

Impact of Outcome Misclassification on Radiation Health Risk Models

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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. Our previous simulation study evaluated whether there was a statistically significant impact on risk estimates resulting from misclassifications. It demonstrated that the conclusion of an epidemiological study could be changed from statistically non-significant to significant as a result of misclassification errors. With a predefined p-value close to 0.05, simulated death certificate misclassification errors moved odds ratios far enough away from the null value to erroneously change the conclusion from non-significant to significant 4.2% - 42.3% of the time. This follow-up study will explore the impact of outcome misclassification on risk estimates across various parameters, including: different dose distributions (log-normal, normal, uniform, and exponential), varying baseline prevalence rates, and a range of sample sizes. These extended simulations will enhance our understanding of how misclassification impacts the outcome of epidemiological studies under different conditions.

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