AN APPROACH TO MODEL CORRELATIONS BETWEEN BINARY RESPONSES OVER UNEQUAL TIME INTERVALS

S.S. Thwin¹, D. G. Gagnon¹, H. J. Cabral¹, L. A. Cupples¹

¹Department of Biostatistics, School of Public Health, Boston University, Boston, USA

Email: sst@bu.edu

An approach to modeling correlations among responses is proposed when analyzing by GEE the binary response data that have been collected longitudinally over unequal time intervals. This unequal time correlation structure fixes the correlation coefficient and time interval between the first 2 observations as constraints and adjusts the correlations for subsequent pairs by their relative time intervals, simplifying to the AR1 structure when time intervals are equal. Correlated binary response data under logistic regression model were generated with the proposed unequal time correlations for 3 time points. Bias in parameter estimation and asymptotic relative efficiency (ARE) were evaluated for scenarios when working correlation structures were misspecified as exchangeable, 1st order autoregressive or unstructured. We observed minimal bias in parameter estimation, although relative bias increased as the magnitude of the parameter being estimated increased. In addition, we observed that the magnitude of the correlation between the first 2 observations was always under estimated in the working correlation, with the unstructured correlation performing the best and exchangeable correlation, the worst. ARE for exchangeable was similar to that of the AR1 structure for 4 time points; however, for 8 time points, exchangeable performed better than AR1.