the Finkel et al. (1964) data, omitting 117 cases below 0.1 μCi, where no tumors were seen. Similarly, only portions of the MIT data were used in Hems's analysis.

Goss (1970) took a different approach. He suggested that a zero incidence of tumors in the low dose range was highly unlikely and suggested that a linear dose-response relationship existed in the region between zero dose and the apparent "practical threshold." Goss tested the Evans et al. (1969) data against a natural tumor incidence rate of 0.09% at zero dose and a rate of 1.09% at 138 cGy (his calculation of the dose after a daily intake of radium that would result in a body content of 0.1 μCi after 50 years). This function predicted 3.41 tumors in the 406 subjects below 1,200 cGy, among whom no tumors were seen; Goss stated that the probability of seeing none if the prediction was true was 3.1%. He then tested this function against the Evans et al. (1969) data combined with the Finkel et al. (1969) data, obtaining about twice as many cases with no tumors up to a maximum dose of 450 cGy (the Argonne tumor case at the lowest dose). This data set yielded a probability of only 1.9% of seeing none instead of the predicted number. Goss concluded that neither of these probabilities was small enough to reject the linear hypothesis.

Gofman and Tamplin (1971) tested individual dose ranges from the data of Evans et al. (1969) and Finkel et al. (1969) against a linear expression of the form

$$I = I_0 (1 + 0.1D), \qquad (2)$$

where I = expected cancer incidence,

I_0 = spontaneous cancer incidence, and

D = dose in cGy.

Gofman and Tamplin (1971) used a spontaneous tumor incidence of 0.0006 and calculated the expected incidence in each set of data for each dose range where no bone malignancies were seen. Their expression yielded a value that did not lie outside the range of 50-90% probability for any dose range tested. They concluded that the data for the radium cases neither supported a threshold hypothesis nor rejected a linear model of radiation carcinogenesis. They also pointed out, however, that their analysis did not prove that the linear model was correct or disprove the existence of a safe threshold.

Subsequently, Evans (1974) expounded on his threshold concept and provided dose-response plots of cumulative tumor incidence versus cumulative skeletal cGy for more than 500 epidemiologically suitable cases. He found tumor incidence for these cases to be 28 ± 6% at 1,000-50,000 cGy, and zero below