

# THE IMPACT OF TRAFFIC AIR POLLUTION ON CHRONIC LUNG REJECTION AND MORTALITY AFTER LUNG TRANSPLANTATION

Tim Nawrot, *Hasselt University, Belgium*  
Robin Vos, *Leuven University (KULeuven), Belgium*  
Lotte Jacobs, *Leuven University (KULeuven), Belgium*  
Stijn Verleden, *Leuven University (KULeuven), Belgium*  
Christel Faes, *Hasselt University, Belgium*  
Shana Wauters, *Leuven University (KULeuven), Belgium*  
Veerle Mertens, *Leuven University (KULeuven), Belgium*  
Christoph Doms, *Leuven University (KULeuven), Belgium*  
Peter Hoet, *Leuven University (KULeuven), Belgium*  
Dirk E Van Raemdonck, *Leuven University (KULeuven), Belgium*  
Lieven J Dupont, *Leuven University (KULeuven), Belgium*  
Benoit Nemery, *Leuven University (KULeuven), Belgium*  
Geert Verleden, *Leuven University (KULeuven), Belgium*  
Bart M Vanaudenaerde, *Leuven University (KULeuven), Belgium*

**Background and Aims:** Approximately half of all lung transplant patients suffer from Bronchiolitis Obliterans Syndrome (BOS), the clinical correlate of chronic rejection, within five years after transplantation. This prevalence is much higher than for other solid organ transplantations, possibly due to the lung's direct contact with the environment. We assessed the association of residential proximity to major roads with BOS and mortality in a cohort of lung transplant patients.

**Methods:** We calculated hazard ratios for BOS and mortality in relation to residential proximity to major roads, adjusting for relevant covariables, in 288 lung transplantations at the Leuven University Hospital between 1997 and 2009 and with follow-up until August 2009. Inflammatory parameters in plasma and bronchoalveolar lavage (BAL) were assessed in 207 patients.

**Results:** During follow-up 117 (41%) patients developed BOS and 61 (21%) died. Patients whose residence was within 171m of a major road (lowest tertile) were 2.06 (95% CI 1.39-3.05) times more likely to develop BOS and 2.20 (1.25-3.86) times more likely to die than those living farther away. The adjusted hazard rates (HR) of BOS and mortality were 0.57 and 0.72 for each tenfold increase in distance from major roads. Proximity to a major road was inversely associated with plasma CRP levels and neutrophil percentage and interleukin-6 concentration in BAL.

**Conclusions:** Living close to a major road represents a substantial risk of developing BOS and premature dying after lung transplantation. Overall, traffic-related air pollution appears to constitute a serious risk of BOS and mortality after lung transplantation.