

# Comparison of land use regression models with dispersion models in selected European cities

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**Background and Aims:** Few studies to this date have carried out comparisons between land use regression (LUR) models and dispersion models for their use in estimating exposures for epidemiological studies. Until now evidence suggest that LUR models predict the small-scale variation in air pollution concentrations as well or better than dispersion models. The ESCAPE project aims to get a better understanding of LUR and dispersion models by comparing the performance across a number of ESCAPE study areas.

**Methods:** In selected European cities, LUR and dispersion models were used to estimate a range of traffic-related air pollutants (NO<sub>2</sub>, NO<sub>x</sub>, PM<sub>10</sub>, PM<sub>2.5</sub>, and absorbance) at both ESCAPE monitoring sites and cohort addresses. Comparisons between the two methods were made at the ESCAPE monitoring sites (40 for NO<sub>x</sub>/NO<sub>2</sub> and 20 for PM) between measured and the 2 modelled estimates.

**Results:** Preliminary results for the Bradford study area (UK) (NO<sub>x</sub>/NO<sub>2</sub> only) show strong correlations using both methods on the 40 monitoring sites. Reported R<sup>2</sup>'s for NO<sub>x</sub> were 0.88 (LUR, leave-one-out procedure) and 0.63 (ADMS-Urban) and respectively 0.80 and 0.51 for NO<sub>2</sub>. Correlations between LUR and ADMS for both pollutants were also high with R<sup>2</sup> of 0.61. In Umea (Sweden) the NO<sub>2</sub> LUR model and the AIRVIRO dispersion model were applied to over 1700 random receptors and the predicted concentrations show a good correlation (R<sup>2</sup> = 0.58). In the Ruhr area (Germany) the LUR NO<sub>x</sub> background model and the EURAD-CTM dispersion model were applied to the cohort addresses also showing good correlation (Spearman R = 0.66).

**Conclusions:** Preliminary results in Bradford suggest that LUR performs slightly better than ADMS-Urban whereas in Umea and Ruhr area they show a good correlation between both methods at selected receptors. More comparisons will be presented from Stockholm, Copenhagen, Athens, Heraklion, Augsburg, Rome, the Netherlands and Helsinki.