Impact of Death Certificate Misclassifications on Radiation Health Risk Models

Xirui Liu[1], Stacey L. McComish[1], Sergey Y. Tolmachev[1], Joey Y. Zhou[2]

[1]*U.S. Transuranium and Uranium Registries, Richland, WA;* [2]*Office of Domestic and International Health Studies, United States Department of Energy, Washington, DC*

Death certificates are commonly used as a primary source of information in epidemiological studies investigating the relationship between radiation exposure and health outcomes. However, it is known that death certificates may misclassify the underlying cause of death. At the United States Transuranium and Uranium Registries, these misclassification errors have been observed at an overall rate of 25.5% for a group of 275 individuals with internal deposition of actinide elements. This simulation study aims to evaluate whether there is a statistically significant impact on risk estimates resulting from misclassifications. For the analysis, the logistic regression model was used as the risk model. Dose datasets were generated using a log-normal distribution with predefined values for the geometric mean and the geometric standard deviation. Subsequently, outcomes were randomly generated using a predefined odd ratio and baseline prevalence. Varied rates of over- and under-classification were evaluated to assess the impact of misclassification on the risk estimate results. With a predefined odd ratio of 1 (e.g. no statistical association), misclassification errors on death certificates can result in statistically significant odds ratios from 10% to 35% of the time. Further simulation studies will explore the impact of misclassification of outcome on risk estimates by various factors such as different risk levels, baseline prevalence, different types of dose distributions, and sample sizes.

USTUR-0656-23A