

Table 2.13. Case-Control studies of exposure to Plutonium (Pu)

Reference, study location and period	Characteristics of cases	Characteristics of controls	Exposure assessment	Organ site (ICD code)	Exposure categories	Relative risk (95% CI)*	Adjustment for potential confounders	Comments
Brown et al. (2004) Rocky Flats plant, Colorado, US, 1951-89	180 cases (173 male, 7 female)	720 controls selected by density sampling and individually matched on age, sex, birth year	Pu, Am and U annual doses to the lung calculated for each worker using internal dosimetry model (International Commission on Radiological Protection publication 30). Data for external radiation doses came from electronic databases of recorded doses from film and thermoluminescent personal dosimeters	Lung (ICD9: 162)	Cumulative Pu lung dose, mSv 0 >0-100 >100-400 >400-644 >644-940 >940 p for trend	1.0 1.14 (0.46-2.86) 2.11 (0.86-5.20) 2.74 (0.92-8.19) 3.20 (1.15-8.94) 5.04 (1.55-16.4) <0.001	Period of first hire, employment duration	No significant trend of risk with Pu systemic deposition No significant trend of risk with γ -dose
Tokarskaya et al. (2002) Ozyorsk, Russia, 1966-1991	Mayak workers. 162 cases diagnosed and verified by histological examination, with external and Pu dosimetry data available, with smoking history (packs a day) known	324 controls matched for sex, year of birth (± 5 years), year of first employment (± 2 years), profession and workplace	Individually measured by film badges external doses, Pu body burden and dose measured by urinalysis	Lung (ICD9: 162.2-162.5)	Pu Dose Low Smoking Indx Low Pu Dose High Smoking Indx Low Pu Dose Low Smoking Indx High Pu Dose High Smoking Indx High	1.0 16, p<0.001 13.5, p<0.001 45, p<0,001	Stratifies by smoking	Results were consistent with additive effects of high levels of Pu exposure and moderate levels of cigarette smoking