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Air pollution and adverse pregnancy outcomes

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Until the late 1990's, epidemiologic air pollution studies mostly ignored prenatal exposures and their influence on pregnancy outcomes. Fairly recently, studies relying on birth certificates from countries that undertake routine air pollution measurements created a fast growing body of evidence that pregnancy outcomes are indeed affected by ambient air pollution. Dense routine air monitoring networks covering large populations allow for exposure assessment on a fine time scale for large populations. The relatively short period during which the fetus develops in utero provides unique opportunities to study the influence of medium to short-term variations in exposures within geographically defined populations and to assess susceptible gestational windows for adverse birth outcomes. Generally, ambient monitors are placed to assess community-wide average exposures and are less apt to provide quality data for spatially heterogeneous air pollution; specifically, for pollutants where proximity to sources can cause very high exposures. Personal monitoring and biomarkers promise in-depth exposure information at a physiologic/target organ level, but are costly, labour intensive, and usually only feasible in small samples for defined toxins. Alternatively, geographic information system techniques such as land use based regression methods could be employed. Major remaining issues that will be discussed in this presentation are: (1) existing clues on biological mechanisms; (2) the lack of consistency in pollutants and exposure periods of concern that emerge from the existing literature; and how we may be able to address bias due to (3) exposure misclassification, especially for motor vehicle exhaust as a pollution source, and (4) possible residual confounding.