

Publication

Application of land use regression modelling to assess the spatial distribution of road traffic noise in three European cities

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Noise prediction models and noise maps are used to estimate the exposure to road traffic noise, but their availability and the quality of the noise estimates is sometimes limited. This paper explores the application of land use regression (LUR) modelling to assess the long-term intraurban spatial variability of road traffic noise in three European cities. Short-term measurements of road traffic noise taken in Basel, Switzerland (n=60), Girona, Spain (n=40), and Grenoble, France (n=41), were used to develop two LUR models: (a) a "GIS-only" model, which considered only predictor variables derived with Geographic Information Systems; and (b) a "Best" model, which in addition considered the variables collected while visiting the measurement sites. Both noise measurements and noise estimates from LUR models were compared with noise estimates from standard noise models developed for each city by the local authorities. Model performance (adjusted R(2)) was 0.66-0.87 for "GIS-only" models, and 0.70-0.89 for "Best" models. Short-term noise measurements showed a high correlation ($r=0.62-0.78$) with noise estimates from the standard noise models. LUR noise estimates did not show any systematic differences in the spatial patterns when compared with those from standard noise models. LUR modelling with accurate GIS source data can be a promising tool for noise exposure assessment with applications in epidemiological studies.

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