

## IMPACT OF AIR POLLUTION AND PARKINSON'S DISEASE ON MORTALITY

**Stephen Van Den Eeden**, *Kaiser Permanente Northern California, USA*

**Kathleen Albers**, *Kaiser Permanente Northern California, USA*

**Lorene Nelson**, *Stanford University, USA*

**Caroline Tanner**, *Parkinson's Institute, USA*

**Jun Shan**, *Kaiser Permanente Northern California, USA*

**Charles Quesenberry**, *Kaiser Permanente Northern California, USA*

**Background and Aims:** Preliminary studies suggest that traffic or air pollution may increase the risk of Parkinson's disease (PD). We sought to examine how exposure to ambient air pollution and Parkinson's disease are associated with mortality.

**Methods:** Study subjects were participants in the Parkinsonism Epidemiology at Kaiser (PEAK) case-control study. Patients with PD (n=470) were diagnosed in 1994-1995 and matched to sex- and age-matched controls (n=498); both groups were followed annually for mortality. Residential location for each individual was geocoded at time of diagnosis (cases) or reference date (controls) and assigned the mean level of air pollutants in the year prior to this date based on ambient air pollution data geospatially interpolated from air quality monitoring data. A four-level variable was created based on case-control status and exposure (as above and below mean for the pollutant) and was analyzed using proportional hazard models to estimate the hazard ratio (HR) with the case-exposure classifications variable entered indicator variables and mortality (all-cause) as the outcome, while adjusting for age, sex, race/ethnicity, BMI and smoking.

**Results:** Compared to controls with low (below mean) exposure, the mortality HR for PD cases with low NO<sub>2</sub> exposure and with high NO<sub>2</sub> exposure were 1.34 (95% CI 0.93-1.95) and 1.58 (95% CI 1.12-2.22), respectively. For ozone exposure, mortality was significantly elevated for PD low exposure and PD high exposure groups (HR=1.64; 95% CI 1.17-2.31; and HR=1.78; 95% CI 1.25-2.53, respectively). PM<sub>10</sub> exposure, mortality was similarly elevated for PD low exposure and high exposure groups (HR=1.29; 95% CI 0.92-1.80; and HR=1.28; 95% CI 0.92-1.78, respectively). There were no significant associations for controls above the median relative to controls below the median for any of these pollutants. No associations were observed for exposure to CO.

**Conclusions:** These data suggest that air pollution may have an adverse mortality effect among individuals with Parkinson's disease.