

Nie J, Beyea J, Bonner MR, Han D, Vena JE, Rogerson P, Vito D, Muti P, Trevisan M, Freudenheim JL (2005). Environmental exposure to traffic polycyclic aromatic hydrocarbons (PAHs) and risk of breast cancer. Amer. Assoc. for Cancer Research Annual Meeting. Anaheim.

Polycyclic aromatic hydrocarbons (PAHs) are an important component of air pollution and potential human carcinogens. While they have been shown to cause mammary cancer in animal studies, the association between PAH exposure and breast cancer risk is not well understood. Traffic emissions are one of the major sources of PAH exposure in cities. Further, growing evidence suggests that there may be critical time periods of exposure in breast cancer initiation and development. In this study, we examined the association between breast cancer risk and exposure to PAHs from traffic emissions estimated for each woman at menarche, at the time when she had her first pregnancy and birth, and at 20 and 10 years prior to interview, using data collected from the Western New York Exposures and Breast Cancer (WEB) study, a population based case control study in western New York. All participants were women, aged 35-79, residents of Erie and Niagara Counties. Cases had incident, primary, histologically-confirmed breast cancer. Controls were randomly selected and frequency-matched to cases on age, race and county. In-person interviews were used to collect data on potential breast cancer risk factors including self-reported lifetime residential history. Traffic volumes on roads were obtained from historical records for the years from 1960-2002. Tailpipe emission data were based on previous reports, including measurements carried out in tunnels or on individual vehicles run in place on test beds. A geographic model, developed by Dr. Beyea and colleagues from the Long Island Breast Cancer project, was used to reconstruct historical traffic PAH, using BaP as a surrogate for total PAH exposure. Cruise emissions, cold engine emissions and intersection emissions were used to estimate total traffic PAH emissions. Meteorological information was also utilized in the geographic dispersion model to assign PAH exposure at each residence. The model was validated using data collected from both Long Island and our study area. We found evidence that higher exposure to traffic PAH emissions at menarche was associated with increased risk of premenopausal breast cancer (OR 2.07, 95% CI 0.91-4.72, p for trend 0.03) and emissions at the time of a woman's first birth was associated with postmenopausal breast cancer (OR 2.58, 95% CI 1.15-5.83, p for trend 0.19). Both associations were limited to lifetime non-smokers. There was no association of traffic emissions with risk for any of the other time periods. These findings provide evidence for both the potential importance of early exposures and the potential importance of an environmental agent in risk of breast cancer.

Key Words: traffic emission, polycyclic aromatic hydrocarbons, PAHs, epidemiology, humans, breast cancer