COMPARING DIFFERENT EXPOSURE MEASURES OF TRAFFIC-RELATED POLLUTION: A STUDY OF TERM LOW BIRTH WEIGHT IN LOS ANGELES COUNTY, CALIFORNIA

Jo Kay Ghosh, University of California, Los Angeles, 650 Charles E. Young Dr. South, CHS 7-254, Los Angeles, CA 90095-1772, jokay@ucla.edu
Michelle Wilhelm, University of California, Los Angeles, Los Angeles, CA
Jason Su, University of California, Berkeley, Berkeley, CA
Daniel Goldberg, University of Southern California, Los Angeles, CA
Myles Cockburn, University of Southern California, Los Angeles, CA
Michael Jerrett, University of California, Berkeley, Berkeley, CA
Beate Ritz, University of California, Los Angeles, Los Angeles, CA

Background and Aims: Few birth outcomes studies have examined associations with air toxics in traffic exhaust, such as benzene, toluene, ethyl benzene, and xylene (BTEX). Additionally, land use-based regression (LUR) provides estimates of small area variation in air pollution and contributes to an understanding of the spatial distribution of traffic-related air pollution. We compare effect estimates for term low birth weight (LBW) based on LUR-modeled estimates, and criteria pollutant and air toxics data.

Methods: We included births from 1/1/1995-12/31/2006 to women residing within 5 miles of a California Air Resources Board air toxics monitoring station in Los Angeles County, California. LUR-modeled estimates of NO, NO₂, and NOₓ based on >200 field measurements were seasonalized using monitoring station data, and extracted for geocoded residential addresses. We examined associations with term LBW (≤37 weeks completed gestation and <2500g birth weight) using logistic regression adjusted for maternal age, race/ethnicity, education, parity, and infant gestational age and gestational age squared.

Results: We analyzed 8,181 term LBW cases and 370,922 term normal-weight non-cases. For LUR-estimated and air toxics exposures, the strongest associations were seen for the third trimester, the entire pregnancy, and the last pregnancy month averages. Adjusted odds ratios (ORs) for a 10ppb increase in NO, NO₂, and NOₓ, respectively, were 1.02 (95%CI=1.01, 1.03), 1.05 (95%CI=1.02, 1.08), and 1.01 (95%CI=1.00, 1.02) for third trimester seasonalized LUR-estimated exposures, and 1.06 (95%CI=1.03, 1.09), 1.12 (95%CI=1.05, 1.19), and 1.04 (95%CI=1.02, 1.07) for unseasonalized LUR estimates. Third trimester BTEX exposures were associated with term LBW when stratifying by closest monitoring station, for women living within 5 miles of north Long Beach, Burbank, and downtown LA stations.

Conclusions: Using spatial contrasts (e.g. unseasonalized LUR estimates) and temporal contrasts (e.g. monitoring station estimates, stratified by station), we provide additional evidence that traffic-related air pollution increases the risk of term LBW.