A CEREBRAL PALSY ANALYSIS AND ITS UNDERLYING CAUSES OF DEATH: A COMPETING RISKS APPROACH.

J. Anzures-Cabrera¹, J. L. Hutton²

¹MRC Biostatistics Unit, Cambridge, UK ²Department of Statistics, University of Warwick, Coventry, UK

Email: judith.anzures-cabrera@mrc-bsu.cam.ac.uk

We present an analysis undertaken to understand the progression of cerebral palsy in children born between 1966 and 1987 in two areas of the United Kingdom. Left truncation arises in the data as children entered the study at various ages. They were followed from this delayed entry time until either death or censoring. The log-logistic distribution provides the best fit to the data. A competing risks model, adjusted for left truncation, was used to asses the covariates that affect the survival of children who died from cerebral palsy when other causes of death are present. This model was derived by extending a log-logistic truncated accelerated failure time model (AFT) into the competing risks case. The extension was undertaken by assuming that each one of the sub-hazard functions could be modeled as a log-logistic truncated AFT model with the same shape parameter for all the causes of failure. The contribution to the likelihood function from censored observations is given by the marginal survivor function, which can be expressed as the product of truncated survivor functions from a log-logistic truncated AFT model for each cause of failure. The most common underlying causes of death (as opposed to immediate cause) for people under age 35 are cerebral palsy, respiratory diseases and epilepsy. The competing risks log-logistic truncated AFT model provides an efficient description of the dependence of hazard rates for different causes of death on impairments and age.