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Background: Exposure to pesticides has been associated with respiratory disease. Most widely described are their effects among individuals in high risk occupations. For example, herbicide use by farmers has been associated with the development of wheeze. Among asthmatics adults, experimental exposure to insecticide aerosol induced greater reductions in lung function than did exposure to control aerosol. These studies suggest that exposure to pesticides may be associated with either the development of asthma or induction of asthma exacerbations in adults. However, very little research on the effects of pesticide exposure on respiratory health in children has been conducted. One exception is the Children's Health Study that retrospectively questioned parents of children in grades 4, 7 and 10 and reported that exposure to pesticides, herbicides and farm crops in the first year of life was associated with asthma by age 5-6 years. Recently, our group reported that prenatal exposure to the pyrethroid group of pesticides (eg. cis-permethrin) was associated with more frequent cough by age 5 years.

We hypothesize that early exposure to pesticides, measured from air samples in children's homes, is associated with wheeze, cough and asthma in a young inner city cohort. Our strategy is to take advantage of an established Northern Manhattan and South Bronx inner city birth cohort as part of Columbia Center for Children's Environmental Health (CCCEH; CCCEH.org) in which multiple environmental exposures and health outcomes are being collected prospectively from the third trimester of pregnancy through age 11 years. We propose to analyze airborne measures of pesticides currently being completed at age 5-6 years and compare to respiratory outcomes at age 5-6 years. Our objective is to:

Determine whether current exposure to piperonyl butoxide (PBO), and specific pyrethroid pesticides cis-permethrin and trans-permethrin, as measured by airborne residential levels, is associated with wheeze, cough, report of asthma and IgE at age 5-6 years, after controlling for prenatal pesticide exposure, sex, ethnicity, parental history of asthma, allergen exposure and any ETS exposure.

Design: The research will be nested within the ongoing longitudinal CCCEH. Enrollment during pregnancy has been described. Eligibility criteria included pregnant, non-smoking African American or Dominican adult women with stable residences. Enrollment into the proposed study will include n=406 will have completed age 5-6 year monitoring for airborne pesticide exposure. During pregnancy, information was elicited on demographics, smoking, medical and occupational history, and home characteristics. Additional questionnaires are administered to the mothers every 3 months through age 2 years and every 6 months thereafter that include questions addressing the child's medical history and symptoms. At age 5 and 6 years the validated ISAAC questionnaire for wheeze, rhinitis and eczema is administered.

Pesticide exposure will be ascertained by two week indoor residential air sampling at age 5-6 years, already collected. Air levels are measured at the Southwest Research Institute. Primary outcomes will be wheeze, cough, and parental report of asthma at age 5-6 years, and elevated total or anti-cockroach IgE at age 5 years.

Potential Impact: This proposal would be the first to prospectively measure urban domestic pesticide exposure at early ages and ascertain whether it is associated with the development of wheeze, cough and asthma in young children. This information could lead to potentially better modes for asthma intervention, such as educational tools and public policy.