DEMENTIA AND DRIVING: AN UPDATED KNOWLEDGE SYNTHESIS

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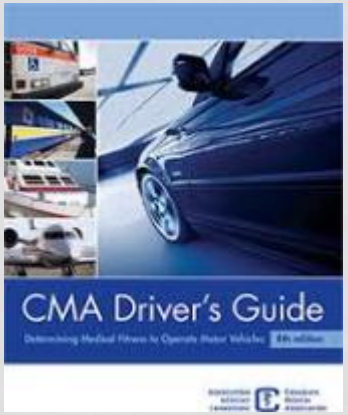


BACKGROUND

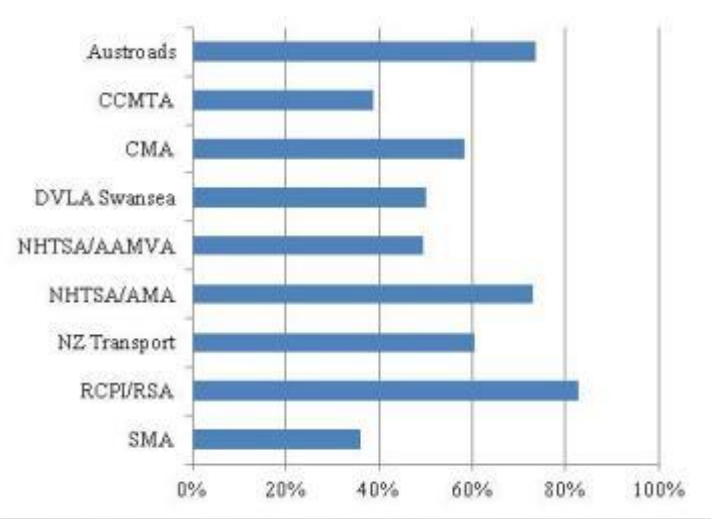
Overall quality scores of guidelines on driving with medical illness and recommendations in descending order of overall quality

Clinical Practice Guideline	Overall Quality	Overall Recommendation (%)		
		Recommend	Recommend with Modifications	Do Not Recommend
1. NHTSA/AMA (America)	5.00/7	25	75	0
2. Austroads (Australia)	4.88/7	62.5	37.5	0
3. NHTSA/AAMVA (America)	4.88/7	12.5	75	12.5
4. CMA (Canada)	4.13/7	12.5	75	12.5
5. DVLA Swansea (UK)	3.88/7	12.5	50	37.5
6. CCMTA (Canada)	3.63/7	0	87.5	12.5
7. RCPI/RSA (Ireland)	3.50/7	0	75	25
8. NZ Transport (New Zealand)	3.13/7	0	50	50
9. SMA (Singapore)	2.25/7	0	12.5	87.5

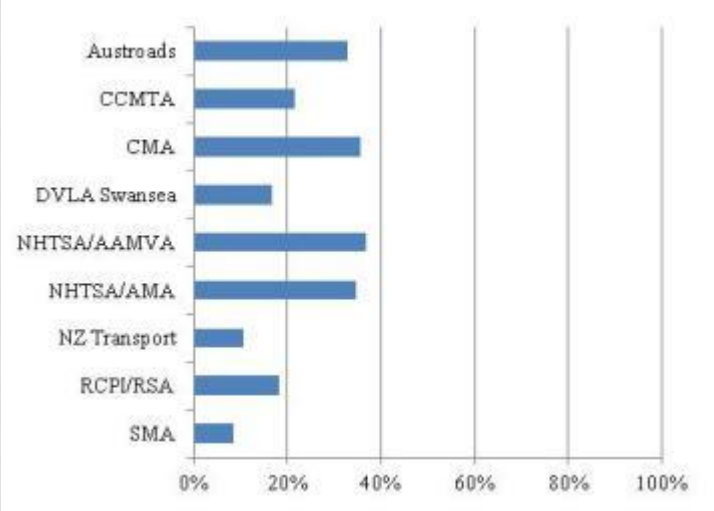
Rapoport et al, QJM 2015; 108:859-869.

Quality of guidelines on driving with medical illness: Areas needing improvement

Stakeholder involvement



Rigour of development



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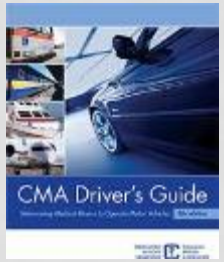
METHOD

Chee, J, et al, Alzheimer's & Dementia 2016

TEAM STRUCTURE:

MEMBERSHIP



- An international team of experts followed the ADAPTE guideline adaptation process to: a) perform a knowledge synthesis on driving with dementia; and b) update existing clinical recommendations.

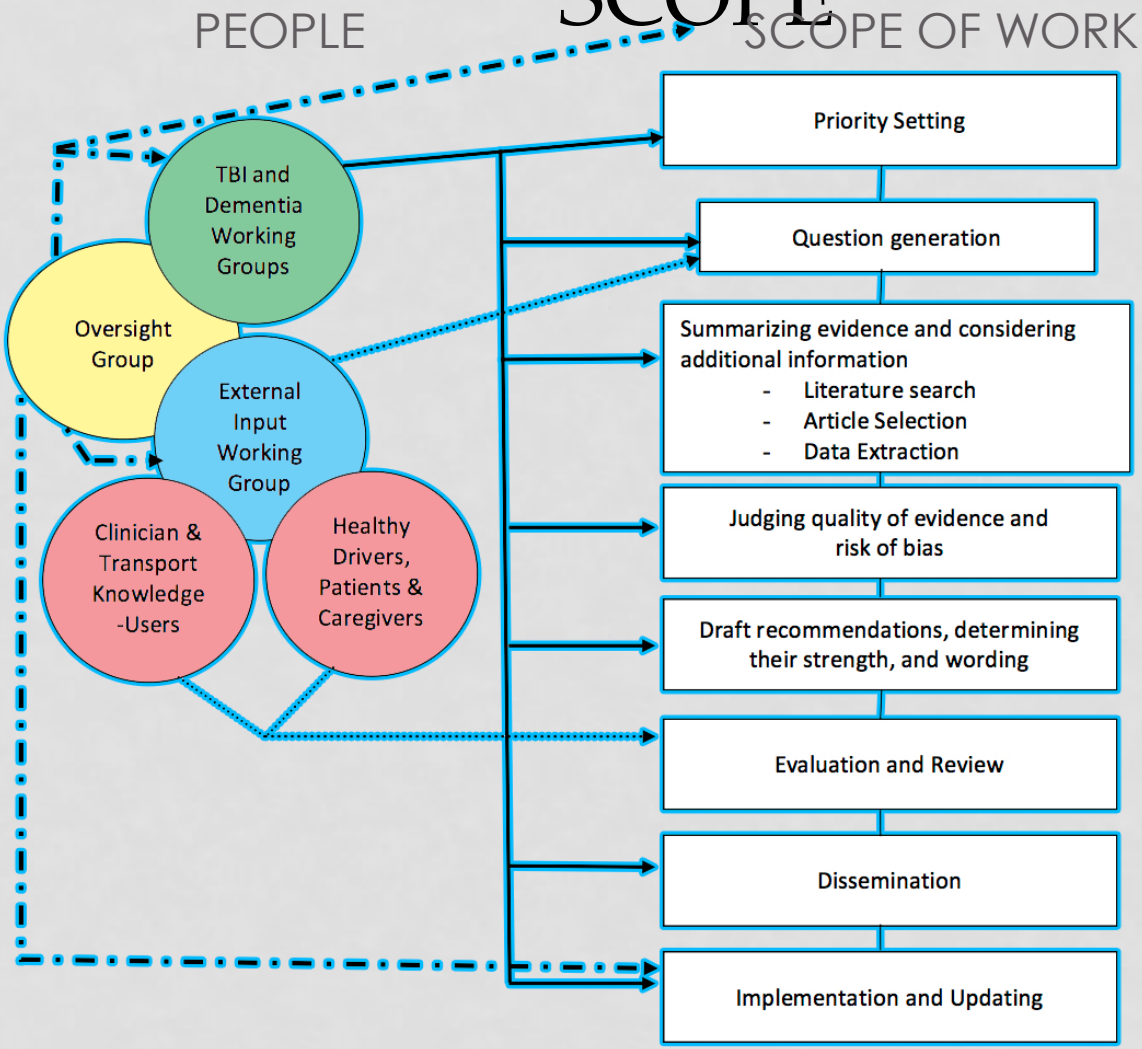
COUNTRY	CITIES	# MEMBERS
Canada	Toronto, Ottawa, Hamilton, London, Kingston, Quebec City, Victoria	16
Australia	Clayton	2
Belgium	Brussels	1
Ireland	Dublin	2
UK	Coventry	2
USA	St. Louis, MO, New Haven, CT	2

TRAINING	SPECIALTY	# MEMBERS
MD	Geriatric Psychiatrist, Geriatrician, Physiatrist, Psychiatrist, Neurologist, Family Physician	13
PhD	Pharmacologist, Psychologist, Occupational Therapist	9
Medical Librarian		1
Transportation Knowledge User		2

TEAM STRUCTURE:

WORKING GROUPS AND PROJECT SCOPE

Adapted from Guidelines 2.0: systematic development of a comprehensive checklist for a successful guideline enterprise.



METHOD

- Systematic review
  - Dual-investigator screening of titles and abstracts
  - Dual data extraction
  - Meta-analysis where feasible
  - Effect size calculation where not feasible
- Guidelines
  - A,B,C ratings of evidence.
  - 100% consensus of expert group required, with allowances for abstentions and quorum
  - 90% a-priori consensus definition for clinical stakeholder review

SYNTHESIS

What is the absolute and relative risk of motor vehicle collision or driving impairment, as measured by on-road testing, associated with different severities of dementia (mild, moderate, or severe) and different diagnoses (e.g. common non-AD neurodegenerative dementias, including Frontotemporal Dementia, Vascular Dementia, Lewy body disease, etc.)?

RESULTS

Chee, J, et al, Alzheimer's & Dementia 2016
Chee, J. et al, Am J Geriatric Psychiatry (In Press)

PRISMA Process

We searched: 1990-2015; Medline, Cinahl, Scopus, Embase, Psychinfo, and TRID.

We obtained 12,860 results, including 9,165 after removing duplicates.

After careful dual investigator review of titles, abstracts, full-texts and 60 published pre-2005, we were left with 34 articles.

We then excluded 26 articles for irrelevant outcomes, no healthy comparisons, no extractable data or duplicate samples.

We were left with 7 articles for this synthesis.

Crash Risk Outcomes

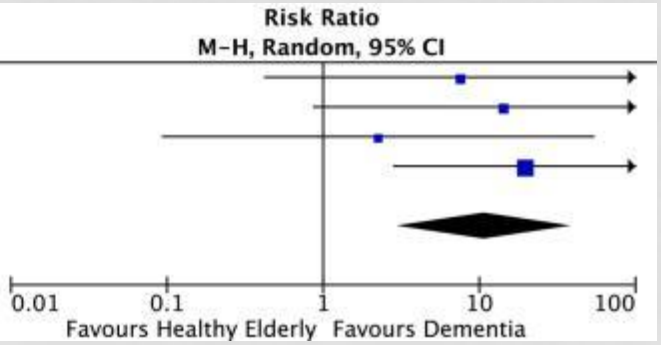
Article	Method	Results
Davis et al 2012	Retrospective	no differences in % of persons with MVCs between Dementia and Comparison over last year, even when adjusted for miles driven.
Ott et al 2008	Retrospective	8.78 MVC per 1000 miles driven in dementia vs 1.86 per 1000 m in comparison group, over last 3 years
	Prospective	11% of Comparison Group crashed vs 1% of dementia group, over next 3 years

Meta-Analysis of the Risk of Road Test Failure Associated with Dementia

Study or Subgroup	Dementia Events	Dementia Total	Healthy Elderly Events	Healthy Elderly Total	Weight	Risk Ratio M-H, Random, 95% CI	Year
Lincoln 2006 (1)	4	37	0	31	19.6%	7.58 [0.42, 135.51]	2006
Ott 2008 (2)	13	84	0	44	20.8%	14.29 [0.87, 234.93]	2008
Davis 2012 (3)	1	59	0	44	16.2%	2.25 [0.09, 53.95]	2012
Barco 2015 (4)	37	60	1	32	43.4%	19.73 [2.84, 137.23]	2015
Total (95% CI)		**240**		**151**	**100.0%**	**10.77 [3.00, 38.62]**	
Total events	55		1				

Heterogeneity: $Tau^2 = 0.00$; $Chi^2 = 1.50$, df = 3 (P = 0.68); $I^2 = 0\%$

Test for overall effect: Z = 3.65 (P = 0.0003)



DRIVING PERFORMANCE OUTCOMES

- Large Effects:
- Road test errors, landmark identification, lost trips, miles belted, miles driven 10mph or more slower than surrounding traffic.
  - Aksan et al (2015); Barco et al (2015); Davis et al (2012); Eby et al (2012); Whehilan et al (2005)

- Medium Effects
- Safety errors, lane observance, turning errors
  - Aksan et al (2015); Barco et al (2015)

EXTERNAL INPUT

- External Input: 145 responses, 51 geriatrics, 51 geriatric psychiatry, 17 Fam MD, 25 OT.
- Additional 33 excluded (blank responses, non-included stakeholders).
- Of the 23 recommendations
  - more than 90% of respondents agreed with 14 (61%)
  - the remaining nine (39%) were endorsed by more than 80% and less than 90%.

Revised Guidelines

	Class of Evidence	Percent Agreement
Dementia often has a direct effect upon fitness to drive, and clinicians should address cognitive compromises that may impact fitness to drive.	C	96.6
Diagnosis of dementia alone is not sufficient to withdraw driving privileges.	A	93.8
Severe dementia is an absolute contraindication to driving.	C	96.6
It 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	92.4

OTHER TOPICS OF REVISED GUIDELINES

- ADL/IADL loss
- Screening
- Re-evaluation
- On-road testing
- Dementia not in isolation
- Behavioral Changes
- Language impairment
- Planning cessation
- Burdens of cessation
- Caregiver report

DISCUSSION

Chee, J, et al, Alzheimer's & Dementia 2016

CONCLUSIONS

- dementia, even in the very mild or mild stages places an older adult at a higher risk to fail a performance-based on-road assessment
- consistent findings of on-road driving impairment, driving errors, and failure on on-road tests among patients with dementia compared to controls
- Future directions
  - Transportation knowledge-users
  - Updates
  - Insight, caregiver concern, technology

Thank you

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