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Thesis subject: Air pollution and dispensing of asthma medication in Iceland's capital region

Subject: Epidemiology

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Background: Though Reykjavík air is largely clean, heavy traffic on the main traffic ores of the capital region causes pollution levels to surpass the health limits many times every year when weather conditions are unfavorable. Especially particle matter (PM) consisting of asphalt, soil, soot and salt is abundant in Reykjavík air as well as gases from vehicle exhaust (O3 and NO2) and geothermal sources (H2S). Particulate matter pollution in Iceland can be very fluctuant. A European study, which included data from Iceland, showed that prevalence of respiratory symptoms was associated with residence close to main roads, but this study included few participants. Pollution from traffic is known to aggravate symptoms of respiratory disease and increase medication usage for asthma patients. This is the first study to examine the association between respiratory health and daily variations in air pollution in the capital area.

Data: Daily asthma drug dispensings by number of individuals, number of prescriptions and volume grouped by sex and drug category as well as information about infectious disease epidemics were provided by the Directorate of Health. Pollutants and weather factor measurements were provided from the City of Reykjavík Environmental Office, pollen counts from the Icelandic Institute of Natural History. All data cover the period January 1st 2004 to September 31st 2008 (except for H_2S which was measured from February 2006).

Methods: In a poisson regression model, the daily number of individuals who were dispensed a respiratory drug were modelled as a function of daily means of four pollutants, with a lag time of 0 to 14 days, with covariates to adjust for weather, season, day-of-week , time trends and flu season. Insignificant covariates were excluded using backwards selection.

Results: Preliminary analyses show that the association between daily numbers of individuals who are dispensed respiratory medications and air pollution levels in the following 3 to 8 days after high pollution levels are positive for all pollutants (PM_{10}, NO_2, O_3 and H_2S). The association is significant for the 24-hour mean of PM_{10} and H_2S in a three day moving average model. Because of the severity of particle pollution events that last only few hours, the highest daily 1-hr average was speculated to be a better fit, but did not show as good correlation in the model.

Conclusion: The positive association between air pollution levels and asthma medication dispensings show that sensitised individuals are affected by air pollution in Reykjavík.