

LONG-TERM CONCENTRATIONS OF AMBIENT AIR POLLUTANTS AND RISK OF DEATH AMONG SUBJECTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD).

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Background : Studies show mixed results concerning the association between ambient particulate matter (PM) air pollution and outcomes among persons with chronic obstructive pulmonary disease (COPD). These variations could be due to the challenges in estimating accurate ambient air pollution levels for each subject. The AHSMOG study (N=6,338) has previously found associations between ambient air pollution and COPD using the inverse distance weighted (IDW) interpolation method from the nearest fixed monitoring station to residence and workplace.

Methods : Using data from the Adventist Health Study-2, a cohort of 97,000 US subjects, we identified 5,494 subjects with self-reported doctor- told COPD at baseline who have had the same residence address throughout follow-up. Subjects were enrolled between 2001 and 2006 and completed a 50 page questionnaire at enrolment including medical history, time spent outdoors, exercise, smoking and diet. A total of 159 subjects have died of natural causes during an average of 7 years of follow-up. The analyses controlled for a number of potential confounding factors including age, race, education, BMI, smoking and lifestyle. The Cox proportional hazard model was used for survival analysis. Inverse distance weighting (IDW) with interpolation to residence address was used to estimate individual level ambient air pollution. Cumulative monthly averages from 12 months prior to enrolment until one month before censoring were used.

Results and Conclusion: For each $10 \mu\text{g}/\text{m}^3$ increase in $\text{PM}_{2.5}$, the hazard ratio (HR) for death due to any cause was 2.35 (95% confidence interval (CI): 1.08-5.13) in the single-pollutant model and 2.40 (95 % CI: 1.10-5.23) in the two-pollutant model with O₃. No associations were found with each 10 ppb increase in Ozone either in single or two-pollutant models (HR's and 95 % CI were 1.15 (0.71-1.89) and 1.20 (0.74-1.94) respectively). These findings could have implication for policy regulations.