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## Background

A high but varying prevalence of HIV-associated neurocognitive disorders (HAND) has been reported among HIV-infected individuals, despite treatment with combination antiretroviral therapy (cART).<sup>1,2</sup> Neuropsychological assessment (NPA) is the recommended method for the diagnosis of HAND.<sup>3,4</sup> However, NPA is a time-consuming and expensive examination. Therefore, a short and accurate cognitive screening tool would be useful to identify those at increased risk for HAND allowing targeted referral for NPA.

<sup>1</sup> Cysique LA et al. *J Neurovirol.* 2011; 17: 176-83.

<sup>2</sup> Simioni et al. *AIDS.* 2010;24:1243-50.

<sup>3</sup> Antinori et al. *Neurology.* 2007;69:1789-99.

<sup>4</sup> Schouten et al. *AIDS.* 2015; in press.

## Objectives

To assess diagnostic characteristics of four cognitive screening instruments: Mini Mental State Examination (MMSE), HIV Dementia Scale (HDS), Montreal Cognitive Assessment (MoCA), and the 3-item questionnaire as published by Simioni et al (Simioni questionnaire)<sup>2</sup>

## Methods

**Study cohort:** The AGE<sub>IV</sub> Cohort Study is a prospective comparative cohort study investigating age-associated comorbidities and their risk factors among HIV-infected and highly comparable HIV-uninfected participants, all aged ≥45 years, in Amsterdam.

**Inclusion in AGE<sub>IV</sub> Cohort Study**  
598 HIV+ 550 HIV-  
Biennial study visits in which participants undergo standardized screening for age-associated co-morbidities, organ dysfunction and risk factors.

**Inclusion in substudy**  
Substudy inclusion criteria: (1) male gender  
(2) plasma HIV-1-RNA <40c/mL for ≥12months on cART  
Substudy exclusion criteria: neurological/psychiatric disorder, current IV drug use, use of illicit drugs or excessive alcohol consumption, insufficient command of Dutch daily use language

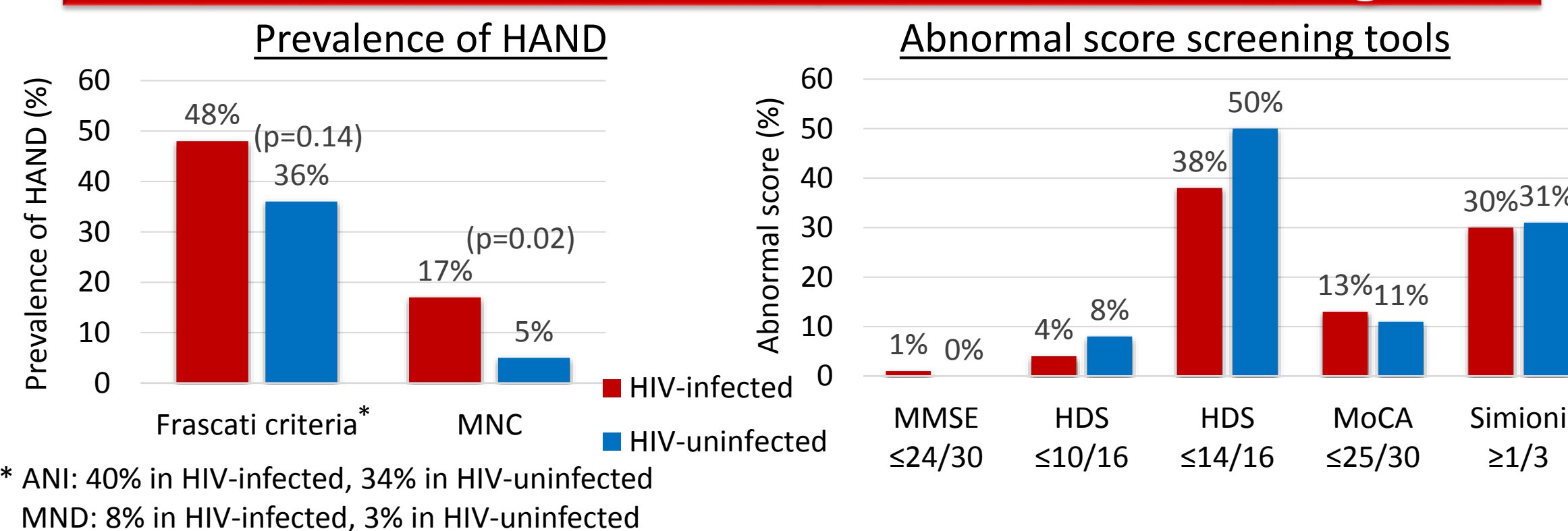
**Inclusion in nested cognitive substudy**  
103 HIV+ 74 HIV-  
NPA, covering 6 cognitive domains commonly affected by HAND, and 4 cognitive screening tests were performed in all substudy participants. HAND was classified using Frascati criteria<sup>3</sup> and MNC<sup>4</sup> (multivariate normative comparison). Screening tests were defined as abnormal when meeting the following cutoffs: MMSE≤24/30, HDS≤10/16, HDS≤14/16, MoCA≤25/30, Simioni questionnaire≥1/3 “yes, definitely”.

**Statistical analysis:** In HIV-infected participants, sensitivity and specificity of MMSE, HDS, MoCA and Simioni questionnaire was calculated, and a receiver operating characteristic (ROC) analysis was performed using Frascati criteria and MNC as the gold standard, respectively.

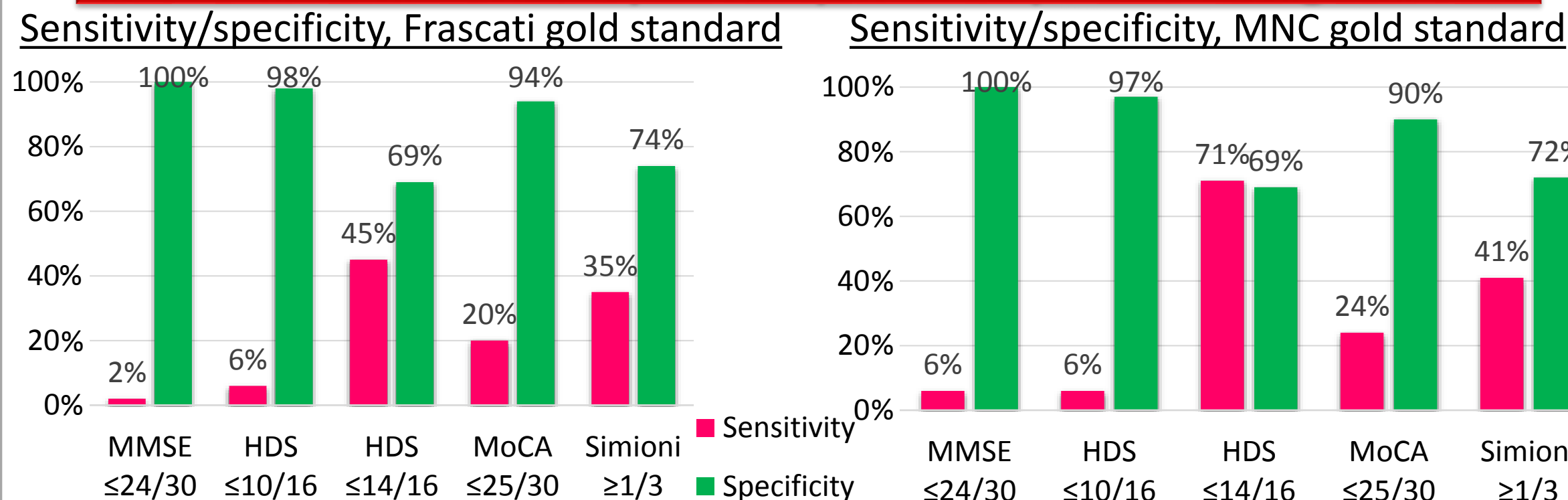
## Results: Cohort Characteristics

	HIV-infected individuals (median (IQR) / %, n=103)	HIV-uninfected individuals (median (IQR) / %, n=74)
Age (years)	54 (49-62)	54 (49-61)
Men who have sex with men	93%	90%
Dutch as native language	91%	95%
Education (ISCED level)	6 (5-6)	6 (5-6)
Premorbid intelligence (IQ)	101 (95-111)	103 (96-112)
Subjective cognitive complaints (CFQ ≥42)	13%	5%
Depressive symptoms (BDI >13)	6%	4%
Weekly to monthly use of ecstasy	2%	13%
Years of known HIV-infection / ART use	13.5 (7.4-17.1) / 11.6 (4.9-14.9)	
ART-naïve at start cART	80%	
Prior AIDS	35%	
Mean nadir/current CD4 (cells/mm <sup>3</sup> )	170 (60-250) / 625 (475-800)	
CPE score of current cART regimen	7 (7-8)	

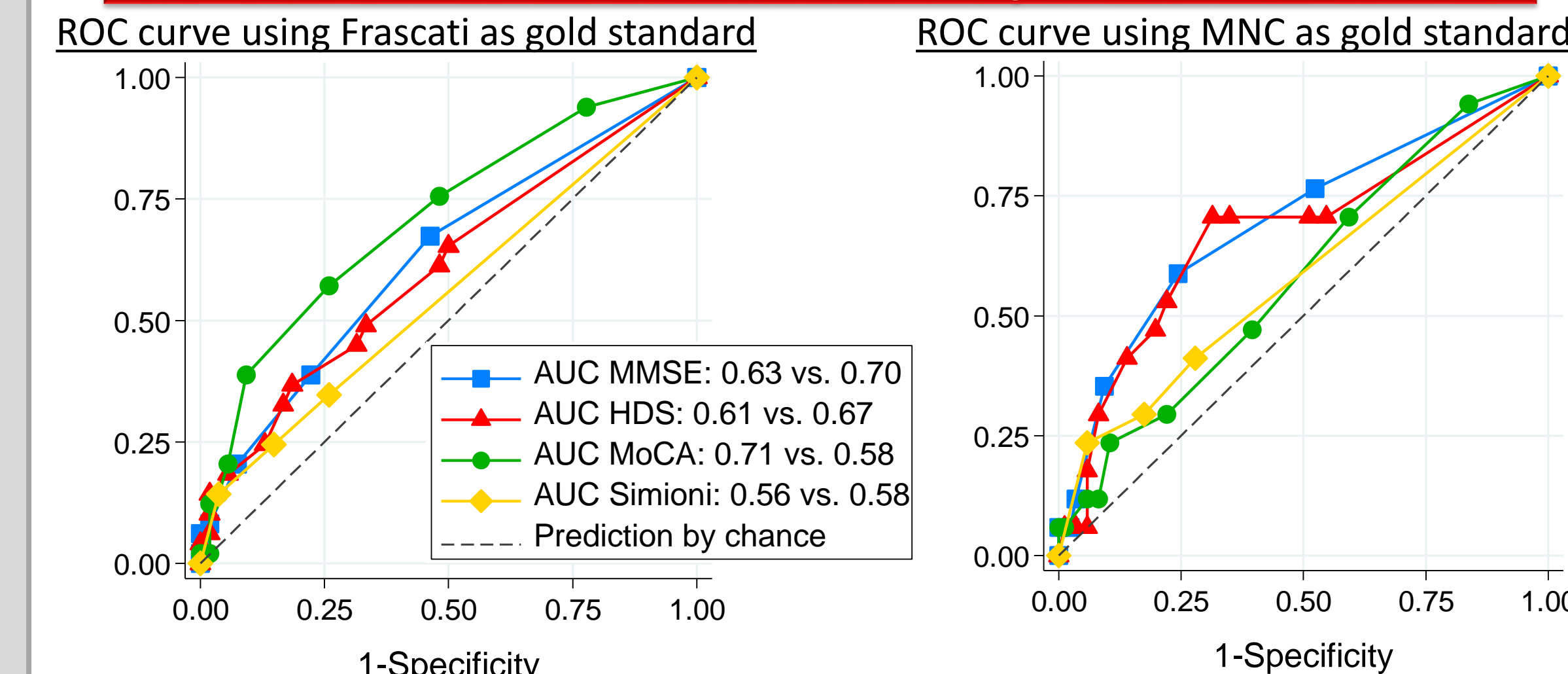
## Results: Prevalence HAND/Abnormal Screening Test



## Results: Sensitivity and Specificity Screening Tools



## Results: ROC Analysis



## Conclusions

Cognitive screening instruments performed poorly for detecting HIV-associated cognitive impairment

**NPA and cognitive screening tools in HIV-infected and HIV-uninfected men**

- HAND was diagnosed in 48% of HIV-infected, but also in 36% of HIV-uninfected men using Frascati criteria (p=0.14)
- MNC classified 17% of HIV-infected men as cognitively impaired compared to 5% in HIV-uninfected controls (p=0.02)
- All screening tools showed comparable proportions of abnormal scores among patients and controls

**Diagnostic characteristics cognitive screening tools in HIV-infected participants**

- Sensitivity of screening tools: low to moderate
- Specificity of screening tools: moderate to high
- Optimal cutoffs: no large improvement sensitivity/specificity
- ROC analysis: low to moderate area under the curve for all screening tools; no instrument had superior performance

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## Acknowledgements

Financial support: The Netherlands Organisation for Health Research and Development (ZonMw) grant nr. 300020007 & AIDS Fonds grant nr. 2009063. Additional unrestricted scientific grants: Gilead Sciences, Viiv Healthcare, Janssen Pharmaceutica N.V., Bristol-Myers Squibb, Merck & Co, and Boehringer Ingelheim.

