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**Title:** Ground-level ozone levels are associated with acute hospital admissions and emergency room visits in Reykjavík, Iceland

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**Body:** Background: Air pollution levels in Reykjavík, Iceland, are generally low, but follow a different pattern than in most other cities. Intercorrelations are low, a large fraction of particulate matter with aerodynamic diameter  $\leq 10\mu\text{m}$  (PM<sub>10</sub>) is from natural sources, and ozone (O<sub>3</sub>) peaks in early in spring. This study aimed to study short-term associations between pollution levels and daily emergency room visits and hospital admissions (ERV/HA) for cardiopulmonary causes. Methods: A time series of daily cardiopulmonary ERV/HAs between the years 2003 and 2009 was made from hospital register data. Three-day moving averages of exposure variables PM<sub>10</sub>, nitrogen dioxide (NO<sub>2</sub>), O<sub>3</sub>, and weather variables were calculated. The ERV/HA counts were regressed on the exposure variables with Generalized Additive Models assuming Poisson distribution, and time trend adjustment using Cubic splines. The relative increase in number of events per interquartile (IQR) increase in pollutant level was calculated from the model coefficients with a 95% confidence interval (CI). Results: Mean daily number of ERV/HAs was ten, 76% were cardiac and 60.8% in people older than 70 years of age. Pollution was characterized by seasonality and large PM<sub>10</sub> fluctuations. Daily ERV/HA's were associated with O<sub>3</sub> levels, we estimated a 4.6% increase in ERV/HA's per IQR change in three-day moving average (95% CI 1.9-5.5). The association was stronger in women; 7.2% (95% CI 3.3-11.4). In elderly, NO<sub>2</sub> was associated with an increase of 3.4% (95% CI 0.1-6.8). We found no associations with PM<sub>10</sub>. Conclusion: In this study, O<sub>3</sub> was associated with cardiopulmonary ERV/HAs. NO<sub>2</sub> was associated with ERV/HAs in the elderly.