have installed** – is of the format vN.N (N)

- Panel **E** Tells you:
- when your last sync of data with the server occurred** e.g. Just Now or N days /minutes ago. See the “Understanding data sync-ing” section below)
 - if you are currently not connected to the internet** i.e. are working in Offline mode, a red “Offline” indicator will appear in this panel thus:



- Panel **F** Provides the stage of assessment for each patient thus:
- GREEN** means that an assessment has been completed and a test report has been generated and is available to view. Clicking on the patient in this panel allows you to view the report.
 - YELLOW** means that an assessment has been completed but a test report has not yet been generated. Clicking on the patient in this panel allows you to generate a report (if test credits are available).
 - RED** means that an assessment has not yet been started. Clicking on the patient in this panel allows you to start an assessment.
- Panel **G** Provides a list of all patient records. Clicking on a patient in this panel allows you to edit the patient’s details, archive the patient, start a test, or view an any existing assessments.

Menu options

When you select the DSDA-2 menu, the following options are presented:

Home	Returns you to the home screen
View account	<p>Opens a DSDS-2 web page that allows you to view your Administrator account details and change your:</p> <ul style="list-style-type: none"> • Password • First name and Surname • Phone • Address <p>and allow you to purchase test credits online.</p> <p>You MUST be connected to the internet to use this feature.</p>
Sync Data Now	<p>Pushes all patient records and assessments that you may have created whilst working in Offline mode to the DSDA-2 server. Also updates the Credits remaining on your account.</p> <p>You MUST be connected to the internet to use this feature. If you are working in Offline mode and attempt to use this option, you will be presented with the message:</p> <p><i>ERROR Please check your internet connection or try again later.</i></p>
Reset PIN	Allows you to change your Administrator PIN.
Administration Manual	<p>Displays this manual.</p> <p>You MUST be connected to the internet to use this feature.</p>
Feedback	<p>Open an email window to allow you to send us an email. We automatically include in this email the DSDA-2 app version number, your iPad device version and OS version to assist in diagnosing any technical problem.</p> <p>You MUST be connected to the internet to use this feature.</p>
Terms and Conditions	<p>Displays legal terms of conditions, licence agreement and our privacy collection statement.</p> <p>You MUST be connected to the internet to use these features.</p>
Licence Agreement	
Privacy Collections Statement	
Logout	Logs you out of the DSDA-2 app on your iPad.

Understanding data sync-ing

If you use the DSDA-2 app in Offline mode (i.e. without a wifi or personal hotspot connection to the internet), any patient data that you create, including patient records, assessments and test reports will **ONLY BE STORED LOCALLY ON YOUR iPad**. If your iPad has a technical issue and/or is lost or stolen, you run the risk of losing this data.

Sync-ed data resides on a centrally managed DSDA-2 server, allowing authorised account holders to access their data by logging into their account from another iPad with the DSDA-2 app installed on.

Thus, to protect your data, the DSDA-2 app:

- a. will attempt a sync of all local data to the DSDA-2 server whenever an internet connection is detected.
- b. will present you with a reminder message to sync your data every 30 days; this message can be dismissed; however, we strongly recommend regular sync-ing
- c. we provide a menu option “Sync Data Now” to allow you to initiate a sync at any time.

NOTE: If you have un-synced local data, you can logoff the DSDA-2 and **as long as the next logon to DSDA-2 on the iPad is to the same account that you last logged off, your local data will remain**. We strongly encourage a sync of data after logging back in.

Purchased Credits for reports

A patient test can be administered without purchased report “credits”, but the results and report cannot be generated until further credits are purchased. You can administer tests when the iPad is off-line. You can also generate reports when the iPad is off-line if you have sufficient credits. Additional report “credits” can be obtained online (as long as you are connected to the internet) at:

- <https://drivesafedriveaware.com/purchase-credits>

Getting Assistance

For assistance, contact please use the Contact Us form at:

- <https://drivesafedriveaware.com/contact>

or email support@drivesafedriveaware.com or phone us on mobile **+61 402 544 119**.

Who Can Administer DSDA-2?

Medical practitioners and other health professionals (occupational therapists, psychologists, speech pathologists, physiotherapists and registered nurses) may administer the DSDA-2 and interpret the test results.

Who Should Complete DSDA-2?

The DSDA-2 should be administered to patients when cognitive capacity for driving could be impaired by a medical condition, injury or age-related changes.

The DSDA-2 has not yet been validated for drivers:

- with reduced literacy or English language skill,
- diagnosed with a psychiatric condition, and/or
- learner or beginning drivers.

However, in practice, DSDA administration can provide useful qualitative information for these patients when applied in combination with clinical judgment and caution (further information provided below). Further research for these patient groups will be conducted and disseminated in the future.

Diagnostic Categories

The diagnoses provided in the drop-down menus for the patient set-up are common conditions for which DSDA-2 is used. The categories are not exhaustive but based on the Australian Austroads Medical Fitness to Drive Guidelines (2022). **More detail on which conditions fall under each category can be found in Chapter 3 of this manual:**

- Blackouts
- Cardiovascular conditions
- Diabetes Mellitus
- Hearing loss and deafness
- Musculoskeletal conditions
- Neurological Conditions
- Orthopaedic conditions
- Psychiatric conditions
- Sleep Disorders
- Vision and eye disorders
- Other
- Not applicable

Patients with Physical Deficits

All patients with physical deficits that could impact their ability to operate car controls should be referred for an occupational therapy driving assessment. Vehicle modifications or license and vehicle restrictions may be required for these drivers. However, the DSDA-2 may still provide useful information regarding the new learning capacity for this group if cognitive impairment is also present.

A stylus may be used, or the Administrator-Assisted Method applied, if a patient has an upper limb deficit that impacts their ability to use touch screen technology (e.g., finger deformities, reduced coordination, or a tremor).

Patients with Reduced Literacy or English Language Skills

The touchscreen DSDA was validated with patients who have attended at least one year of high school. The DSDA-2 is simple to administer to patients who have reduced or no English language skills, reduced literacy, or a medical condition impacting verbal and written communication (e.g., aphasia) as compared to the desktop version. The touchscreen DSDA can often be used successfully with patients with aphasia, who often have difficulty with other neuropsychological tests that require receptive and expressive language skills. However, the test has not been validated for these groups. Results may be used qualitatively but should be interpreted with caution.

The following notation appears on the clinical report if the administrator indicates that the patient does not speak English at home: “DriveSafe DriveAware has been standardised for people who speak English as a first language. Where English is not spoken at home the test results may be used qualitatively but should be interpreted with caution”. In some cases, the administrator may be able to accurately translate the English instructions into the patient’s first language. The administrator should read aloud the instructions in the patient’s language with the iPad muted in this case. Validation for this technique will occur in the future.

Patients Diagnosed with a Psychiatric Condition

The DSDA-2 was developed to determine a patient’s ability to manage the cognitive aspects of driving. Psychiatric conditions may impact cognitive functioning. However, often the primary difficulty with driving is due to disturbances of emotion, behaviour, and perception. The following statement appears on the report if the administrator indicates that a patient has an identified psychiatric condition: “DriveSafe DriveAware has not been standardised for drivers with psychiatric conditions. The purpose of the test is to predict cognitive capacity for driving. Results may be used qualitatively but should be interpreted with caution”.

Learner Drivers

Learner or beginning drivers who have a medical condition that could affect driving need to undergo an occupational therapy driving assessment where there is concern regarding their fitness to drive. The DSDA-2 test is not valid as a standardised test for this group because prior driving experience is assumed, and the test

was validated with experienced drivers. Results may be used qualitatively but should be interpreted with caution.

CHAPTER ONE Summary

- The DSDA-2 is a valid and reliable tool for screening cognitive fitness-to-drive.
- The DSDA-2 trichotomises patients by means of two evidence-based cut-off scores, based on the likelihood of passing an on-road assessment: likely to pass, likely to fail or further testing required.
- The Intersection Rules subtest is optional because it does not contribute to DSDA scoring or patient categorisation.
- Report credits are required to score and generate reports and can be purchased by at: <https://admin.drivesafedriveaware.com/pages/credits/index.html> after creation of an Administrator account.
- The DSDA-2 is not currently validated for drivers with limited or no English proficiency, psychiatric diagnoses or beginning drivers. The test may provide useful qualitative information for these groups, but results should be interpreted with caution. Research for these groups will be conducted and communicated in the future.

CHAPTER TWO: Administration Guidelines

Administration Methods

The DSDA-2 is either self-administered or practitioner-administered. The Administrator-Assisted Method (described in Chapter 3) is recommended for individuals who cannot self-administer the test due to a medical condition or difficulty with the technology. Research conducted in the touch screen development phase (Cheal et al., 2019; Cheal et al., 2018) indicated that 9 out of 10 senior adults (ages 65 to 93) were able to successfully self-administer the application.

The following administration information is briefly summarised for convenience in three Quick Guides presented at the beginning of this manual.

Rapport / Approach

The DSDA-2 should be administered in as non-threatening a way as possible so the patient can give their best effort. Clinical experience and common sense should be applied to determine the most effective way of establishing rapport. A confident, friendly, and relaxed approach can elicit cooperation and ease uncertainty or anxiety about testing.

Instructions

Administer the DSDA-2 in a professional and unhurried manner, following the instructions given. This manual includes standard phrases that must be used when prompting is required. **The standard phrases appear in bold, red type.** These are the only words that should be used. The test includes audio and written instructions to enable self-administration.

Rest Periods / Breaks

Rest breaks are unlikely to be required because the administration time is short. The patient is allowed a rest break during testing if requested but ensure the break occurs after the patient has completed a subtest and not in the middle of a subtest. Stopping in the middle of a subtest may impact test validity. The DSDA-2 application only saves data upon completion of a subtest. Data is not saved if a subtest is abandoned part way through. Subtests can be completed on different days or with breaks in between. Subtests can be administered by different practitioners.

Discontinuing Testing

Allow patients using the self-administration method time to repeat items and practice if they are having difficulty. Switch to the Administrator-Assisted Method if the patient continues to struggle (described in Chapter 3). Discontinue testing if the patient has difficulty with the test to the point that the results may not be valid. **The test can be discontinued at any time by tapping the top left corner of the screen twice.** Enter the PIN number to exit the test.

Patients experiencing significant difficulty completing the DSDA-2, either independently or via the Administrator-Assisted Method, are likely to have cognitive deficits that may impact driving: referral to a driver assessment service to determine fitness to drive is advised.

Frequency of Testing (Test-Retest Reliability)

Test-retest reliability has been examined for both the touchscreen (Johnston et al., 2021) and desktop computer (O'Donnell et al., 2013, O'Donnell et al., 2019) versions of the DSDA. The analyses provided evidence that the DSDA was test-retest reliability. More information regarding this can be found on the DriveSafe DriveAware website: <https://drivesafedriveaware.com/about-the-product>.

Caution in Applying the Results

Suitably qualified practitioners are expected to use the DSDA-2 as a decision support tool in conjunction with their clinical judgment and other clinical indicators when assessing a patient's capacity to resume or continue driving.

The health practitioner must ensure the patient's vision is legal for driving according to the license authority standards that apply for their region, prior to advising a return to driving. Medical clearance for driving is required to ensure the patient does not have medical conditions that are contraindicated for driving (e.g., seizures, blackouts, and some heart conditions). Further information regarding vision and medical guidelines for drivers in Australia and New Zealand is available via the Assessing Fitness to Drive guidelines (Austroads & National Transport Commission, 2022). These guidelines indicate that a practical driving assessment, typically conducted by an occupational therapy driving assessor, may be required to determine fitness to drive for some drivers.

Referral to a specialist driving assessment service is advised when:

- Results of the DSDA-2 place the patient in the category 'requires further testing' and the patient wishes to continue driving.
- Results of the DSDA-2 place the patient in the category 'unlikely to pass an on-road driving assessment' but the patient still wishes to drive and requests further assessment.
- The patient has long-term physical deficits that may impact their ability to operate car controls (e.g., amputations, paralysis, or incoordination): vehicle modifications are likely to be required.
- The Patient experiences significant difficulty completing the DSDA-2, either independently or via the Administrator-Assisted Method: they are likely to have cognitive deficits that may impact

driving.

- Information supplementary to the clinical assessment is required for borderline cases where fitness to drive is not clear.

Occupational therapists in Australia conducting in-car driving assessments must be certified driving assessors. This means they must have completed postgraduate training in driver assessment and rehabilitation and have a registration number allocated by the training institution.

Setting Up the Testing Environment

Room Set Up

Administer the DSDA-2 in a quiet room free from distractions and interruptions. Use headphones for the patient if the DSDA-2 is administered in a busy or noisy area. Administer the DSDA-2 without family or friends present. If this is not possible, instruct any person accompanying the patient to sit silently and avoid inadvertently helping or distracting the patient.

Table / Chair Set Up

Seat the patient comfortably in an upright chair at a table or desk. Place the iPad on the table, not on the patient's lap. Ensure the desk is free of other materials to minimise distractions. Position the patient away from windows or lights that may cause glare on the iPad screen. Close window coverings or turn off lights if the patient prefers it. In summary:

- Seat the patient on an upright chair at a table.
- Place the stand on the table, directly in front of the patient (in their midline) at a 20-degree angle.
- Place the iPad on the stand and make sure the patient can reach it comfortably, without allowing the patient's hand to rest on the screen. This will trigger unwanted responses.
- Adjust the brightness of the iPad image to full to ensure there is no glare on the screen and there is adequate
- contrast in the image.
- The volume of the tablet should be turned to full.

Note: It is acceptable to turn down volume or brightness of the tablet if requested by the patient for their comfort. The patient may adjust the proximity of the stand for comfort.

The goal of the iPad set-up is to ensure that the patient has the best view of the screen for their focal length, with good image contrast for the time of day and light in the room.

Use of Headphones and Stylus

Offer the patient the opportunity to use headphones if they have a hearing difficulty or to minimise background noise as needed. Offer the patient a stylus if they have difficulty responding due to physical impairments (e.g., reduced hand function) during the familiarisation process. The decision to use these aids is up to the patient.

Administrator Position

Sit beside the patient on a separate chair during the set up and practice stage of the assessment in case assistance is required.

DriveSafe

The DriveSafe subtest is self-administered with instructions presented in written and audio form. DriveSafe consists of 10 images of a 4-way intersection (an example intersection image is presented in Figure 1.). Each intersection includes 2-4 potential hazards (people and vehicles). These objects are presented for 4 seconds then disappear. The patient is prompted to recall 3 pieces of information for each object presented:

1. Type of object (e.g., car, pedestrian, couple walking together, truck, or bicycle)
2. Object location
3. Object direction of movement



Figure 1. Example DriveSafe Intersection Image

The patient is prompted with “touch the screen to show your responses” after the objects disappear. A yellow location point appears with an object menu attached when the patient touches the screen (see Figure 2.). The patient selects one of the five possible object icons to indicate the type of object previously observed.



Figure 2. Object Location Point with Object Type Menu

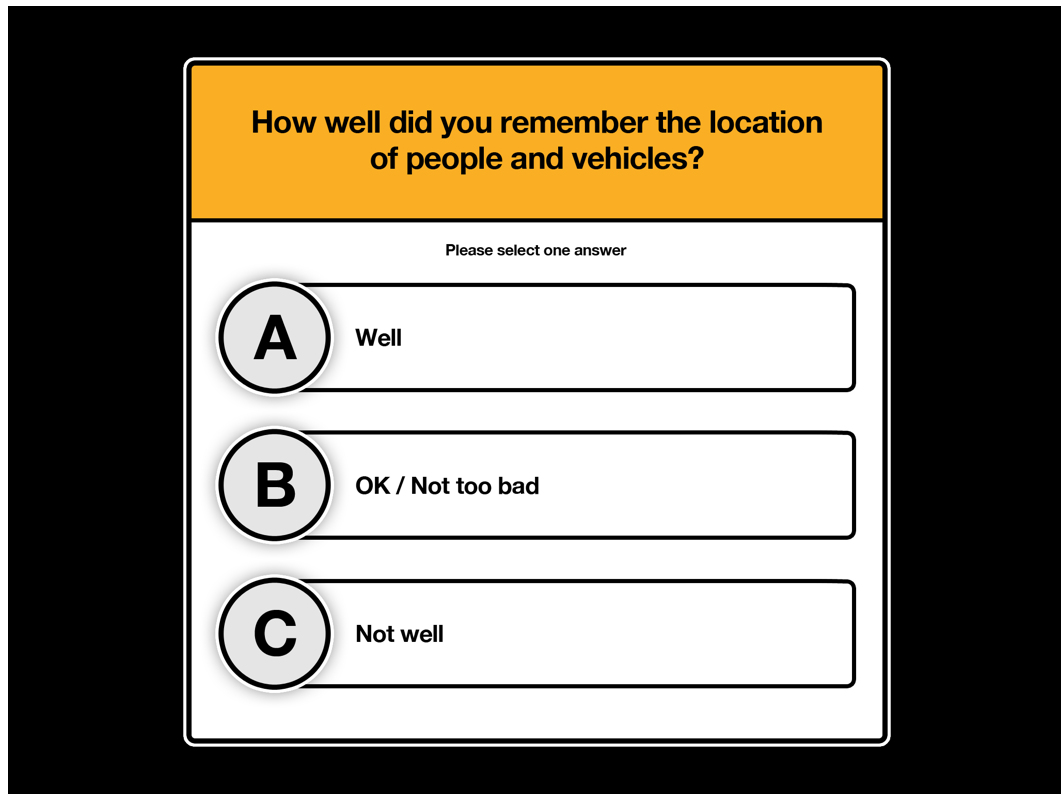
After the patient selects the object type, an arrow appears (see Figure 3.). The patient must drag the arrowhead in the direction the object was travelling.



Figure 3. Object Direction Icon

DriveAware

The DriveAware subtest consists of seven questions. The patient rates their perceived performance on the DriveSafe subtest in two self-administered questions (see Figure 4.). Self-administered questions are presented via written and audio instructions.



The image shows a digital interface for a DriveAware question. At the top, a yellow header box contains the question: "How well did you remember the location of people and vehicles?". Below this, a white box contains the instruction "Please select one answer". There are three radio button options, each in a white circle with a black border, followed by a white rectangular input field. Option A is "Well", Option B is "OK / Not too bad", and Option C is "Not well".

Figure 4. Example DriveAware question

The remaining five DriveAware questions are part of an interview that the administrator conducts at the conclusion of the test. The administrator reads aloud four questions to the patient and enters the patient's responses via the touch screen. The patient should not be viewing the screen during this interview. The final question requires the administrator to rate their level of concern for the patient's fitness to drive, based on clinical or personal indicators.

Results of the DriveSafe and DriveAware subtests are used to classify drivers in three categories: likely to fail an on-road assessment, requires further testing, and likely to pass an on-road assessment. See Chapter 4 for more information on scoring and categorisation.

Intersection Rules (Optional)

Intersection Rules is an optional, self-administered subtest with instructions presented in written and audio format. The test is optional because it does not contribute to the DSDA-2 scoring or the final patient classification. The Administrator-Assisted Method can be used to administer the subtest if required. The

subtest automatically begins after the two DriveAware self-administered questions if the practitioner has selected it for inclusion.

The Intersection Rules subtest presents eight intersections with two to four vehicles in each intersection (see Figure 5.). Four intersections have road sign symbols. The patient is prompted with the phrase “tap the vehicles in order” for each intersection. The patient touches the screen to indicate the order in which vehicles in the intersection should proceed, according to the road markings and symbols presented.

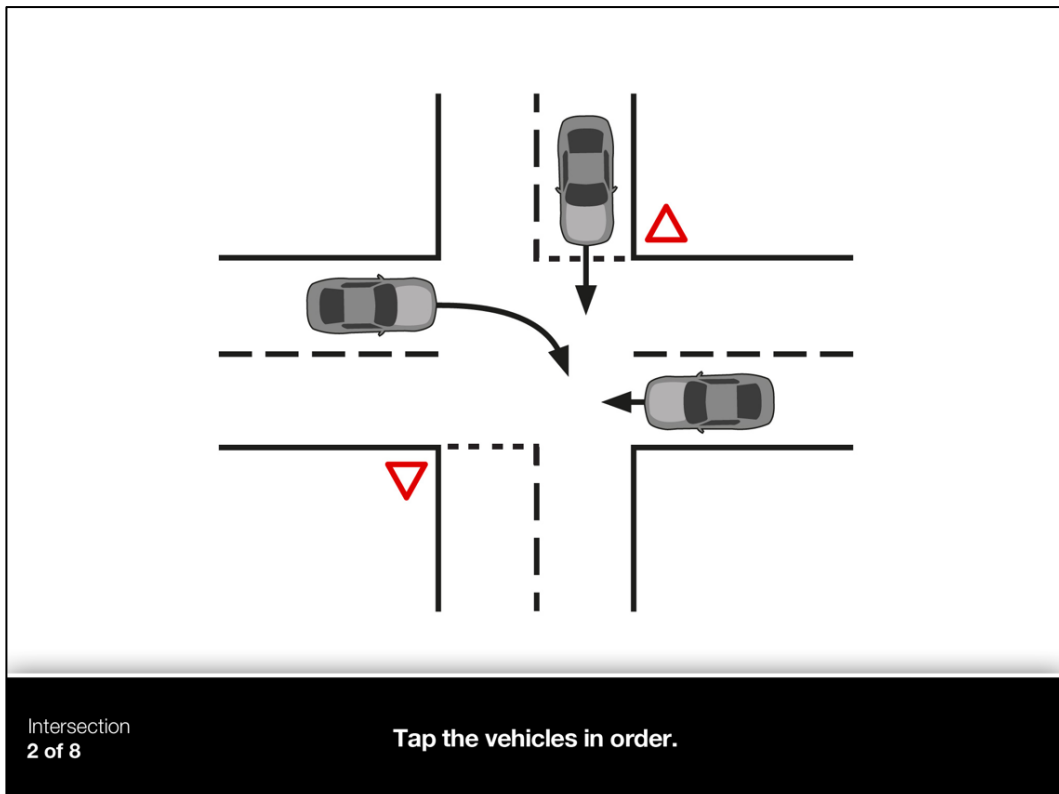


Figure 5. Example Intersection Rules item

CHAPTER TWO Summary

- The DSDA-2 can be either self-administered or the Administrator-Assisted Method can be used.
- If the patient is unable to complete either method, they should be referred for further assessment or for an on-road assessment.
- The test can be discontinued at any time by tapping the top left corner of the screen twice and entering the PIN code.
- Note the phrases in this manual that appear in **red** that should be used during administration.
- The advised set-up is to ensure that the patient has the best view of the screen for their focal length, with good image contrast for the time of day and light in the room.
- Seat the patient at a table in a quiet room with no distractions.
- Use headphones if background noise is causing distraction or if the patient has difficulty hearing well.
- Offer the patient the use of a stylus if it is their preference.
- The DSDA-2 can be repeated as it demonstrates test-retest reliability.
- Suitably qualified practitioners are expected to use the DSDA-2 as a decision support tool in conjunction with their clinical judgment and other clinical indicators when assessing a patient's capacity to resume or continue driving.

CHAPTER THREE: Administering DSDA

Preparing the Tablet for Testing

The DSDA-2 home screen is shown in Figure 6. The home screen has three columns. Use the left column to search patient records by name, status, or date of testing. Touch 'Patient set-up' to set up a new test. The number of report credits available is shown at the bottom of this left column.

The centre column lists records from newest to oldest and colour codes records based on status. Red indicates the test is ready to start or resume. Yellow indicates the test has been completed, but the report has not yet been created. Green indicates the test has been completed and the report created. The right column lists all records for patients previously tested. You can retrieve old records from this column or by using the search fields in the left column.

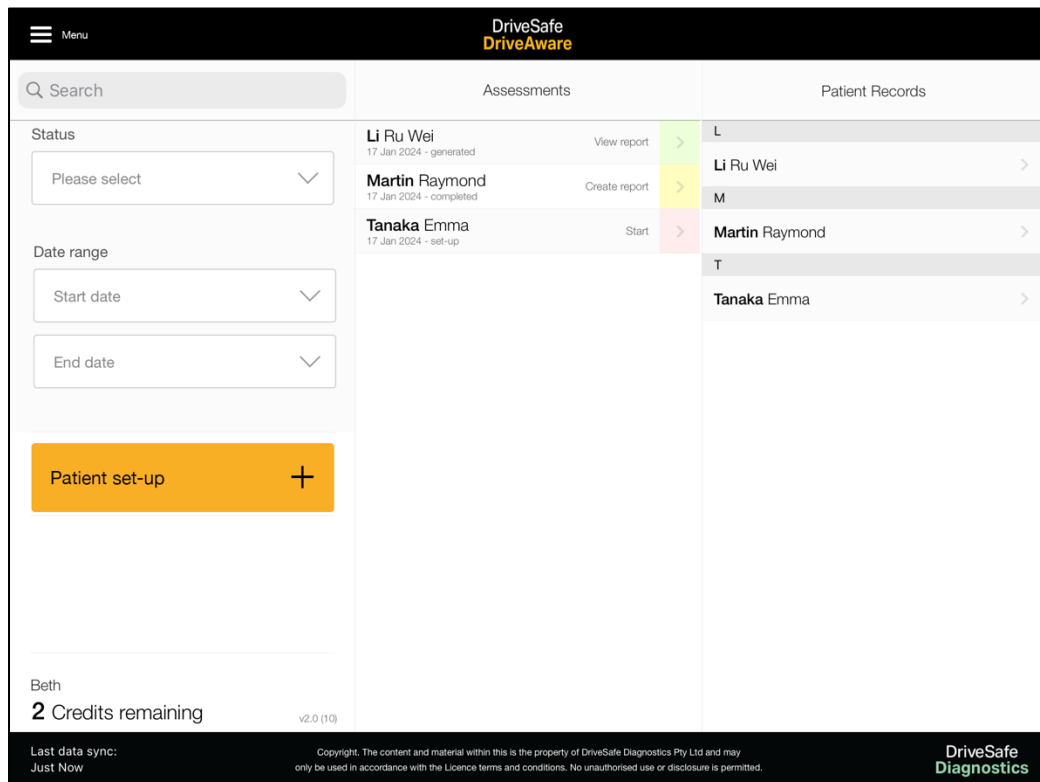


Figure 6. DSDA-2 Touch Screen Home Screen

Patient records can be set up prior to the patient's appointment. This process takes 1–2 minutes and ensures that the test is ready when the patient arrives for the assessment. Select 'Patient set-up' to start a new test for either a new patient or to re-test a previous patient (see Figure 7.). Enter the patient details, then select 'Save' or 'Start Test' as preferred. Select 'Start Test' to begin testing. Select 'Save' to return to the home page.

The screenshot displays a patient information form with the following fields and values:

- First Name:** Emma
- Last Name:** Tanaka
- Gender:** F (Female) is selected.
- Date of Birth:** 13 May 1988 (Age = 35y 8m 2d old)
- Address 1:** Unit 8
- Address 2:** 16 John Street
- Suburb:** North Ryde
- Postcode:** 2113
- Country:** Australia
- Does the patient speak a language other than English at home?:** No is selected.
- Primary Diagnosis:** Multiple Sclerosis
- Secondary Diagnosis:** Not applicable
- Identification Number:** 145
- Test Administrator:** Li Ru Wei

Figure 7. DSDA-2 Patient Set-Up Screen

DSDA-2 Entering Patient Set-up Information

Procedure

Select Patient Set-Up

- Type in patient’s first name: **compulsory**.
- Type in patient’s last name: **compulsory**.
- Select gender M (male), F (female) or X (Indeterminate/Intersex/Unspecified): **compulsory**.
- Using the calendar scroll, enter the patient’s date of birth: **compulsory**.
- Enter the patient’s address, using one or two lines for number and street name as required.
- Enter the patient’s suburb or town name.
- Enter the patient’s address postcode: **compulsory**.
- Enter the patient’s country: **compulsory**.

- Select Yes or No to answer if the patient speaks a language other than English at home: **compulsory**.
- Select the patient’s Primary Diagnosis from the drop-down menu (see page 19) for clarification of diagnostic classifications).
- If appropriate, select the patient’s secondary diagnosis from drop-down menu.
- Enter Identification Number used by your clinical practice if appropriate.
- Type in the test administrator’s name.
- Type in any notes relevant to the patient if appropriate (e.g., clarification of a medical condition if the diagnosis label selected does not exactly specify).
- Click on “Save” to save the information and proceed to the consent page: **compulsory**.

Consent Process

The patient or the administrator must provide consent prior to beginning the test. The patient consent form provides a summary of the test purpose and content, explains where the information is being sent, and states that the participant may withdraw consent at any time until testing has been completed and results calculated. The patient must select ‘yes’ in response to “I have read and agree to the conditions”. Alternatively, you can consent on behalf of the patient by selecting ‘yes’ to the statement “I have given the patient a verbal explanation of the DSDA-2 test, its procedures and risks and I believe that the patient has understood that explanation”.

Note: if the patient withdraws consent the file cannot be deleted from the iPad of the account. However, the patient record can be edited and de-identified and then archived.

DSDA-2 Diagnostic Group Descriptions

- **Blackouts** (e.g., syncope)
- **Cardiovascular conditions** (e.g., atrial fibrillation, CABG or coronary artery disease)
- **Diabetes Mellitus**
- **Hearing loss and deafness**
- **Musculoskeletal conditions** (e.g., back pain or arthritis)
- **Neurological Conditions List:**
 - Dementia / Memory Loss: e.g., Alzheimer’s Disease or Mild Cognitive Impairment.
 - Stroke / Transient Ischaemic Attack (TIA): e.g., Cerebral Vascular Accident (CVA), Subarachnoid haemorrhage, Intracerebral Haemorrhage or cerebral ischaemic infarct.
 - Other Cerebrovascular Conditions: e.g., Moya Moya disease, unruptured intracranial aneurysm, arteriovenous malformation
 - Cerebrospinal Fluid Disorders: e.g., chiari malformation, syringomyelia or hydrocephalus
 - Traumatic Brain Injury: e.g., head injury or concussion
 - Brain Tumours: e.g., malignant tumour or benign tumour
 - Epilepsy / Seizures: e.g., generalised epilepsy or narcolepsy
 - Huntington’s Disease

- Multiple Sclerosis
- Parkinson’s Disease
- Neuropathies: e.g., muscular dystrophy or peripheral neuropathy
- Spinal Cord Injury / Conditions: e.g., paraplegia, tetraplegia or spinal stenosis
- Cerebral Palsy
- Neurodivergent Conditions: e.g., autism spectrum disorder or ADHD
- Other
- **Orthopaedic conditions** (e.g., amputation or joint replacement)
- **Psychiatric conditions** (e.g., anxiety disorder or bipolar disorder)
- **Sleep Disorders** (e.g., Obstructive Sleep Apnoea [OSA])
- **Vision and eye disorders**
- **Other**
- **Not applicable** (e.g., mandatory testing due to advanced age)

Administering the Demo and Practice Sections

Use the following procedure for the demonstration and practice sections, for both administration methods.

Test Start

The test Start Screen appears after the consent process is completed (see Figure 8).

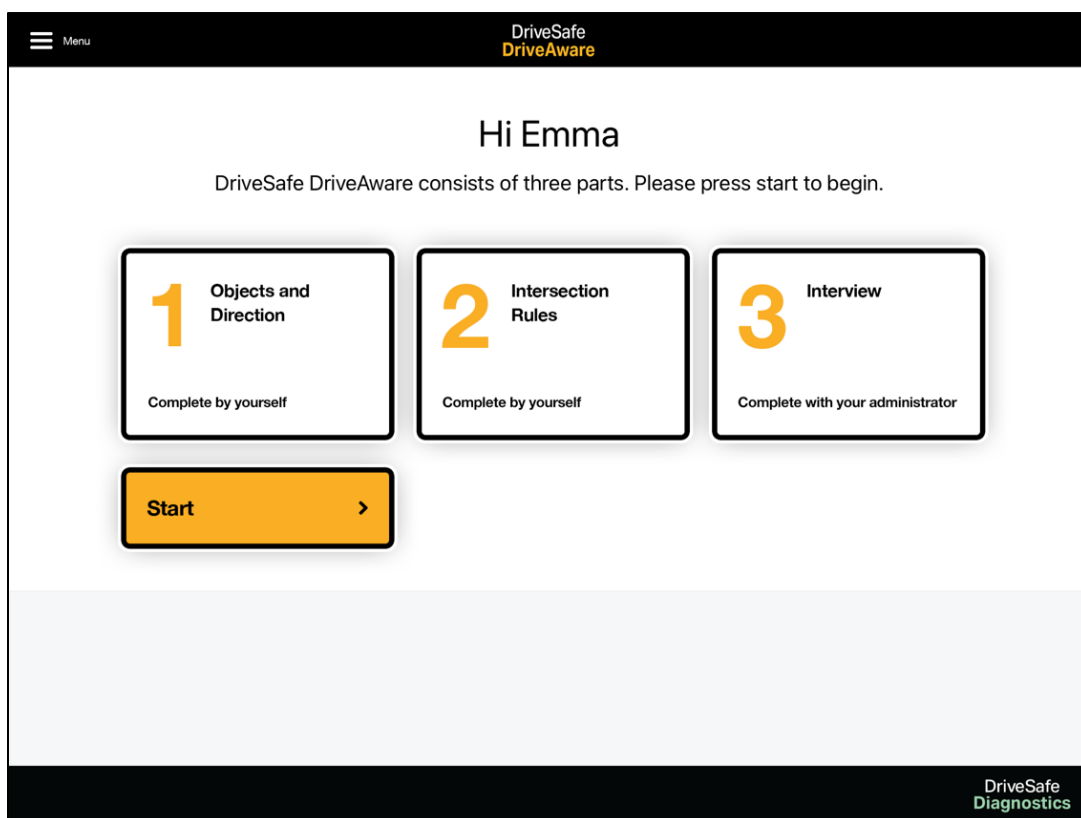


Figure 8. DSDA-2 Patient Start Screen

The patient touches 'Start' when ready to begin. Allow the patient to self-administer the test, following the prompts. The patient is taken through audio and vision checks to ensure the volume is appropriate and the screen is the correct brightness. When the checks are complete, the patient is presented with the DSDA-2 demonstration introduction screen, which describes the premise of the test via audio and written instructions (see Figure 9.).

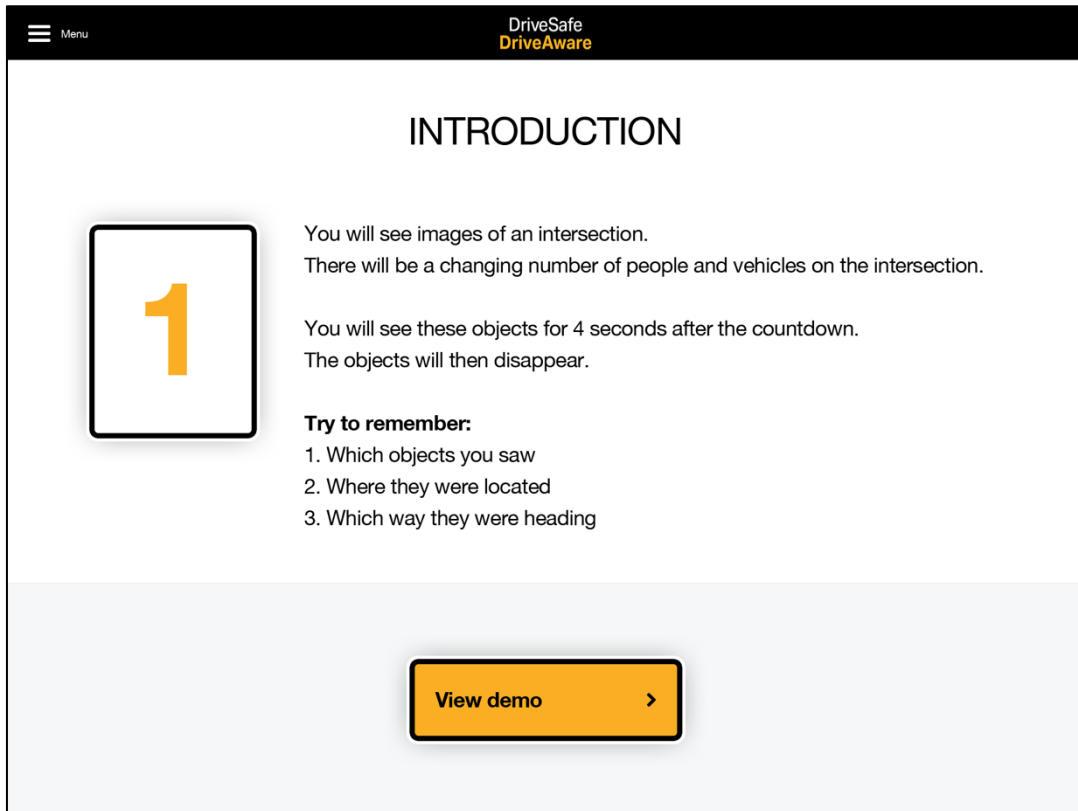


Figure 9. DSDA-2 Demonstration Introduction Screen

The patient begins the demonstration by touching 'View demo'. Remain in the room until the patient successfully completes the demonstration and practice items. This enables you to:

1. provide assistance if needed; and,
2. decide whether the Administrator-Assisted Method is required.

Demo Section

The demonstration section consists of one item to teach the patient the test functions (tap, arrow swivel, object menu and undo). Watch the patient complete the demonstration item (with the red car driving

forwards). If the patient struggles to move the arrow, say: **touch the arrowhead and move your finger to show which way the car was driving**. The administrator may also demonstrate this but allow the patient to try first.

Repeating the Demo Section

The patient can repeat the demonstration item only once by selecting 'Repeat demo'. Ask the patient to repeat the item if they are having significant difficulty and you think it may help.

The patient moves from the demonstration to the practice section by selecting 'Start practice' (see Figure 10.).

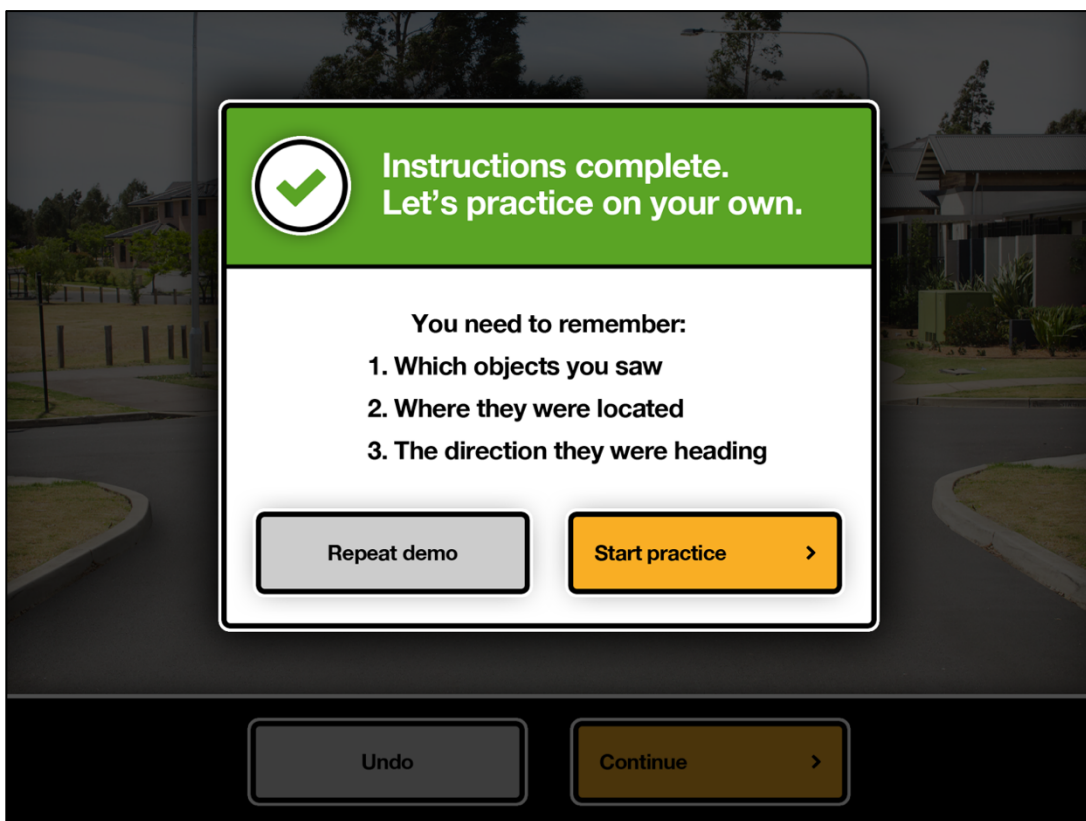


Figure 10. DSDA-2 Practice Start Screen

Practice Section

The practice section of DriveSafe consists of three items. The purpose of the practice section is to teach the patient the basic premise of the test. The items provide various levels of assistance as required via error messages and additional instructions.

The patient must complete each of the three practice items correctly before the test allows them to proceed. The patient can have a maximum of four attempts per item. If the patient fails to answer correctly on the fourth attempt, they receive a message instructing them to see their administrator for help. The development and research phase of the test revealed no improvement in performance beyond four attempts and/or the patient became too frustrated to succeed beyond this point. It is recommended that the administration switch to the Administrator-Assisted method should this occur (described in the following section).

Repeating the Practice Section

The patient may repeat the practice section only once if you judge that this will be beneficial in facilitating independence (repeating the practice multiple times was not found to be beneficial in the development and research phase of the test).

Patient Unable to Self-Administer Test

If a patient has significant difficulty with the test and does not improve with practice, consider what you observed during the practice section of DriveSafe and ask yourself: Was the patient able to complete at least one practice item without assistance (i.e., indicate object location, type and direction of movement without help)? If the answer is 'no' then use the Administrator-Assisted Method outlined in the following sections. Figure 11. represents the Administration Method Decision Tree.

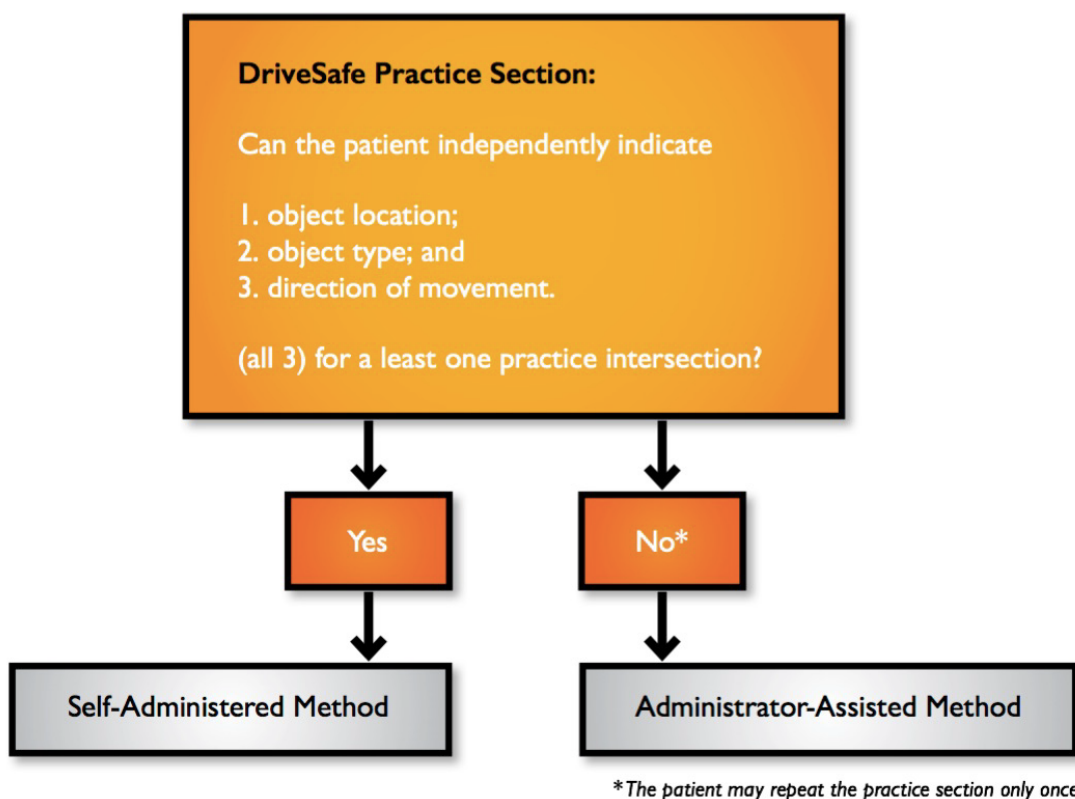


Figure 11. Administration Method Decision Tree

DSDA-2 Self-Administered Method

DriveSafe

The DriveSafe Start Test screen appears after the patient has successfully completed the demonstration and practice sections. The patient should select 'Start test' when ready to begin (see Figure 12.).

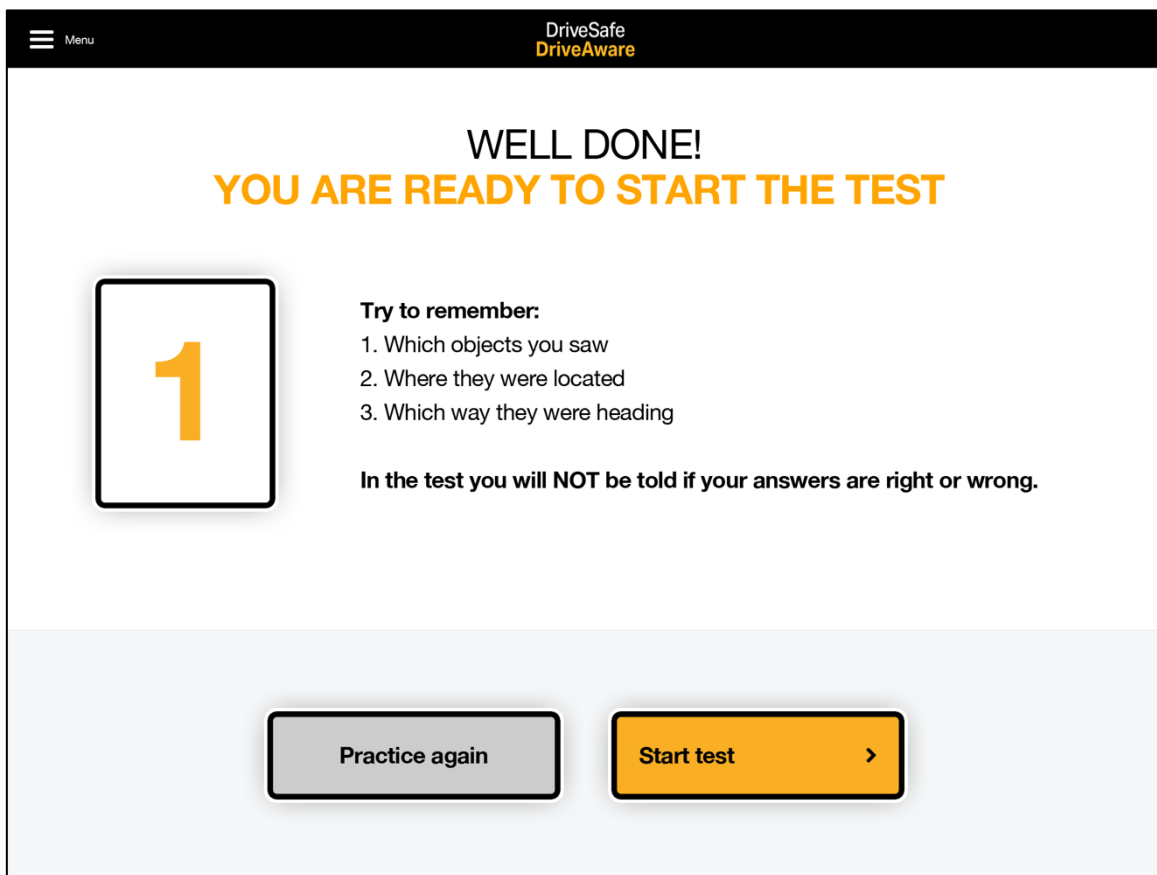


Figure 12. DriveSafe Start Test Screen

No further prompting or assistance may be given. The administrator may leave the room but should be available should the patient call for assistance. If the patient asks for assistance, only say:

Sorry, I cannot provide assistance during the test. Just do your best.

You cannot physically assist with test functions, provide verbal prompts (e.g., “which was the car going”), or provide feedback on performance if the patient is self-administering the test.

DriveAware

DriveAware – Self-Administered Questions

The patient completes the two self-administered DriveAware questions according to written and audio instructions. The patient can only choose one response. Do not provide any prompting or assistance during the questions. If the patient asks for help, say:

Sorry, I cannot provide assistance during the test. Just touch the response that seems most correct to you.

DriveAware – Clinician Interview

The remaining five DriveAware questions comprise an interview that the administrator is to conduct the same way for all patients. Conduct the interview in a private area, such as a treatment room or office. The administrator and the patient should be comfortably seated. The administrator must read the questions verbatim and touch the response that is most like the one the patient gives. Following are two examples of how to enter responses for questions in the DriveAware interview.

Example 1: DriveAware Question 6

The screenshot shows a mobile application interface for a DriveAware question. At the top, there is a yellow header with a back arrow on the left and the question text: "Why have you been asked to complete DriveSafe DriveAware?". Below the header, the instruction "Please select one response" is centered. There are three response options, each in a white rounded rectangle with a black border. Option A is "Does not report primary reason for assessment. (e.g., 'I don't know')". Option B is "Does not initially report reason for assessment but later mentions it, or indicates partial awareness of reason for assessment.". Option C is "Reports primary reason for assessment.". Each option is preceded by a large letter in a circle: A, B, and C respectively.

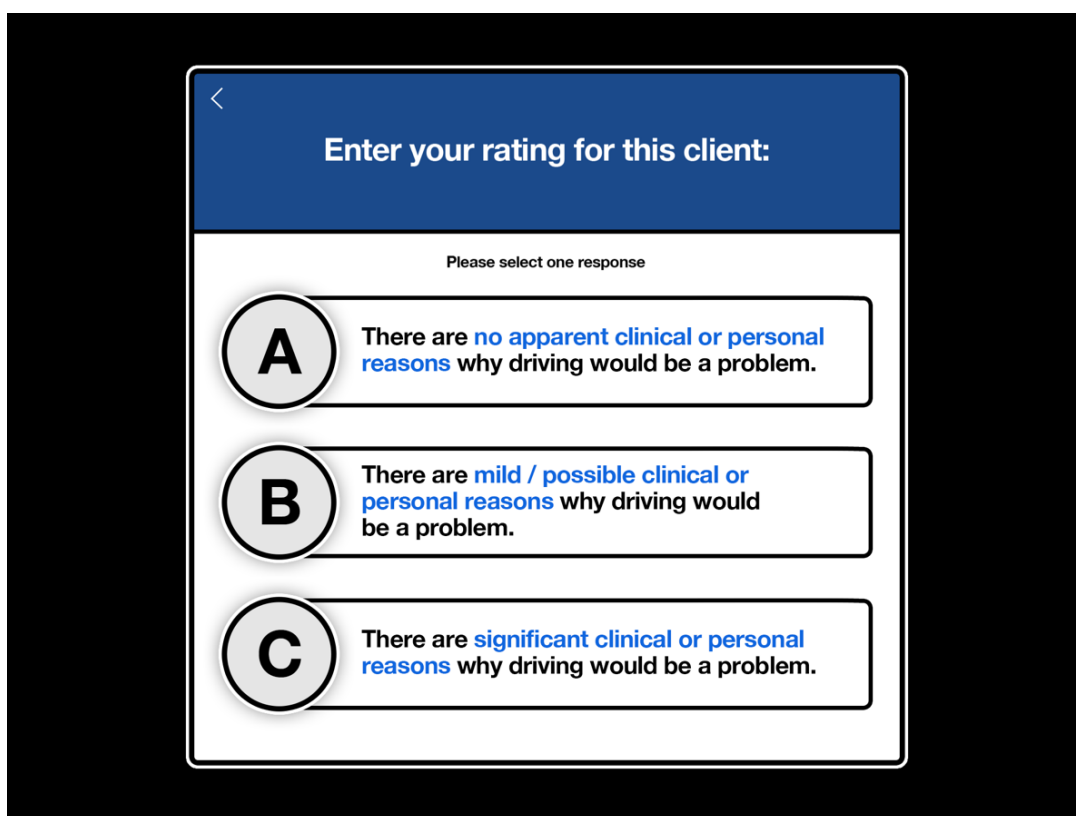
Figure 13. DriveAware Question 6

The following table provides examples of appropriate administrator responses for DriveAware Questions 6, based on example responses given by the patient in the first column.

Table 1. Example administrator selections for DriveAware Question 6

Example Patient Responses	Example Clinical Context	Appropriate Administrator Selection
"I don't know"	Patient has been diagnosed with dementia. Diagnosis discussed with patient in the past.	A: Does not report primary reason
"My GP just told me to come."	Patient referred due to memory loss. Family concerned about forgetfulness.	A: Does not report primary reason
"Doctor can you please fill out my license form to say I am OK to drive"	License authority has posted the patient a medical form to be completed by their doctor due to their age.	C: Reports primary reason
"I agreed to be involved in a research project"	Test being administered as part of a research project.	C: Reports primary reason
"I'm just getting old"	Patient has had a stroke and recent hospital admission.	A: Does no report primary reason
"I don't know. My family are worried about my memory but I'm OK"	Patient diagnosed with dementia. The diagnosis has been discussed with them in previous appointments.	B: Indicates partial awareness
"I have had a brain injury so people are worried this might affect my driving. I think I'm OK."	Patient has had a brain injury. There is uncertainty regarding whether this will affect driving safety.	C: Reports primary reason
"I've had a stroke"	Patient had a stroke last month but has largely recovered.	C: Reports primary reason
"I don't know – I have no problems with my driving. I have been driving for 60 years"	The patient told the receptionist earlier that he had collided with a pole in a car park, so his daughter suggested seeing the doctor.	B: Indicates partial awareness

Example 2: DriveAware Question 7



The screenshot shows a mobile application interface for a clinician rating question. At the top, a blue header bar contains a back arrow and the text "Enter your rating for this client:". Below the header, the instruction "Please select one response" is centered. Three radio button options are listed vertically, each in a white box with a black border. Option A is selected, indicated by a white dot in the center of the radio button. The options are: A: "There are no apparent clinical or personal reasons why driving would be a problem."; B: "There are mild / possible clinical or personal reasons why driving would be a problem."; C: "There are significant clinical or personal reasons why driving would be a problem." The text "clinical or personal reasons" is highlighted in blue in all options.

Figure 14. DriveAware Question 7. (Clinician Rating)

The administrator selects A, B or C in Question 7, depending on their judgment for this patient (see Figure 14.). The decision is based on the clinical information available (e.g., medical diagnosis, vision report, medical test results, referral information) and other information reported by family, care givers or the patient (e.g., difficulty with daily activities, reduced mobility, recent collisions, family concern regarding safety, or report of reduced frustration tolerance).

Intersection Rules (Optional)

The Intersection Rules subtest is an optional subtest. When the administrator first sets up the patient, they will be required to indicate whether this subtest should be included.

The administrator does not need to be present during the Intersection Rules subtest. If the patient calls for assistance, this can be provided but only for the practice item. Assistance may include demonstration of how to number vehicles or select 'undo' in the practice item. The administrator may repeat instructions but only as written (e.g., **You need to number all of the vehicles**). The patient can repeat the practice item as many times as they like. If the patient asks for help deciding right-of-way, say:

Sorry, I cannot provide assistance during the test. Just do your best

DSDA-2 Administrator-Assisted Method

Set-up

The administrator sits at the table next to the patient. The patient should have an unimpeded view of the tablet.

- The tablet should be muted so that there is no sound.
- The administrator enters or selects test functions (e.g., 'start' and 'next', and DriveSafe responses) and manages pop-ups (e.g., error messages) to minimise distractions.

DriveSafe

Starting the Test

Begin testing with the DriveSafe start test screen (see Figure 15.).

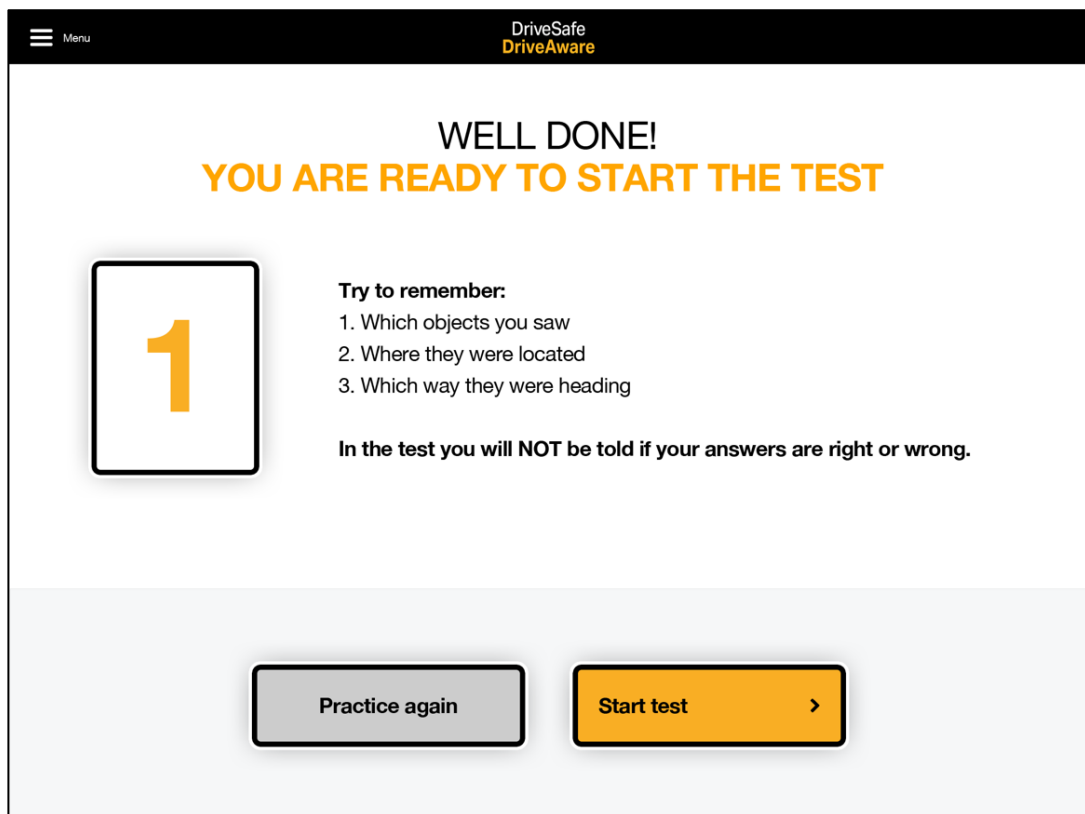


Figure 15. DriveSafe Start Test Screen

Clearly state the following instructions to the patient:

You will see images of an intersection. Try to remember:

1. **which objects you saw,**
2. **where they were located, and**
3. **which way they were going.**

Are you ready to start?

Select 'Start test' when the patient is ready to begin. The administrator may repeat the instructions verbatim as many times as required. Do not use any additional words.

During Countdown

During the countdown, say: **Get ready to look.**

After Objects Disappear

When the objects have disappeared, say: **Tell me what you saw.**

If the patient says "There is nothing there" or does not understand the test requirements, say: **Try to remember the objects you saw before they disappeared. Tell me what you saw.** You may repeat these words many times as required, but do not use any additional words.

Response Entry

The administrator's role during DriveSafe is simply to provide assistance with response entry. No prompting should be given to elicit information. For example, the administrator is not permitted to say, "which way was the car going?" or "where did you see the car?"

Enter responses exactly as the patient has stated them. Pointing and gestures are accepted to indicate responses (e.g., direction of movement).

Keep in mind the three categories of information that need to be recalled when entering patient responses (name of object, object location, and direction of movement). For example, if the patient says, "there was a car over there", enter only the object type (car) and object location (as indicated by the patient) and, not the direction of movement (because it was not given). Table 2. provides examples of how to interpret patient responses.

Table 2. Example patient responses with corresponding administrator response entry

Patient Response	Administrator Response Entry
“I saw something here (pointing but not touching screen) but I can’t remember what it was.”	Location: Administrator touches location point indicated by patient but first asks: “Is this what you mean?” Object: No entry (leave menu on screen) Direction of Movement: No entry
“I saw two people over here (touching screen).”	Location: Location point entered by patient Object: Administrator selects couple icon Direction of Movement: No entry
“I saw a thing here on the road, but I can’t remember if it was a car or a truck. I’m not sure.”	Location: Administrator touches location point indicated by patient but first asks: “Is this what you mean?” Object: No entry Direction of movement: No entry
“I saw a person over here” (pointing to pole on left footpath but not touching screen).	Location: Administrator touches location point indicated by patient but first asks: “Is this what you mean?” Object: Administrator selects person icon Direction of movement: No entry
“There were two people here” (pointing to right footpath). “They were walking this way” (gesturing left) “and a bike over here” (touching screen) “coming this way” (gesturing toward self).	Location 1: Administrator touches location point indicated by patient but first asks: “Is this what you mean?” Object 1: Administrator selects 2-person icon Direction of movement 1: Administrator moves arrow to approximately 270 degrees. Location 2: Entered by patient Object 2: Administrator selects bike icon Direction of movement 2: Administrator moves arrow to approximately 180 degrees.

The administrator may allow the patient to touch the tablet if they judge this as effective (e.g., the patient enters the location and object type, and you enter the direction of movement). Ask the patient to locate the object as specifically as possible by saying: **Is this where you mean?** No other prompting or instruction is allowed. If the patient says “no”, delete the response and re-enter it as indicated.

If the patient accidentally triggers unwanted or additional responses (e.g., as the result of a tremor), simply delete the responses. When using the Administrator-Assisted Method, the administrator responds to all pop-ups and messages such as, “Are you sure you have completed this screen?” and “Do you want to delete this response?” **The goal is to facilitate a smooth testing flow and limit disruptions.**

Patients with significant cognitive deficits may attempt to tell the administrator their responses while objects are still displayed on the screen. In this case, say: **Wait until the objects are gone.** When they have disappeared, say: **Now tell me what you saw.**

When the patient is ready to move to the next image, ask: **Are you ready to move on?** If the patient says yes, select Continue.

DriveAware

Self-Administered Questions

Read the two questions exactly as written and ask the patient to respond. Allow the patient to see the screen and read the text, but do not allow the patient to touch the screen. The administrator must enter the responses for the patient (this is to avoid incorrect responses inadvertently being selected). If the patient asks for help, say: **Sorry, I cannot provide assistance during the test. Just tell me the response that seems most correct to you.**

Clinician Interview

The remaining five DriveAware questions are conducted in the same way for all patients, whether the test has been self-administered or administrator-assisted. The procedure was previously described under the “DSDA-2 Self-Administered Method” section of this chapter.

Intersection Rules (Optional)

The Intersection Rules subtest runs if the administrator opted to include it in the setup stage.

Practice Item

Read the instructions exactly as written. Mute the sound for this part of the test. Select ‘View practice’ when the patient is ready (see Figure 16.).

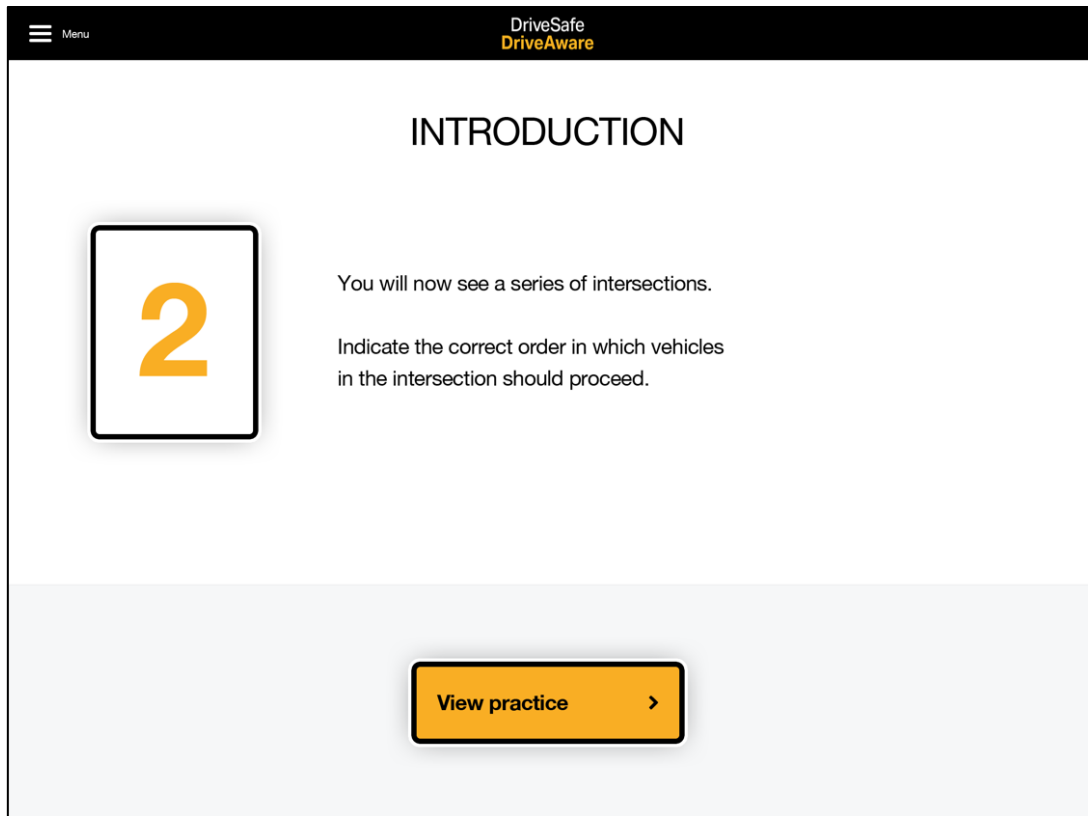


Figure 16. Intersection Rules Instructions

When the practice intersection appears, ask: **Which car goes first?** The patient may touch the desired car them self, or you may touch the car on their behalf.

Next, ask: **Which car goes second?** Again, the patient may touch the desired car, or you may touch it on their behalf. Allow the patient to touch cars only if it does not disrupt the flow of testing.

If the patient response is incorrect, read the error messages verbatim and then select Continue or Try again. The practice item can be completed as many times as you think it is necessary.

When the patient is ready to start the test, read the instructions on the Intersection Rules start test screen (see Figure 17.) verbatim and then select 'Start test'.

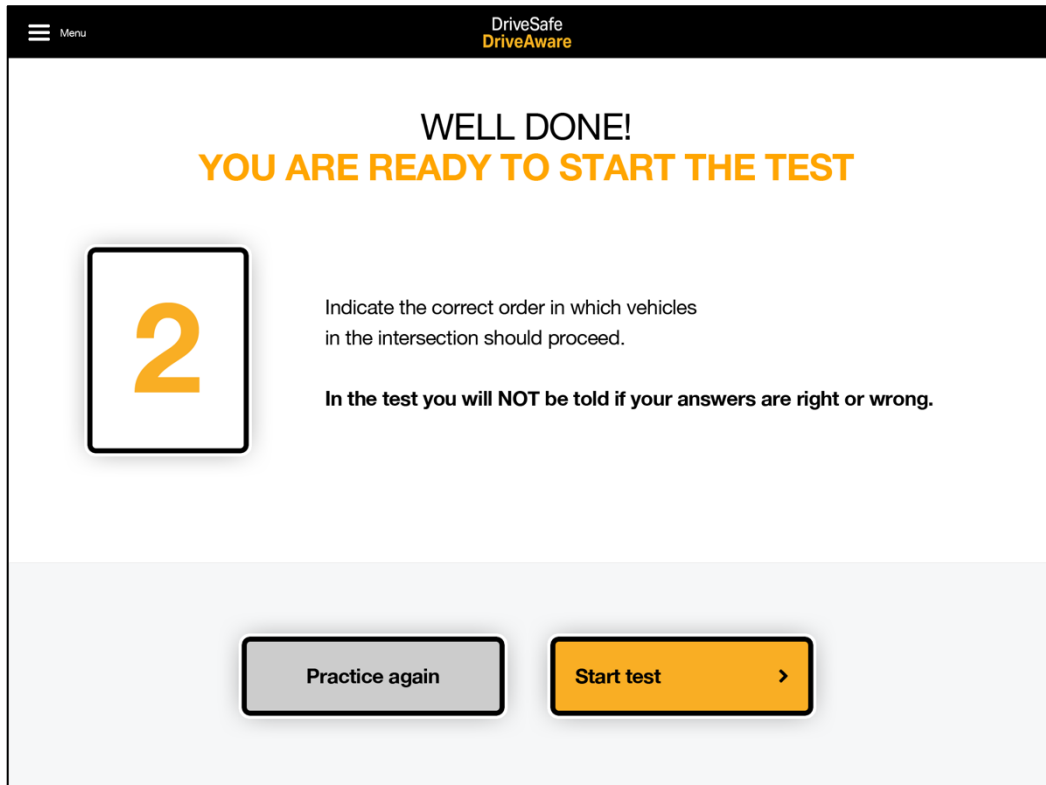


Figure 17. Intersection Rules Start Test Screen

Test Items

Follow the same procedure for selecting vehicles as for the practice items. Ask: **Which car goes first?** Enter the response (or allow the patient to touch the desired vehicle). Do this for all remaining vehicles (e.g., **Which car goes second? Which car goes third? Which car goes fourth?**).

CHAPTER THREE Summary

- The DSDA-2 must be administered by following the method outlined in the manual to ensure reliability.
- Thoroughly read the administration instructions in Chapter 3 of this manual before administering the test.
- Quick Guides for administration are provided in the introduction of this manual.
- Consider practicing administering the test with another health professional initially to ensure you are following the correct instructions.
- Use the phrases written in **RED** when administering the DSDA-2
- Examples of DriveAware question scoring are available in *Table 1. Example administrator selections for DriveAware Question 6* and *Table 2. Example patient responses with corresponding administrator response entry.*

CHAPTER FOUR: Scoring and Reporting

Scoring and Timing

The DSDA-2 automatically scores all test items and records the timing for the DriveSafe subtest. These are presented in a clinical report and patient letter at the conclusion of the test (see Reporting). The DriveSafe subtest is the key subtest for trichotomising patients and should be given priority when interpreting test results. The DriveAware subtest is a supplementary subtest included to increase predictive accuracy, particularly where results are borderline (Kay et al., 2008).

Note: Administrators that have used the former touchscreen version of DSDA (Pearson distributed) may notice a difference in the DriveSafe completion time recorded on the extended report. The previous version measured the time to complete the demonstration and practice screens, in conjunction with the 10 DriveSafe test items. The DSDA-2 only measures the time it takes to complete the 10 DriveSafe test items. Timing on DSDA-2 commences when the patient selects “start test” on DriveSafe. The timer ceases when the patient touches the “next” button on screen ten of DriveSafe.

DriveSafe Scoring

The DriveSafe subtest consists of 10 intersections, with a total of 28 objects presented. All possible independent and combined variable options were examined throughout the development and research phase. Results indicated that the variables most predictive of driving performance were object type, object location, and direction of movement, scored as independent variables. As a result, these variables were selected as the basis for the DriveSafe subtest scoring.

Each correctly recalled piece of information (object type, location and direction of movement) in the DriveSafe subtest receives one point. The maximum score for 28 objects is 84. The total number of objects missed, the total number of details missed (location and directions), and the number of additional objects the patient indicates (that were not actually present) are also recorded. Time taken to complete the test is automatically recorded.

The total DriveSafe subtest score (maximum 84) is used to categorise patients three ways (see Figure 18.). A score of 57 or below indicates the patient is likely to fail an on-road assessment. A score of 72 or above indicates the patient is likely to pass an on-road assessment. A score of 58 to 71 indicates further assessment is required to determine fitness to drive. The patient’s DriveAware results are then applied to this scoring categorisation.

DriveAware Scoring

The DriveAware subtest consists of six items (seven questions are asked but one of these contributes to discrepancy scoring for one of the six items). A discrepancy score is calculated for each item based on the difference between the patient’s self-rating and actual performance on the DriveSafe subtest, along with

the clinician’s ratings. A final score is generated by converting the discrepancy score (–2 to 2) into a final score via a 5-point ordinal scale. This results in a maximum total score of 17. A score of 10 or below indicates impaired awareness of abilities related to driving and a high score of 13 or above indicates awareness of abilities related to driving. A score of 11 or 12 indicates further assessment is needed.

Final categorisation in DriveAware depends on the DriveSafe subtest outcome. Both DriveSafe and DriveAware scores are combined to further classify patient ability and awareness into the three categories: Pass, Fail, and Further Testing. For example, given a high DriveSafe score (≥ 72) and a low DriveAware score (≤ 10), a patient is classified as Further Testing. A low DriveSafe score (≤ 57) and a high DriveAware score (≥ 13) is also classified as Further Testing. Awareness is necessary for accurately self-monitoring driving performance and implementing strategies to compensate for any reduction (e.g., avoiding complex traffic conditions). In the first scenario, awareness is reduced, so further assessment is advised regarding fitness to drive. In the second scenario, the patient performed poorly in DriveSafe, but DriveAware results indicated a high level of awareness, so this patient has more potential for implementation of compensatory strategies. Further testing is therefore advised. The DSDA scoring system and decision flowchart is illustrated below (see Figure 18.).

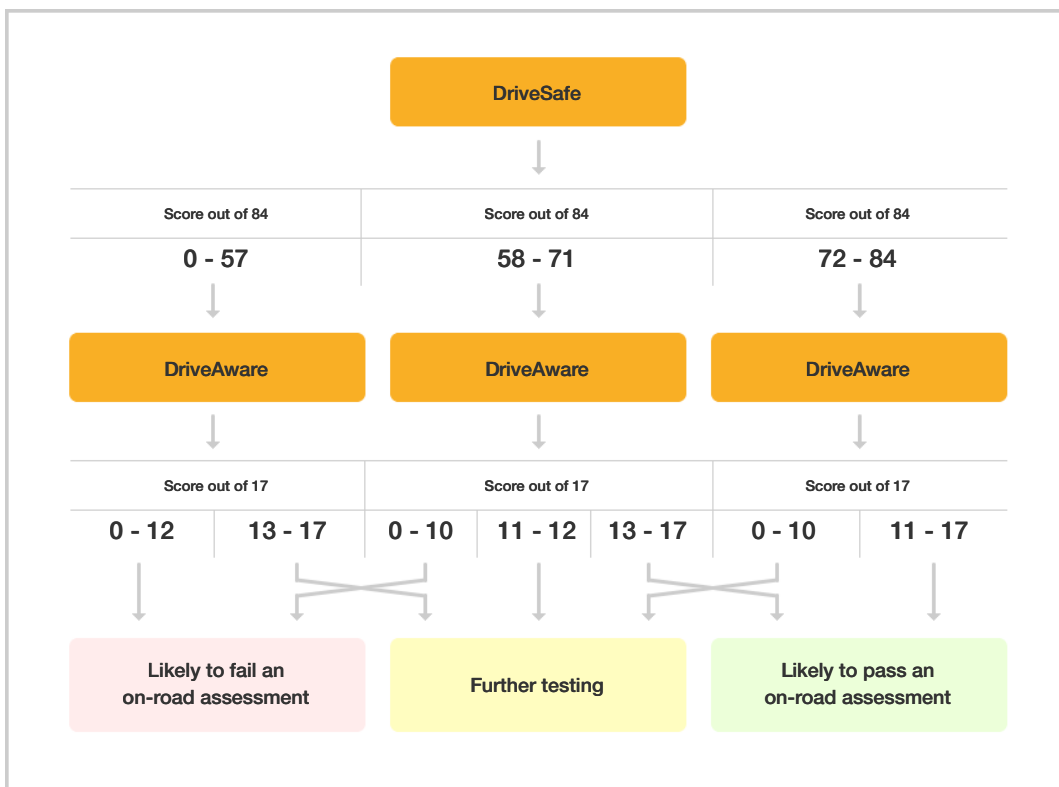


Figure 18. DriveSafe DriveAware Classification Flow Chart

Intersection Rules Scoring (Optional)

The Intersection Rules subtest consists of 8 items. One point is awarded per item only when all vehicles are placed in the correct order of right of way. This results in a maximum score of 8. Note: Intersection Rules is based on Australian and New Zealand road rules and may not be correct for other jurisdictions.

Intersection Rules was initially investigated in the context of DriveAware in the statistical analysis during the development and research phase. Results indicated the subtest was not useful as a predictor of driving performance and was not correlated with performance on the DriveSafe subtest, the DriveAware subtest, or with the on-road assessment outcome. Intersection Rules was therefore altered to be an optional road law knowledge subtest. Patient performance on this subtest does not contribute to DriveSafe or DriveAware scoring. The subtest is retained primarily for occupational therapy driving assessors to use as a brief screen of knowledge regarding right of way at intersections and for the qualitative information provided (e.g., ability to plan responses and follow instructions). This subtest may still be useful for other clinicians including general practitioners and can be selected for inclusion at the patient set-up stage.

Reporting

A report is generated once the patient has completed the DSDA-2. The report can be emailed to the administrator or printed directly from the tablet. The report consists of three sections:

1. Clinical Report: Summary Report
2. Clinical Report: Extended Report
3. Patient Letter

The Summary Report can be saved and/or emailed or alternatively both clinical reports can be emailed if additional information is required (e.g., the patient wants evidence of why they fell into a particular category). The Patient Letter provides a brief summary of performance and the implications of this performance for the patient. Sample Clinical Reports are provided in Figures 19 to 21. A sample Patient Letter is provided in Figure 22. A 9-square, colour-coded graphic provides a quick visual representation of performance in both the Summary Report and the Patient Letter.

Clinical Report: Summary

The Summary Report is a brief, one-page summary of performance that includes demographic information and any notes that were entered. The Summary Report includes the following information (see Figure 19.):

- Demographic information
- DSDA diagram illustrating test results
- Total scores for the DriveSafe and DriveAware subtests, and the Intersection Rules subtest (if completed)
- Outcome category (likely to pass on-road, likely to fail on-road, requires further testing)
- Recommendation

-
- Notes entered by the administrator into the open notes fields

Clinical Report: Extended

The Extended Report provides more detail on performance. The Extended Report includes the following information (see Figures 20. and 21.):

- Summary of the number of objects and details missed in the DriveSafe subtest.
- Number of additional objects reported (that were not present) in the DriveSafe subtest.
- DriveAware score in relation to cut-off scores.
- Performance on simple compared to complex intersections on the Intersection Rules subtest
- Time taken to complete DriveSafe.
- Categorisation diagram illustrating cutoff scores and categorisation process.
- Caution notices if the test flags that the person speaks English as a second language or has a psychiatric condition.

Patient Letter

The Patient Letter includes the following information (see Figure 22.):

- Purpose of the test
- Total score on the DriveSafe subtest as well as indication of the number of objects and details missed
- Total score on the DriveAware subtest
- Total score on the Intersection Rules subtest (if completed)
- Outcome category (likely to pass on-road, likely to fail on-road, requires further testing)
- DSDA diagram illustrating test results
- Recommendation



DriveSafe DriveAware - Summary Report

Name
Raymond Martin

Identification Number
261

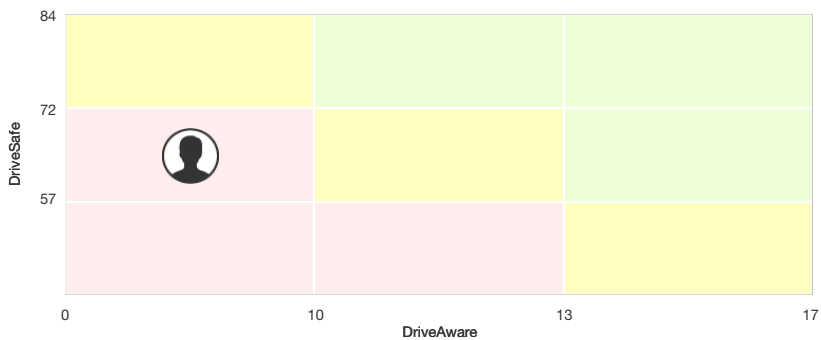
DOB / Age
21 Apr 1948 - 75 years

Assessment Date
15 Jan 2024

Gender
Male

Test Administrator
Claudia Perez

Diagnosis
Stroke / TIA | Diabetes mellitus



DriveSafe **66 / 84**
DriveAware **9**
Intersection Rules **5 / 8**

Outcome*

Likely to fail an on-road assessment

*Please consult manual for interpretation of category.

Recommendation

Results indicate the patient is potentially 'at risk' when driving and is likely to fail an Occupational Therapy (OT) on-road assessment. The patient is likely to have difficulty with the cognitive aspects of driving.

Referral to an OT driving assessment service is advised if the patient wishes to continue driving. Please contact your local occupational therapy association for a list of occupational therapy driver assessors in your area.

Figure 19. Example Summary Report



DriveSafe DriveAware - Extended Report

Name
Raymond Martin

Identification Number
261

1. DriveSafe (Objects & Directions)

DriveSafe determines awareness of the driving environment.

Table 1: Missed information

Information	No. Missed / Incorrect
Objects	6/28
Details (Location / Direction)	12/56

Total score **66 / 84**

Additional objects **0**

Time taken to complete test **4 minutes and 8 seconds**

2. Intersection Rules

Right of way is determined for 8 intersections.

Table 2: Performance based on intersection complexity

Intersection No.	Road Signs	No. of Vehicles in Image	Score
1, 3, 4, 7	Without road signs	2	2/4
2, 5, 6, 8	With road signs	3-4	3/4

Total score **5 / 8**

Figure 20. Example Extended Report: Page 1



DriveSafe DriveAware - Extended Report

Name
Raymond Martin

Identification Number
261

3. DriveAware

DriveAware determines awareness of own abilities related to driving.

Score **9**

A score of 10 or below indicates impaired awareness.

A score of 11 or 12 indicates further assessment is needed.

A score of 13 or above indicates intact awareness.

Figure 1. DriveSafe DriveAware Categorisation Cut-off Scores

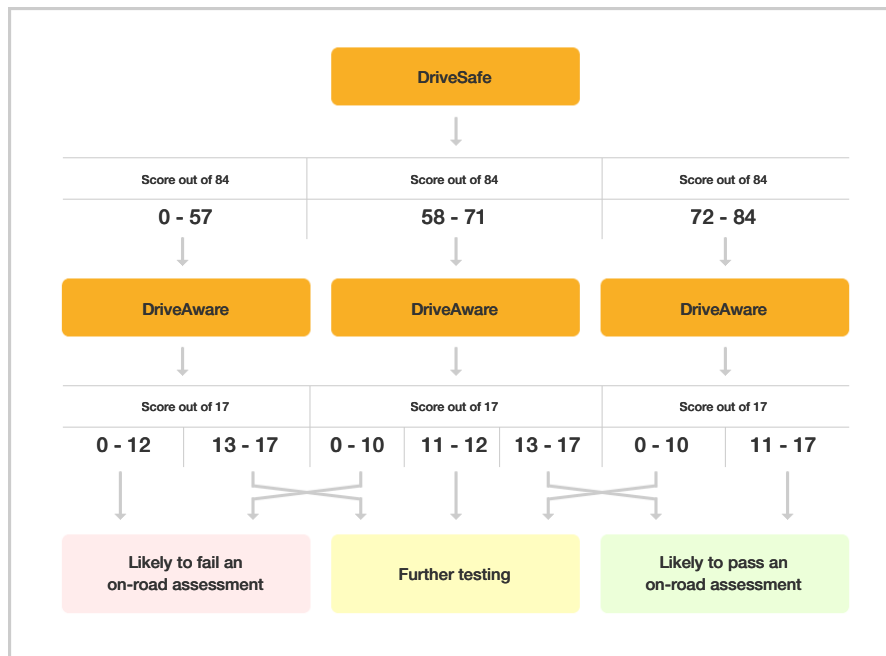


Figure 21. Example Extended Report: Page 2



DriveSafe DriveAware - Patient Letter

Name
Raymond Martin

Identification Number
261

The purpose of this test is to determine a driver's awareness of the driving environment and their own abilities related to driving. Results are used to indicate if further assessment of ability to manage the cognitive aspects of driving (thinking skills) is required.

Your results were:

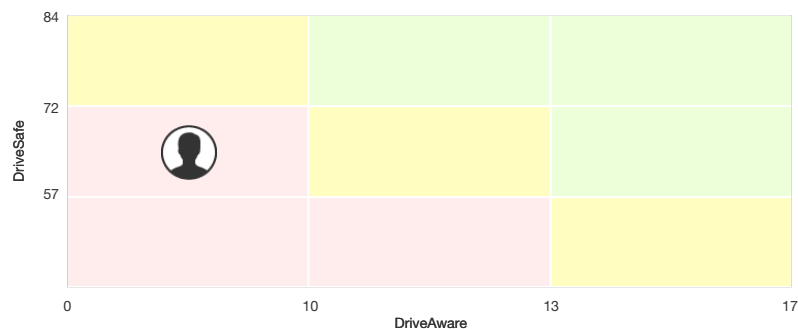
DriveSafe **66 / 84** Missed 6 objects and 12 details (location/direction).
DriveAware **9** A score of 10 and under indicates reduced awareness of abilities related to driving.
Intersection Rules **5 / 8**

These results place you in the category:

Likely to fail an on-road assessment

Your results indicate you may be 'at risk' when driving and are likely to fail an occupational therapy on-road assessment. Further assessment of driving ability is advised if you wish to continue driving.

Please discuss these results with your test administrator.



Note: If you have a medical condition that can affect physical capacity to drive, you may be required to undergo an occupational therapy driving assessment even if you fall into the 'green' section on this graph.

If you would like more information about DriveSafe DriveAware please visit the following website:

<https://www.drivesafedriveaware.com>

Disclaimer

The recommendations above were based on information provided by you, clinical information, performance on the day of the assessment, and results of research. The results of this test are for clinical and diagnostic purposes only, and are intended for use with a licenced clinical practitioner. The results should not be relied upon as an indicator of being collision-free (or otherwise).

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DriveSafe Diagnostics

Figure 22. Example Patient Letter

CHAPTER FOUR Summary

- A report is generated on completion of the DSDA-2 if there are purchased credits available.
- A summary report, extended report and/or patient letter can be emailed or printed directly from the iPad.
- DriveSafe and DriveAware scores are presented separately.
- **The DriveSafe subtest is the key subtest for trichotomising patients and should be given priority when interpreting the test results.** DriveAware provides supplementary information.
- DriveSafe and DriveAware scores are combined to categorise the patient as *likely to pass and on-road assessment, likely to fail an on-road assessment, or further testing is required.*

CHAPTER FIVE: DriveSafe DriveAware Research

The DSDA has been examined in an extensive body of peer-reviewed international research. To view a list of references that provide further information regarding the psychometric properties and predictive validity of the test, please visit:

<https://drivesafedriveaware.com/about-the-product>.

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