

The association between air pollution and lung cancer
in the North West of Adelaide: a case control study
and air quality monitoring

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Abstract

Some suburbs within North West (NW) metropolitan Adelaide have lung cancer mortality up to twice that expected from state averages. Previous international research investigating high lung cancer rates in similar shared industrial and residential areas have had inconsistent results. This case control study was conducted to determine whether residential exposure to industry is a risk factor for lung cancer in NW Adelaide. Contemporary ambient air monitoring was undertaken as an indicator of future respiratory health risk.

142 lung cancer patients and 415 age, gender matched population controls were interviewed utilising an event history calendar. Lifetime exposure indices were calculated for cigarette smoking, passive smoking, occupation, air pollution (residential proximity to industry) and hobbies. Data was analysed utilising chi-squared and conditional logistic regression. Ambient carcinogens and fine particulates with potential industrial sources in the region were monitored in five locations.

In the final multivariate model leaving school early, pack-years of cigarettes and not living in close proximity to the power station or light industrial area were statistically significant risk factors for lung cancer. A composite score of residential exposure to all industries was not significant. However cautious interpretation is required as it was noted participating controls resided significantly closer to industry than non-participants. Average concentrations of ambient carcinogens were within guidelines; however diesel exhaust particulate and Polycyclic Aromatic Hydrocarbons were elevated at sites in

proximity to heavy vehicle traffic. Diurnal variations in PM_{2.5} included weather and traffic-related short term peaks, and other peaks potentially related to industrial activity.

Cigarette smoking is likely to be the primary cause of elevated lung cancer mortality in suburbs of NW Adelaide. The negative effect of residential exposure to two industries may be due to participation bias. Whilst having more thorough exposure assessment than previous research, this study may have been limited by low participation rates in cases and controls. Air monitoring data suggests there is not a significant public health risk at present; however these results are unlikely to be indicative of historical exposures. Future public health initiatives to curb high lung cancer mortality in the NW should focus on smoking prevention and reduction strategies.

This work contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text.

I give consent to this copy of my thesis, when deposited in the University Library, being available for loan and photocopying.

Signed _____

Date _____

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