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Mathematical Models for Human Cancer Incidence Rates

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Abstract

The overall cancer incidence rate declines at old ages. Possible causes of this decline include the effects of cross-sectional data which transform cohort dynamics into age pattern, population heterogeneity which selects out individuals susceptible to cancer, decline in some carcinogenic exposures in the old, effects of individual aging which slow down major physiological processes in an organism, etc. We discuss several mathematical models contributing to the explanation of this phenomenon. We extend the Strehler and Mildvan model of aging and mortality and apply it to the analysis of data on cancer incidence at old ages. The model explains time trends and age patterns of cancer incidence rates. Applications to cancer incidence data provided by the International Agency for Research on Cancer illustrate the models.

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