

**AN EXTENDED AGE PERIOD COHORT MODEL FOR ANALYSING DATA ON BREAST CANCER DEATHS BASED ON KNOWLEDGE ABOUT UNDERLYING BIOLOGY**

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An extended age period cohort model for analysing (age, period)-tabulated data on breast cancer is introduced with a convincing rationale for the model based on knowledge about the underlying biology of the disease. In addition to factors associated with age and period, the introduced model includes factors associated with exposure to environmental risks along with two kinds of multiplicative factors, one varies depending on time since exposure to the environmental risks and the other varies depending on age when they are exposed to them. Because of that, the introduced model is nonlinear so that the discussion of ML estimation is rather intricate. It is seen, however, that the introduced model provides a better fit to the data on breast cancer deaths for females in US than the original age period cohort model. Besides ML estimates of the parameters in the introduced model are suggest that the probability that a cell primed by carcinogen in the environment grow to be terminal cancer increases linearly with time since exposure to the risks and females in their ages 45-44 are the most susceptible to the risks. Further it is suggested that the environmental risks and the period effects are consistently decreasing since 1960s, which might suggest efficacy of the US government policy for the public health in the last several decades.