## COX REGRESSION ANALYSIS IN PRESENCE OF COLLINEARITY: AN APPLICATION TO ASSESSMENT OF HEALTH RISKS ASSOCIATED WITH OCCUPATIONAL RADIATION EXPOSURE

<u>X. Xue<sup> $\dagger 1$ </sup></u>, M. Y. Kim<sup>1</sup>, R. E. Shore<sup>2</sup>

<sup>1</sup>Albert Einstein College of Medicine, Bronx, USA; <sup>2</sup> New York University School of Medicine, New York, USA

<sup>†</sup> E-mail: xxue@aecom.yu.edu

The study considers the analysis of time to event data in the presence of collinearity between covariates. In linear and logistic regression models, the ridge regression estimator has been applied as an alternative to the maximum likelihood estimator in the presence of collinearity. The advantage of the ridge regression estimator over the usual maximum likelihood estimator is that the former often has a smaller total mean square error and is thus more precise. In this paper, we generalize this approach for addressing collinearity to the Cox proportional hazards model. Simulation studies were conducted to evaluate the performance of the ridge regression estimator. The paper was motivated by an occupational radiation study conducted at Oak Ridge National Laboratory to evaluate health risks associated with occupational radiation exposure where the exposure is correlated with possible confounders such as years of exposure and attained age. We apply the methods to this study to obtain a more precise estimator of the risk associated with radiation exposure.