



# EMIF Deliverable 3.11: 2 novel combinatorial MRI marker algorithms for prognosis

Executive summary

## Executive Summary

The objective of D3.11 was to investigate whether combined information derived from MRI imaging biomarkers may be used to predict the progression of MCI to AD. Moreover, it was inspected whether the best combination obtained can identify clinical signature of the brain amyloidosis.

Data used in the present report came from the EHRs of the EMIF 1000-AD-Cohort and archived in the TranSMART platform. Only the subjects whose MRI 3DT1 were correctly processed with two fully automated analysis pipelines (i.e.: FSL-FIRST and FreeSurfer), were considered in the analysis.

MRI imaging biomarkers that significantly differed ( $p < 0.05$ ) across converter and non-converter subjects were pooled together. The performances of the “combinatorial marker” were compared with those obtained from each single marker. The same procedure was followed considering subjects who were classified as amyloid- $\beta$  positive or negative by cerebrospinal fluid (CSF) and PET scan examination.

The results indicate that a combination of 9 MRI-based measures selected via Principal Components Analysis (PCA) could be used to predict the progression from MCI to AD reaching an Area Under the Curve (AUC) equal to 0.81. A similar analysis has been used to select 17 components useful to predict the brain amyloidosis with a lower AUC, equal to 0.7.

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