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RADIATION DOSES AND CAUSE-SPECIFIC MORTALITY AMONG WORKERS AT A NUCLEAR MATERIALS FABRICATION PLANT

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A historical cohort mortality study was conducted among 6,781 white male employees from a nuclear weapons materials fabrication plant for the years 1947–1979. Exposures of greatest concern are alpha and gamma radiation emanating primarily from insoluble uranium compounds. Among monitored workers, the mean cumulative alpha radiation dose to the lung was 8.21 rem, and the mean cumulative external whole body penetrating dose from gamma radiation was 0.96 rem. Relative to US white males, the cohort experienced mortality deficits from all causes combined, cardiovascular diseases, and from most site-specific cancers. Mortality excesses of lung and brain and central nervous system cancers were

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seen from comparisons with national and state rates. Dose-response trends were detected for lung cancer mortality with respect to cumulative alpha and gamma radiation, with the most pronounced trend occurring for gamma radiation among workers who received ≥ 5 rem of alpha radiation. These trends diminished in magnitude when a 10-year latency assumption was applied. Under a zero-year latency assumption, the rate ratio for lung cancer mortality associated with Joint exposure of ≥ 5 versus < 1 rem of both types of radiation is 4.60 (95% confidence limits (CL) 0.91, 23.35), while the corresponding result, assuming a 10-year latency, is 3.05 (95% CL 0.37, 24.83). While these rate ratios, which are based on three and one death, respectively, lack statistical precision, the observed dose-response trends indicate potential carcinogenic effects to the lung of relatively low-dose radiation. There are no dose-response trends for mortality from brain and central nervous system cancers.

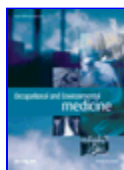
occupational diseases; prospective studies; radiation, ionizing; uranium


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