A predictive model and algorithm forecasting time to outcomes in Alzheimer's disease patients

Modeling the clinical course of Alzheimer disease (AD) is essential for accurate medical decisions in the treatment of AD patients and for estimating cost offsets for proposed medical and pharmaceutical interventions. To address these issues, decision makers have increasingly relied on predictive models to form the core components of their decision analyses. This technology describes a model for AD progression that can be applied towards such clinical decisions and analyses. The technology can predict the timing of important disease signposts such as institutionalization and death for an individual affected with AD. Thus, this technology has large implications for pharmaceutical and public health studies associated with Alzheimer’s disease.

Utilizing cognitive neuroscience tools with heterogeneous patient populations to predict Alzheimer’s disease progression

Conventional models use a multivariable-adjusted Cox model to describe AD progression. However analyses based on the Cox hazards models violate the assumption that patient population in each state is homogeneous with respect to the risk of subsequent transitions. This technology describes a model of AD progression based on data collected in 252 patients over 10 years from the Predictors of Severity in Alzheimer’s Disease Study. This model, called the Longitudinal Grade of Membership (L-GoM) model, uses tools and techniques from cognitive neuroscience to investigate the natural progression of AD. The algorithm estimates the time to three important disease signposts: 1) the need for full-time care, 2) institutionalization, and 3) death.

The accuracy of this technology has been validated by using 107 out-of-sample data points from a cohort independent in the Predictors of Severity in Alzheimer's Disease Study.

Lead Inventor:

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Applications:

• Accurate prediction of time for full-time care, institutionalization, and death in Alzheimer’s disease patients.
• Design of pharmaceutical treatment to improve patient care.

Advantages:

• More accurate when compared to current Cox models being used in clinical environments.
• The improved accuracy offered by this technology provides better estimates for cost offsets concerning proposed medical and pharmaceutical interventions.
• Does not require a faulty homogeneous transition rate assumption, and is thus able to provide predictive values with a highly heterogeneous patient population.

Patent information:

Patent Pending

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Related Publications:


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