

## Background

- Major consensus criteria currently in use include: (1) National Institute on Aging-Alzheimer's Association (NIA-AA; McKhann 2011), (2) International Working Group (IWG; Dubois 2007, Dubois 2010, Dubois 2014), (3) International Classification of Diseases (ICD-10; WHO 2010), and (4) Diagnostic and Statistical Manual of Mental Disorders (DSM-5; APA 2013)
- The National Institute of Neurological and Communicative Disorders – Alzheimer's Disease and Related Disorders Association (NINCDS-ADRDA; McKhann 1984) criterion remains an important comparator standard given its role in AD research prior to the advent of the newer, biomarker-driven criteria
- A preliminary study of participants from the Sunnybrook Dementia Study (SDS; ClinicalTrials.gov NCT01800214) demonstrated notable discordance between criteria, in particular between the subtype and co-pathology permissive NIA-AA, and the prototypic and biomarker-requiring IWG

## Objective

To examine the diagnostic agreement between current criteria and the NINCDS-ADRDA "bronze standard"

## Methods

- Clinical history and imaging for **155 participants** from the SDS who met 1984 NINCDS-ADRDA criteria for **probable or possible AD** were reviewed retrospectively including:
  - function (Alzheimer's Disease Functional Assessment of Change Scale)
  - cognitive screening (MMSE and Behavioural Neurology Assessment)
  - cognitive testing (Dementia Rating Scale)
  - MRI, and single photo emission computed tomography (SPECT)
- Tc<sup>99m</sup>-SPECT was used instead of FDG-PET for NIA-AA and IWG criteria.

## Results

Diagnostic re-classification by new criteria is shown in Table 1 and Table 2. Comparing across broad diagnostic categories (AD vs. not AD), **agreement with the NINCDS-ADRDA was best for the NIA-AA (94%) and DSM-5 (96%)**, and poor for the IWG-1 (54%) and ICD-10 (55%). Agreement with the NINCDS-ADRDA probable AD subgroup was better for the IWG (76%) and ICD-10 (71%), and much worse for the possible AD subgroup – IWG (13%) and ICD-10 (27%).

	NIA-AA		IWG-1		ICD-10		DSM-5	
	n	%	n	%	n	%	n	%
<b>AD</b>	146	<b>94%</b>	83	<b>54%</b>	86	<b>55%</b>	149	<b>96%</b>
<b>Not AD</b>	9		72		69		6	

**Table 1:** Breakdown of re-classified diagnoses among new criteria for NINCDS-ADRDA defined AD (n=155). AD includes: (1) for NINCDS-ADRDA - probable and possible AD; (2) for NIA-AA - probable and possible AD; (3) for IWG-1 – probable AD; (4) for ICD-10 – dementia due to AD; (5) DSM-5 – major neurocognitive disorder due to probable or possible AD. % refers to percentage agreement with NINCDS-ADRDA

	NIA-AA		IWG-1		ICD-10		DSM-5	
	Re-classified NIA-AA subgroups	%	Re-classified IWG-1 Subgroups	%	Re-classified ICD-10 subgroups	%	Re-classified DSM-V subgroups	%
<b>NINCDS-ADRDA Probable AD (n = 100)</b>	Probable AD	<b>93%</b>	Probable AD	<b>76%</b>	Dementia due to AD	<b>71%</b>	Major NCD, probable AD	<b>95%</b>
	Possible AD		76		71		Major NCD, possible AD	
	MCI	6	Not AD	24	Not AD	29	Mild NCD	5
<b>NINCDS-ADRDA Possible AD (n = 55)</b>	Probable AD	<b>96%</b>	Probable AD	<b>13%</b>	Dementia due to AD	<b>27%</b>	Major NCD, probable AD	<b>98%</b>
	Possible AD		7		15		Major NCD, possible AD	
	MCI	2	Not AD	48	Not AD	40	Mild NCD	0
	Not AD	0					Not AD	1

**Table 2:** Breakdown of re-classified diagnostic subcategories among new criteria for NINCDS-ADRDA defined AD subgroups; probable (n=100) and possible (n=55)

## Discussion and Conclusions

**Individuals diagnosed with AD by the NINCDS-ADRDA will generally still be diagnosed with AD by the NIA-AA and DSM-5. However, a significant portion will not when using the IWG or ICD-10.**

**Disagreement is especially high for those previously diagnosed with only possible disease.**

**Factors contributing towards classification disagreement include presence of co-occurring medical conditions, especially cerebrovascular disease.**

## References and Acknowledgements

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We gratefully acknowledge financial support from the Canadian Institute of Health Research (MT#13129), Alzheimer Society of Canada, Alzheimer's Association (USA), the L. C. Campbell Foundation, the Heart and Stroke Foundation Canadian Partnership for Stroke Recovery, and the CIHR Training Program in Neurodegenerative Lipidomics.

