Data Sharing and Standardization to Expand a Patient-Level Database of a Regulatory Endorsed Clinical Trial Simulator for Alzheimer Disease (AD)

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Objectives: To expand a Clinical Data Interchange Standards Consortium (CDISC)-standardized database of patient-level data, and to update a regulatory-endorsed clinical trial simulator (CTS) for mild-to-moderate AD.

Methods: The CAMD patient-level database integrates randomized-controlled-trials, contributed by consortium members and was previously utilized to develop the first regulatory-endorsed CTS for AD in 2013. To expand the database with contemporary patient-level data in AD clinical trials for the purposes of updating this tool, a formal data acquisition and management process was implemented (see Figure): 1) a legally-binding data contribution agreement; 2) encrypted transfer to a secure storage server; 3) comprehensive data remapping to CDISC standards; 4) thorough data curation; 5) integration into the CAMD database. New data of interest for the CTS update include the number of ApoE4 alleles and concomitant medication use.

Results: Since the original CAMD database the following changes have occurred: the number of individuals increased from 3255 to 4575, the percent of individuals who are female remained stable from 55.1\% to 55.4\%, the mean years since diagnosis increased from 2.07 to 2.46 years, the individuals with measured numbers of ApoE4 alleles increased from 1486 to 1895, and the number of individuals on stable medication increased from 2483 to 3271.

Conclusions: The development of regulatory-endorsed model-based drug development tools is not possible without a sound data-sharing structure and a rigorous data management framework. Improvements of quantitative drug development tools by pharmacometricians require databases using CDISC standards and the integration of additional potential sources of variability. Incorporation of the new data into the clinical trial simulator here, is anticipated to improve the design of future clinical trials in patients with AD.