

Epidemiology (245-248)

245 Statistical Associations between Radiation Exposure and Physical Strength in Radiology Technicians

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Associations between occupational irradiation, cigarette smoking, alcohol drinking, exercising and physical strength were investigated in 942 Japanese male radiology technicians. The number of investigated items was 23, including 12 cardio-respiratory functions and 11 physical functions. The subjects were divided into eight age-groups whose intervals were five years. The associations with each factor were evaluated in each age-group by using the multiple linear regression model. As single factors, irradiation associated with eight items, smoking associated with seven items, drinking associated with eight items and exercising associated with 11 items. As interactive factors, the combination of irradiation and smoking associated with heart rate and with fast walk.

246 Computation of life expectancy after radiation exposure by superposition with exponential function

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Lost life expectancy (LLE) has been utilized in radiation risk assessments. In computation of life expectancy τ , we sometimes find suitable hazard functions for the cumulative incidence rate of cancer, however, some of those do not directly describe the survival ratio of population after exposure. Thus we tried to obtain life expectancy after an exposure by combining the hazard for incidence $h(t)$ with an exponential function that approximates the survival from onset of cancer to death. We computed changes in τ with varying values of r by the equation for τ as follows;

$$\tau = \int_0^{\tau} (1 + \int_0^{t'} (ds(t')/dt')(1 - \exp(-r(t-t'))) dt') dt,$$

where

$$S(t) = \exp(-\int_0^t h(t') dt').$$