Background: The use of biomarkers to identify individuals at risk for developing late-onset Alzheimer’s disease (LOAD) is of interest for the design of therapeutic prevention or delay – of - onset clinical trials. A biomarker risk assignment algorithm (BRAA) based on APOE and TOMM40 - 523 genotypes and age is being used to enrich an international phase 3, double-blind, randomized, placebo-controlled clinical trial. This presentation reports preliminary data on the performance of the BRAA, specifically precision of the BRAA as a function of the experimental variation of the genotype assays, predictive characteristics of the algorithm to identify MCI due to AD, and comparative data for CSF and imaging (fMRI) based biomarkers. Methods: A simulation study was performed to determine how the experimental variation of the APOE and TOMM40 - 523 assays impacts the risk assignment by the BRAA. Performance of the BRAA (odds ratio, improvement in net reclassification rate vs. versions of the algorithm based only on age and/or APOE genotype) was calculated in a retrospective analysis of the Alzheimer’s Disease Neuroimaging Initiative data (n = 660). Its performance (sensitivity and specificity) was compared to data from literature reports for proposed CSF and fMRI biomarkers. Results: The simulation study shows the expected precision of the BRAA to be >98%, based on the observed experimental variation of the TOMM40 - 523 and APOE assays. The odds ratio for using the algorithm to predict MCI or LOAD ranges from 3 to 5, and comparison of the full algorithm to a version based on APOE and age alone shows a significant (p < 0.0001) improvement in the net reclassification rate. The performance of this informative genotype BRAA compares favorably (PPV, NPV 70-80%) with CSF and imaging (fMRI) biomarkers. Conclusions: The performance characteristics of the biomarker risk algorithm support its use as a pharmacogenomic enrichment tool for stratification of individuals at high or low risk for developing MCI due to AD in a phase 3 clinical trial. The data from this prospective trial will be used to support qualification of the BRAA by regulatory agencies.