The next Argonne publication on dose-response (Rowland et al. 1983) used data for female dial painters who started work before 1950. Two cohorts were examined to find dose-response functions for the induction of bone sarcomas. The first cohort included all measured subjects who survived at least five years after first employment, while the second limited the analysis to those surviving two years after the first measurement of their body contents. The five-year requirement for the first cohort was based on an assumed five-year minimum bone sarcoma induction period, while the two-year survival for the second cohort was chosen to eliminate individuals who might have been measured because of a diagnosed bone sarcoma. The first cohort contained 1,468 women who experienced 42 bone sarcomas; the second was limited to 1,257 women with only 13 bone sarcomas. The striking reduction in the number of sarcomas in the second group reflects the fact that the study, and thus the measurement of most of the dial painters, took place long after they started work and often as a consequence of their symptoms. For this analysis, incidence was in units of bone sarcomas per person year, and dose (D) was in initial systemic intake, where intake was expressed as the sum of μCi of ^{226}Ra plus 2.5 times μCi of ^{228}Ra.

Rowland et al. (1983) used the same procedure as in their 1978 publication and again found the best fit to be given by a function of the form

$$\text{Incidence} = (C + \beta D^2)\, e^{-\gamma D} \qquad (9)$$

for the first cohort. The second cohort (defined by the time of first measurement) was found to be fitted both by the above function and by the simple linear function.

Rowland et al. (1983) used the dose-squared function, as found for the first cohort (defined by time of entry into dial painting), to predict the occurrence of bone sarcomas in two other populations of measured radium cases. These individuals, who acquired radium from sources such as medical usage and laboratory exposure, included all of the other measured radium cases. One group consisted of 138 women who experienced 15 bone sarcomas. The derived function predicted 17.3 sarcomas for this population, in remarkable agreement with the observed number. The second group contained 347 men who experienced 3 sarcomas. From the distribution of systemic intakes derived from the measured body burdens for this group, 10.9 sarcomas were predicted. This is an unlikely result, indicating either that the population of men in the CHR files is not representative of radium-exposed males or that the dose-response function derived from observation of female dial painters does not apply to males.

In an attempt to address the risk from radium and uranium isotopes in drinking water, Mays et al. (1985) predicted the bone sarcoma risk from ^{226}Ra with the linear function from the second cohort (defined by time of first