

SOME SKELETAL PLANS FOR STUDYING HEALTH EFFECTS OF AIR POLLUTION

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1. Filtered air studies on populations at risk

One of the difficulties in evaluating the health effects of photochemical pollution lies in the fact that these tend to be long term effects, in contrast to immediate air pollution disasters, such as the London "Killer fog" of 1952. A method of obtaining short term photochemical pollution effects consists of considering the results of lung function tests obtained under different pollution conditions on subjects suffering from respiratory diseases.

In Ury and Hexter [5], a number of univariate and multivariate statistical procedures are discussed for a study in which a series of lung function tests and other physiological measurements were obtained for 15 emphysematous subjects, both under ambient and under filtered air conditions, in a Los Angeles hospital room with controllable air supply. A significant association was found to exist between airway resistance and oxidant levels. (Subsequently, a lesser but still significant association was found to exist between airway resistance and NO_2 .)

This type of study can obviously be extended to subjects suffering from any respiratory or circulatory disease or to any other population at risk, and to any pollutant which can be effectively filtered out. In order to isolate the effects of specific pollutants, partial correlation or step-wise regression should presumably be used.

2. Simple and robust "preliminary" methods, after blocking

In Ury [3] and Ury *et al.* [4], a statistically significant association is shown to exist between the frequency of automobile accidents and oxidant levels in Los Angeles, while no association is found between such accidents and CO levels.

The statistical method used in these reports is extremely simple. Accident frequencies and pollutant levels are compared for the same hour of the day on the same day of the week at time intervals of exactly one week, in order to equalize as many covariables as possible. If the hour with the higher pollutant level has the higher accident frequency, this is scored +1, and the opposite case, -1. Ties in either variable are scored 0. Thus, a concordance sign test,