Cognitive Impairment and Dialysis

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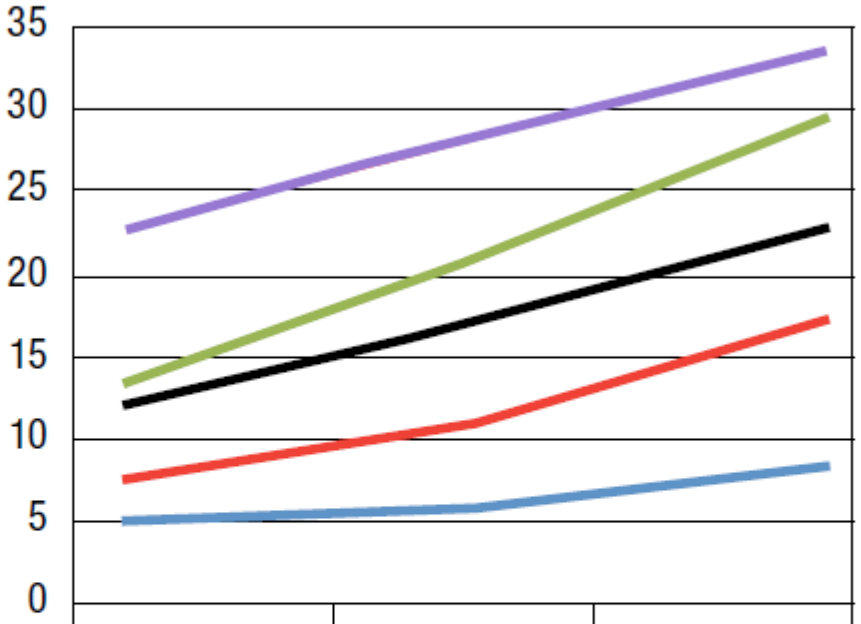
Figure 1.1

Percentage of the total population aged 60 years and over, by country income level, 2015 to 2050



	2015	2030	2050
LIC	5.2	6.0	8.4
L-MIC	8.1	11.2	16.3
UMIC	13.3	20.5	28.9
HIC	22.0	27.3	31.6
World	12.2	16.3	21.2

Table 5.4

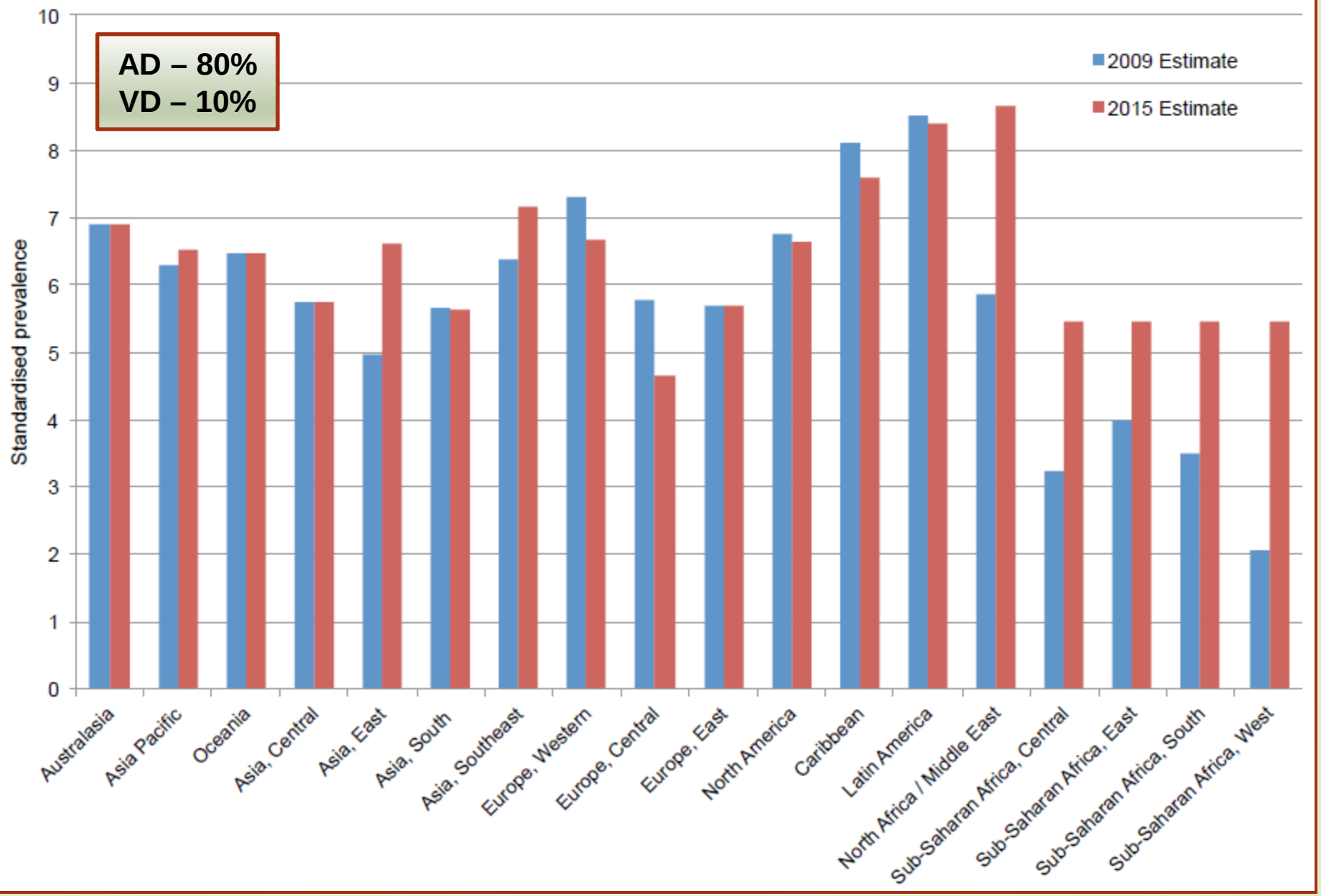
The 12 leading contributors to Years Lived with Disability among people aged 60 years and over, according to the WHO GBD (2004) and IHME GBD (2010) methodology

WHO GBD (2004)			IHME GBD (2010)		
Chronic disease/ condition	Million YLD (% contribution to total)	Rank order (YLD)	Chronic disease/ condition	Million YLD (% contribution to total)	Rank order (YLD)
Visual impairment	30.9 (26.4%)	1	Musculoskeletal disorders	42.0 (25.8%)	1
Dementia	**15.4 (13.1%)**	**2**	Mental disorders	16.2 (10.0%)	2
Hearing loss	13.0 (11.1%)	3	Chronic respiratory	11.8 (7.2%)	3
Musculoskeletal disorders	11.2 (9.6%)	4	Visual impairment	10.4 (6.4%)	4
Mental disorders	7.0 (6.0%)	5	Diabetes/ endocrine	9.0 (5.5%)	5
Chronic respiratory	5.8 (5.0%)	6	Hearing loss	7.5 (4.6%)	6
Heart disease	4.7 (4.0%)	7	Genitourinary disorders	6.6 (4.1%)	7
Diabetes/ endocrine	4.6 (3.9%)	8	**Dementia**	**6.2 (3.8%)**	**8**
Stroke	4.4 (3.8%)	9	Heart disease	4.8 (2.9%)	9
Cancer	2.6 (2.2%)	10	Stroke	3.0 (1.8%)	10
Genitourinary disorders	0.8 (0.7%)	11	Cancer	2.9 (1.8%)	11
Digestive disorders	2.2 (1.9%)	12	Digestive disorders	1.0 (0.6%)	12
Total YLD burden (all diseases)	117.0 (100%)			162.8 (100%)	

Alzheimer's Disease International: World Alzheimer Report 2015

Figure 2.3

Estimated prevalence of dementia for those aged 60 and over, standardised to Western Europe population, by GBD region



Alzheimer's Disease International: World Alzheimer Report 2015

Figure 2.3

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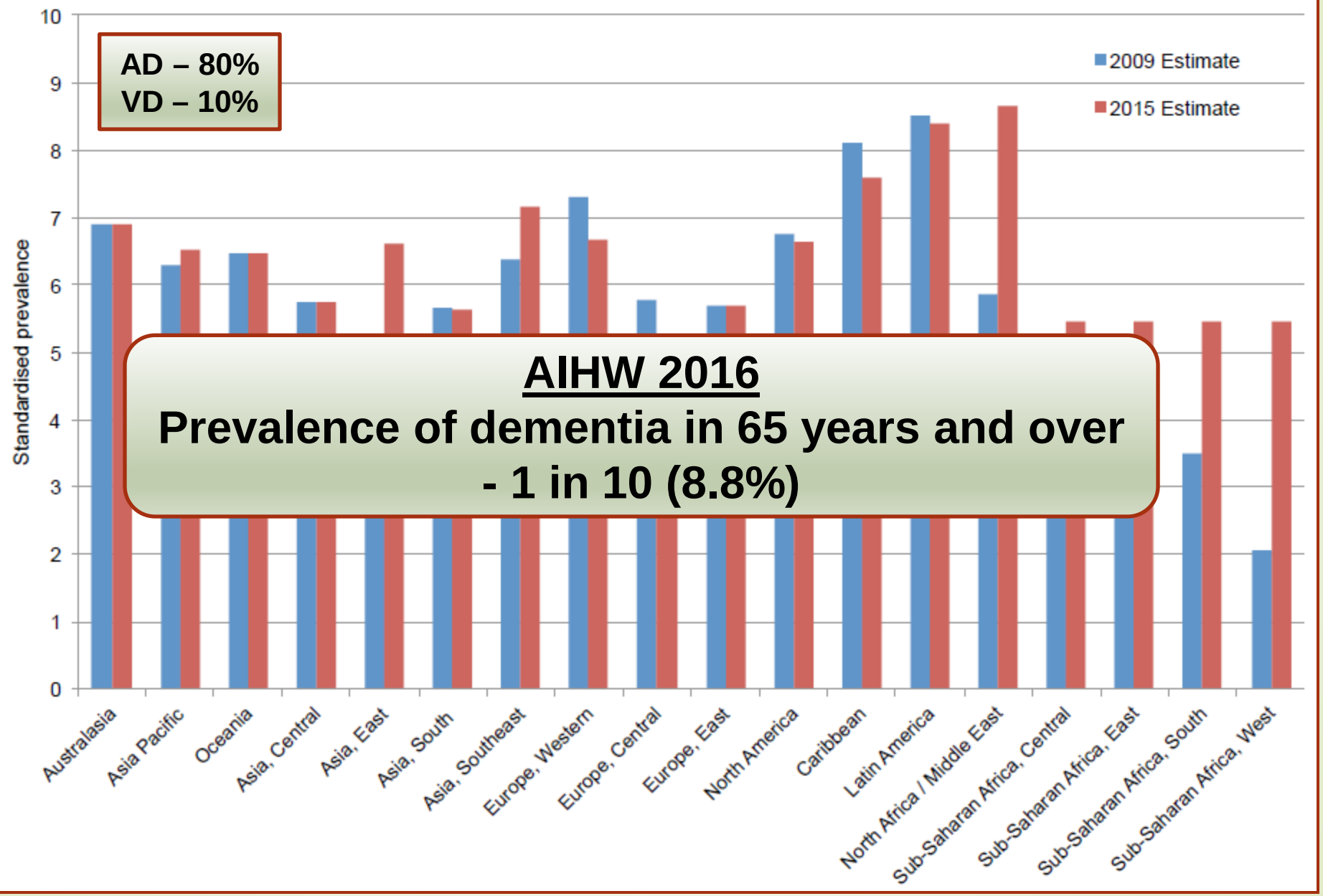
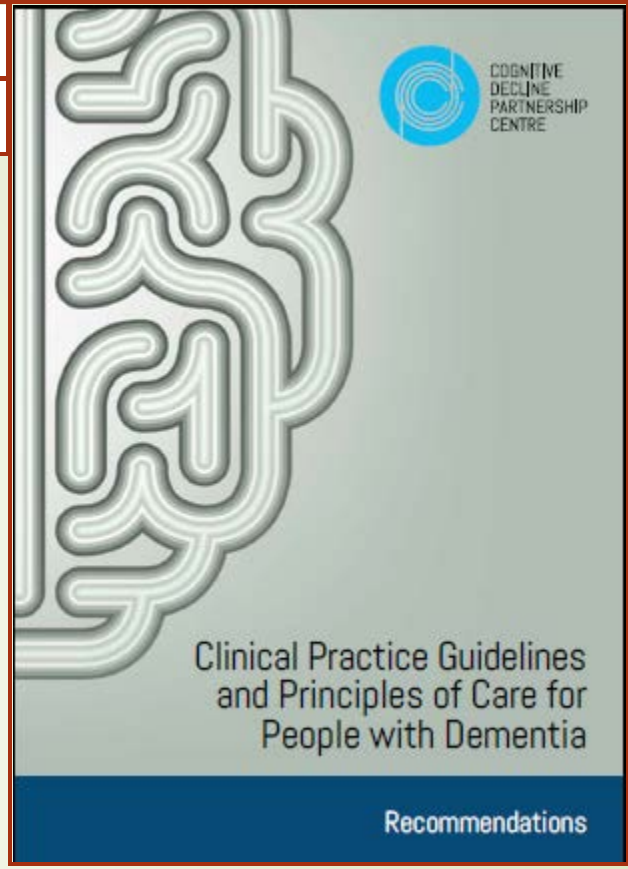


AIHW 2016

Prevalence of dementia in 65 years and over - 1 in 10 (8.8%)

Alzheimer's Disease International: World Alzheimer Report 2015

Guideline Adaptation Committee. Clinical Practice Guidelines and Principles of Care for People with Dementia. Sydney. Guideline Adaptation Committee; 2016.



Early identification

22	CBR	General population screening for dementia should not be undertaken.
23	PP	Concerns or symptoms should be explored when first raised, noted or reported by the person, carer(s) or family and should not be dismissed as 'part of ageing'.
24	CBR	Medical practitioners working with older people should be alert to cognitive decline, especially in those aged 75 years and older.

Guideline Adaptation Committee. Clinical Practice Guidelines and Principles of Care for People with Dementia. Sydney. Guideline Adaptation Committee; 2016.

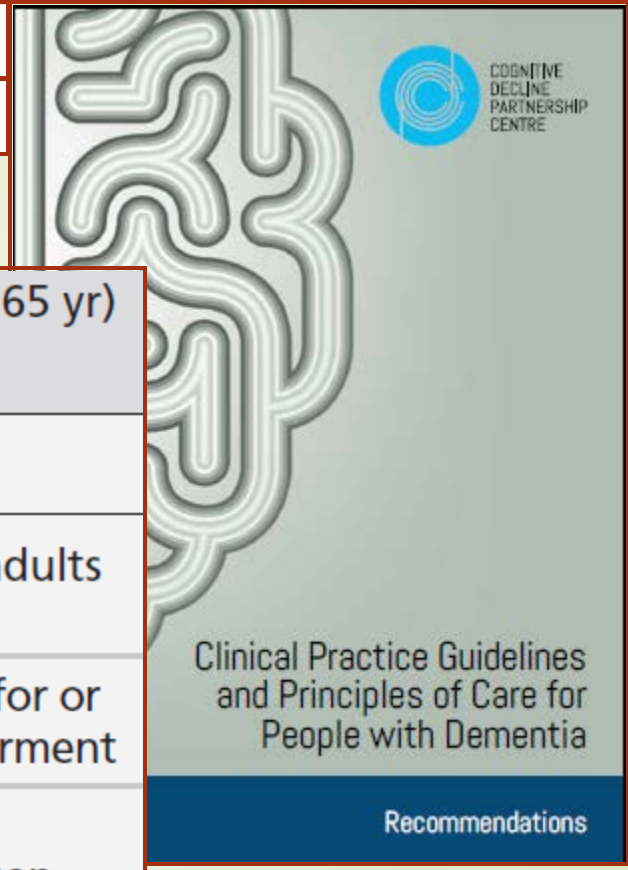
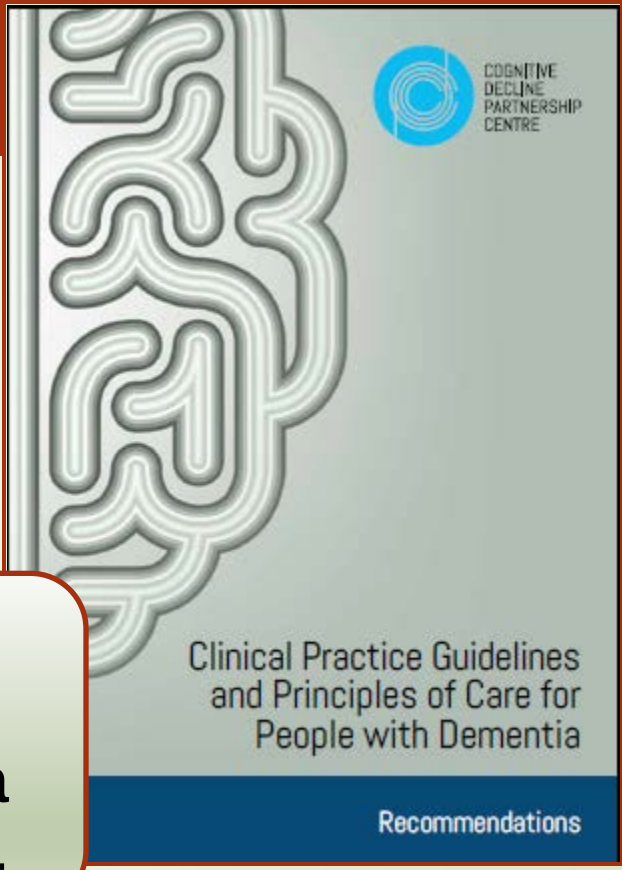


Table 2: Summary of recommendations for screening older people (≥ 65 yr) for cognitive impairment from Canada and elsewhere

Organization	Recommendation
Canadian Task Force on Preventive Health Care (current)	Do not screen asymptomatic older adults (≥ 65 yr) for cognitive impairment
Canadian Task Force on Preventive Health Care (2001)[15]	Insufficient evidence to recommend for or against screening for cognitive impairment
National Institute for Health and Care Excellence (2011)[36]	Screening for dementia in general population should not be undertaken
BC Ministry of Health, 2014[39]	Do not screen asymptomatic population
US Preventive Services Task Force (2014)[40]	Insufficient evidence to assess the balance of benefits and harms of screening for cognitive impairment

Guideline Adaptation Committee. Clinical Practice Guidelines and Principles of Care for People with Dementia. Sydney. Guideline Adaptation Committee; 2016.



Mild Cognitive Impairment

Common as brain ages

Does not consistently progress to dementia

False positive: MMSE – 1 in 8 MoCA – 1 in 4

Clinical Care Standards

Quality statement 1
Early screening

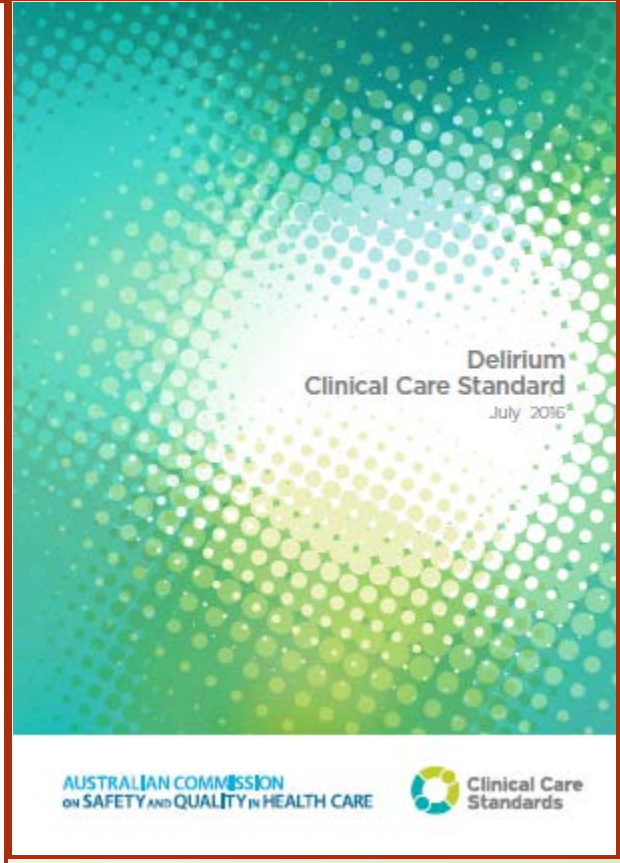
A patient presenting to hospital with one or more key risk factors for delirium receives cognitive screening using a validated test. In addition, the patient and their carer are asked about any recent changes (within hours or days) in the patient's behaviour or thinking.

Purpose

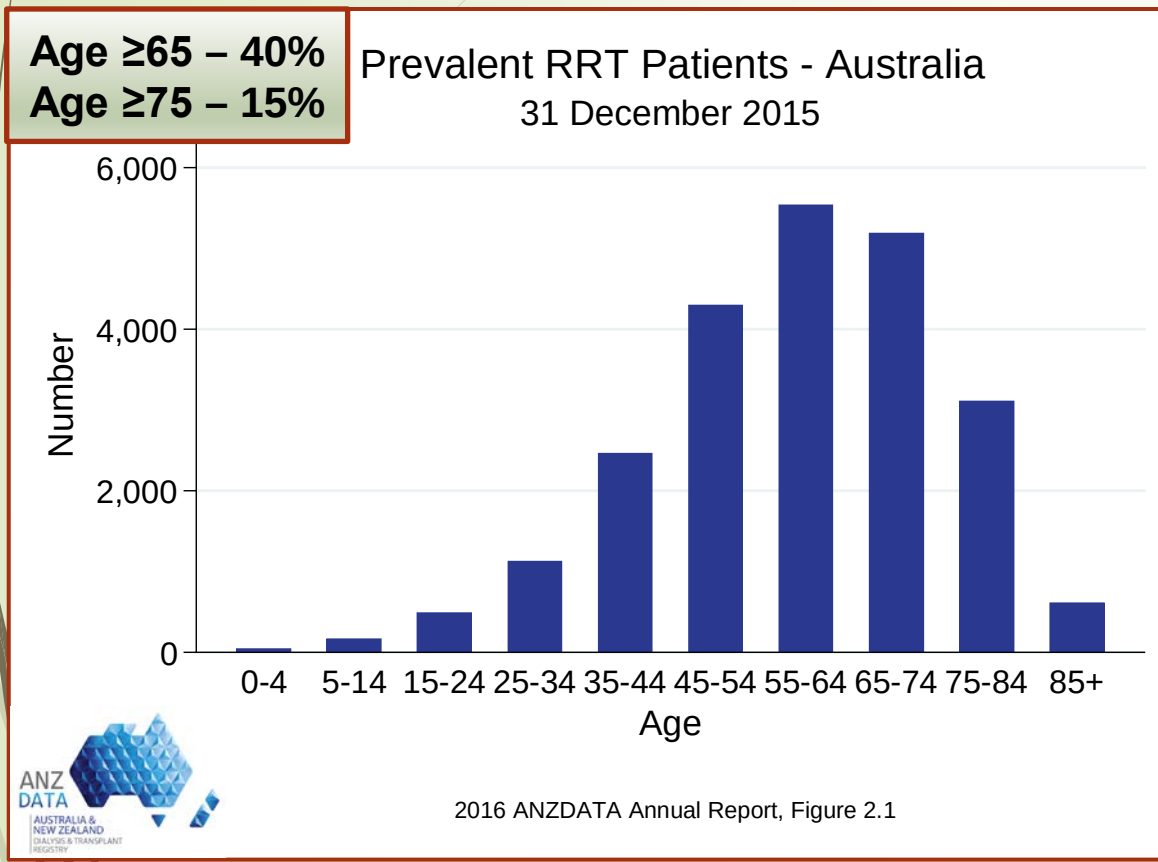
To ensure patients with delirium and those at risk of delirium who present to hospital are identified early so that appropriate management and preventive measures can be put in place.

Rationale

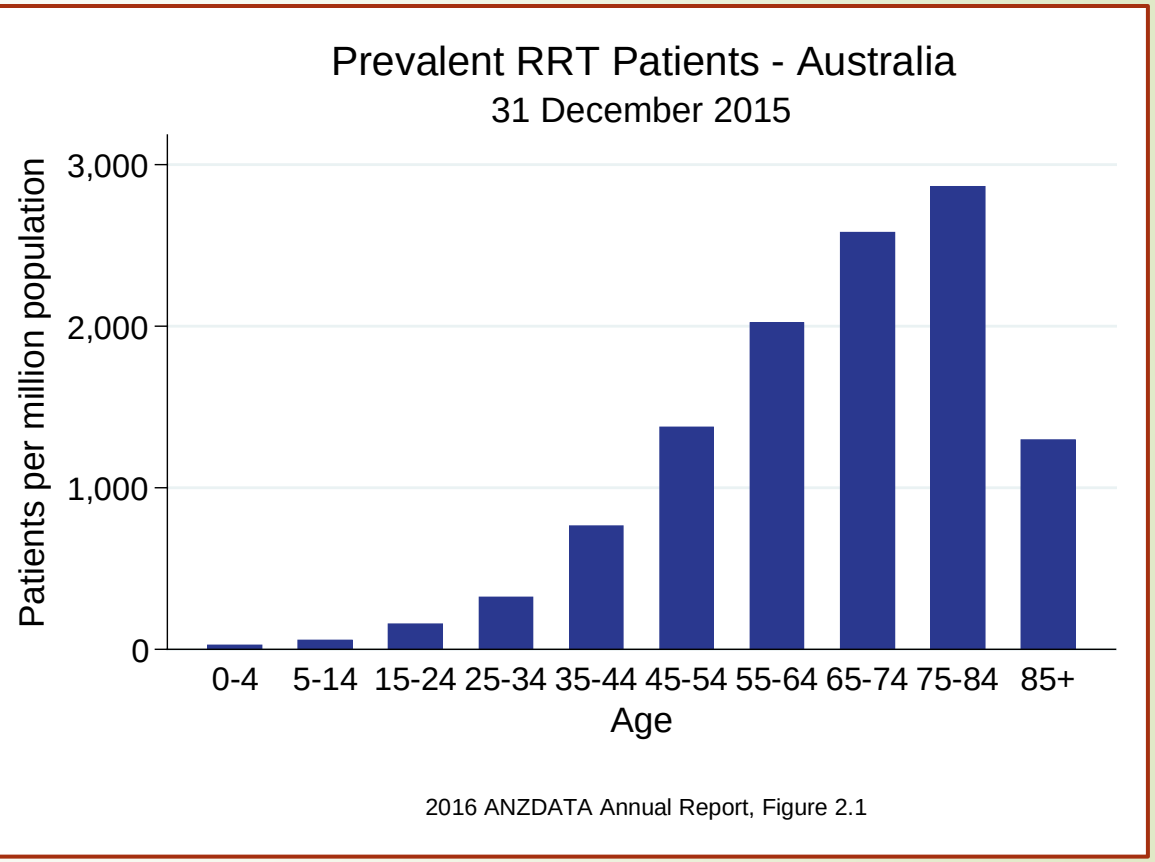
Delirium is often missed in patients who present to hospital.[4, 9] A structured approach can help improve detection rates.[5] Age ≥ 65 years, known cognitive impairment/dementia, severe medical illness and current hip fracture are key risk factors for delirium; additional risk factors may be included. Patients with any one key risk factor should undergo cognitive screening, be asked about any recent changes in behaviour and thinking, and receive interventions to prevent delirium.[6] Cognitive screening on presentation helps identify patients who should be assessed for delirium and is useful for monitoring delirium onset during a hospital stay.[5, 27, 28] Patients who have cognitive impairment or who have had a recent change in behaviour or thinking may have delirium and need to be assessed for it.[6]



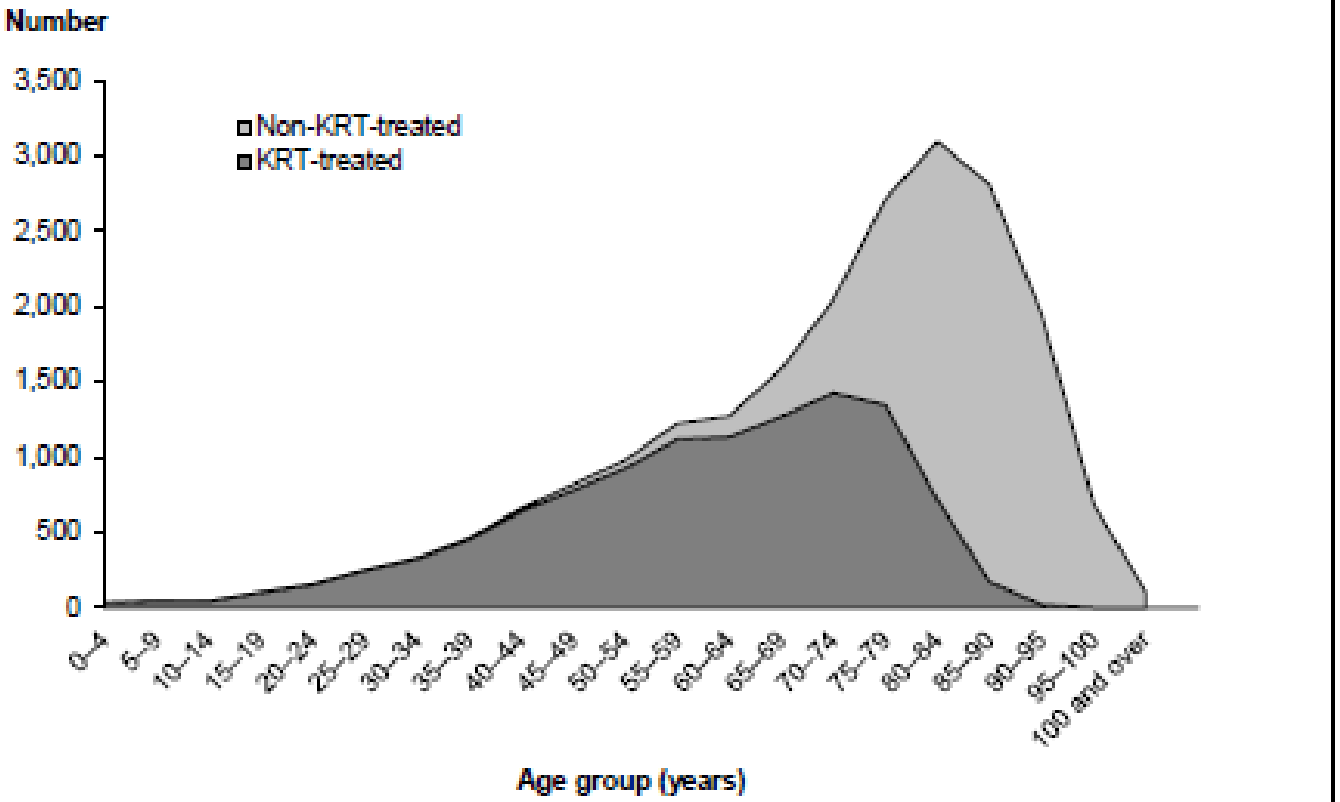
Age ≥65 – 40%
Age ≥75 – 15%



2016 ANZDATA Annual Report, Figure 2.1

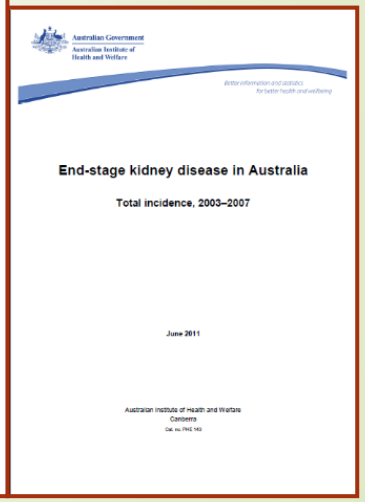


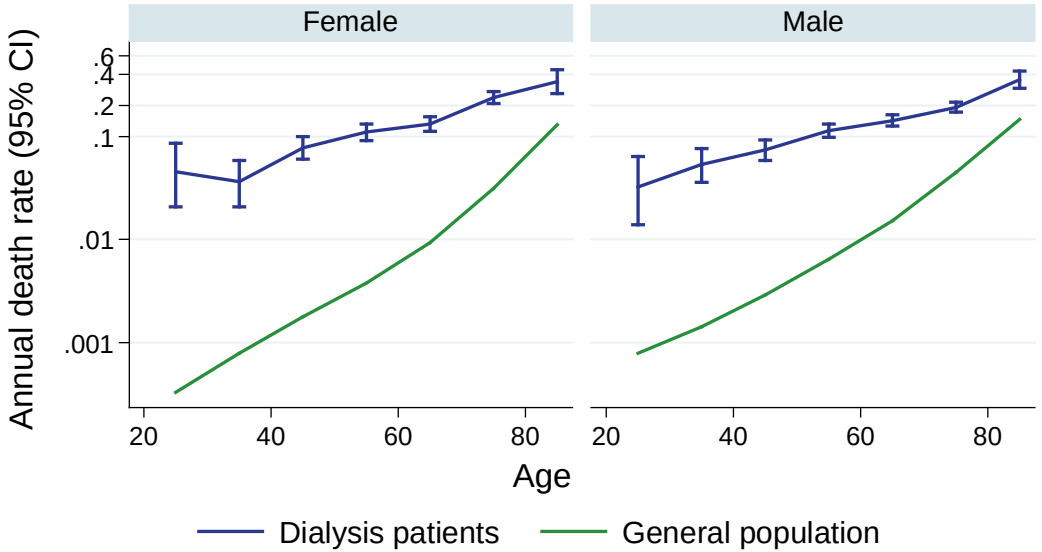
2016 ANZDATA Annual Report, Figure 2.1



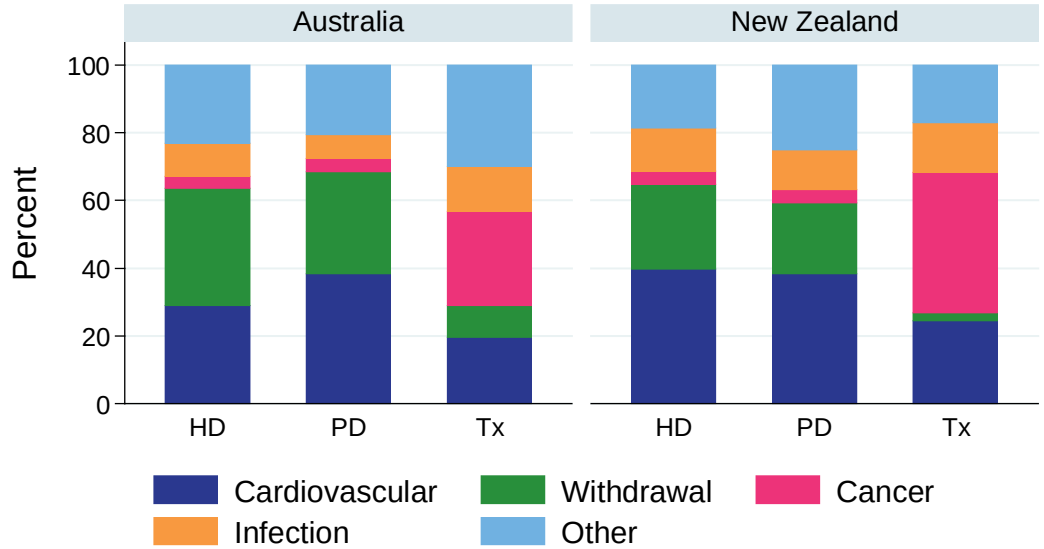
Source: Linked ANZDATA Registry, AIHW National Mortality Database and National Death Index.

Figure 4.3: Number of KRT-treated and non-KRT-treated cases, by age group at ESKD onset, 2003–2007



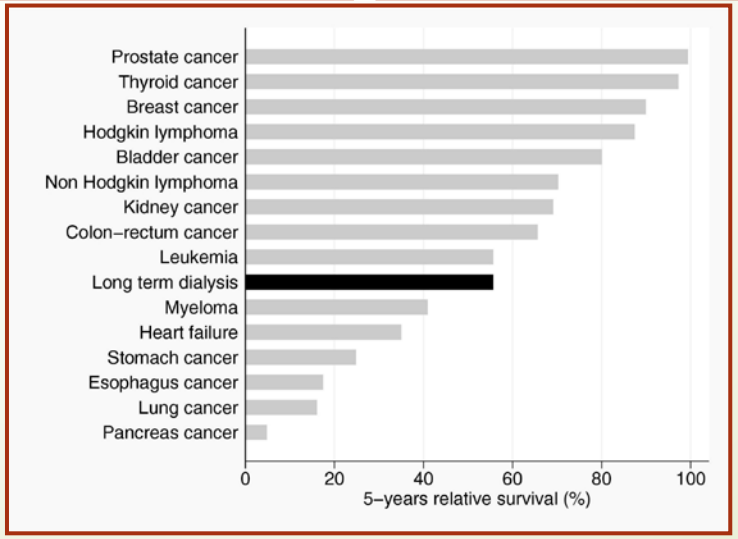


2016 ANZDATA Annual Report, Figure 3.2

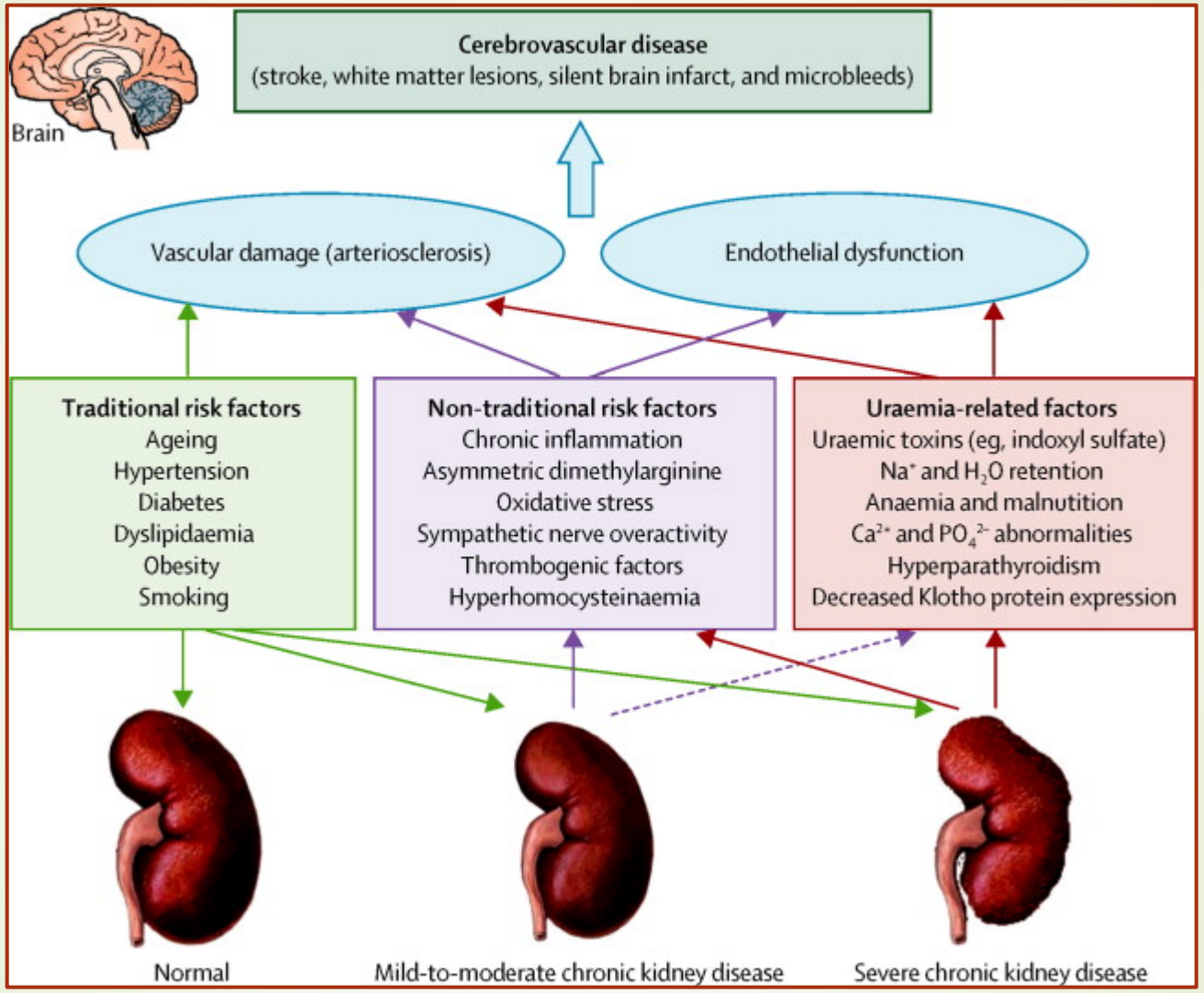


2016 ANZDATA Annual Report, Figure 3.5

Median 5Y Survival - Australia Commencement of RRT - 2006-15	
Age	***Survival***
45-64	69
65-74	48
75-84	33
85+	19

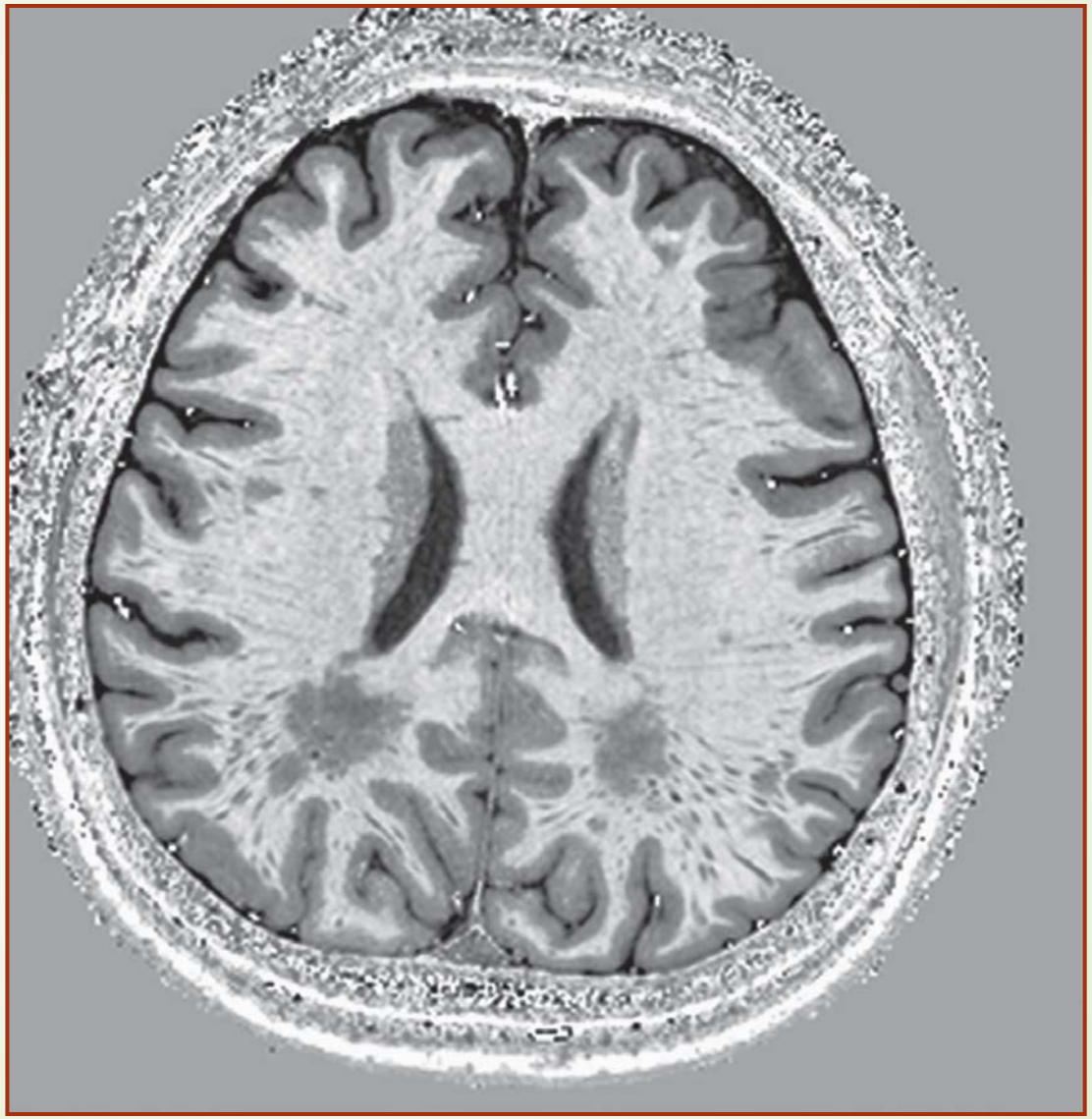


Nordio M, et al. AJKD, 2012, 59(6): 819-28



Lancet Neurology 2014 V13, I8, P823-33

35Y, HD 7Y, no macrovascular, diabetes or smoking history



KI 2015 V87, P1109-15

AJKD
Am J Kidney Dis. 2016;67(6):925-935
Original Investigation

Cognition in People With End-Stage Kidney Disease Treated With Hemodialysis: A Systematic Review and Meta-analysis

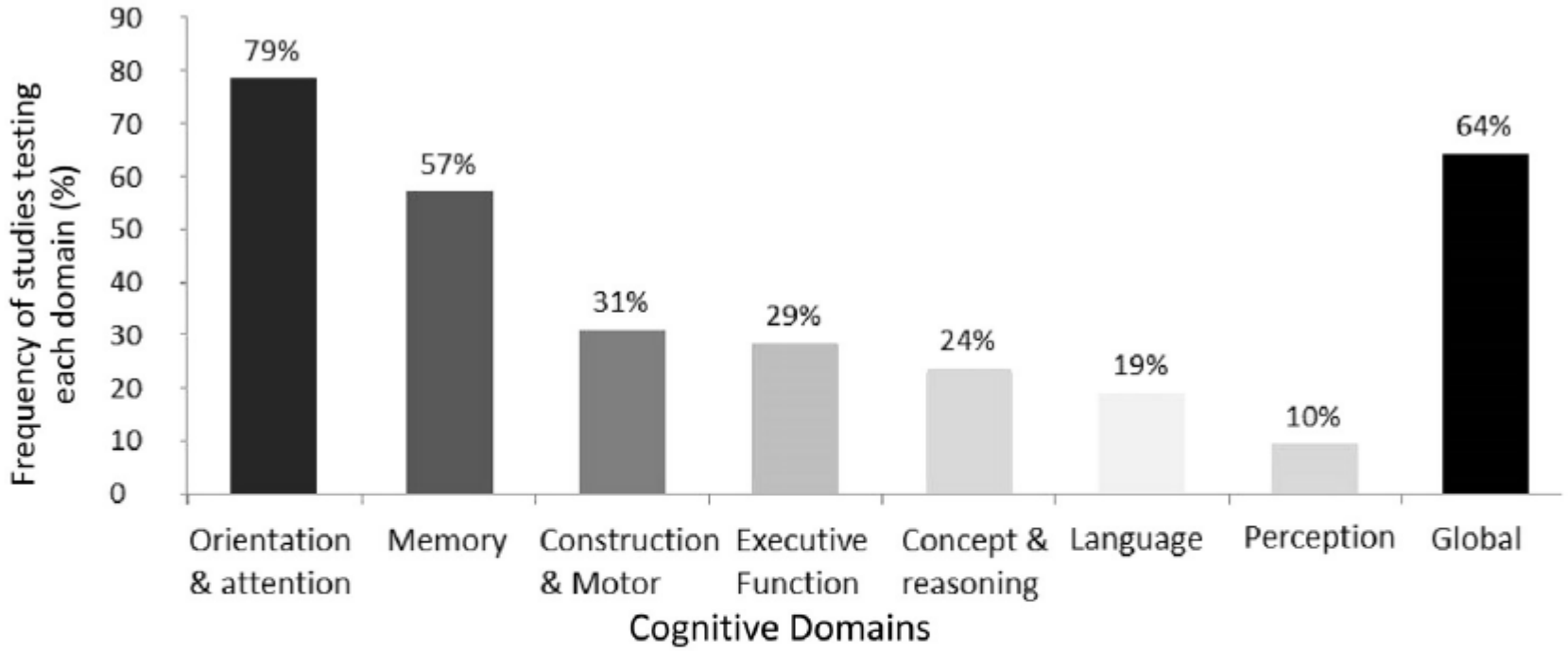
Emma O'Lone, MBChB,[1,2] Michael Connors, PhD,[1,3,4,5] Philip Masson, PhD,[1,2,6] Sunny Wu,[1] Patrick J. Kelly, PhD,[1] David Gillespie, PhD,[6] Daniel Parker, PhD,[7] William Whiteley, PhD,[6] Giovanni F.M. Strippoli, PhD,[1,8,9] Suetonia C. Palmer, PhD,[10] Jonathan C. Craig, PhD,[1,2] and Angela C. Webster, PhD[1,2,11]

42 cross-sectional & cohort studies (3,522 total participants) included in data synthesis

Comparison population	Studies†	Participants†
General population	32	2,231
People with NDD-CKD	8	629
People on PD	13	1,144
People with nondialyzed CKF	7	248

AIKD

Am J Kidney Dis. 2016;67(6):925-935



Trials (N)	33	24	13	12	10	8	4	27
Participants	3361	2922	1812	1554	376	1264	126	2458
No. of tests utilized to measure the domain	33	38	13	11	11	9	5	12
Most frequent test used	TMT A and B (17%)	WMS (25%)	Clock and GPB (17% each)	Stroop test (37%)	Progressive matrices (22%)	HVLT (20%)	Halstead Reitan (25%)	MMSE (53%)

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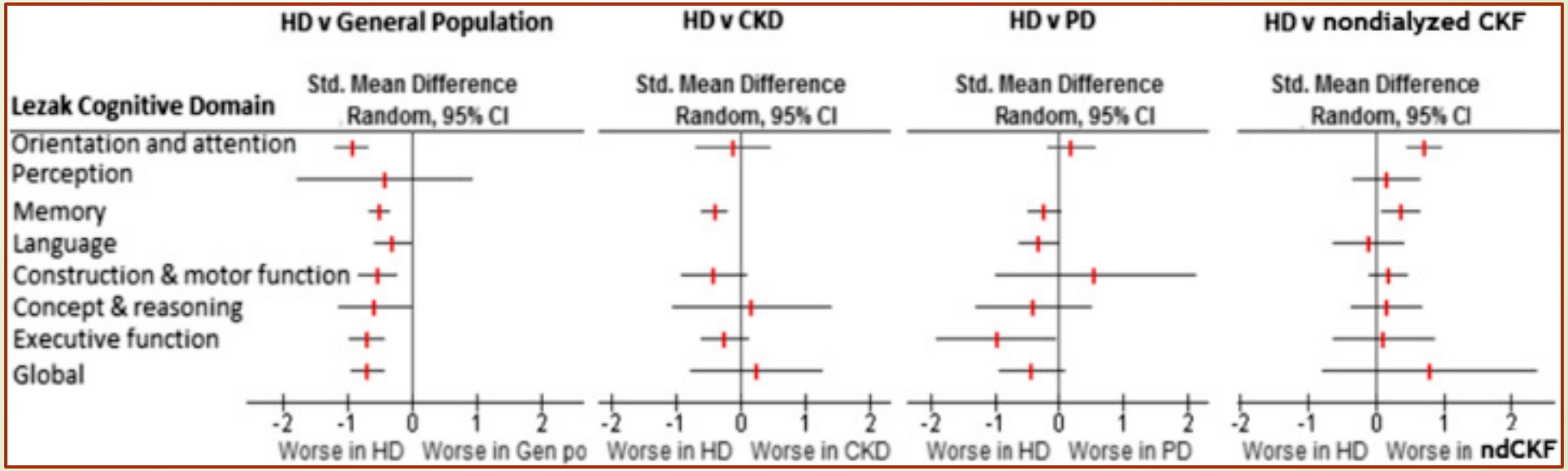


Berger *et al. BMC Medicine* (2016) 14:206
DOI 10.1186/s12916-016-0745-9

BMC Medicine

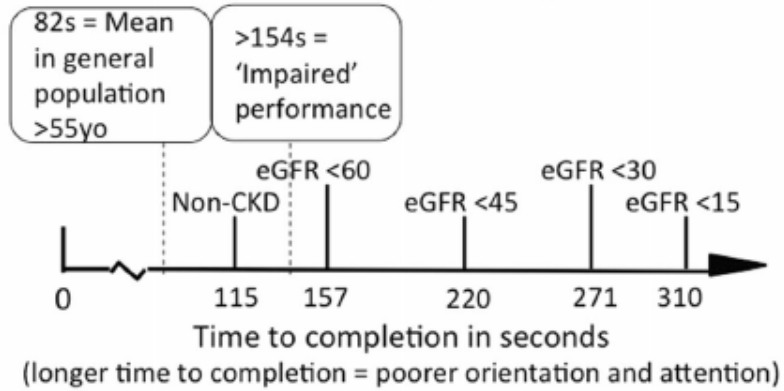
RESEARCH ARTICLE Open Access

Cognition in chronic kidney disease: a systematic review and meta-analysis

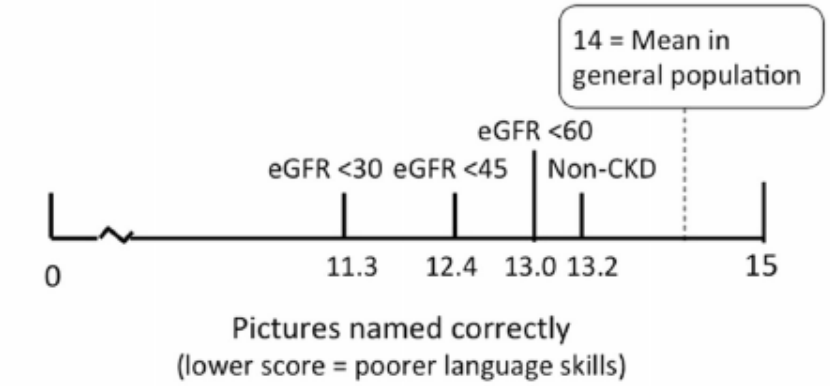
Israel Berger[1*], Sunny Wu[1], Philip Masson[1], Patrick J. Kelly[1], Fiona A. Duthie[2], William Whiteley[2], Daniel Parker[3], David Gillespie[2] and Angela C. Webster[1,4*]

Total included in meta-analyses: 44 studies, 51,590 participants
Possible comparisons between eGFR (mL/min/1.73m²):
eGFR 60: 43 studies, 51,418 participants
eGFR 45: 15 studies, 37,259 participants
eGFR 30: 13 studies, 18,041 participants
eGFR 15: 6 studies, 5482 participants

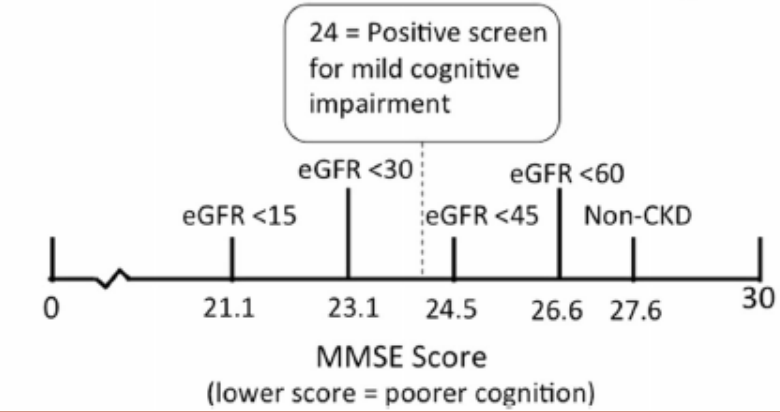
a. Estimated difference in TMT B score, representing Orientation and Attention



b. Estimated difference in 15-item BNT score, representing Language



c. Estimated difference in MMSE score, representing Global Cognition

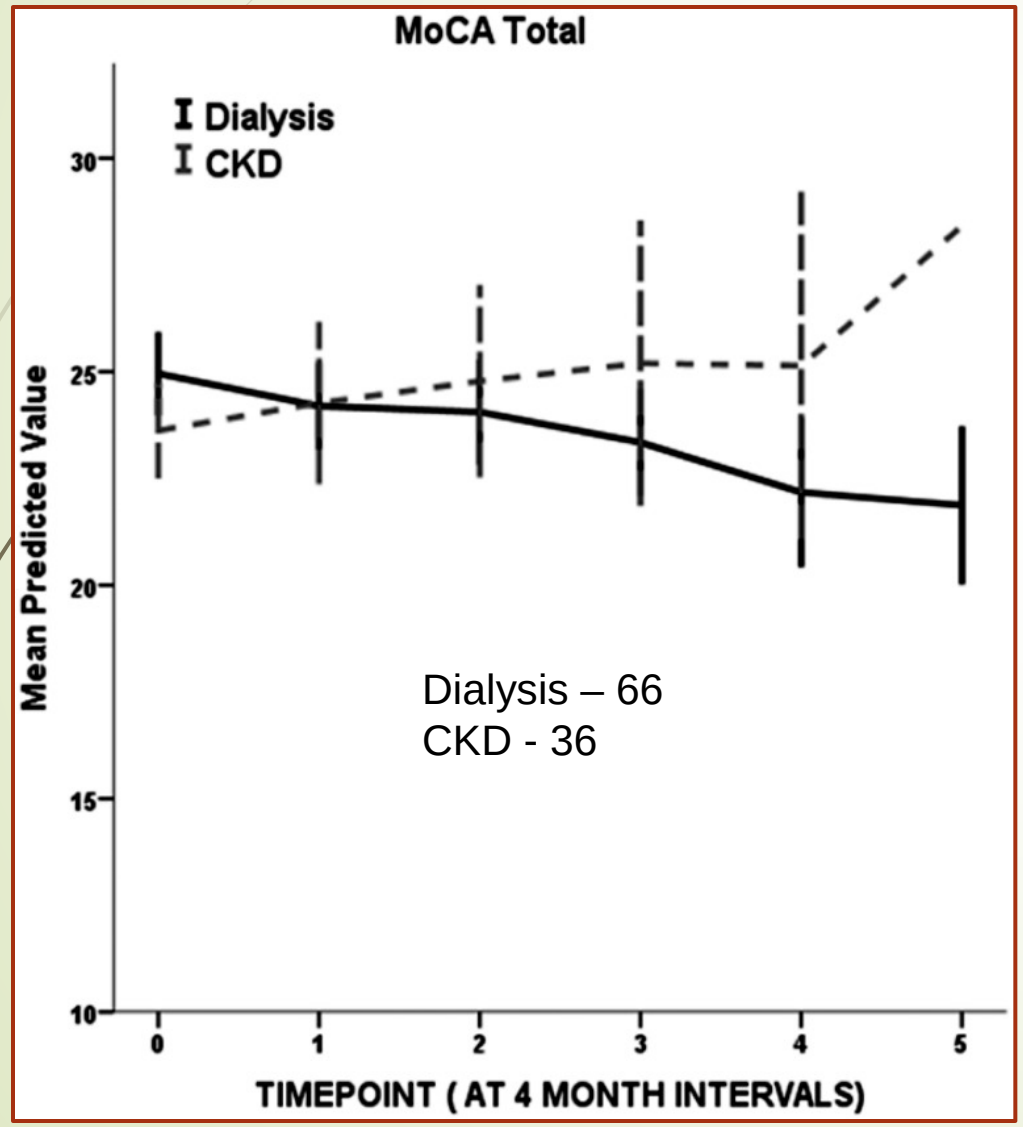


- **Pattern of CI in CKD is does not fit in to known syndromes**
- **Cognition declines with advancing CKD in each domain follows a unique pattern**
- **Global cognition measure appear to be useful in screening**

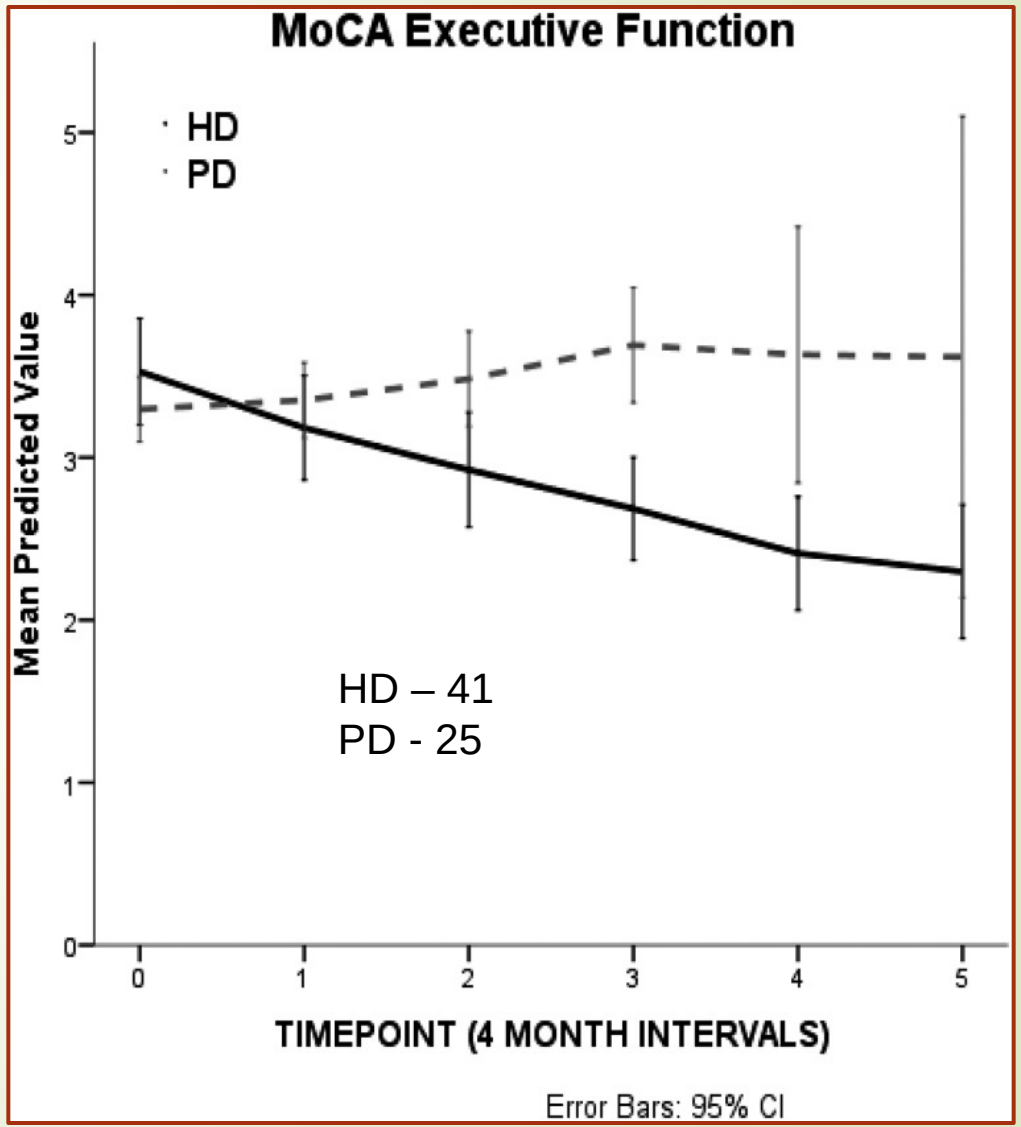
ORIGINAL ARTICLE
Clinical Kidney Journal, 2017, vol. 10, no. 1, 89–94

Cognitive function and advanced kidney disease: longitudinal trends and impact on decision-making

Osasuyi Iyasere[1], David Okai[2] and Edwina Brown[1]



Dialysis – 66
CKD - 36



HD – 41
PD - 25

ORIGINAL ARTICLE
Clinical Kidney Journal, 2017, vol. 10, no. 1, 89–94

Cognitive function and advanced kidney disease: longitudinal trends and impact on decision-making

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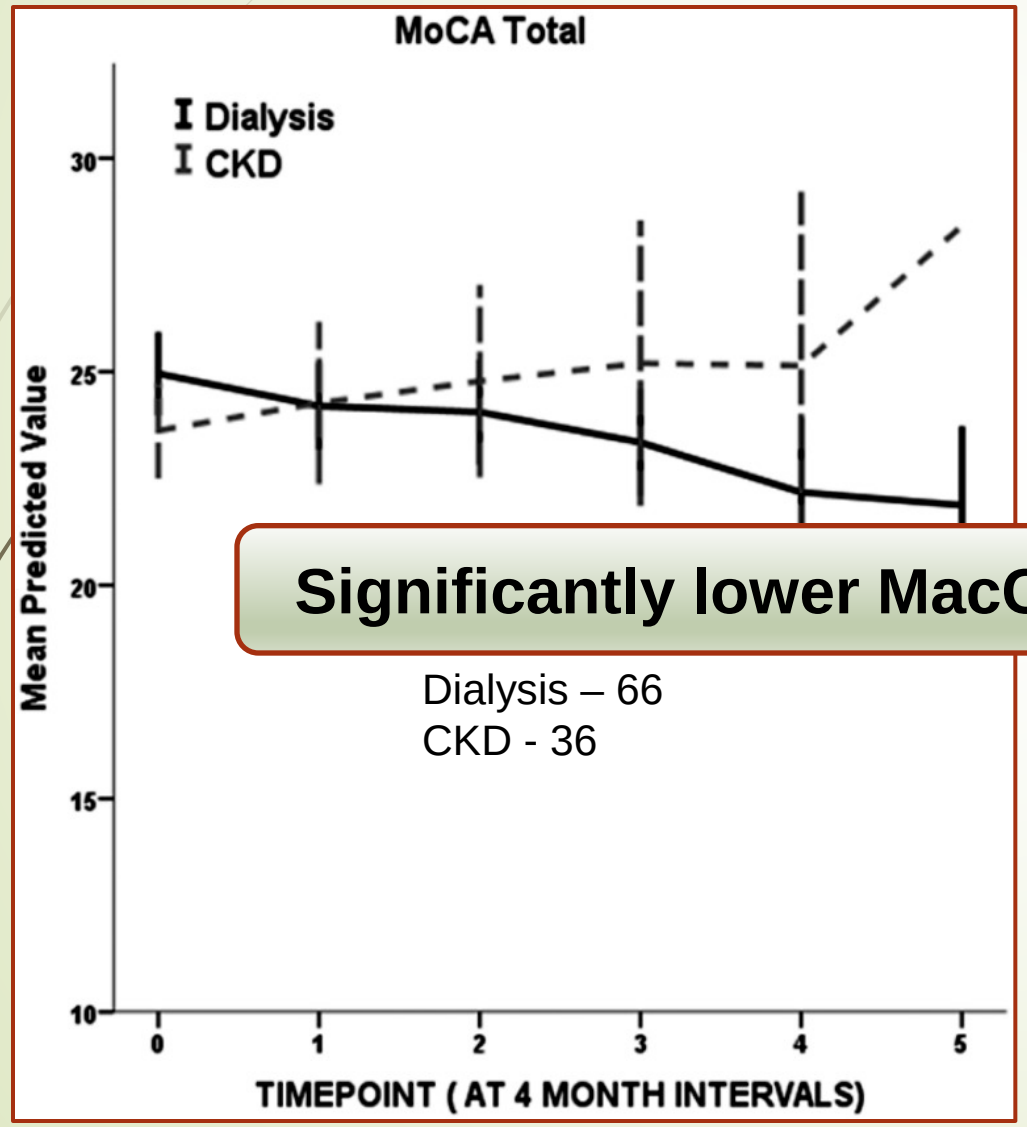
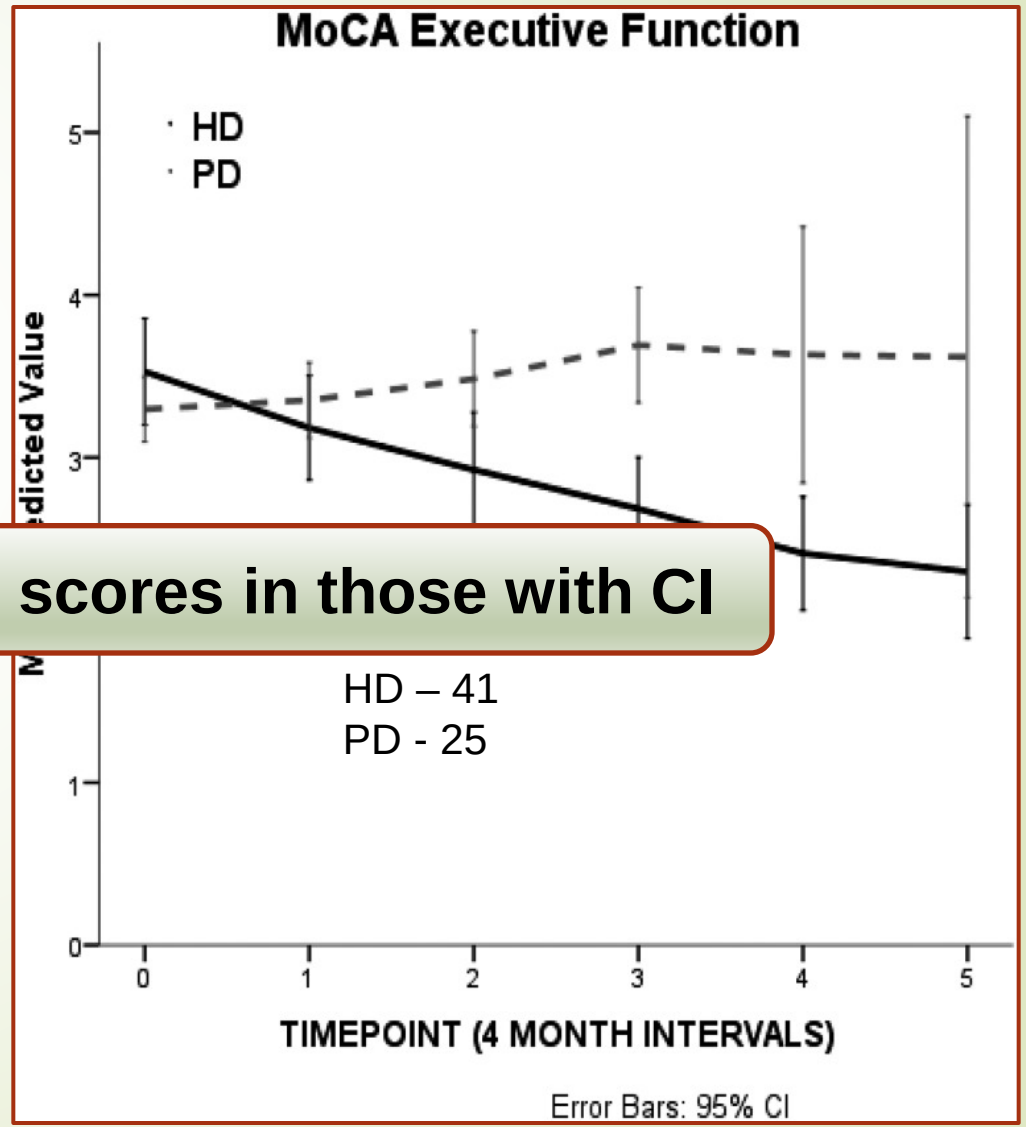




Significantly lower MacCAT-T scores in those with CI

Dialysis – 66
CKD - 36

HD – 41
PD - 25

Impact of cognitive impairment

- Health literacy
- Self-management capability
- Delirium and depression
- Decision making capacity (w/w dialysis)
- Care giver burden
- Resource utilisation
- Mortality

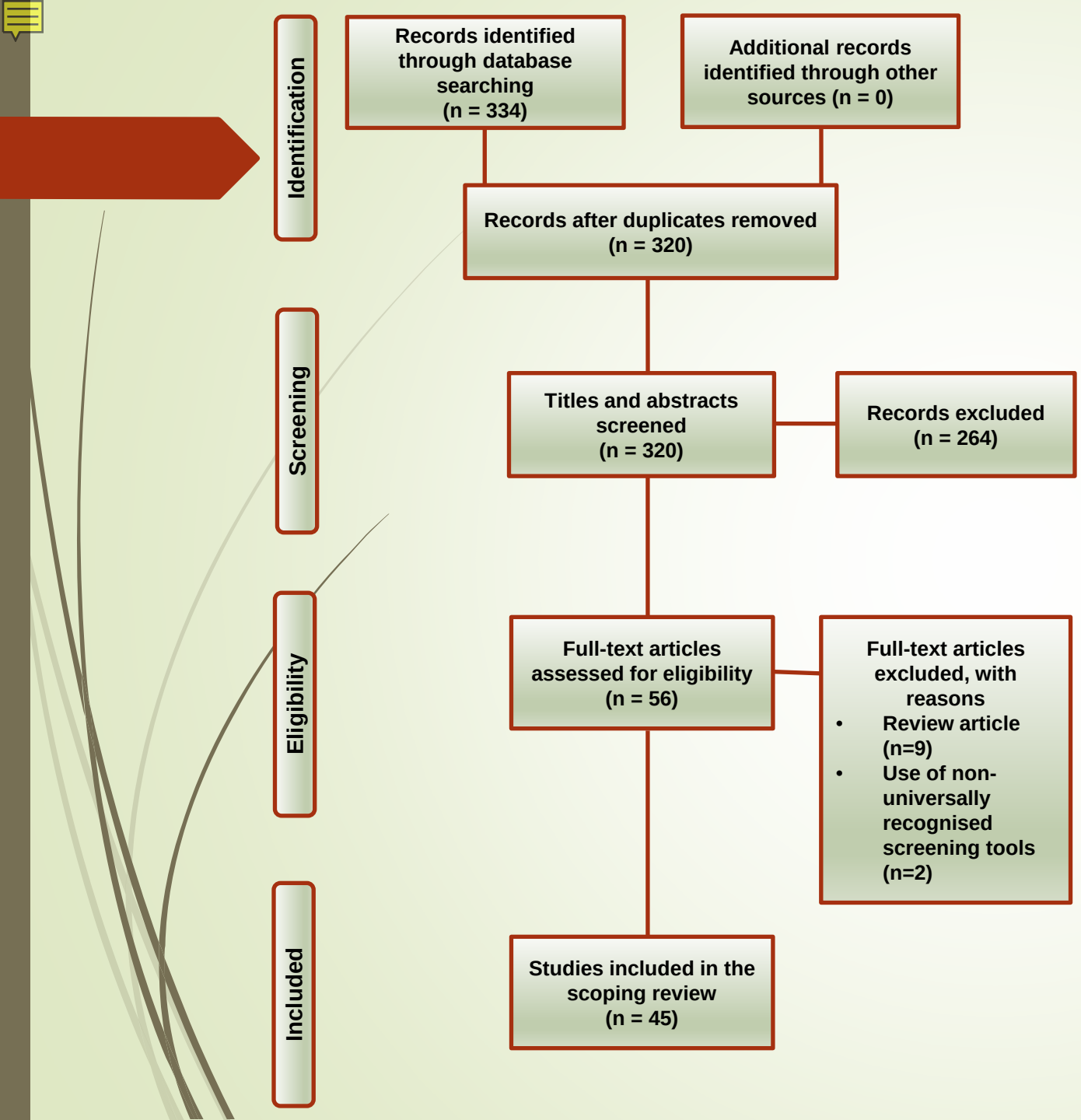
- Recognition and management of depression
- Prevention, recognition and management of delirium
- Advance care planning
- Assistance to patients and their carers with:
  - Navigating care pathways
  - Weighing up treatment options
  - Compiling advice from multiple sources
  - Adherence
  - Maintaining independence

BMC Medicine 2016 V14, P206

Screening of cognitive impairment in dialysis – a scoping review

A San, B Hiremagalur, W Muircroft and L Grealish

- Validated tools for global cognitive assessment
- Optimal condition and timing in relation to HD for administering the tool
- Prevalence based on global cognitive assessment



- Medline, Cinhal, Embase, Psychinfo, Pubmed and Cochrane
- 2000 to 2015, English
- ESKD on dialysis
- Prospective trials using global cognitive assessment tools

"dementia" OR "dementia" [tw] "delirium"[mh] OR "delirium"[tw] "cognition"[mh] OR cognition[tw] OR "cognition disorders"[mh]

"renal dialysis"[mh] OR "dialysis"[mh] OR dialysis[tw] OR hemodialy*[tiab] OR haemodialy*[tiab] OR dialy*[ti] OR peritoneal dialysis[tw] OR dialysis patient*[tiab] OR end-stage renal[ti] OR dialysis therapy[tiab] OR "Hemofiltration"[majr] OR "Renal Replacement Therapy"[majr:noexp] OR esrd[ti] OR renal replacement[ti]

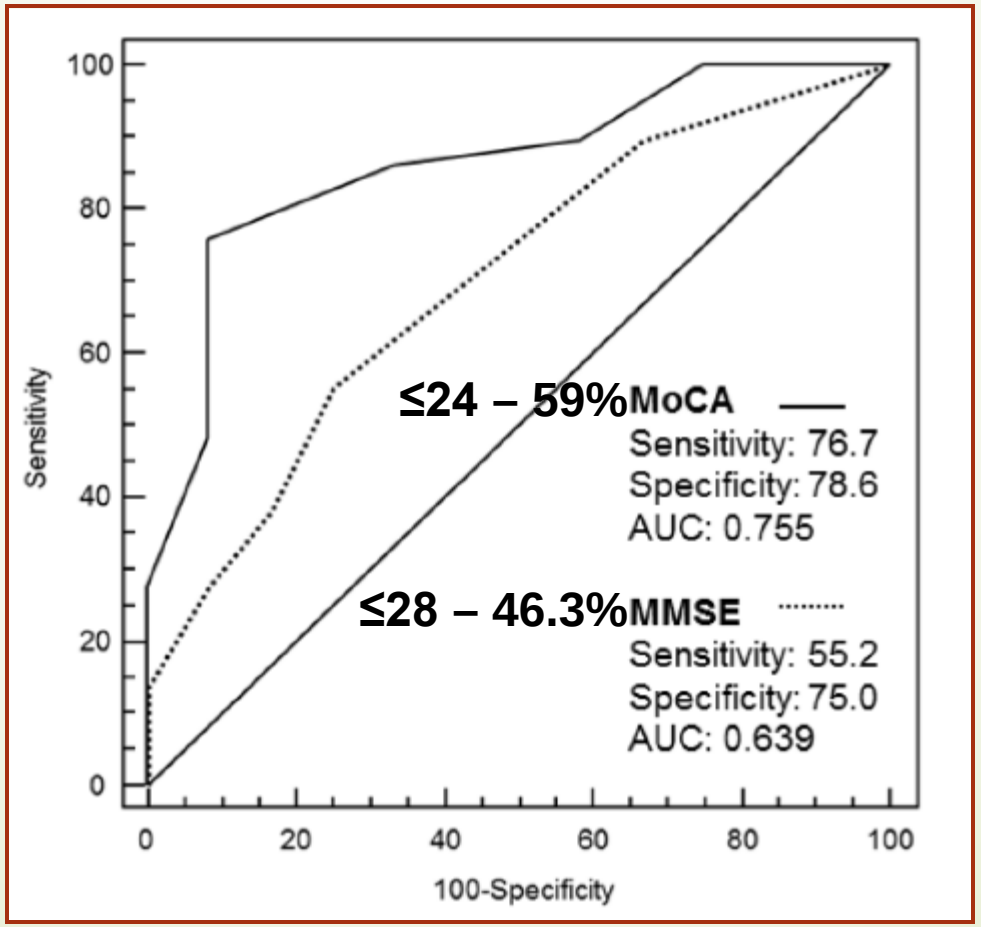
N = 45

- Cross-sectional studies
- HD – **35** studies, HD+PD – **9** studies, PD – **1** study
- Control group included – **21** studies
- MMSE – **32** studies, MMSE+MoCA – **3** studies, MoCA – **1** study, 3MS – **9** studies
- Detailed neuropsychological testing – **17** studies
- Mean age 65 and over – **43** studies

The Montreal Cognitive Assessment (MoCA) - A Sensitive Screening Instrument for Detecting Cognitive Impairment in Chronic Hemodialysis Patients

Frances E. Tiffin-Richards[1,2], Ana S. Costa[1,2], Bernhard Holschbach[3], Rolf D. Frank[4], Athina Vassiliadou[5], Thilo Krüger[6], Karl Kuckuck[1,2], Theresa Gross[6,7], Frank Eitner[6,8], Jürgen Floege[6], Jörg B. Schulz[1,2], Kathrin Reetz[1,2,9]*

PLOS ONE | www.plosone.org October 2014 | Volume 9 | Issue 10 | e106700



N = 43
CI based on NP – 70%

MoCA

- Developed as a quick tool to detect MCI
- More sensitive than MMSE in detecting MCI
- Assesses patients in more domains than MMSE
  - Executive function
  - Higher-level language
  - Complex visiospatial processing
- Covers a range of content required for assessment of CI in CVD
  - Exception – mental processing speed
- Evidence that visiospatial/executive subset makes it preferentially sensitive to VD is mixed

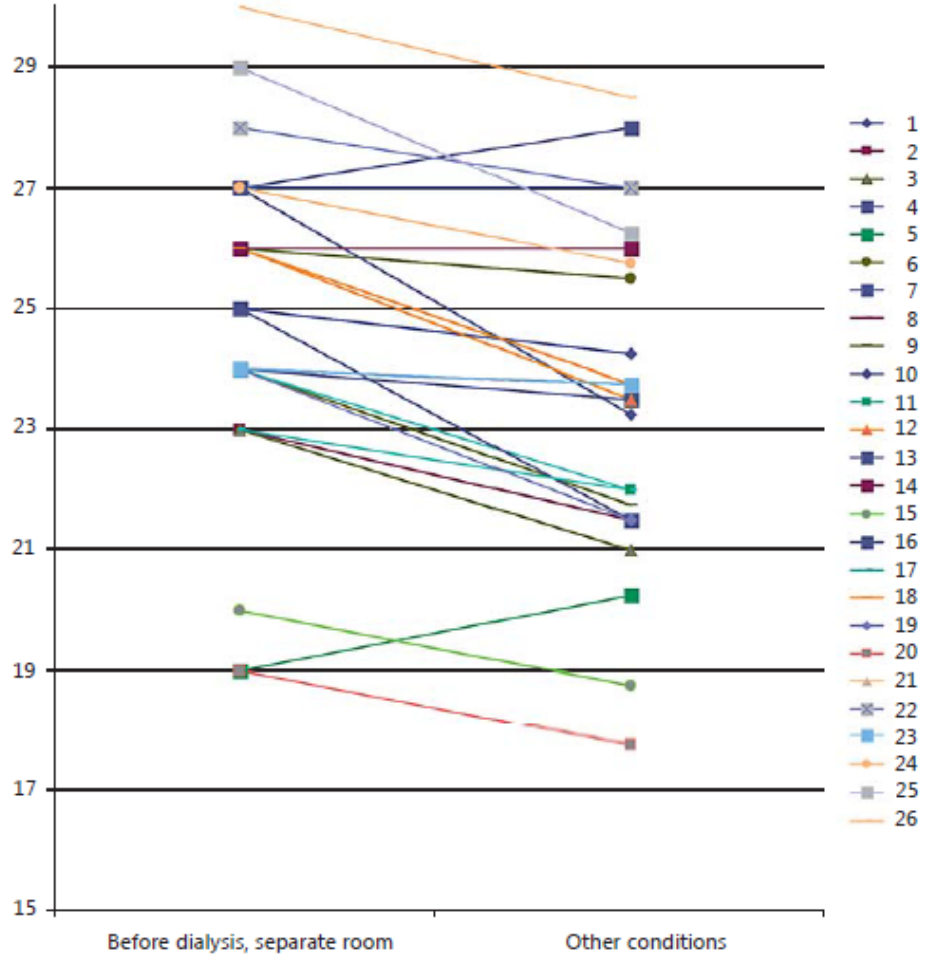
Dement Geriatr Cogn Disord 2014;38:31–38

DOI: 10.1159/000357803

Testing conditions	MoCA total score	p value (t test)
Separate vs. group room	24.17±3.1 vs. 23.69±2.64	0.101
Before vs. after dialysis	24.42±2.62 vs. 23.37±3.33	0.013*
Before dialysis		
Separate vs. group room	23.27±2.99 vs. 24.35±2.95	0.012*, a
Separate room vs. other conditions	24.96±2.84 vs. 23.62±2.78	<0.001*, a

Values represent mean ± SD. Statistically significant: * $p < 0.05$.

[a] Statistically significant after Bonferroni correction of multiple comparisons.



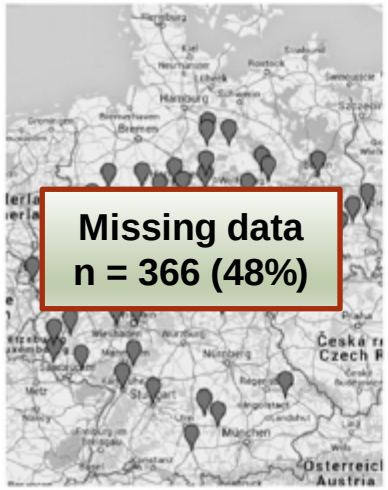
Prevalence

- Global Cognitive Assessment Tool
  - HD (21/44 studies) - 6% to 66%; PD (3/10 studies) – 3 to 14%
- Neurocognitive Assessment (5/17 studies)
  - HD – 58 to 73%; PD – 67%
- Where reported:
  - HD>PD>CKD>Controls
  - NP>GCAT

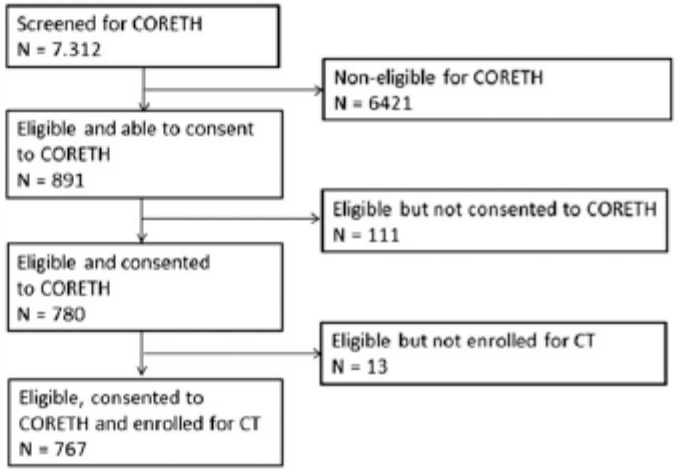
Cognitive Testing in Patients with CKD: The Problem of Missing Cases

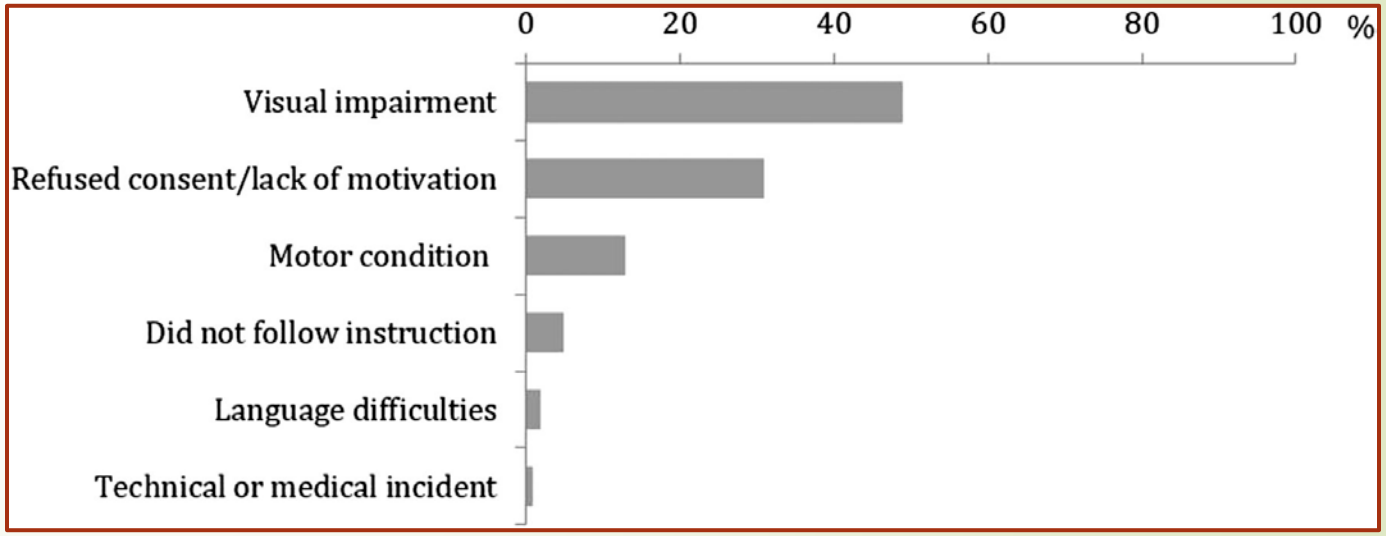
Denise Neumann,[*†] *Maxi Robinski,*[*†] *Wilfried Mau,*[*†] *and Matthias Girndt*[†‡]

Clin J Am Soc Nephrol 12: 391–398, 2017



Missing data
n = 366 (48%)





Summary

- Routine cognitive assessment
- Assessment tool
- Barriers to assessment