Driving and Dementia

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Candrive
Driving research for older adults.
Au volant de la recherche sur les aînés

McGill

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Conflict of Interests

- None to declare

Overview of the presentation

- A few facts
- The driving task and the impact of dementia on driving
- Screening the at-risk drivers
- The Comprehensive Driving Evaluation
- Driving cessation

Importance of Driving

- Driving is an important activity for community participation and quality of life
- Driving cessation can have a devastating impact
  - depression
  - Isolation
  - Access to activities

(Liddle & McKenna, 2003; Marshall et al., 2007; Poole et al., 2008)

A Few Facts…

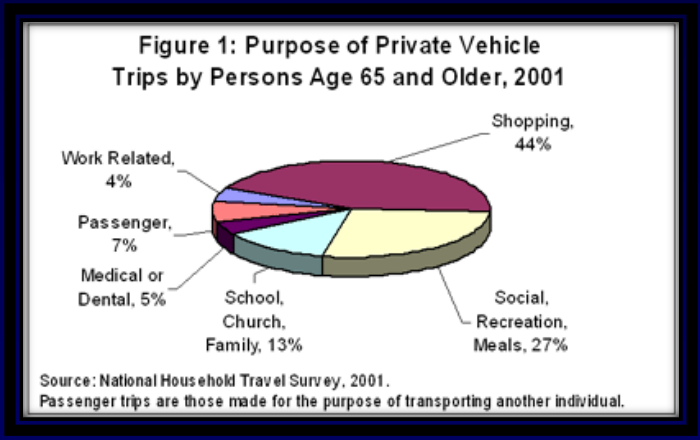
- In Canada, 75% of the persons aged 65 and over had a driving license in 2009 (Turcotte, 2012).

- According to Transport Canada (2008):
  - 71% for the 65-69 age range
  - 23% for the 85 years and over group

- It is estimated that there will be at least 85% of drivers aged 65 and over in 2028.

A Few Facts…

- Their preferred and most frequently used mode of transportation is the car (Kostyniuk & Shope, 2003).
- 72% of the older drivers report driving 3 or more times a week (Millar, 1999).



- Their driving habits differ according to their living environment (urban vs rural) (Bess, 1999).
- Older drivers usually drive safely.

A Few Facts…

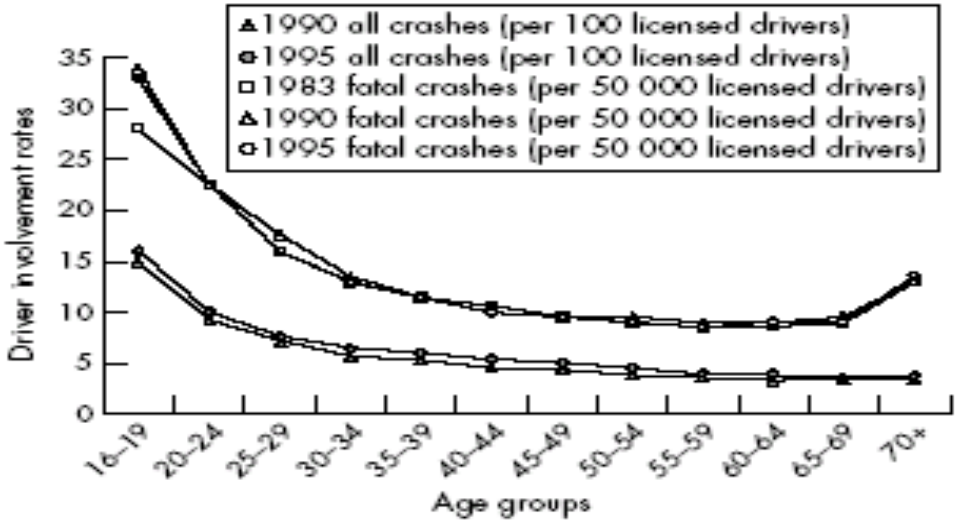


Figure 2 Driver involvement rates for all police reported crashes (General Estimates System) per 100 licensed drivers (Federal Highway Administration) for 1990 and 1995 and for fatal crashes (Fatality Analysis Reporting System) per 50 000 licensed drivers for 1983, 1990, and 1995 by age group.

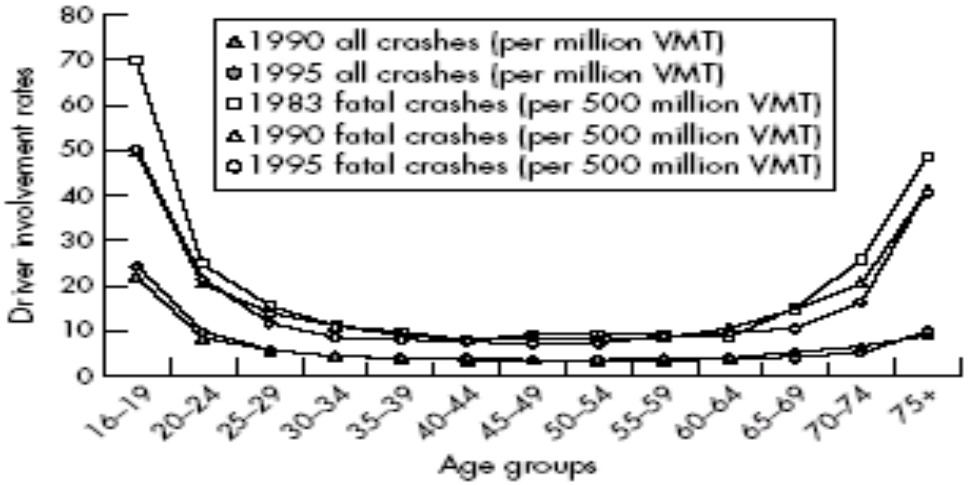


Figure 3 Driver involvement rates for all police reported crashes (General Estimates System) per million vehicle-miles of travel (VMT) (Nationwide Personal Transportation Survey) for 1990 and 1995 and for fatal crashes (Fatality Analysis Reporting System) per 500 million VMT for 1983, 1990, and 1995 by age group.

(Lyman, S., Ferguson, S.A., Braves, E.R., Williams, A.F., 2002)

A Few Facts…

- In 2009, it was estimated that 28% of Canadians aged 65 and over diagnosed with a dementia had a driving license (Turcotte, 2012).

- Studies report:
  - An accident risk 2 to 8 higher for individuals diagnosed with a dementia (Hing et al., 2007)
  - Following the onset of a dementia, the risk of accidents doubles every 5 years.

A Few Facts…

- Clear evidence that individuals with moderate to severe dementia are unsafe to drive (Consensus statements).
- The impact of mild dementia or MCI on driving safety is not clear:
  - Individuals with MCI performed worse (no clear evidence of impairment) than age-match participants:
    - On computer-simulated driving (Frittelli et al, 2009; Kawano et al, 2013)
    - On-road testing (Wadley et al, 2009)
  - Reported rates of on-road failure range between 12% and 48% (Ott et al., 2008; Snellgove, 2009)

The challenge …

Safety

Autonomy

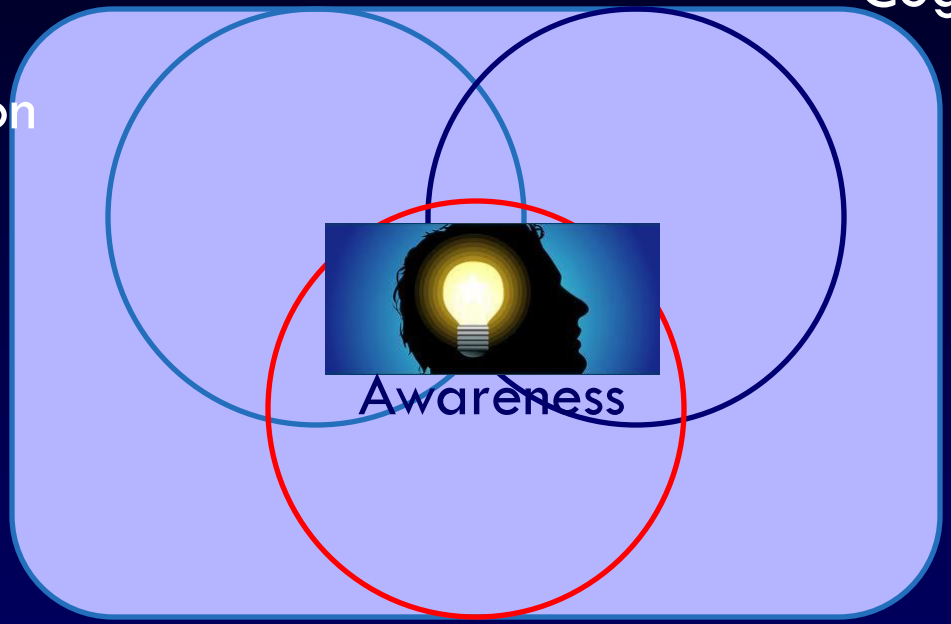
The screening of at-risk drivers relies on…

a good understanding of the driving activity

Manœuvre

Skills Required for Driving

Sensation /Perception



Cognition

Motivation / Affective

Psychomotor

A large portion of the driving task is done at a subconscious level…

- and relies on **automaticity**

- It involves rapid and effortless information processing activities developed after several repetitions

  Important for the experienced drivers…

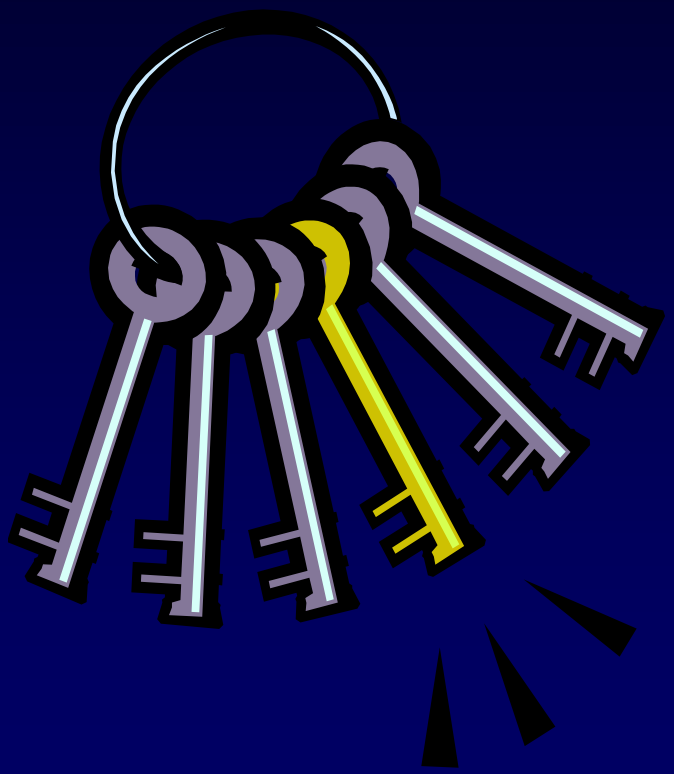
However…

Driving is not a routine activity

It is often unpredictable

It requires the use of good judgment, attention, planning and rapid decision making.

AWARENESS as a KEY indicator



Asking the following questions is crucial in screening a potentially at-risk driver:

1. Is my client aware of his surroundings in an appropriate manner? (Situational Awareness)
2. Is my client aware of his own strengths and limitations?

The Hierarchical Model of Task Performance in Driving

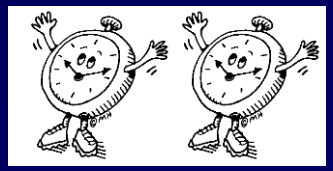
Strategic

- **General Plans**

Tactical

- **Controlled Action Patterns**
- Influenced by Environmental Input

Operational



- **Automatic Action Patterns**
- Influenced by Environmental Input

Awareness

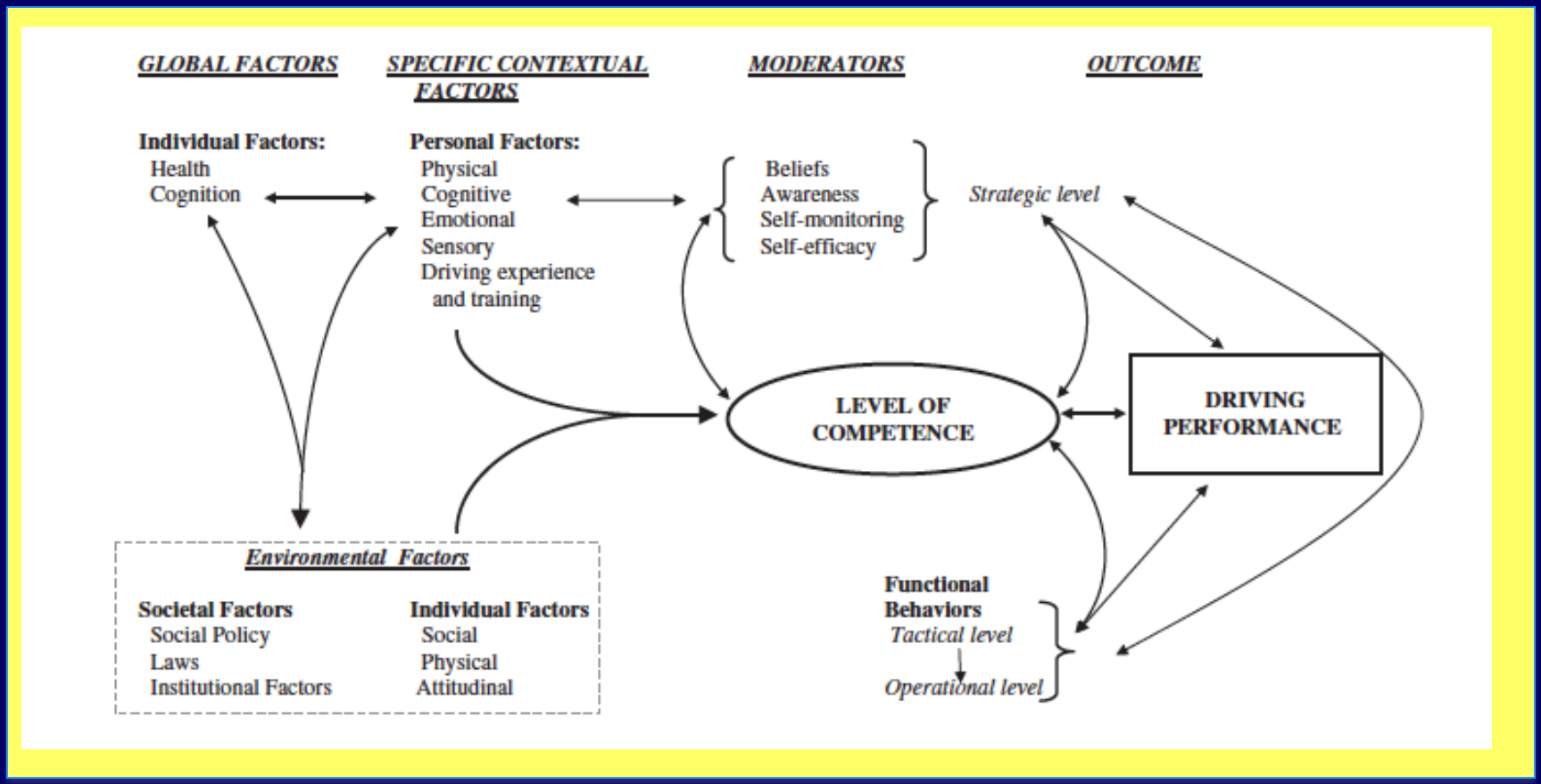
- Capabilities\Limitations
- Situational

Compensation

(Michon, 1979)

The Driving as Everyday Competence Model

(Lindstrom-Forneri, Tuokko et al., 2010)



SELF-REGULATORY BEHAVIORS

- Some drivers tend to take less risks while driving
- Use automatisms acquired from past driving experience
- Use of compensatory strategies:
  - Avoid certain risky situations
  - Compensation/Substitution
  - Optimization
  - Anticipation

What is the impact of age-related changes and dementia on driving ability?

Older drivers have…

- more accidents
  - While changing lane
  - While performing L unprotected turns
  - At intersections
- a tendency to:
  - Run over a red light or a stop sign
  - Have more difficulties with complex decision making while driving
- a tendency to take less risks

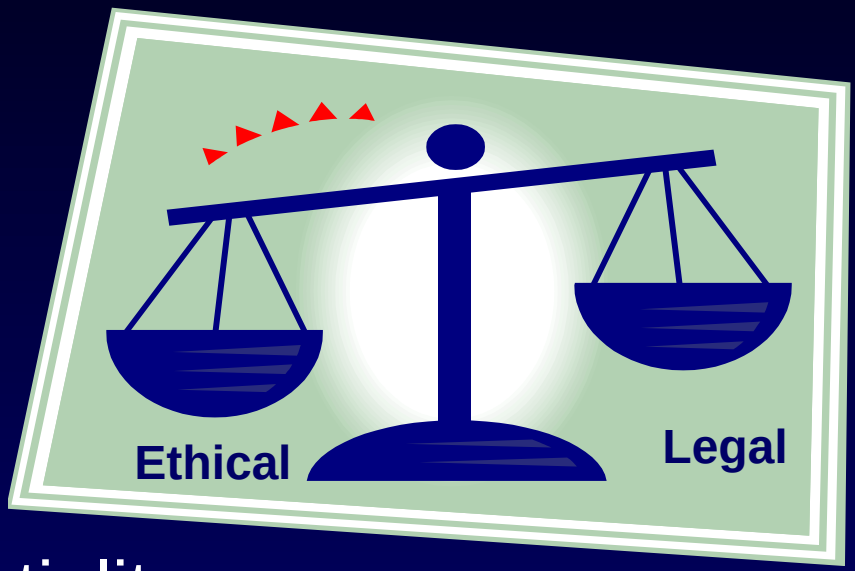
(Baker, Falb, Voas & Lacey, 2003)

Drivers with Dementia tend to…

- Drive more slowly
- Drift in adjacent lanes
- Brake suddenly
- Miss stop signs or lights; stop for green light
- Have difficulty with L non protected turns, lane changes, merging
- Get lost
- Have collisions or near-misses
- Irritate other drivers with their driving behavior; honking
- Need a co-pilot

SCREENING DRIVING-RELATED PROBLEMS IN THE CLINIC

PROFESSIONAL RESPONSIBILITIES



- Protect the client
- Protect public safety
- Maintain client confidentiality
- Respect the regulations related to reporting unfit drivers

The professional should:

- be knowledgeable of the medical conditions that can impair driving performance
- assess whether their client's condition may have an impact on driving performance
- discuss the impact that the condition may have on driving performance with their client
- report the client to the licensing authority, if required
- counsel the client and family and follow up on recommendations

Canadian Medical Association Guidelines (2012)

- A diagnosis of dementia is not sufficient to remove driving privileges

- Individuals with moderate to severe dementia should not drive *(or individuals not able to perform 2 or more IADLs or any BADL due to cognitive impairments)*

- The driving safety of individuals with mild dementia should be assessed since a significant number of individuals can still drive safely:
  - Requires a comprehensive driving evaluation by a specialist. On-road assessment viewed as the ‘gold standard’.
  - Periodic reassessment every 6 to 12 months.

Canadian Medical Association Guidelines (2012)

- At the moment, no test is sensitive and specific enough to be used as a determinant of fitness to drive
  - Using only cognitive screening tests is not sufficient.
  - However, abnormal results on the *MMSE*, *Clock Drawing* and *Trails B* should warrant a more in-depth evaluation

- Individuals with dementia and their family should be informed of the eventual need to retire from driving and be offered support for planning alternative modes of transportation.

Initial Screen:

- Include driving-specific questions and/or observations :
  Does the client have a car? Does the client have a valid driver's license? Does the client still drive?
- Be alert to "**Red Flags**"

RED FLAGS

- Medical conditions (acute & chronic) with resulting deficits that can impact on driving performance such as:
  - failing vision
  - mental deterioration (confusion, declining memory, perceptual deficits-visuospatial problems) – type of dementia
  - ↓ awareness
  - multiple physical deficits
- Side effects of prescribed or over-the-counter drugs/Alcohol abuse
- Client's or family member's concerns

Initial Screen:

- Include driving-specific questions and/or observations :
  Does the client have a car? Does the client have a valid driver's license? Does the client still drive?
- Be alert to "**Red Flags**"

Not at risk

No significant deficits affecting driving performance

- Safe Driving Tips
- Periodic Evaluation
- Start planning for an eventual cessation

At risk

Screen for problems in the following areas :

- Driving history and current driving behaviours
- Medical history and medication
- Vision and perception
- Cognition
- Psychomotor abilities

Which tools can I use?

QUESTIONNAIRES

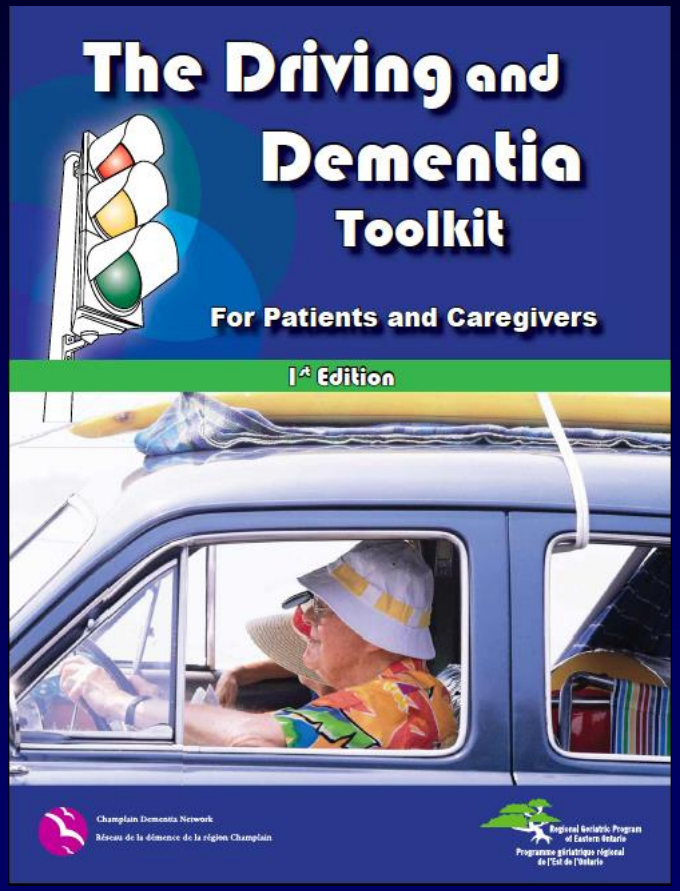
Driving and Dementia Tool Kit for patient and family

Aim:

- keep safe drivers on the road
- assist at-risk drivers to eventually cease driving

Content:

1) Overview of dementia and driving
2) Description of the assessment process
3) What to do in relation to the assessment outcome
4) Resources



QUESTIONNAIRES
DRIVING HISTORY

Areas assessed:

- Purpose
- Driving habits: alone/ accompanied, night, highway, rush hours, bad weather, neighborhood
- Frequency
- Mileage
- Driving speed
- Accidents and violations
- Perception of driving safety/ importance of driving

Questionnaire: MacDonald et al. Topics in Geriatric Rehabilitation 2008;24(3):239-252

- Driving Habits and Intentions (Lindstrom-Forneri et al., 2007)

- 13-item Day and16-item Night Driving Comfort Scales (Mac Donald, Myers & Blanchard, 2007)

'How comfortable are you driving in the daytime ...'
(please choose 0%, 25%, 50%, 75% or 100% when describing your level of comfort).

1 . In light rain?

○ 0% ○ 25% ○ 50% ○ 75% ○ 100%

- 15-item measures of Perceived Abilities (current) and Perceived Changes in Abilities (Mac Donald et al., 2007)

How would you rate your <u>current</u> ability to ...
Assume daytime driving unless specified otherwise (night)

Please fill in one of the circles that best describes your answer.

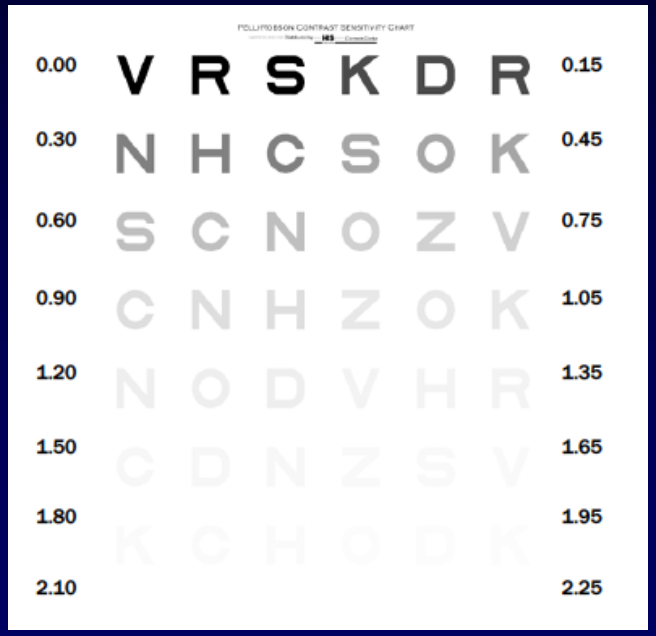
	Poor ▼	Fair ▼	Good ▼	Very Good ▼
1. See road signs at a distance?	○	○	○	○

Screening Tools

Structured …not developed to screen the at-risk drivers

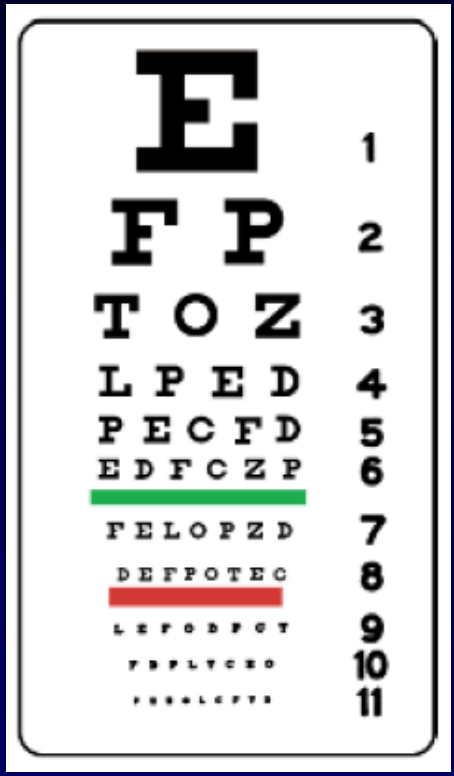
VISUAL SCREEN

Visual Skills



Pelli-Robson-Contrast Sensitivity
(Pelli et al.,1988)

Snellen Test for Visual Acuity
(Drasdo & Haggerty, 1981)



Peripheral Vision
(AMA, 2003)

Sensory-Motor Skills

- Finger-Nose Test
- Functional Range of Motion and Strength (Neck-Trunk, Upper and Lower limbs)
- Reaction time Test (Rapid Foot Taps)
- Timed up and Go or Rapid pace Walk Test

PERCEPTION & COGNITION

According to some authors, should include tests of:

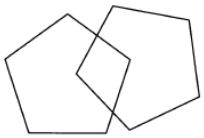
- visuospatial skills (Reger et al., 2004)
- visuomotor and executive functions (Whelihan et al, 2005; Ott et al., 2008; Carr & Ott, 2010)

PERCEPTION & COGNITION
Tests commonly used

- Mini-Mental State Examination (MMSE) (Folstein, Folstein & McHugh, 1975)
- MoCA (Nasreddine ZS, Phillips NA, Bédirian V, Charbonneau S, Whitehead V, Collin I, Cummings JL, Chertkow H., 2005)
- Motor-Free Visual Perception Test (M.V.P.T.) (Bouska & Kwatny, 1982)
- Trail Making A & B (Reitan, 1986)
- Clock Drawing Test
- Traffic Sign Recognition Test

Mini Mental State Exam (MMSE)

	Maximum Score	Score
ORIENTATION		
What is the (year) (season) (date) (day) (month)?	5	
Where are we: (province) (country) (town or city) (hospital) (floor)?	5	
REGISTRATION		
Name 3 common objects (eg. "apple", "table", "penny") Take 1 second to say each. Then ask the patient to repeat all 3 after you have said them. Give 1 point for each correct answer. Then repeat them until he/she learns all 3.	3	
Make a maximum of 6 trials. Count trials and record. Trials: _____		
ATTENTION AND CALCULATION		
Spell "world" backwards. The score is the number of letters in correct order (D-L-R-O-W-) [Note: Instead of "world", the following may be used - subtract 7 from 100 and keep subtracting 7 from the result until you tell him/her to stop.]	5	
RECALL		
Ask for the 3 objects repeated above. Give 1 point for each correct answer. [Note: recall cannot be tested if all 3 objects were not remembered during registration].	3	
LANGUAGE		
Name a "pencil," and a "watch." (2 points)	2	
Repeat the following: "no ifs, ands, or buts." (1 point)	1	
Follow a 3-stage command: "Take a paper in your right hand, fold it in half, and put it on the floor (3 points)	3	
Close your eyes (1 point)	1	
Write a sentence (1 point)	1	
Copy the following design (1 point)	1	
	Total Score _____/30	

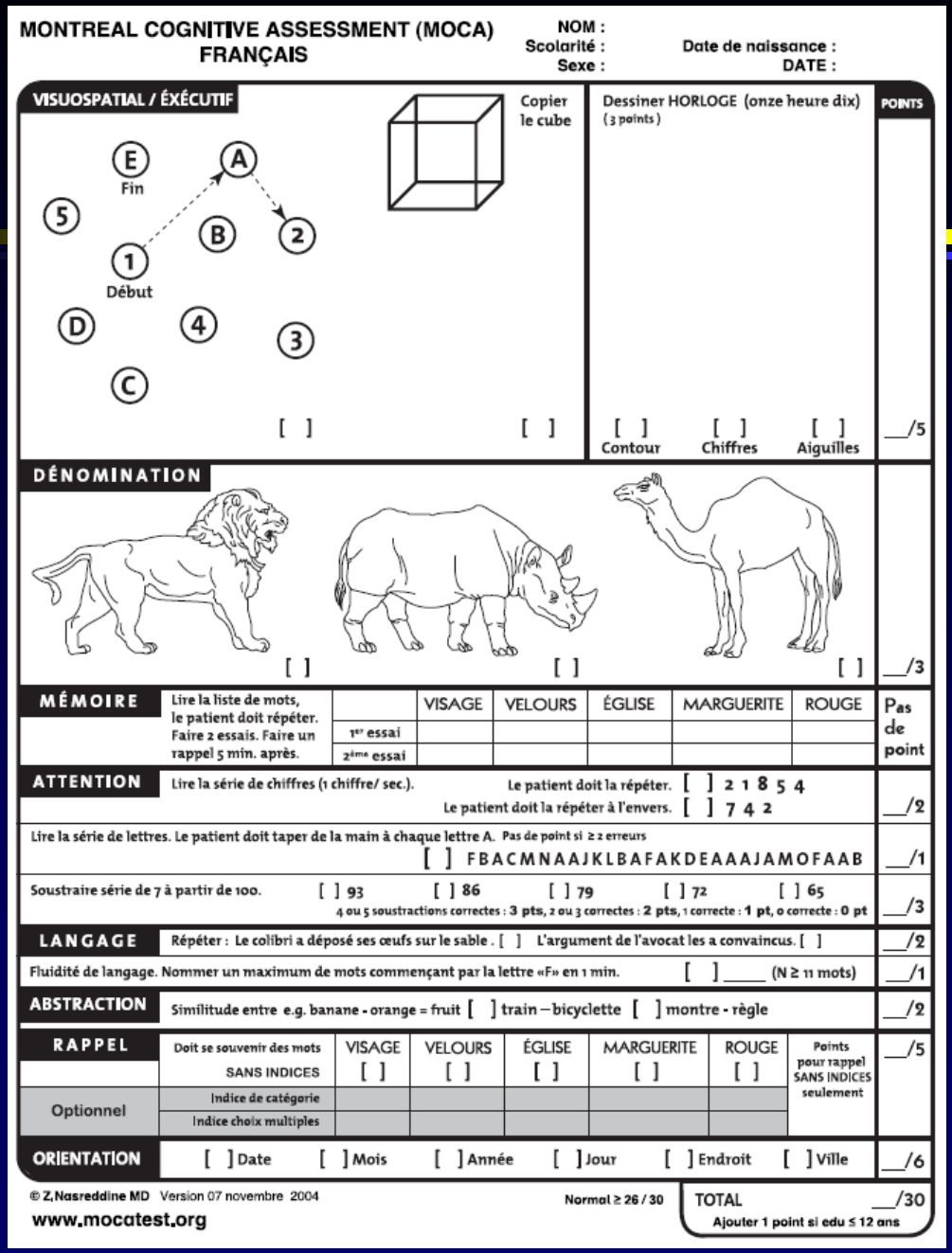


Adapted from Fostein MF, Folstein SE, and McHugh Pr. "Mini-Mental State": a practical method for grading the cognitive state of patients for the clinician. J Psychiatr Res 1975;12:196-8 and Cockkrell JR, and Folstein MF. Mini-Mental State Examination (MMSE) Psychopharm Bull 1988:24 (4):689-92

Its use as a screening tool for driving is controversial

(Bieliauskas et al., 1998; Lincoln et al., 2006; MacGregor et al., 2001; Freund et al. 2007; Ott et al., 2003)

MoCA Test
Montreal Cognitive Assessment



MONTREAL COGNITIVE ASSESSMENT (MOCA)
FRANÇAIS

NOM :
Scolarité :
Sexe :
Date de naissance :
DATE :

VISUOSPATIAL / ÉXÉCUTIF — POINTS

Copier le cube [ ] [ ]

Dessiner HORLOGE (onze heure dix) (3 points) [ ] Contour [ ] Chiffres [ ] Aiguilles — /5

DÉNOMINATION [ ] [ ] [ ] — /3

MÉMOIRE Lire la liste de mots, le patient doit répéter. Faire 2 essais. Faire un rappel 5 min. après. Pas de point

	VISAGE	VELOURS	ÉGLISE	MARGUERITE	ROUGE
1er essai					
2ème essai					

ATTENTION Lire la série de chiffres (1 chiffre/ sec.). — /2
Le patient doit la répéter. [ ] 2 1 8 5 4
Le patient doit la répéter à l'envers. [ ] 7 4 2

Lire la série de lettres. Le patient doit taper de la main à chaque lettre A. Pas de point si ≥ 2 erreurs — /1
[ ] F B A C M N A A J K L B A F A K D E A A A J A M O F A A B

Soustraire série de 7 à partir de 100. [ ] 93 [ ] 86 [ ] 79 [ ] 72 [ ] 65 — /3
4 ou 5 soustractions correctes : 3 pts, 2 ou 3 correctes : 2 pts, 1 correcte : 1 pt, 0 correcte : 0 pt

LANGAGE Répéter : Le colibri a déposé ses œufs sur le sable . [ ] L'argument de l'avocat les a convaincus. [ ] — /2

Fluidité de langage. Nommer un maximum de mots commençant par la lettre «F» en 1 min. [ ] ____ (N ≥ 11 mots) — /1

ABSTRACTION Similitude entre e.g. banane - orange = fruit [ ] train – bicyclette [ ] montre - règle — /2

RAPPEL — /5

Doit se souvenir des mots	VISAGE	VELOURS	ÉGLISE	MARGUERITE	ROUGE	Points pour rappel SANS INDICES seulement
SANS INDICES	[ ]	[ ]	[ ]	[ ]	[ ]	
Optionnel — Indice de catégorie						
Optionnel — Indice choix multiples						

ORIENTATION [ ] Date [ ] Mois [ ] Année [ ] Jour [ ] Endroit [ ] Ville — /6

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www.mocatest.org

Normal ≥ 26 / 30

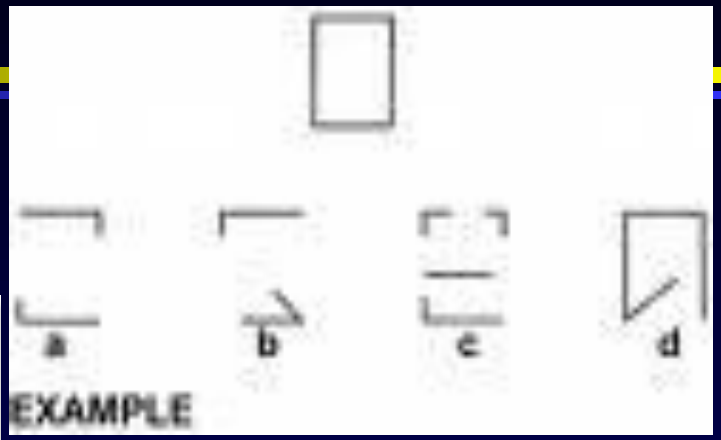
TOTAL — /30
Ajouter 1 point si edu ≤ 12 ans

- Found to have predictive ability (sensitivity of 84.5%; specificity of 50 %) with a cut-off of ≤25.
- Was significantly associated with the UFOV risk category.

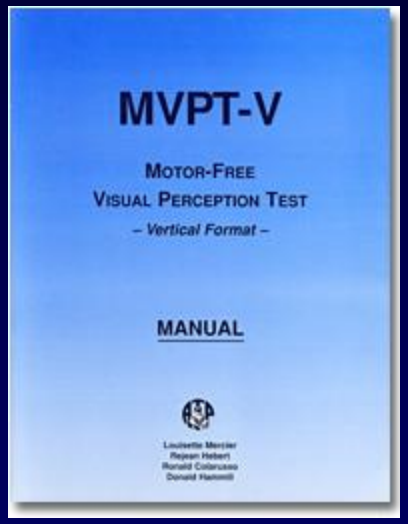
(Chui Wai Kwok, Gélinas, Benoit, Chilingaryan, 2015)

(Nasreddine ZS et al., 2005)

MOTOR-FREE VISUAL PERCEPTION TEST

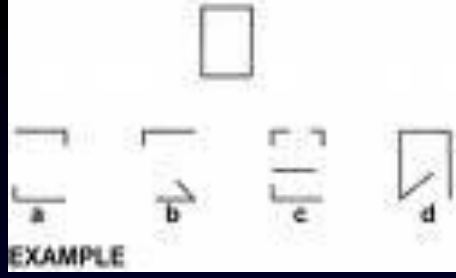


Original (Bouska & Kwatny, 1982)



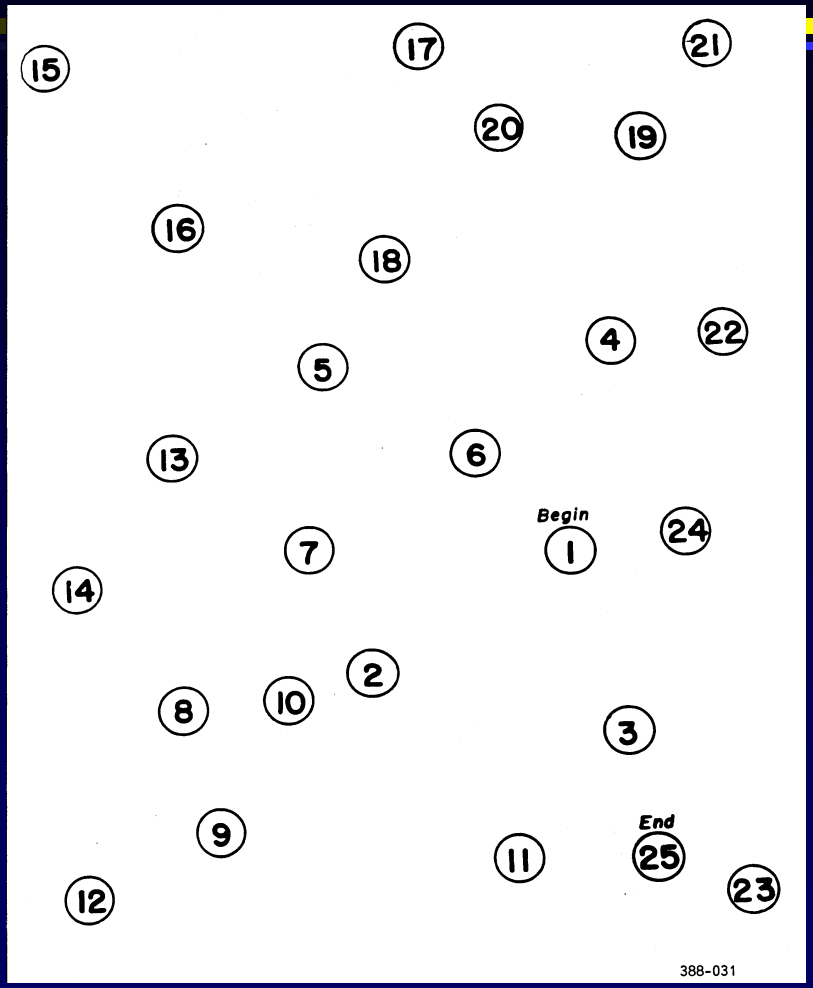
MVPT- 3 (Colarusso & Hammil, 2003)

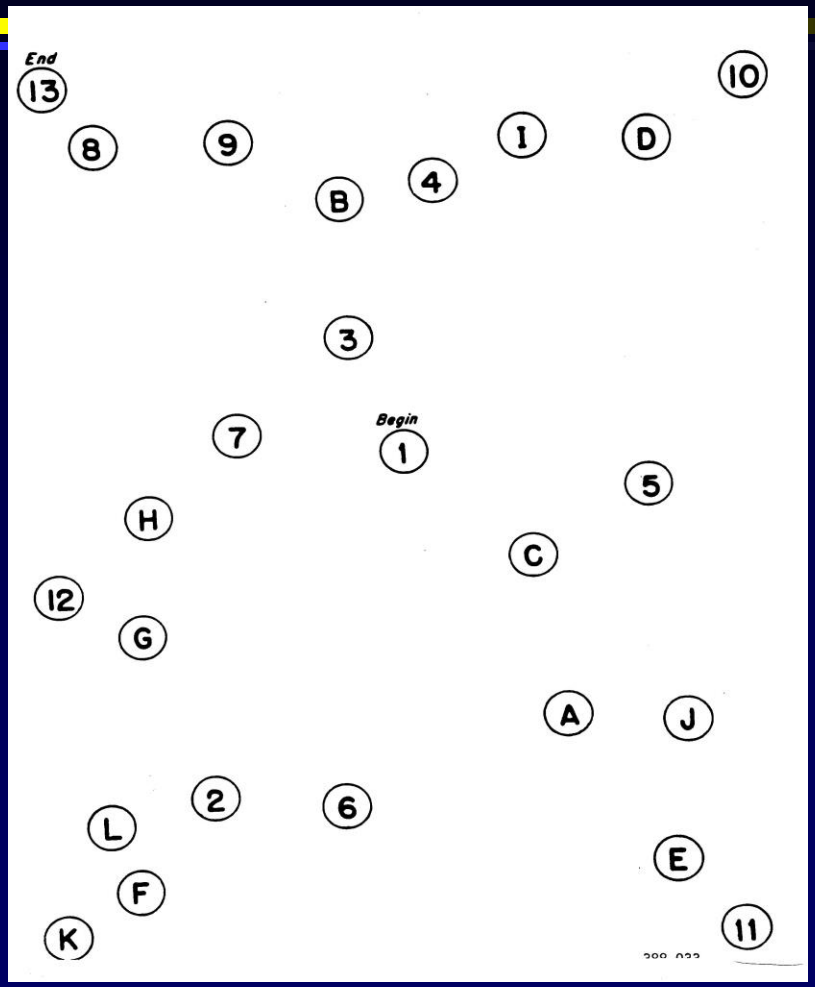
MVPT Studies



- With a cut-off of :
  - ≥32 : 60% sensitivity & 83% specificity (Oswanski et al, 2007);
  - >30 : PPV of 60.9 & NPP of 64.2 (Korner-Bitensky, Mazer, Sofer, Gelinas et al., 2000)
- MVPT & Trail B: 22 times more likely to fail on-road test (Mazer et al., 1998)
- The Visual closure subtest is used in batteries of tests (GRIMPs, CanDRIVE Study)
- MVPT 3, only 1 study has used it with 2 subtests (visual closure & spatial orientation). Spatial orientation was found to correlate with on-road performance (Stav et al, 2008)

TRAIL MAKING A & B





(Reitan, 1986)

TRAIL MAKING A & B

A

- Correlated with on-road performance in clients with Alzheimer's Disease and a control group (Grace et al, 2005; Ott et al, 2008)
- Associated to crash risks (Stutt et al, 2008)
- Correlated to driving simulator performance (Szlyk et al 2002)

B

- Correlated with on-road performance with different client groups (Ott et al, 2008; Dey, 2004; Grace et al, 2005)
- Correlated to driving simulator performance (Szlyk et al 2002)

Systematic review of the evidence for Trails B cut-off scores in assessing fitness-to-drive

Roy M., Molnar F.,CANADIAN GERIATRICS JOURNAL, VOLUME 16, ISSUE 3, SEPTEMBER 2013

TABLE 3.
Studies reporting Trails B cut-off values

Author, Year (Country)	*Reported Trails B Cut-off Value*	*Source of Reported Cut-off*
Hargrave, 2012 (U.S.)[10]	90 seconds	Analysis of primary driving research
Marottoli, 1998 (U.S.)[11]	133 seconds	
Ball, 2006 (U.S.)[12]	147 seconds	
Staplin, 2003 (U.S.) (original MaryPODS data)[13]	180 seconds	
Mazer, 1998 (Canada)[14]	<3 errors	
Betz, 2009 (U.S.)[15]	180 seconds	References (Wang 2003[18] and Tombaugh 2004[6])[a]
Classen, 2008 (U.S.)[16]	3 minutes	References (Fals-Stewart 1992[20] and Franzen 1996[21])[a]
Bliokas, 2011 (Australia)[17]	≥ 292 seconds	Reference (Lezak 1983[19])[a]

[a]Cut-offs provided in these studies are not based on pri

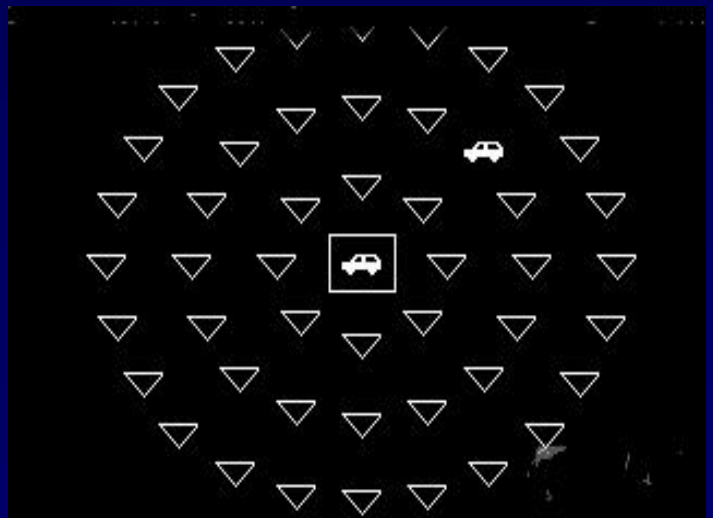
	Average	Deficient
TRAIL A	29 sec	>78 sec
TRAIL B	75 sec	>273 sec

Clock Drawing Test

Client is asked to draw a clock with hands indicating 11:10.

- 7 points scale: sensitivity of 64,2% & specificity of 97.7% with a cut-off of 4 for predicting performance on a driving simulator (Freund et al., 2004)
- 4 points scale : sensitivity of 70% & specificity of 65% with a cut-off of 3 for predicting on-road performance (Oswanski et al, 2007)
- 5 points scale : fails to be significant in predict self-report driving ability (Ott et al, 2003)

Useful Field of View (UFOV)



- UFOV reduction correlates with on-road performance (overall score and specific items) (Duchek et al, 1998; Raedt et al, 2000)
- Also correlates with official crash rate (Goode et al, 1998)
- Fails to predict driving simulator performance (Sifrit, 2005)
- Subtest 2 alone can predict on-road performance and official crash rate (Wood et al, 2008; Ball et al, 2006)

Screening Tools

Developed specifically to screen for at risk-drivers…

Traffic Sign Recognition Test

Test usually not standardized, often 'home-made'

- Different tests used in the different studies.
- Associations noted with crash rate (MacGregor et al, 2001; Stutt et al, 1998), and on-road performance (Stav et al, 2008; Kantor et al, 2008)

Road Sign Recognition Test

Example Question:
Please select the best answer for this sign.

A. *Prepare to stop abruptly*
B. *You are entering a priority traffic lane. You must yield and adjust your speed.*
C. *This sign is only used in Europe.*

(MacGregor et al, 2001)

Road Sign Recognition Test

What would you do
in this situation?

(Centre de réadaptation Constance Lethbridge, programme de conduite automobile et adaptation de véhicule, 2011)

Judgment and Awareness

Questions to include in the Interview

Ask family members if the driving habits or attitudes of the person related to driving have changed

- Has your diagnosis influenced your driving?
- Do you have problems driving at night? During rush hour?
- If your car suddenly breaks down on the highway, what would you do?
- While you are driving on the highway, you notice a police car with flashing lights behind you. What do you do?
- You have an appointment with your doctor, who has moved to a new location. You are not familiar with the neighborhood and you do not have the new address. How will you get there?

(Centre de réadaptation Constance Lethbridge, programme de conduite automobile et adaptation de véhicule)

10 MINUTE OFFICE BASED DEMENTIA AND DRIVING CHECKLIST

(Based on Clinical Opinion and Experience not Evidence. Development lead by and copyright held by Dr. W. Dalziel).

The checklist can take 10 minutes or less to complete as it is not necessary to complete all 10 items if it is obvious the patient is unsafe to drive based on early items.

PROBLEM

☐ 1. Dementia Type:
Generally Lewy Body dementia (fluctuations, hallucinations, visuospatial problems) and Frontotemporal dementias (if associated behaviour or judgment issues) are unsafe.

☐ 2. FUNCTIONAL IMPACT of the Dementia - According to *CMA guidelines* Unsafe if:
- impairment of more than 1 Instrumental ADLs due to cognition
(IADLs = SHAFT: Shopping, Housework/Hobbies, Accounting, Food, Telephone / Tools)
- OR impairment of 1 or more Personal ADLs due to cognition (PADLS = DEATH: Dressing, Eating, Ambulation, Transfers, Hygiene)

☐ 3. Family Concerns: (ask in a room separate from the person)
Family feels safe/unsafe (make sure family has recently been in the car with the person driving)
* The grand daughter question - Would you feel it was safe if a 5 year old grand daughter was in the car alone with the person driving (often different response from family's answer to previous question)
Generally if the family feels the person is unsafe they are unsafe. If the family feels the person is safe, the person may still be unsafe as family may be unaware or may be protecting patient.

☐ 4. Visuospatial: (Intersecting pentagons/clock drawing numbers)
If major abnormalities – likely unsafe

☐ 5. Physical inability to operate a car (often a "physical" reason is better accepted):
Medical/Physical concerns such as musculoskeletal problems, weakness/multiple medical conditions (neck turn, problems in the use of steering wheel/pedals), cardiac/neurologic (episodic "spells")

☐ 6. Vision/Visual Fields:
Significant problems including visual acuity, field of vision.

☐ 7. Drugs: (if associated with side effects: drowsiness, slow reaction time, lack of focus)
Alcohol/Benzodiazepines/Narcotics/Neuroleptics/Sedatives
Anticholinergic–antiparkinsonian/muscle relaxants/tricyclics/antihistamine(OTC)/antiemetics/antipruritics/antispasmodics/others

PROBLEM

☐ 8. Trailmaking A&B: (available at www.rgpsy.com)
Trailmaking A - Unsafe = > 2 minutes or 2 or more errors
Trailmaking B - Safe = < 2 minutes and < 2 errors (0 or 1 error)
Unsure = 2-3 minutes or 2 errors: (consider qualitative dynamic information regarding HOW the test was performed: slowness/hesitation/anxiety or panic attacks/impulsive or perseverative behaviour /lack of focus/multiple corrections/forgetting instructions/inability to understand test etc.)
Unsafe = > 3 minutes or 3 or more errors

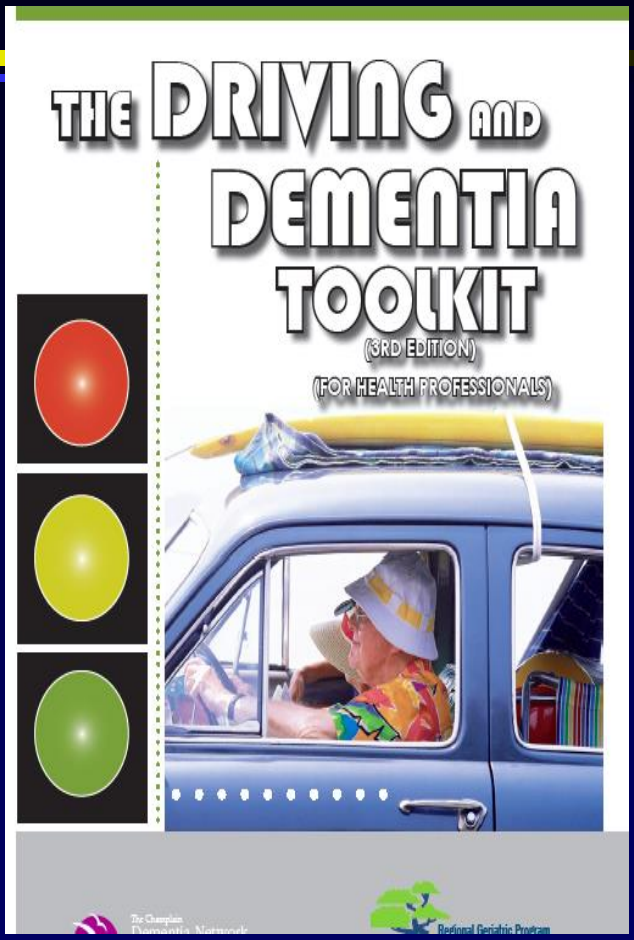
☐ 9. Ruler Drop Reaction Time test (Accident Analysis & Prevention 2007; 39(5): 1056 – 1063): The bottom end of a 12" ruler is placed between thumb and index finger (1/2" apart) let go and person tries to catch ruler (normal = 6-9"/abnormal = 2 failed trials)

☐ 10. Judgment/Insight (Ask the person):
What would you do if you were driving and saw a ball roll out on the street ahead of you?
With your diagnosis of Dementia, do you think at some time you will need to stop driving?

CONCLUSION:

Safe	Unsafe	Unsure
↓	↓	↓
Reassess 6-12/12	Report to Provincial Registrar	If only driving an issue – refer to Specialized On Road Assessment If driving and other dementia related issues refer to specialized dementia assessment services.

(reference Age and Ageing 2009 and https://akontario.collinsv.com/Driving)



ASSESSMENT ALGORITHM/ROADMAP

INITIAL CONTACT WITH DRIVER WITH DEMENTIA

↓

Do the 10 minute Office Dementia and Driving Checklist - page 10

↓

Clearly unsafe

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Inform the patient to stop driving (give patient/family written notification and document in chart) (page 17)

↓

Notify the Provincial Registrar - (See Insert Back pocket)

↓

Follow up regarding: (page 17&18)

- confirmation of driving cessation
- Isolation
- Depression
- Use of alternative transportation

Driving risk is uncertain

↓

IF there are dementia-related issues other than driving which assesment and treatment (or if paient truly cannot afford on-road test

↓

Refer to local multidisciplinary dementia assesment site (could include occupational therapy or neuropsychology evaluation)

If still unsure re: fitness to drive →

IF driving is the only dementia-related issue to address.

↓

Refer to health professional led comprehensive driving evaluation- on/off road (see Insert Back pocket)

Appears safe

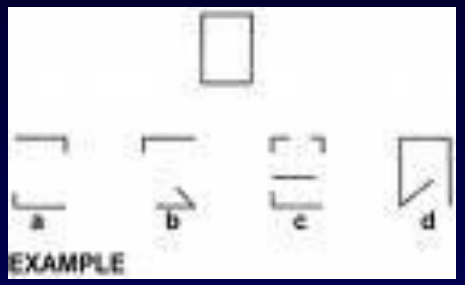
↓

Follow Up

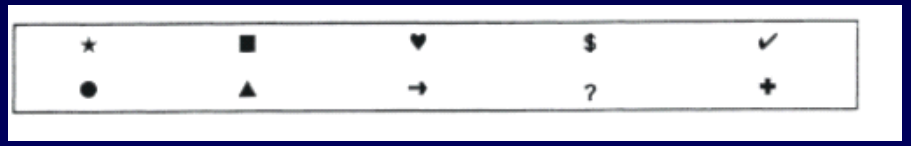
(every 6 - 12 months) (page 15)

Gross Impairments Screening Battery of General Physical and Mental Abilities (GRIMPS)

- Rapid-Pace Walk
- Cued Recall (MMSE test Item #3)
- Alternating Foot-Tap Test
- MVPT – Visual Closure Subtest
- Arm Reach
- Head/Neck and Upper Torso Rotation



- Scanning Task



- Trail Making Test: Part A (abbreviated) and Part B
- Delayed Recall (MMSE test item #5)
- Vision Tests (optional)

http://www.nhtsa.dotgov/people/injury/olddrive/safe/01c02.htm

GRIMPS

- TMT B and MVPT visual closure subtests associated with collision risks (Ball et al, 2006)
- Fall history associated with collision risks (Ball et al, 2006)
- Rapid pace walk correlated with on-road performance (Stav et al, 2008)
- Trunk/ neck ROM correlated with on-road performance (Stav et al, 2008; Wood et al, 2008)
- More studies needed

Assessment of Driving-Related Skills (ADReS)

- Visual Acuity
- Visual Fields
- Trail-Making Test, Part B
- Clock Drawing Test
- Rapid Pace Walk
- Manual Test of Range of Motion
- Manual Test of Motor Strength

Wang, CC, Kosinski, CJ, Schartzberg, JG & Shanklin, AV. American Medical Association Physician's Guide to Assessing and Counseling Older Drivers. American Medical Association, Washington, D.C.: National Highway Traffic Safety Administration, 2003.

ADReS

- Clock Drawing Test associated with on-road performance (McCarthy et al, 2006)
- TMT B not related: non-standardized version used (McCarthy et al, 2006)
- Rapid pace walk & ROM related to on-road performance (McCarthy et al, 2006)
- Not sensitive but specific
- Several methodological limitations
- Further studies needed

Fitness-to-Drive Screening Measure (FTDS) A web-based measure for caregivers, family members and OT (Classen & collaborators, 2013)

- **Four Sections**:
  - Demographics of the rater
  - Demographics of the driver
  - Driving history and habits
  - 54 Driving Behaviors

    54 items: Observable behaviors; Progress in the level of difficulty; 4-point rating scale from very difficult-moderate-little-no difficulty

- **Profile**: At-risk driver/Routine driver/Accomplished driver + **targeted recommendations**
- Measurement Properties determined (e.g.validity, reliability)

http://fitnesstodrive.phhp.ufl.edu/

CanDRIVE/Ozcandrive Cohort study

(Multidisciplinary team of researchers, CIHR Team Grant 2008-2013)

Objectives

- Determine the risk factors associated with crashes in older drivers.
- Develop a decision tool for use by clinicians to identify the at-risk drivers who may require a more in depth assessment.

Participants

Drivers aged 70 yrs and over

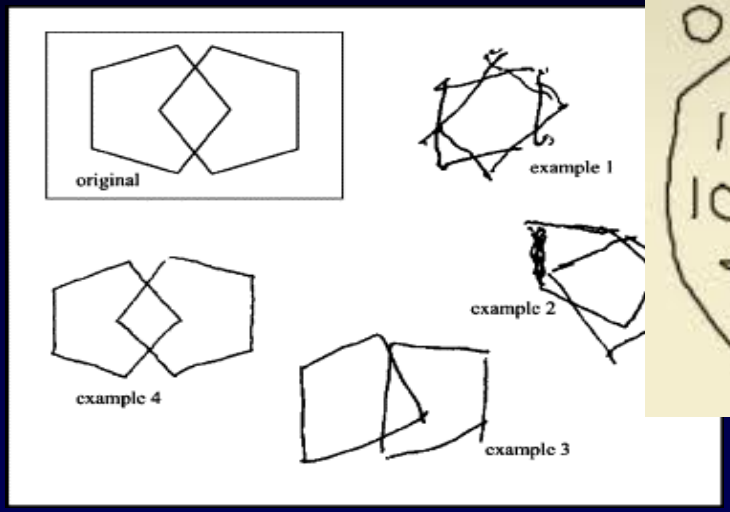
Candrive
Driving research for older adults.
Au volant de la recherche sur les aînés

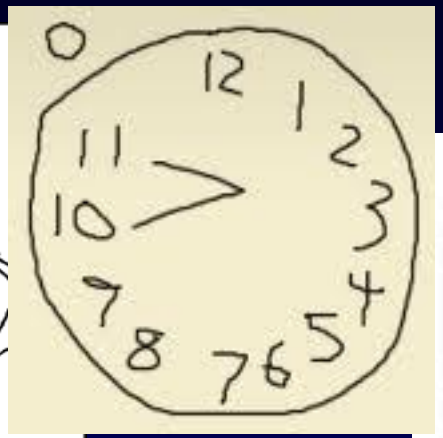
7 sites
(928 participants)
+
sites in Australia & New Zealand
(302 participants)

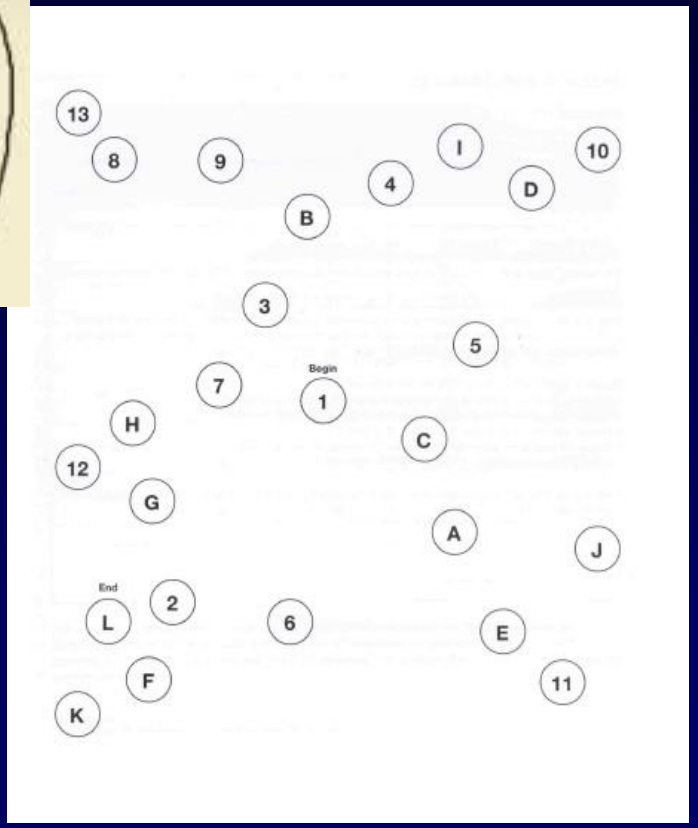
Procedure

- Participants are followed prospectively over 5 yrs
- Annually:
  - Comprehensive evaluation
    - Environmental factors, personal factors, medical & functional assessment (physical, cognitive, emotional)
  - Phone contacts every 4 months
    - Verification of changes in the medical condition
    - Verification of changes in the driving habits
  - GPS installed in the vehicle
    - Driving patterns
  - Observation of driving performance (years 4 & 5) (Funding from Auto21 NCE)
  - Driving records (collisions)

#1. Annual Health Battery





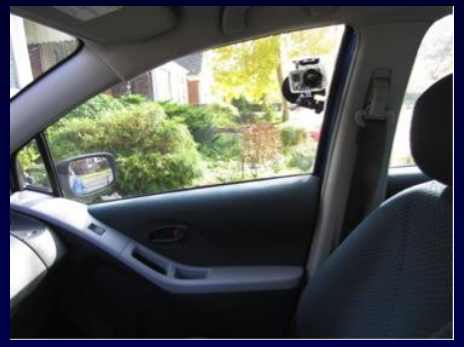


#2. Driving Exposure

#3. Crashes & Violations

- **Ministry/Provincial Records**
- **Self-reported crashes/violations**

#4. Naturalistic Driving (sub-sample)



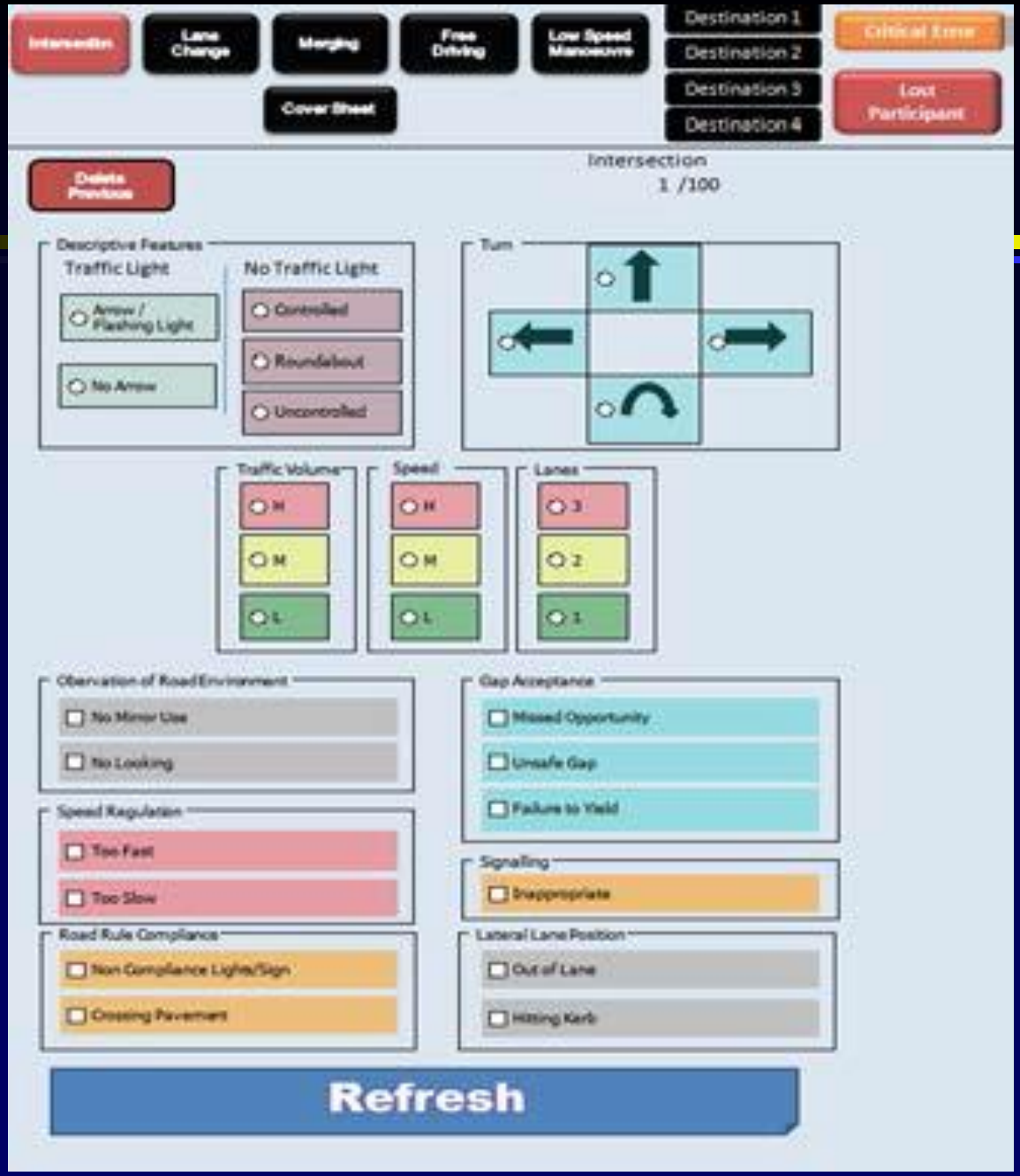
PERSENTECH

Candrive
Driving research for older adults.
Au volant de la recherche sur les aînés.

AUTO21 TM/MC
Innovation Through Research Excellence
l'innovation par l'excellence en recherche

Ozcandrive
Driving research for seniors in Australia and New Zealand

GoPro
Be a HERO.



eDOS Tracking Sheet

Score: 0-100

Recommandations when screening (Molnard et al., 2012)

- Are the test results consistent with other information gathered or other tests? *The test results should be part of a more detailed evaluation.*
- Ensure that you have considered factors that could impact on the test scores (e.g. anxiety, low education, language,…)
- Take also into consideration the qualitative information observed during testing
- Consider whether the person's functional abilities are expected to improve, remain stable or worsen.

Recommandations when screening (Molnard et al., 2012)

- Given the testing performed, 4 questions to help make a decision:
  - Would I get into a car with the person driving?
  - Would I let a loved one get into a car with the person driving?
  - Would I want to be crossing the street in front of a car with the patient driving?
  - Would I want to have a loved one cross the street in front of a car with the person driving?
- Make recommendation that are within your professional competencies

Consensus among dementia experts for reporting individuals with mild dementia and MCI

(Rapoport et al., 2014)

Supports the importance of assessing driving safety

- *Trigger a report*:
  - Presence of caregiver concern about driving + abnormal Clock Drawing Test (CDT)
  - Combination of caregiver concern about driving + ↓ MOCA score (e.g. 19/30) or prior crash
- *Consider reporting*:
  - Long completion time for Trail B + several errors
- *Consider deferring referral for further testing or reporting*:
  - No caregiver concern about driving + normal CDT + no change in behavior + no cognitive slowing

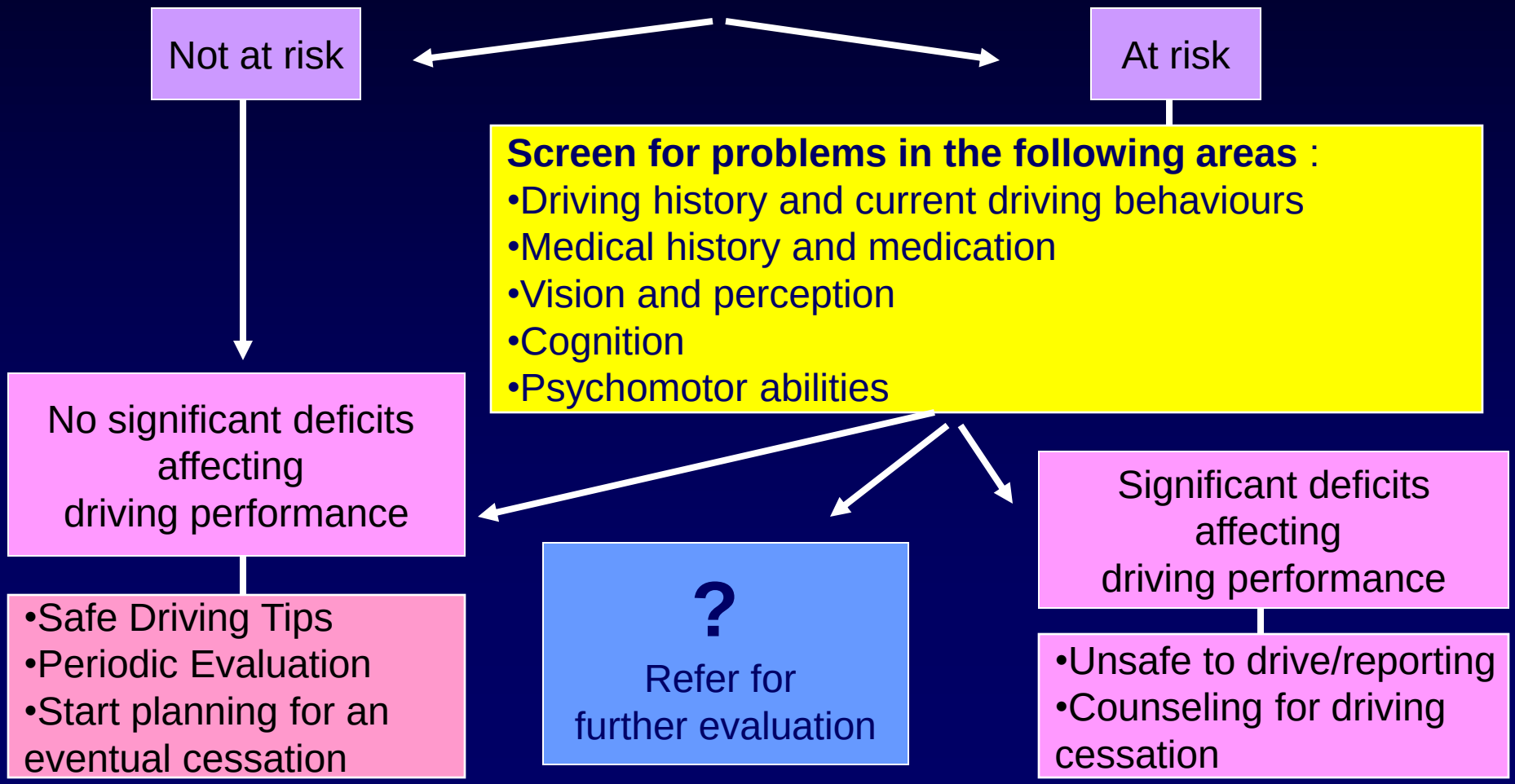
Consensus among dementia experts for reporting individuals with mild dementia and MCI

(Rapoport et al., 2014)

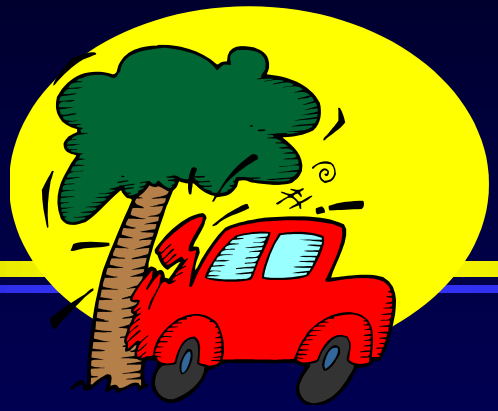
- *Additional Recommendations*:
  - Physical disability affecting the operation of controls, multiple medical comorbidities, medication affecting driving, behavioral difficulties, sensory impairment, driving self-restriction
  - Careful look at caregiver concerns (reliability of caregiver, circumstances,…)
  - Deferral of reporting should include a plan to follow-up and reassess

Initial Screen:

- Include driving-specific questions and/or observations :
  Does the client have a car? Does the client have a valid driver's license? Does the client still drive?
- Be alert to "**Red Flags**"

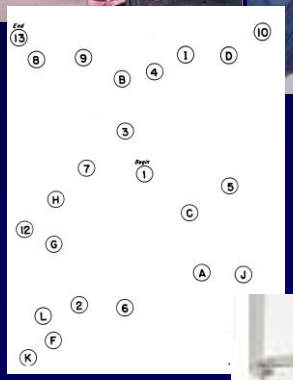


Results of screening suggest that my client poses a safety risk on the road… what do I do now?



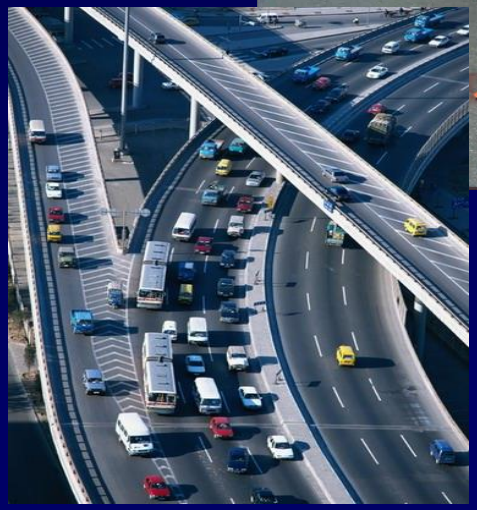
- Reporting to licensing authorities
- Referral to a specialized center for a *Comprehensive Driving Assessment*

Comprehensive Driving Assessment



Off-Road Assessment

On-Road Assessment



ALTERNATIVES FOLLOWING DRIVING CESSATION

- Provide support to the person and family
- Assess transportation needs
- Explore alternative forms of transportation
  - public transportation
  - family member or volunteers
  - adapted transport
  - taxi
- Investigate activities that can be accessed through other means of transportation

Conclusion

Thank You!

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