

## **Risk of Lung Cancer and Leukemia from Exposure to Ionizing Radiation and Potential Confounders Among Workers at the Portsmouth Naval Shipyard**

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### **ABSTRACT**

Significantly elevated lung cancer deaths and statistically significantly positive linear trends between leukemia mortality and radiation exposure were reported in a previous analysis of Portsmouth Naval Shipyard workers. The purpose of this study was to conduct a modeling-based analysis that incorporates previously unanalyzed confounders in exploring the exposure-response relationship between cumulative external ionizing radiation exposure and mortality from these cancers among radiation-monitored workers in this cohort. The main analyses were carried out with Poisson regression fitted with maximum likelihood in linear excess relative risk models. Sensitivity analyses varying model components and using other regression models were conducted. The positive association between lung cancer risk and ionizing radiation observed previously was no longer present after adjusting for socioeconomic status (smoking surrogate) and welding fume and asbestos exposures. Excesses of leukemia were found to be positively, though not significantly, associated with external ionizing radiation, with or without including potential confounders. The estimated excess relative risk was 10.88% (95% CI – 0.90%, 38.77%) per 10 mSv of radiation exposure, which was within the ranges of risk estimates in previous epidemiological studies (---4.1 to 19.0%). These results are limited by many factors and are subject to uncertainties of the exposure and confounder estimates.

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