

MASTER'S SEMINAR ANNOUNCEMENT
Department of Statistics

"Distributed Lag Model: Analysis of Air Pollution on Asthma Occurrence"

WEDNESDAY, August 4, 2004, 10:00 am
Eckhart Hall, Room 110, 5734 S. University Avenue

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ABSTRACT

Many studies have reported associations between air pollution and daily asthma occurrence. Those studies have not consistently specified the lag between exposure and response, especially multiple lags, although most have found associations that persisted for more than 1 day. A systematic approach to specifying the lag association would allow better comparison and give insight into the nature of the relation. To examine this question, daily asthma claim (daily beta-agonist prescription counts) of about 20,000 adults were collected in metropolitan Chicago, aggregated at the ZIP code level. The study follows a case-crossover design and strata were defined as all days on the same day of the 5 consecutive weeks in the same year. I fit distributed lag relation to the association between daily asthma claim with ozone, pm10, relative humidity, pollen and temperature. We assume the weights for lag follow a binomial distribution function and let the effect of a single day's exposure depends on the past 14 days. We use conditional logistic regression for the distributed lag model and apply Box-Tidwell method to estimate the probability in the weight function. Models with and without the smooth time function are compared. Results showed that exposure to ozone, pm10 and pollen have a positive effect on the response with effects most evident with large lags. Exposures to temperature and relative humidity have a negative effect on daily asthma claim. The effect of temperature is strongest with small lags and relative humidity is the only one which doesn't have a lagged structure when jointly estimated with the other four covariates in the distributed lag model, only the exposure on the current day is associated with the response. The effect of ozone is sensitive to which model is used. A valid test by fixing at 0.5 for the covariate we are interested is performed to check the significance of that pollutant.