

# SHORT-TERM VARIATION IN AIR POLLUTION TRIGGERS ACUTE REJECTION AFTER LUNG TRANSPLANTATION

Hans Scheers, *K.U.Leuven, Belgium*

Tim Nawrot, *UHasselt, Belgium*

Stijn Verleden, *K.U.Leuven, Belgium*

Rachel Geenens, *K.U.Leuven, Belgium*

Peter Hoet, *K.U.Leuven, Belgium*

Frans Fierens, *Interregional Environment Agency, Belgium*

Erik Verbeken, *K.U.Leuven, Belgium*

Ben Nemery, *K.U.Leuven, Belgium*

Geert Verleden, *K.U.Leuven, Belgium*

Bart Vanaudenaerde, *K.U.Leuven, Belgium*

**Background and Aims:** Epidemiological studies demonstrated that fine particulate air pollution (PM) can trigger adverse health outcomes. Recently, we demonstrated that chronic exposure to air pollution is associated with increased risk of chronic rejection and mortality after lung transplantation. In the present study, we investigated whether short-term elevations in ambient PM<sub>10</sub> increased the risk of acute rejection after lung transplantation.

**Methods:** All transbronchial biopsies from a routine follow-up of 355 transplanted patients at the University Hospital Leuven were included. Acute perivascular and peribronchial rejection was scored and % BAL neutrophils and serum CRP were assessed. We used land use data to calculate the background level of PM<sub>10</sub> for each participant's home address using a kriging interpolation method. We estimated % BAL neutrophils, serum CRP and the risk of acute rejection in relation with outdoor PM<sub>10</sub> concentrations on the day of tissue sampling and up to five days before. The model was adjusted for covariates such as age, sex, post-operative day (POD) and daily temperature..

**Results:** The odds of acute rejection increased by 30% (95% CI: 4-61%) for each 10 µg/m<sup>3</sup> increment in ambient PM<sub>10</sub> concentration three days before the day of biopsy (lag day 3). Log-transformed neutrophils and serum CRP were significantly related to PM<sub>10</sub> as well. For each 10 µg/m<sup>3</sup> increment in ambient PM<sub>10</sub> concentration on lag day 2, % BAL neutrophils increased by a factor 1.09 (95%CI 1.01-1.18) and serum CRP increased by a factor 1.10 (95%CI 1.02-1.18).

**Conclusions:** We showed that short-term variation in ambient air pollution acts as a trigger of acute rejection after lung transplantation, probably mediated by a pro-inflammatory response.