AIR QUALITY CHANGES AFTER COMMISSIONING OF AN URBAN ROAD TUNNEL

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Background & Aims: The commissioning of a new road tunnel in Sydney, Australia, in March 2007 provided an opportunity to assess the effect of this intervention on air pollutant concentrations in the affected area. Dispersion model-based predictions were that pollutant concentrations would decrease around the main bypassed road where traffic flow was halved and would increase along feeder roads to the tunnel.
Methods: PM_{10}, $PM_{2.5}$ and NO_2 data from six continuous monitoring stations erected in the study area were used and compared with regional changes in air quality. We also collected data on NO_2, as a marker of traffic related air pollution, using a network of passive samplers. Spatial variability was assessed by land use regression. The study period was Jan 2006 to Dec 2008.
Results: Data from the continuous monitors showed that, after adjusting for regional changes in air quality, the opening of the tunnel did not lead to consistent reductions in either PM or NO_2 in the study area as a whole. However, the passive sampler data showed that, while NO_2 levels were not significantly reduced in the first post-tunnel year (-2.1%, 95% CI -5.9% to +1.8%), they were significantly reduced in the second post-tunnel year (-16.1%, 95% CI -19.2% to -12.7%). Further, passive sampler NO_2 concentrations were reduced in both post-tunnel years along the major by-passed road. The LUR model also demonstrated reductions of NO_2 (up to 10 ppb) along the by-passed road and an increase in NO_2 of up to 5 ppb along the feeder roads.
Conclusion: This study highlights the need to study fine scale spatial variability when assessing the impact of traffic interventions and supports the effectiveness of traffic interventions in reducing exposures for people living close to main traffic routes.