Ms. Daisy is still driving…
So when is it time to take an Uber?
An Evidenced-Based Review on Dementia and Driving

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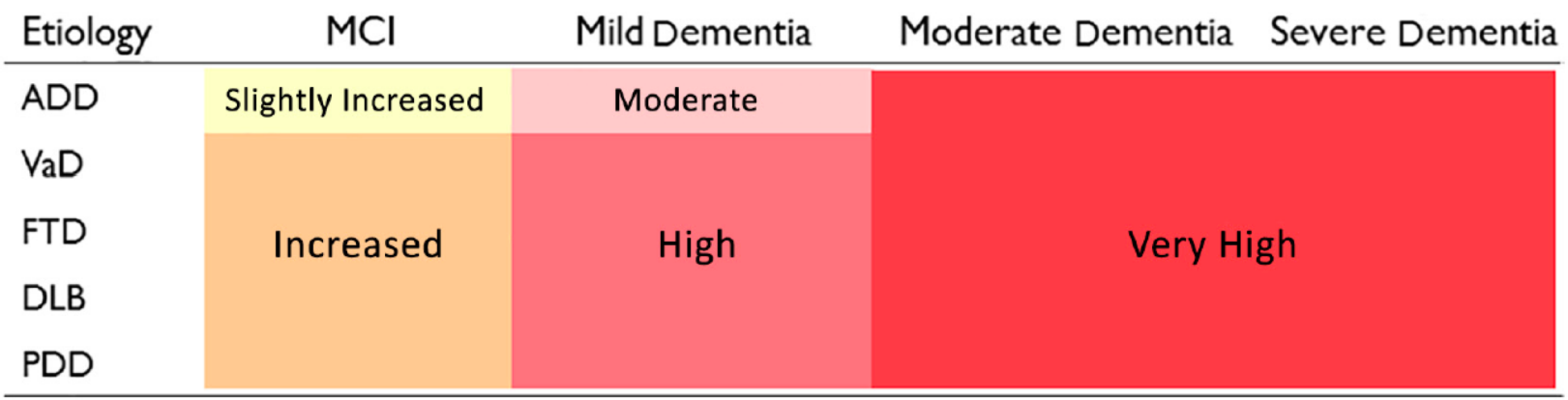
PRESENTATION OBJECTIVES

Review a recent national guideline on dementia and driving

Follow a patient with dementia in our memory clinic as we try to make clinical decisions related to driving

Pose some additional observations and questions…

This talk does not cover MCI, preclinical AD, non-AD dementias



Toepper M and Falkenstein M. Driving Fitness and Different Forms of Dementia. 2019. JAGS 67:2186-2192.

National Guidelines on Driving and Dementia

Current Psychiatry Reports (2018) 20: 16
https://doi.org/10.1007/s11920-018-0879-x

GERIATRIC DISORDERS (W MCDONALD, SECTION EDITOR)

An International Approach to Enhancing a National Guideline on Driving and Dementia

Mark J. Rapoport[1,2] · Justin N. Chee[1,2] · David B. Carr[3] · Frank Molnar[4,5] · Gary Naglie[2,6] · Jamie Dow[7] · Richard Marottoli[8] · Sara Mitchell[1,2] · Mark Tant[9] · Nathan Herrmann[1,2] · Krista L. Lanctôt[1,2] · John-Paul Taylor[10] · Paul C. Donaghy[10] · Sherrilene Classen[11] · Desmond O'Neill[12]

Published online: 12 March 2018

Rapport M, et al. International Approach to Enhancing a National Guideline on Driving and Dementia. Current Psychiatry Reports 2018; 20:16

Driving & Dementia Working Group (2018). Driving with dementia or mild cognitive impairment Consensus guidelines for clinicians. United Kingdom.
Available: https://research.ncl.ac.uk/driving-and-dementia/consensusguidelinesforclinicians/

Case-Based Approach

- An 83 year old female presents with dementia
- Daughter raises concerns about driving given mother's slowed reaction time, medications, and other medical conditions
- PMH: HTN, Type II DM, Anxiety Disorder (GAD)
- Medications:

  Atenolol 50mg BID,

  Metformin 500g BID

  Sertraline 25mg QD

  Alprazolam .125 mg BID prn

Clinical Questions One Might Ask…

Should clinicians be involved in fitness-to-drive evaluations?

Should a diagnosis of Alzheimer's disease result in immediate cessation of driving privileges?

(crash risk or failure on a road test)

Is there a level of dementia severity where driving becomes unsafe?

How can one rate dementia severity if they don't use the Clinical Dementia Rating (CDR)?

Can AD patients demonstrate driving competency?

A convenience sample of 58 controls, 36 subjects with very mild DAT, and 29 subjects with mild DAT.

Results: Analysis of road test ability of controls (2 subjects [3%] failed the test), very mild DAT subjects (7 subjects [19%] failed), and mild DAT subjects (12 subjects [41%] failed) disclosed a significant association between driving performance and dementia status [N=123];$P<.001$.

Interrater reliability for assessment of driving performance ranged from k=0.85 to 0.96. One-month test-retest stability on the road test was 0.76 (quantitative scoring) and 0.53 (clinical judgment).

Conclusion: Some patients with AD can drive safely

Hunt, et al. Reliability of the Washington University Road Test. Arch Neurol 1997;54:707-12.

Review > Am J Geriatr Psychiatry. 2017 Dec;25(12):1376–1390.
doi: 10.1016/j.jagp.2017.05.007. Epub 2017 May 15.

Update on the Risk of Motor Vehicle Collision or Driving Impairment with Dementia: A Collaborative International Systematic Review and Meta–Analysis

Justin N Chee [1], Mark J Rapoport [2], Frank Molnar [3], Nathan Herrmann [2], Desmond O'Neill [4], Richard Marottoli [5], Sara Mitchell [6], Mark Tant [7], Jamie Dow [8], Debbie Ayotte [9], Krista L Lanctôt [2], Regina McFadden [4], John-Paul Taylor [10], Paul C Donaghy [10], Kirsty Olsen [10], Sherrilene Classen [11], Yoassry Elzohairy [12], David B Carr [13]

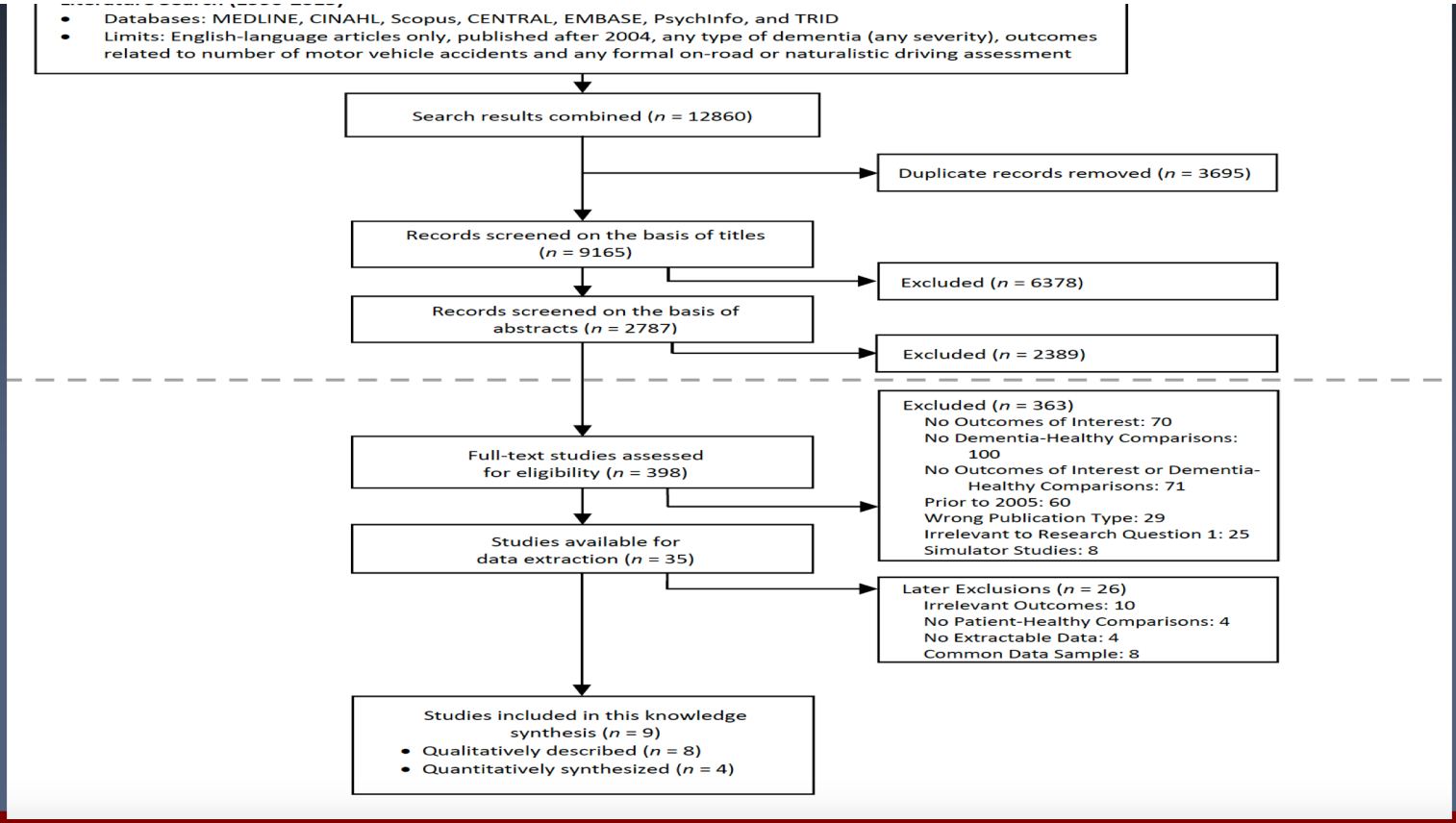


Table 2. Individual Results of Included Studies: MVC Risk and Driving Performance

a)	MVC RISK OUTCOMES				
Author (Year)	MVC Risk Variable	Comparison Group: Baseline Result	Dementia Group: Baseline Result	Comparison Group: Longitudinal Result	Dementia Group: Longitudinal Result
Davis et al.[30] (2012)	Percentage of persons with MVCs	13.6% *(Past 1 Year)*	8.5% *(Past 1 Year)*	*Not assessed*	*Not assessed*
	Number of MVCs per year/10,000 miles driven	0.02 (0.04) *(Unclear: Past 1-3 Years)*	1.4 (7.5) *(Unclear: Past 1-3 Years)*	*Not assessed*	*Not assessed*
Ott et al.[31] (2008)	Percentage of persons with MVCs	11% *(Past 3 Years)*	18% *(Past 3 Years)*	**11%** *(Next 1.5 Years)*	**1%*[a]** *(Next 1.5 Years)*
	Number MVCs per 1000 miles driven per week	**1.86** *(Past 3 Years)*	**8.78 **** *(Past 3 Years)*	5.63 *(Next 1.5 Years)*	1.85[a] *(Next 1.5 Years)*
	MVC rate per driver per year	0.04 *(Past 3 Years)*	0.06 *(Past 3 Years)*	0.06 *(Past 3 Years)*	0.01[a] *(Past 3 Years)*
	Total number of MVCs	5 *(Past 3 Years)*	17 *(Past 3 Years)*	5 *(Past 3 Years)*	2[a] *(Past 3 Years)*

Results of four pooled studies on road test performance indicated:

RR of 10.77 (3.00, 38.62) for failure on road test in comparison to controls

Our Case: Initial Evaluation in Memory Clinic

- Gradual onset/decline in episodic (short-term) memory
- Needing some assistance with check book
- Still cooking, but less complex meals
- Clinical Dementia Rating 0.5 or very mild dementia
- Labs/MRI unrevealing, SBT 6,MMSE 24, Dx AD

What if you can't do a CDR or Full Psychometrics?

Clinical Measure of Dementia Severity	No Dementia (CDR=0)	Questionable or Very Mild Dementia (CDR=0.5)	Mild Dementia (CDR=1.0)	Moderate to Severe Dementia (CDR=2.0)
For the Dementia Specialist: Clinical Dementia Rating	No memory loss or inconsistent memory loss Fully oriented Judgment intact Function intact Personal care intact	Consistent slight forgetfulness Slight difficulty with orientation or judgment Slight impairment in community activities or home activities Personal care intact	Memory loss interferes with everyday activities Geographic disorientation Moderate impairment in judgment Mild but definite impairment of community or home activities Needs prompting for personal care	Severe memory loss Severe difficulty with time relationships and judgment No longer independent in activities Only simple chores preserved Needs assistance in personal effects
For the Clinician: Short Blessed Test MMSE	**N (SD)** 1.2 (1.9) 28.9 (1.3)	**N (SD)** 4.8 (5.9) 23.1 (2.5)	**N (SD)** 15.4 (5.2) 20 (3.9)	**N (SD)** 18.5 (5.5) 16.1 (4.7)
For the Psychologist: Logical Memory	8.8 (2.9)	4.3 (2.7)	1.9 (1.7)	1.5 (2.3)
Block Design	30.1 (8.6)	22.2 (9.8)	12.0 (9.6)	3.2 (6.6)
Digit Symbol	45.6 (11.5)	31.7 (13.6)	17.0 (13.3)	8.3 (8.7)
Trailmaking A	40.9 (20.0)	70.2 (39.2)	108.3 (50.5)	???
Benton Copy	9.6 (.88)	9.1 (1.6)	7.3 (2.7)	???

O'Neill D and Carr DB. Older Drivers. 6th Edition Pathy's Principles and Practice of Geriatric Medicine. 2019

Table 1 The proposed new evidence-informed recommendations on Driving with Dementia for consideration for the Canadian Medical Association Driver's Guide as well as other national guidelines

#	Recommendation	Class of Evidence	Agreement (N^a, %)
1	Dementia often has a direct effect upon fitness to drive, and clinicians should address cognitive compromises that may impact fitness to drive.	C	140, 96.6%
2	Diagnosis of dementia alone is not sufficient to withdraw driving privileges.	A	136, 93.8%
3	Severe dementia is an absolute contraindication to driving.	C	140, 96.6%
4	It is unlikely that safe driving can be maintained in the presence of moderate dementia (e.g. the additional presence of basic ADL impairments) and is to be strongly discouraged. If the patient desires to drive, they should be formally assessed and monitored very carefully.	B	134, 92.4%

1. Should clinicians be involved in fitness-to-drive evaluations? **YES**
2. Should a diagnosis of Alzheimer's disease result in immediate cessation of driving privileges? **No**
3. Is there a level of dementia severity where driving definitely becomes unsafe? **YES CDR 2 and CDR 3**
4. How can one rate dementia severity if they don't use the Clinical Dementia Rating? **Not easily**

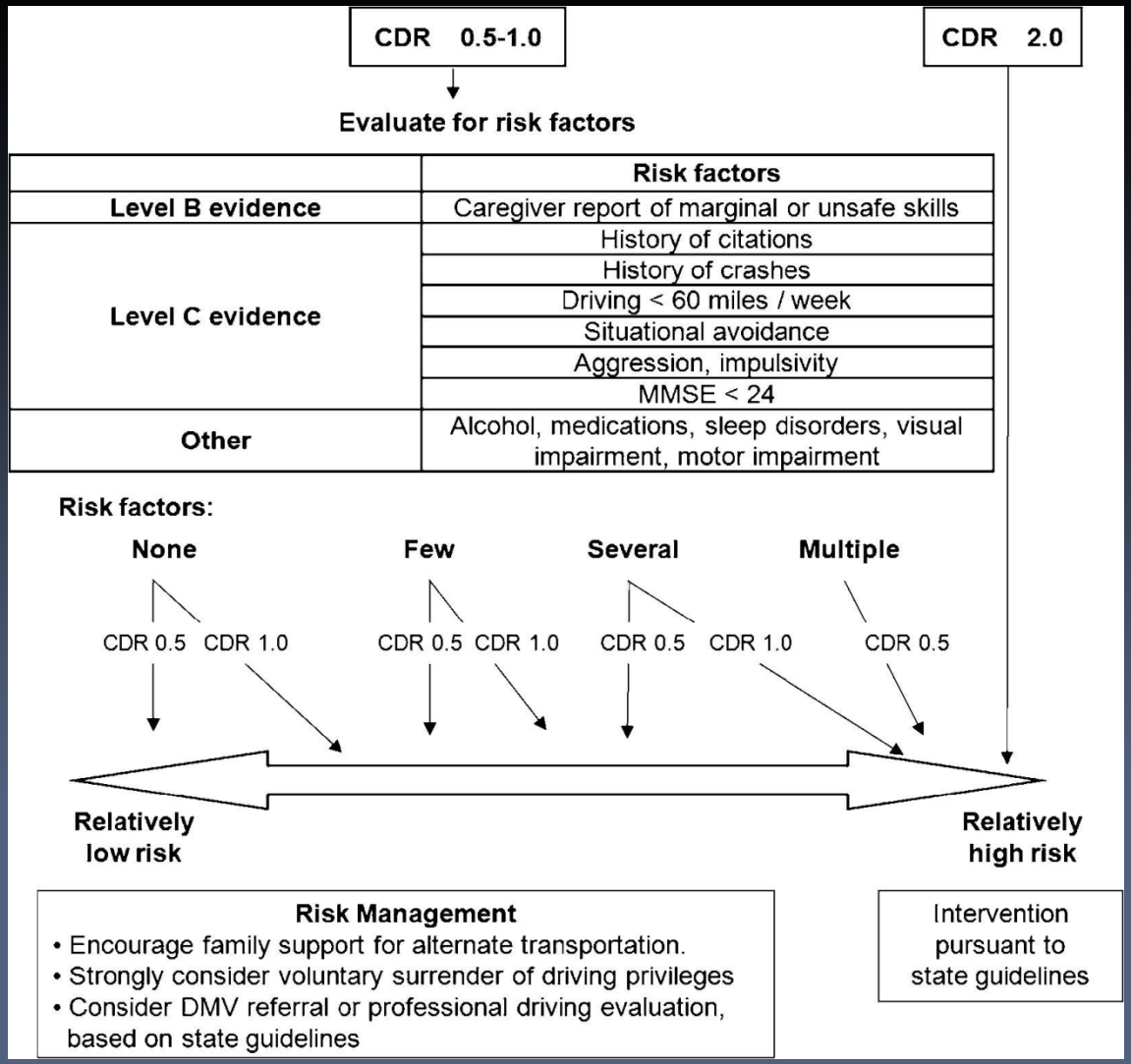
Our patient has AD and CDR 0.5. What are next steps in the evaluation?

What history and examination findings may assist in assessing risk for unsafe driving?

What is the role of cognitive testing in assessing fitness to drive?

What tests and cut-offs (if any) should clinicians adopt to assist with driving recommendations?

Algorithm: Evaluating Driving Risk



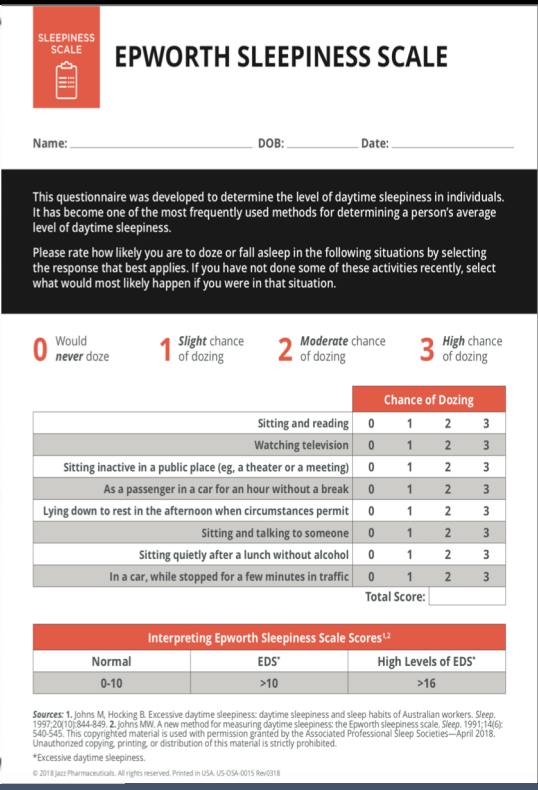
Iverson DJ, et al Practice Parameter: Evaluation and Management of driving and dementia. Neurology 2010; 74: 1316-24

Evidenced Based Driving History (Our Patient)

- Crashes (none)
- Moving Violations (none)
- Informant Rating (fair)
- Exposure (daily)
- Personality (no behavioral issues)
- IADL impairment (finances/cooking)
- Unsafe driving behaviors (slow in traffic)
- Medications (alprazolam prn)

Co-Morbid Conditions Physical Exam

- Visual Acuity (20/25 OU)
- Visual Fields (intact)
- Motor Examination wnl
  - Muscle Strength
  - Range of Motion
- Co-Morbid Conditions
  - Hypersomnolence/OSA (8 ESS)
  - Medication Review (alprazolam)
  - Medical Conditions (DM-no comps)
- Cognitive Screens:
  - Clock (normal)
  - TMT A (62 secs), TMT B (170 secs)



SLEEPINESS SCALE

EPWORTH SLEEPINESS SCALE

Name: _____ DOB: _____ Date: _____

This questionnaire was developed to determine the level of daytime sleepiness in individuals. It has become one of the most frequently used methods for determining a person's average level of daytime sleepiness.

Please rate how likely you are to doze or fall asleep in the following situations by selecting the response that best applies. If you have not done some of these activities recently, select what would most likely happen if you were in that situation.

0 Would *never* doze 1 *Slight* chance of dozing 2 *Moderate* chance of dozing 3 *High* chance of dozing

	Chance of Dozing			
Sitting and reading	0	1	2	3
Watching television	0	1	2	3
Sitting inactive in a public place (eg, a theater or a meeting)	0	1	2	3
As a passenger in a car for an hour without a break	0	1	2	3
Lying down to rest in the afternoon when circumstances permit	0	1	2	3
Sitting and talking to someone	0	1	2	3
Sitting quietly after a lunch without alcohol	0	1	2	3
In a car, while stopped for a few minutes in traffic	0	1	2	3
	Total Score:			

Interpreting Epworth Sleepiness Scale Scores[1,2]		
Normal	EDS*	High Levels of EDS*
0-10	>10	>16

Sources: 1. Johns M, Hocking B. Excessive daytime sleepiness: daytime sleepiness and sleep habits of Australian workers. *Sleep.* 1997;20(10):844-849. 2. Johns MW. A new method for measuring daytime sleepiness: the Epworth sleepiness scale. *Sleep.* 1991;14(6):540-545.

*Excessive daytime sleepiness.

Narcotics
Barbiturates
Benzo's (present)*
Antihistamines
Antidepressants
Antipsychotics
Hypnotics
Alcohol
Muscle Relaxants
Antiemetics
Antiepileptic

What are reasonable cutoffs for TMT A and TMT B?

Table 1

Rhode Island and St. Louis Sample Demographics: Cognitively-Impaired Older Drivers.

Participant Characteristic	*RI Pawtucket* (N=78)	*RI Providence* (N=75)	*RI Combined* (N=153)	*St. Louis* (N=150)
Road Test; N (%)				
Safe	32 (41.0)	34 (45.3)	66 (43.1)	48 (32.0)
Marginal	35 (44.9)	32 (42.7)	67 (43.8)	15 (10.0)
Unsafe	11 (14.1)	9 (12.0)	20 (13.1)	87 (58.0)
Men; N (%)	48 (61.5)	35 (46.7)	83 (54.2)	96 (64.0)
Whites; N (%)	74 (94.9)	69 (93.2)	143 (94.1)	127 (88.8)
Age (years); mean ± SD	75.3 ± 7.1	76.6 ± 6.2	75.9 ± 0.7	73.6 ± 8.7
Education (years); mean ± SD	13.8 ± 3.4	13.5 ± 3.3	13.7 ± 3.4	15.0 ± 3.4
MMSE; mean ± SD	24.4 ± 3.4	25.1 ± 2.8	24.7 ± 3.1	25.5 ± 4.5

TMT A is as good as TMT B
In a dementia sample in prediction

TMT A>50 secs and TMT B >110 secs
ID many at risk for unsafe driving

Many dementia participants that fail the road test TMT-A scores > 60 secs or TMT-B score >180 secs

Papandonatos GD, et al. JAGS; 2015; 63

Cognitive Status/ Outcome	Dataset	Rate	Test Cutoff	N	Calibration	Discrimination	Sens	Spec	PPV	NPV	CCR
Cognitively Impaired Older Drivers	*MO St. Louis*	.68	Trails A > 37 sec	150	<.01	.75 (.67–.82)	.84	.42	.75	.56	.71
			Trails B >108 sec	132	<.01	.74 (.66–.83)	.86	.44	.73	.64	.70
	RI Pawtucket	.14	Trails A > 48 sec	78	.11	.75 (.59–.91)	.91	.45	.21	.97	.51
			Trails B >210 sec	66	.43	.69 (.47–.76)	.86	.46	.16	.96	.50
	RI Providence	.12	Trails A > 48 sec	75	.34	.60 (.38–.82)	.89	.29	.15	.95	.36
			Trails B >210 sec	74	<.01	.60 (.37–.82)	.56	.60	.16	.91	.59
Unsafe vs. Marginal/Safe	*RI Combined*	.13	Trails A > 48 sec	153	.56	.69 (.55–.82)	.90	.37	.18	.96	.44
			Trails B >108 sec	140	.34	.62 (.49–.75)	.88	.21	.13	.93	.29
	MO St. Louis	.58	Trails A > 48 sec	150	<.01	.74 (.66–.82)	.63	.70	.74	.58	.66
			Trails B >108 sec	132	<.01	.76 (.68–.84)	.88	.40	.62	.76	.65

National Guideline on Driving and Dementia

5a	People with dementia with progressive loss of two or more IADLs due to cognition (but no basic ADL loss) are at higher risk of driving impairment.	A	138, 95.2%
	5b A formal assessment and ongoing monitoring of fitness to drive is recommended in this situation if the patient wishes to continue driving.	B	136, 93.8%
6a	No in-office test or battery of tests including global cognitive screens (e.g. MMSE, MOCA) have sufficient sensitivity or specificity to be used as a sole determinant of driving ability *in all cases*.	A	141, 97.2%
	6b. However, abnormalities on these tests may indicate a driver at risk who is in need of further assessment.	B	139, 95.9%
9a	Caregivers are able to predict driving safety more accurately than can the patients themselves, although in some circumstances, the caregivers may have a vested interest in preserving the patient's autonomy beyond a safe window...	C	119, 82.1%
10	Medical comorbidities, physical frailty and the use of multiple medications are also factors that must be taken into consideration when assessing fitness to drive.	C	135, 93.1%

This patient was referred for a performance based-road test due to AD and risk factors

Two impaired IADL's, Caregiver Rating of Fair
and Psychometric Test Performance

She passed!

Clinical Questions One Might Ask…

How often should patients be retested with a progressive disease if they pass their initial evaluation?

Does the performance based road test as administrated by occupational therapists and/or the licensing authority result in a safety benefit in drivers with dementia?

When and how do you make a referral to the licensing authority?

How to you take a patient off the road that refuses to stop driving?

When should drivers with AD be retested?

Table 1. Study Sample Demographics at Entry by Clinical Dementia Rating (CDR)

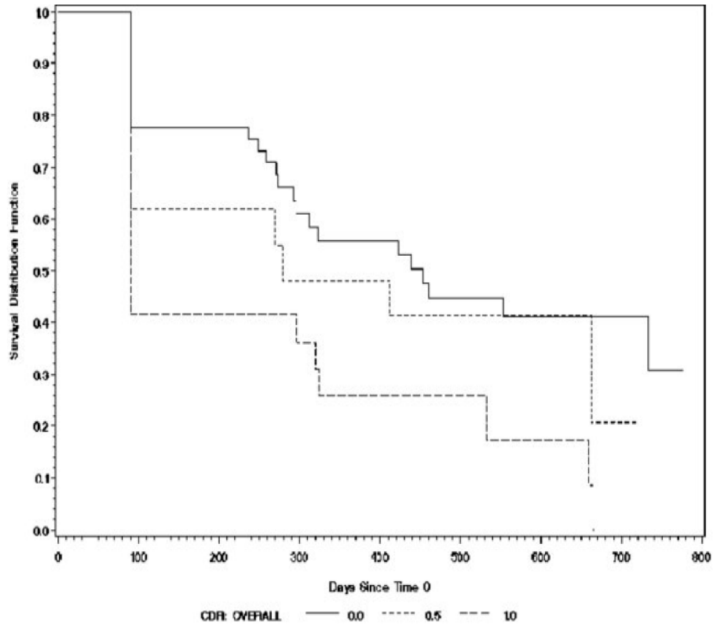
Demographic	Control (CDR = 0) n = 58	Very Mild DAT (CDR = 0.5) n = 21	Mild DAT (CDR = 1) n = 29
Age, mean ± SD	77.0 ± 8.6	73.7 ± 7.0	74.2 ± 7.8
Education, years, mean ± SD	14.9 ± 3.3	13.7 ± 3.7	13.3 ± 3.2
Male, %	52	76	52
Short Blessed Test score, mean ± SD*†	1.4 ± 2.1	5.1 ± 5.9	14.8 ± 6.3
Years driving, mean ± SD	55.1 ± 13.4	55.9 ± 8.6	52.0 ± 13.8

* Range = 0 (no cognitive impairment) to 28 (maximum cognitive impairment).
† $P < .05$.
SD = standard deviation.

Table 2. Number of Participants Administered the Driving Test at Each Time of Testing by Clinical Dementia Rating (CDR)

	Participants, n (%)		
Time of Testing	Control (CDR = 0)	Very Mild DAT (CDR = 0.5)	Mild DAT (CDR = 1)
1	58 (100)	21 (100)	29 (100)
2	39 (67.2)	12 (57.1)	10 (34.5)
3	26 (44.8)	10 (47.6)	7 (24.1)
4	17 (29.3)	5 (23.8)	3 (10.3)

DAT = early-stage dementia of the Alzheimer type.



Duchek JM et al. J Am Geriatr Soc 2003; 51:1342-7

Are patients that pass the road test safe?

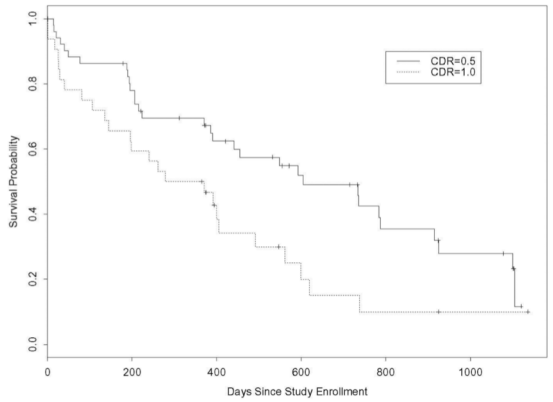
Table 1

Demographic and baseline driving characteristics of study sample by CDR at baseline

	Controls (N = 44)	Patients (N = 84)		
	CDR = 0	CDR = 0.5	CDR = 1	All
Age (mean, SD)	73.5 (9.1)	76.0 (6.3)	75.1 (8.1)	75.7 (7.0)
Education, years (mean, SD) *	15.2 (3.0)	14.0 (3.4)	13.7 (3.3)	13.9 (3.4)
Male, %	43	67	50	61
MMSE (mean, SD) *	29.1 (1.1)	25.4 (3.0)	21.8 (3.3)	24.1 (3.6)
Ethnicity, % Caucasian	98	96	91	94
Years driving (mean, SD)	52.3 (11.5)	57.1 (9.6)	52.9 (12.0)	55.5 (10.7)
Informant hrs/wk with participant (mean, SD) *	4.3 (3.1)	22.6 (49.1)	35.7 (60.9)	27.6 (53.8)
Miles/wk informant rides with participant (mean, SD)	36.9 (69.6)	31.2 (49.4)	13.3 (15.5)	24.4 (40.9)
Trips/wk informant rides with participant (mean, SD)	3.9 (5.7)	3.2 (2.8)	2.8 (2.7)	3.04 (2.7)
Miles/week driven by participant (mean, SD) *	137.8 (121.5)	79.3 (84.8)	49.4 (62.1)	67.8 (77.8)
Trips/week driven by participant (mean, SD) *	15.4 (13.7)	9.2 (8.1)	8.2 (6.0)	8.8 (7.3)
Road test score (mean, SD) *	6.0 (4.5)	12.4 (7.8)	14.3 (8.5)	13.1 (8.1)

* $p < .05$ (Patient vs. Control 2-Group Comparison)

Time to driving restriction due to failed road test, at fault MVA, or dementia progression



Ott et al. Neurology. 70(14):1171-1178, 2008.

The MVA rate per driver per year was .06 for patients and .04 for controls at baseline and .01 for patients and .06 for controls during the 3 yr period based on self-reports or state reports.

Ott B et al. Neurology 2008; 70:1171-1178

National Guideline on Driving and Dementia

7	Patients with dementia who are deemed fit to continue driving should be re-evaluated every 6 to 12 months or sooner, if indicated.	B	135, 93.1%
	Narrative Comments on Recommendations 7 from the Research Team: Our group emphasized that there are limitations to the evidence about the frequency of re-testing. Furthermore, there are some practical concerns: 1) some patients may deteriorate sooner than 6 months; 2) some patients and family members may be unreliable about seeking clinical attention if deterioration should occur, and this may include cancelling or not appearing for scheduled follow-up. The group therefore advises that clinicians be cognizant of these factors, and attend to issues of compliance with		
8a	Any clinician who has concerns but is uncertain whether a patient's cognitive problems may adversely affect driving, should refer the patient for a functional driving assessment, either through an occupational therapy evaluation or directly to the licensing authority.	C	124, 85.5%

Our patient returns at one year…

She had one minor "fender bender" when backing into a car in a parking lot
The daughter noted additional cognitive and functional decline (higher order IADL's)
CDR 1 and TMT A 73 secs and TMT B could not perform
Recommended to stop driving and patient refuses

Do you
A: Refer to the case manager
B. Write a formal letter to the patient stating they should not drive
C. Refer to the DMV for license revocation or testing
D. Remove the car from the premises
E. All of the Above

REMOVING THE RESISTANT DRIVER

- The clinician should "prescribe" driving retirement orally/writing
- Focus on other medical conditions as the reason to stop driving
  - (e.g. vision too impaired, reaction time too slow)
- Use a contract (see THE HARTFORD At the Crossroads guide)
- Vehicle-Related Tactics
  - Hiding/filing down keys
  - Replacing keys
  - Do not repair the car/ send car for "repairs" but do not return
  - Remove the car by loaning, giving or selling
  - Disable the car
- Discuss financial implications of crash or injury
- Revoke license
- Other?

Contact Information/Discussion

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