

Spiers et al. (1983) also demonstrated that the risk estimates given by the ICRP (1977), which were based on dose calculations with a quality factor of 20 for alpha particles, were not applicable for internally deposited radium. For a cohort of 693 women whose radium burdens were measured while they were living, the number predicted from the alpha-particle dose and the risk estimate was 2.63. The number expected from natural causes was 2.05. The sum of the expected numbers, 4.68, was more than twice the observed number of 2 leukemias in this cohort.

Other studies led to the same conclusion. Polednak et al. (1978) found 3 leukemia deaths in a population of 634 women identified from employment lists and equivalent sources entering the dial painting industry before 1930. The expected number was 1.41. Subsequently, Stebbings et al. (1983), using a population of 1,285 pre-1930 dial workers, found 3 leukemia deaths when 4.1 were expected; for 1,185 women who entered the industry between 1930 and 1949, 4 leukemia deaths were found when 1.8 were expected. The contradiction here is that the women employed between 1930 and 1949 acquired far lower radium burdens and were exposed to lower gamma-ray doses in the workplace than those employed before 1930. Thus, these results do not lead to a conclusion that the small excesses noted were due to the radium exposure.

Among radium cases, 21 deaths were coded to leukemia; 7 of these individuals were dial painters. The SNOP files identified 32 diagnosed cases of leukemia among the radium cases; 10 of these individuals had the cause of death coded to leukemia. There is no indication that leukemias are elevated in this population.

Life Shortening in the Dial Worker Population

Polednak et al. (1978), in a study of 634 women who entered the dial painting industry between 1915 and 1929, found a significantly greater number of deaths (240) than expected (188.5). Yet, they concluded that there was "no apparent increase in the number of deaths from various chronic diseases other than cancer. . . ."

This subject was examined in detail by Stehney et al. (1978), who applied life table methods to survival data for female radium dial workers, examining a cohort of 1,235 women employed before 1930 for whom age, year of death, and withdrawal/loss from the study were known. The closing year for this study was 1976, making observation times of 45-60 years possible.