Investigator: Jessica Hinman (1)
Investigator: Lorene Nelson (1)

(1) Epidemiology and Population Health

Title: Trajectory Analysis of Multiple Sclerosis Disease Course

Summary:

The Data Studio Workshop brings together a biomedical investigator with a group of experts for an in-depth session to solicit advice about statistical and study design issues that arise while planning or conducting a research project. This week, the investigator(s) will discuss the following project with the group.

Multiple sclerosis (MS) is the most common inflammatory neurological disorder in young adults, affecting approximately 288–309 individuals per 100,000 in the US as of the 2010 census. While nominally separated into clinical subtypes on the basis of pathological features indicating a primarily autoimmune (relapsing-remitting) or neurodegenerative (progressive) disease process, there is a high level of disease course variability both across and within these categories. Developing a clearer understanding of multiple sclerosis disease course, and the extent to which the underlying determinants of that disease course are modifiable, requires first determining whether there exist distinct, identifiable disease trajectories. To that end, this study will utilize clinical measures relating to key functional domains of MS disease course including gait and upper extremity disability, cognitive decline, and relapse frequency.

The data were obtained from the Multiple Sclerosis Outcome Assessments Consortium (MSOAC) data platform which has compiled data from the placebo arms of 9 distinct clinical trials for a total of 2,465 individual participants. Because this data source was originally formed with the goal of developing and evaluating novel clinical measures of MS disability and progression, the trials included in the consortium extensively utilize standardized and validated prognostic and outcome metrics. The goals of our analyses will be to identify (1) whether distinct trajectories exist in our sample of longitudinal clinical measures, and (2) the extent to which any identified clusters correspond to the patients' clinically assigned disease subtype.

Questions:

The primary difficulty in these analyses centers around the fact that there is no single, unified measure of MS disease progression. Ideally, we would like to use multiple longitudinal markers of the same underlying process (disease progression) to estimate latent class/trajectory membership.
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