

Results of the US-Ukrainian Study of Leukemia and Related Disorders Among Chernobyl Cleanup Workers

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Leukemia is one of the early cancers induced by ionizing radiation. Following the Chernobyl accident in Ukraine in April 1986, several hundred thousand workers received fractionated exposure, primarily from external gamma radiation. A nested case-control study of leukemia was performed in a cohort of 110,645 cleanup workers identified from the Chernobyl State Registry of Ukraine during the period 1986 to 2000. A provisional computerized registry of leukemia and 99 related hematological disorders was created through an intensive search of the files of the oncology, hematology and pathology departments within the study area encountering 37,605 possible cases. After linkage and case ascertainment by the international hematology review 111 cases were confirmed as leukemia (87), multiple myeloma (8) and MDS (7). 66.6% of cases and 7.1% of selected controls were deceased. Individual bone marrow doses were estimated using RADRUE method enabling dose reconstruction from the interviews carried out with proxy respondents. Two types of proxies were selected for each deceased subject: a spouse or next-of-kin proxy to provide data on demographic factors and medical history, and to propose co-workers who could serve as proxy respondents regarding the deceased subject's work history. Detailed interviews were conducted and in 71 case and 501 age- and residence-matched controls selected from the same cohort (mean dose=76.4 (SD=213.4) mGy). In order to reduce uncertainties in the dose estimates, a series of validation studies was undertaken. Conditional logistic regression to estimate leukemia risks. The excess relative risk of total leukemia was 3.44 per Gy (95% confidence interval 0.47- 9.78, $p < 0.01$). The dose-response was linear and did not significantly differ by calendar period of first work in the 30-km Chernobyl zone, duration or type of work. A similar dose-response relationship was found for chronic and non-chronic lymphocytic leukemia.