

Abstract

Exposure to Ambient Air Pollution and Fetal Death in Harris County, Texas

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Few studies have examined the association between fetal death, defined as an intrauterine death occurring at or after 20 weeks of gestation, and maternal exposure to ambient air pollutants. Previous findings on critical windows of exposure have been inconsistent, likely due to differences in study design, populations studied, geographic scales used to assign exposures and the periods of pregnancy that are of interest. This study is the first to use time-to-event analysis to examine the risk of fetal death associated with long-term ambient air pollution (O₃, PM_{2.5} and NO₂) exposure in a racially and ethnically diverse urban area (Harris County, Texas). Using live birth and fetal death data from Harris County from 2008-2013, we assigned weekly average concentrations of each air pollutant to each birth or fetal death based on inverse distance interpolation from the three air monitoring stations closest to the mother's residential address. We will employ Cox proportional hazards models to evaluate associations between exposure to air pollution during pregnancy and fetal death risk. We will examine the effect measure modification potential of several maternal characteristics, including maternal race/ethnicity, nativity status, socioeconomic status and smoking. In preliminary logistic regression analysis, we found an increased risk of fetal death associated with advanced (40+) maternal age (OR = 1.77, 95% confidence interval (CI) [1.39 – 2.24]), maternal race (non-Hispanic Black OR = 2.63, 95% CI [2.31 – 3.0], Hispanic OR = 1.26, 95% CI [1.12 – 1.43]), maternal nativity (U.S.-born OR= 1.25 95% CI [1.14 -1.38]), and smoking during pregnancy (OR= 1.47 95% [1.16 – 1.87]). Upon completing the main analyses, we expect to find an elevated risk of fetal death with increasing exposure to air pollutants. The conclusion will be contingent on our findings and will address time-to-fetal death associated with long-term ambient air pollution exposure.

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