

Publication

Air pollution and lung function in Dutch children : a comparison of exposure estimates and associations based on land use regression and dispersion exposure modeling approaches

JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)

ID 3199362

Author(s) Wang, Meng; Gehring, Ulrike; Hoek, Gerard; Keuken, Menno; Jonkers, Sander; Beelen, Rob; Eeftens, Marloes; Postma, Dirkje S.; Brunekreef, Bert

Author(s) at UniBasel [Eeftens, Marloes](#) ;

Year 2015

Title Air pollution and lung function in Dutch children : a comparison of exposure estimates and associations based on land use regression and dispersion exposure modeling approaches

Journal Environmental Health Perspectives

Volume 123

Number 8

Pages / Article-Number 847-51

Background: There is limited knowledge about the extent to which estimates of air pollution effects on health are affected by the choice for a specific exposure model. **Objectives:** We aimed to evaluate the correlation between long-term air pollution exposure estimates using two commonly used exposure modeling techniques [dispersion and land use regression (LUR) models] and, in addition, to compare the estimates of the association between long-term exposure to air pollution and lung function in children using these exposure modeling techniques. **Methods:** We used data of 1,058 participants of a Dutch birth cohort study with measured forced expiratory volume in 1 sec (FEV1), forced vital capacity (FVC), and peak expiratory flow (PEF) measurements at 8 years of age. For each child, annual average outdoor air pollution exposure [nitrogen dioxide (NO₂), mass concentration of particulate matter with diameters ≤ 2.5 and ≤ 10 μm (PM_{2.5}, PM₁₀), and PM_{2.5} soot] was estimated for the current addresses of the participants by a dispersion and a LUR model. Associations between exposures to air pollution and lung function parameters were estimated using linear regression analysis with confounder adjustment. **Results:** Correlations between LUR- and dispersion-modeled pollution concentrations were high for NO₂, PM_{2.5}, and PM_{2.5} soot ($R = 0.86\text{--}0.90$) but low for PM₁₀ ($R = 0.57$). Associations with lung function were similar for air pollutant exposures estimated using LUR and dispersion modeling, except for associations of PM_{2.5} with FEV1 and FVC, which were stronger but less precise for exposures based on LUR compared with dispersion model. **Conclusions:** Predictions from LUR and dispersion models correlated very well for PM_{2.5}, NO₂, and PM_{2.5} soot but not for PM₁₀. Health effect estimates did not depend on the type of model used to estimate exposure in a population of Dutch children.

Publisher National Institute of Environmental Health Sciences

ISSN/ISBN 0091-6765 ; 1552-9924

edoc-URL <http://edoc.unibas.ch/dok/A6420021>

Full Text on edoc Available;

Digital Object Identifier DOI 10.1289/ehp.1408541

PubMed ID <http://www.ncbi.nlm.nih.gov/pubmed/25839747>

ISI-Number WOS:000360693100029

Document type (ISI) Journal Article