

# PRE- AND POST-NATAL EXPOSURE TO PARTICULATE MATTER AND PREGNANCY AND INFANT OUTCOMES, 1961-92, UK: INITIAL RESULTS

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## Introduction:

A growing body of evidence suggests that exposure to ambient air pollutants, including particulate matter, is associated with foetal and infant health outcomes.

## Aim:

We aim to test the hypothesis that pre- and post-natal exposure to ambient particulate matter (black smoke) adversely affects pregnancy outcomes and infant survival of singletons.

## Methods:

This is a historic cohort study of all singleton births to mothers resident in the city of Newcastle upon Tyne (population 2001: 270,000) during 1961-92. We used data from detailed paper-based delivery records from the two major maternity hospitals. We abstracted date of birth, maternal address, maternal age, parity, paternal and maternal occupation, birthweight, gestational age, gender and birth outcomes, including major congenital anomalies. To capture home births we also abstracted 'birth ledgers' (1961-1973) which only contain date and place of birth, names and vital status. This established the full denominator and allowed us to consider the changing proportion of home births (reduced from 37% in 1961 to 0.4% in 1973). Birth record data is being linked with stillbirth and infant death information held nationally. Socio-economic status is derived from father's occupation (individual level) and from small area deprivation score (aggregate). Daily black smoke data from the monitoring stations across the city during 1961-1992 have been assembled. Place and time of maternal residence will be used to estimate exposure during pregnancy. A space-time contour for black smoke exposure will be constructed to estimate cumulative and peak exposures during each trimester of pregnancy. The association between maternal and infant exposure and foetal/infant outcomes will be estimated using logistic regression, controlling for covariates.

## Results:

The database contains 125,400 birth entries, 29,900 of which have limited information from birth ledgers only. Data for date of birth, maternal address (and therefore grid reference) is 100% complete, for outcome and covariates, completeness is 99% for birthweight, maternal age, parity and gender, 96% for gestational age, 95% for maternal (recorded from 1972 onwards) and 90% for paternal occupation. The mean daily black smoke level ranged from 254 $\mu\text{g}/\text{m}^3$  (SD=260) in the 1960's to 17 $\mu\text{g}/\text{m}^3$  (SD=16) in the late 1980's. Monthly means varied substantially across the city (e.g. Dec 1962: 243–1012 $\mu\text{g}/\text{m}^3$ , Dec 1982: 26–59 $\mu\text{g}/\text{m}^3$ ). Over a given 3-month period the variation was 1.5- to 4-fold between the monitoring stations; the variation over time at an individual station was up to 12-fold.

## Discussion:

This is the first study from the UK linking exposure to particulate matter to foetal and infant outcomes. The high completeness of information on gestational age as well as individual and area based measures of socio-economic deprivation in combination with daily black smoke data for over three decades, makes this a highly powered dataset of great quality and a valuable research resource.

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