

Staging Disease Severity Using the Alzheimer's

Disease Composite Score (ADCOMS): A

Retrospective Data Analysis

Amir Abbas Tahami Monfared, MD, PhD, Eisai Inc., Nutley, New Jersey, USA; and
McGill University, Epidemiology, Biostatistics, and Occupational Health, Montreal,
Quebec, Canada.

Katherine Houghton, MSc, Health Economics, RTI Health Solutions, Manchester, UK

Quanwu Zhang, PhD, Eisai Inc., Nutley, New Jersey, USA

Josephine Mauskopf, PhD, Health Economics, RTI Health Solutions, Research Triangle
Park, North Carolina, USA

for the Alzheimer's Disease Neuroimaging Initiative*

Corresponding Author:

Amir Abbas Tahami Monfared, MD, PhD

Eisai Inc.

200 Metro Blvd

Nutley, New Jersey 07110

Email: amir_tahami@eisai.com

*Data used in preparation of this article were obtained from the Alzheimer's Disease
Neuroimaging Initiative (ADNI) database (adni.loni.usc.edu). As such, the investigators

within the ADNI contributed to the design and implementation of ADNI and/or provided data but did not participate in analysis or writing of this report. A complete listing of ADNI investigators can be found at:

http://adni.loni.usc.edu/wp-content/uploads/how_to_apply/ADNI_Acknowledgement_List.pdf

Supplementary Material

Description of Other AD Severity Measures

Clinical Dementia Rating Scale

The CDR assesses cognitive functioning across six domains - Memory, Orientation, Judgment and Problem-solving, Community Affairs, Home and Hobbies, and Personal Care - and is derived via a semistructured interview with patients and informants. Each domain is rated on a 5-point scale of functioning: 0, no impairment; 0.5, questionable impairment; 1, mild impairment; 2, moderate impairment; and 3, severe impairment. A global score is computed via an algorithm [1]. For the present study, the global score computed by the ADNI owners was used for analysis.

Clinical Dementia Rating Scale – Sum of Boxes

The CDR-SB is obtained by summing the scores for each domain score from the CDR. Scores range from 0 to 18.

Alzheimer's Disease Assessment Scale–Cognition

The ADAS-Cog is a brief structured cognitive test battery with 11 tasks that assesses memory (word recall, word recognition), reasoning (following commands), language (naming, comprehension), orientation, ideational praxis (placing letter in envelope), and constructional praxis (copying geometric designs). Ratings of spoken language, language comprehension, word-finding difficulty, and ability to remember test instructions are also obtained. The test for all 11 tasks is scored in terms of errors, with higher scores reflecting poorer performance. Scores can range from 0 (best) to 70 (worst).

Mini-Mental State Examination

The MMSE is a brief, structured test composed of seven items that measure cognitive impairment. Scores range from 0 to 30, with lower scores indicating greater impairment. The scale evaluates orientation to place, orientation to time, registration (immediate repetition of three words), attention and concentration (serially subtracting seven beginning with 100), recall (recalling the previously repeated three words), language (naming, repetition, reading, writing, comprehension), and visual construction (copy two intersecting pentagons).

The MMSE was originally developed in 1975 as a practical method for cognitive function assessment and is commonly used to assess dementia severity. However, the MMSE is not sensitive to the detection of MCI [2,3].

Supplementary Table 1. All Institutional Review Boards Approving the ADNI Study

Albany Medical Center Committee on Research Involving Human Subjects Institutional Review Board

Boston University Medical Campus and Boston Medical Center Institutional Review Board

Butler Hospital Institutional Review Board

Cleveland Clinic Institutional Review Board

Columbia University Medical Center Institutional Review Board

Duke University Health System Institutional Review Board

Emory Institutional Review Board

Georgetown University Institutional Review Board

Health Sciences Institutional Review Board

Houston Methodist Institutional Review Board

Howard University Office of Regulatory Research Compliance

Icahn School of Medicine at Mount Sinai Program for the Protection of Human Subjects

Indiana University Institutional Review Board

Institutional Review Board of Baylor College of Medicine

Jewish General Hospital Research Ethics Board

Johns Hopkins Medicine Institutional Review Board

Lifespan - Rhode Island Hospital Institutional Review Board

Mayo Clinic Institutional Review Board

Mount Sinai Medical Center Institutional Review Board

Nathan Kline Institute for Psychiatric Research & Rockland Psychiatric Center Institutional Review Board

New York University Langone Medical Center School of Medicine Institutional Review Board

Northwestern University Institutional Review Board

Oregon Health and Science University Institutional Review Board

Partners Human Research Committee

Research Ethics Board Sunnybrook Health Sciences Centre

Roper St. Francis Healthcare Institutional Review Board

Albany Medical Center Committee on Research Involving Human Subjects Institutional Review Board

Rush University Medical Center Institutional Review Board

St. Joseph's Phoenix Institutional Review Board

Stanford Institutional Review Board

The Ohio State University Institutional Review Board

University Hospitals Cleveland Medical Center Institutional Review Board

University of Alabama Office of the IRB

University of British Columbia Research Ethics Board

University of California Davis Institutional Review Board Administration

University of California Los Angeles Office of the Human Research Protection Program

University of California San Diego Human Research Protections Program

University of California San Francisco Human Research Protection Program

University of Iowa Institutional Review Board

University of Kansas Medical Center Human Subjects Committee

University of Kentucky Medical Institutional Review Board

University of Michigan Medical School Institutional Review Board

University of Pennsylvania Institutional Review Board

University of Pittsburgh Institutional Review Board

University of Rochester Research Subjects Review Board

University of South Florida Institutional Review Board

University of Southern California Institutional Review Board

UT Southwestern Institution Review Board

VA Long Beach Healthcare System Institutional Review Board

Vanderbilt University Medical Center Institutional Review Board

Wake Forest School of Medicine Institutional Review Board

Washington University School of Medicine Institutional Review Board

Western Institutional Review Board

Western University Health Sciences Research Ethics Board

Yale University Institutional Review Board

SUPPLEMENTAL REFERENCES

1. Morris JC. The Clinical Dementia Rating (CDR): current version and scoring rules. *Neurology*. 1993;43(11):2412-4.
2. Mitchell AJ. A meta-analysis of the accuracy of the mini-mental state examination in the detection of dementia and mild cognitive impairment. *J Psychiatr Res*. 2009;43(4):411-31.
3. Ciesielska N, Sokołowski R, Mazur E, Podhorecka M, Polak-Szabela A, Kędziora-Kornatowska K. Is the Montreal Cognitive Assessment (MoCA) test better suited than the Mini-Mental State Examination (MMSE) in mild cognitive impairment (MCI) detection among people aged over 60? Meta-analysis. *Psychiatr Pol*. 2016;50(5):1039-52.