

## CORRELATION BETWEEN NOISE AND AIR POLLUTION – KNOWN AND GAPS

**Maria Foraster**, (1) Centre for Research in Environmental Epidemiology (CREAL), Barcelona, Spain, (2) Hospital del Mar Research Institute (IMIM), Barcelona, Spain, (3) Universitat Pompeu Fabra (UPF), Barcelona, Spain, (4) CIBER Epidemiología y Salud Pública (CIBERESP), Spain

**Xavier Basagaña**, (1) Centre for Research in Environmental Epidemiology (CREAL), Barcelona, Spain, (2) Hospital del Mar Research Institute (IMIM), Barcelona, Spain, (4) CIBER Epidemiología y Salud Pública (CIBERESP), Spain

**Inmaculada Aguilera**, (1) Centre for Research in Environmental Epidemiology (CREAL), Barcelona, Spain, (2) Hospital del Mar Research Institute (IMIM), Barcelona, Spain, (4) CIBER Epidemiología y Salud Pública (CIBERESP), Spain

**David Agis**, (1) Centre for Research in Environmental Epidemiology (CREAL), Barcelona, Spain, (2) Hospital del Mar Research Institute (IMIM), Barcelona, Spain, (4) CIBER Epidemiología y Salud Pública (CIBERESP), Spain

**Laura Bouso**, (1) Centre for Research in Environmental Epidemiology (CREAL), Barcelona, Spain, (2) Hospital del Mar Research Institute (IMIM), Barcelona, Spain, (4) CIBER Epidemiología y Salud Pública (CIBERESP), Spain

**Alexandre Deltell**, (5) GREFEMA (Grup de Recerca en Enginyeria de Fluids, Energia i Medi Ambient), Girona, Spain, (6) University of Girona (UdG), Girona, Spain

**Marcela Rivera**, (1) Centre for Research in Environmental Epidemiology (CREAL), Barcelona, Spain, (2) Hospital del Mar Research Institute (IMIM), Barcelona, Spain, (3) Universitat Pompeu Fabra (UPF), Barcelona, Spain, (4) CIBER Epidemiología y Salud Pública (CIBERESP), Spain

**Wim Swart**, (7) National Institute for Public Health and the Environment, The Netherlands

**Nino Künzli**, (8) Swiss Tropical and Public Health Institute, Basel, Switzerland, (9) University of Basel, Switzerland

**Background and aims:** The co-exposure to both traffic-related noise and air pollution may entail a mutual confounding effect of these environmental stressors on common health endpoints such as cardiovascular disease. To disentangle their effects we evaluated the correlation between measured nitrogen dioxide (NO<sub>2</sub>) concentrations and modelled noise levels (LA<sub>eq,24h</sub>) and between 15-minute ultrafine particle counts (UFP) and 15-minute noise measurements (LA<sub>eq</sub>) in the city of Girona.

**Methods:** Long-term averages of NO<sub>2</sub> were measured with passive samplers at 83 outdoor residential locations. These locations were assigned an LA<sub>eq,24h</sub> from a validated traffic noise model (NMPB-routes 96). Besides, we performed 15-minute simultaneous measurements of UFP and traffic-related noise at 31 sidewalk locations during non-rush traffic hours. These measurements were performed with a P-trak and a CESVA SC30 sonometre, respectively. Finally, we compared these results with other studies.

**Results:** The NO<sub>2</sub>-noise correlation was 0.62 (Pearson). However, it was lower at sites with higher traffic density and in the downtown. Building density, distance to the street and traffic density were main determinants of the NO<sub>2</sub> and noise variability. Besides, we could evaluate the relationship between measurements of UFP and traffic-related noise (spearman rank=0.55). In Chicago and Riverside, the Pearson correlation between 2-week NO<sub>2</sub> and 5-minute noise measurements were 0.41 and 0.62, respectively, and between 5-min UFP and noise measurements it was 0.22 to 0.31 and 0.41, respectively (Allen et al, 2009). Other studies reported higher and lower correlations using modelled estimates and different air pollutants.

**Conclusions:** The specific characteristics of each city and each pollutant require evaluating this correlation in each study area prior to analysing the long-term effects of traffic-related noise and air pollution on potential common endpoints. Further studies should evaluate local traffic-related pollutants such as UFP and also compare modelled versus measured data and distinguish between low and high correlation locations.

Allen RW, Davies H, Cohen MA, Mallach G, Kaufman JD and Adar SD. The spatial relationship between traffic-generated air pollution and noise in 2 US cities. Environ.Res, 2009; 109: 334-342.