

Validation of a MoCA-to-MMSE Crosswalk: A Real-World Data Study in the United States

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Among six published MoCA-to-MMSE conversion methods, the **Roalf et al. (2013) crosswalk was most accurate** in a US real-world Alzheimer’s cohort — ICC 0.75, and 64% of converted scores within ±2 MMSE points, enabling researchers to pool fragmented cognitive data and extend longitudinal real-world evidence.

INTRODUCTION	METHODS	RESULTS	CONCLUSIONS	REFERENCES
- The Mini-Mental State Examination (MMSE) and the Montreal Cognitive Assessment (MoCA) are the two most widely used cognitive screening tools, but they are applied inconsistently in clinical practice. - This fragments longitudinal records: a patient may have an MMSE at one visit and a MoCA at the next, so scores cannot be compared over time. - A validated crosswalk between the two scales would let researchers aggregate disparate data and strengthen real-world evidence. Aim: Identify which of six established MoCA-to-MMSE conversion tables performs best in a US real-world Alzheimer’s population. Patients have either MMSE, MoCA or both in NeuroBlu Data V25R3 2,096 260 paired 1,001 MMSE MoCA Number of patients with at least 1 MMSE, MoCA or both	Design. Retrospective study using de-identified US electronic health records from NeuroBlu Data (V25R3), spanning 1999–2025. Population. Patients aged ≥18 years with Alzheimer’s Disease who had ≥1 paired MMSE and MoCA recorded within 90 days of each other (mean 2.8 / median 0 days apart). Published conversion tables compared: - Roalf et al. (2013) - Fasnacht et al. (2022) - Monsell et al. (2016) - Yang et al. (2021) - Trzepacz et al. (2015) - Saczynski et al. (2015) Evaluation. Each method’s converted MMSE was compared with the observed MMSE using the Intraclass Correlation Coefficient (ICC), the Generalizability (G) coefficient, RMSE, and accuracy within ±2 points. Agreement was examined with Bland-Altman analysis. Power. A prior MMSE-2 study (ICC 0.85–0.96) required 31 subjects (Bonett’s method; 95% CI, precision 0.1). N = 73 exceeds this threshold.	0.75 ICC 0.87 G-coefficient 64.4% Within ±2 points 2.97 RMSE Validation Results for Best Crosswalk: Roalf Predicted MMSE vs Actual MMSE Bland-Altman Plot	The Roalf et al. (2013) table provides the most reliable MoCA-to-MMSE crosswalk for a US real-world Alzheimer’s cohort. Applied to NeuroBlu Data, it converted 504 MoCA scores and expanded the analyzable MMSE cohort by 173 patients (+31%) - a direct gain in statistical power. Future work: Test whether accuracy holds across the MCI-to-advanced-AD continuum, and how different populations affect crosswalk residuals to ensure equitable assessment. MoCA MMSE 3689101112131415 0123456789101112131415161718192021222324252627282930 Severe impairment 16171920212223 0123456789101112131415161718192021222324252627282930 Moderate impairment 2425262627282829 0123456789101112131415161718192021222324252627282930 Mild impairment 2929303030 0123456789101112131415161718192021222324252627282930 Normal	- Roalf DR, Moberg PJ, Xie SX, Wolk DA, Moelter ST, Arnold SE. Comparative accuracies of two common screening instruments for classification of Alzheimer’s disease, mild cognitive impairment, and healthy aging. <i>Alzheimers Dement.</i> 2013;9(5):529-537. DOI. PMID: 23260866. - Fasnacht JS, Wüest AS, Berres M, et al. Conversion between the Montreal Cognitive Assessment and the Mini-Mental Status Examination. <i>J Am Geriatr Soc.</i> 2023;71(3):869-879. DOI. PMID: 36346002. - Monsell SE, Dodge HH, Zhou XH, et al. Results from the NACC Uniform Data Set Neuropsychological Battery Crosswalk Study. <i>Alzheimer Dis Assoc Disord.</i> 2016;30(2):134-139. DOI. PMID: 26485498. - Yang H, Yim D, Park MH. Converting from the Montreal Cognitive Assessment to the Mini-Mental State Examination-2. <i>PLoS One.</i> 2021;16(7):e0254055. DOI. PMID: 34237113. - Trzepacz PT, Hochstetler H, Wang S, Walker B, Saykin AJ; Alzheimer’s Disease Neuroimaging Initiative. Relationship between the Montreal Cognitive Assessment and Mini-Mental State Examination for assessment of mild cognitive impairment in older adults. <i>BMC Geriatr.</i> 2015;15:107. DOI. PMID: 26346644. - Saczynski JS, Inouye SK, Guess J, et al. The Montreal Cognitive Assessment: creating a crosswalk with the Mini-Mental State Examination. <i>J Am Geriatr Soc.</i> 2015;63(11):2370-2374. DOI. PMID: 26503296. - Bonett DG. Sample size requirements for estimating intraclass correlations with desired precision. <i>Stat Med.</i> 2002;21(9):1331-1335. DOI. PMID: 12111881. CONTACT Nadia Lipunova Holmusk Technologies Inc., London, UK nadia.lipunova@holmusk.com ALZHEIMER’S ASSOCIATION AAIC>26

73 patients met inclusion criteria. The **Roalf et al. (2013)** crosswalk was the most robust method.

It showed minimal bias (mean difference –0.23 MMSE points; median 0) and an RMSE of 2.97. Bland-Altman analysis confirmed agreement was consistent across the score range.

Crucially, **64% of converted scores fell within ±2 points** of the true MMSE, preserving the clinical interpretation of each patient’s cognitive state. Fasnacht and Monsell followed closely (ICC 0.74).