

## UNDERSTANDING THE COMMON EXPOSURE TO TRANSPORTATION NOISE AND AIR POLLUTION AND THEIR POTENTIAL COMMON HEALTH ENDPOINTS

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**Background and Aims:** Epidemiological studies have shown that air pollution exposure is associated with cardio-pulmonary health outcomes and noise exposure is associated with cardiovascular outcomes. The main source of both exposures is, to a large extent, vehicle traffic. Typically in studies of one exposure the other one is not adjusted for. Investigations of long-term effects are usually based on modeled exposures, using common predictors, which result in (possibly partially artificial) spatially correlated estimates. For short-term exposure variations, there is no evidence on their potential mutual confounding. In this presentation, data from Athens are shown to illustrate the problems and indicate future pathways for distinguishing the effects of the two environmental stressors.

**Methods:** 1) Within the HYENA study, long-term noise and air pollution (PM<sub>10</sub> and NO<sub>2</sub>) exposure was estimated for 780 subjects living near Athens Airport. Air pollution estimates were derived from the APMoSPHERE project and were also modeled using AERMOD; 2) Continuous measurements for PM and noise were performed in 2 typical Athens apartments for one week using a real time noise analyzer and a real time aerosol monitor for different PM fractions.

**Results:** AERMOD PM<sub>10</sub> concentrations originating from vehicle traffic were highly correlated to road traffic noise ( $r=0.76$ ) but moderately correlated to aircraft noise ( $r=0.23$ ). Correlations of the APMoSPHERE estimates for PM<sub>10</sub> & NO<sub>2</sub> and aircraft noise were 0.11 and 0.56 and 0.06 and 0.24 for road traffic noise respectively.

**Conclusions:** The magnitude of the spatial correlations depends on the way exposures were modeled. Further investigation is needed to better understand the determinants of the resulting estimates. In the time scale, air pollution depends on road traffic load as well as on meteorological conditions, in contrast to noise which is also determined by other local noise sources and is modified by meteorology to a much lesser extent.