

A Binational Pilot Study Examining the Impact of Traffic-Related Air Pollution on Asthmatic Children

Project Purpose

The purpose of this study is to examine the ability of a series of alternate air pollution exposure metrics of providing valid health indicators for traffic-related air pollution for asthmatic children in the Paso del Norte border region. Specific attention will be focused on comparing the effectiveness of these metrics compared to existing ambient hazard monitoring. This is the first binational investigation to concurrently measure traffic-related air pollution and corresponding health effects on both sides of the border, in El Paso, TX and Ciudad Juarez, Mexico.

Project Description

Twelve weeks of chemically-, spatially-, and temporally-resolved monitoring of traffic-related air pollutants will be conducted inside and outside of four schools in El Paso and Ciudad Juarez during the fall of 2007. Schools will be recruited according to their location in each city, with the goal of recruiting two schools located in pre-defined high and low traffic-related pollution exposure zones in each city. Air sampling will be conducted at each school to measure: a) weekday, 24-hr integrated outdoor and indoor PM_{2.5} and elemental carbon (EC) concentrations; b) weekly 96-hr integrated (Monday-Friday morning) outdoor and indoor nitrogen dioxide (NO₂) concentrations, and; c) continuous outdoor PM_{2.5} and particle number (PN) concentrations for various particle sizes between 0.002 to 10 µm (in El Paso). Concurrent values for these pollutants will also be obtained from the existing environmental health indicators (i.e., ambient monitoring network). Respiratory health outcomes will be measured in 60 asthmatic schoolchildren (age 6-12 yrs) for the duration of the study. Specifically, 15 children will be recruited from each school (30 in El Paso and 30 in Ciudad Juarez) and evaluated on a weekly basis for: a) daily respiratory symptoms, medications use, school absenteeism, and health care utilization, and; b) weekly (Friday) exhaled nitric oxide. Each of the examined environmental health indicators will, subsequently, be used to predict children's respiratory health with the goals of assessing which indicators are sensitive to changes in children's health and where these indicators should be located to maximize their validity and effectiveness as such.

Expected Outcomes

The results from this pilot study will provide critical preliminary information about the impact of traffic on the region's most sensitive residents, the public health benefits resulting from reducing exposures to mobile source pollution, and identify specific environmental health indicators that can be used to measure these benefits using an accurate, sustainable and cost-effective approach.

Contact Information

- Jeremy A. Sarnat, Sc.D., Department of Environmental and Occupational Health, Emory University, jsarnat@sph.emory.edu
- Fernando Holguin, M.D., Division of Pulmonary and Critical Care, Emory University Medical School, fch5@cdc.gov

- Wen-Whai Li, Ph.D., P.E., Department of Civil Engineering, University of Texas at El Paso, wli@utep.edu
- Stefanie Ebelt Sarnat, Sc.D., Department of Environmental and Occupational Health, Emory University, sebelt@sph.emory.edu
- Silvia Flores Luévano, M.D., Ciudad Juarez Instituto Mexicano del Seguro Social, silflor@prodigy.net.mx
- Alfredo Granados Olivas, Ph.D., Department of Geography, Universidad Autonoma de Ciudad Juarez, agranados@uacj.mx

Key Collaborating Institutions

Emory University, University of Texas – El Paso, Ciudad Juarez Instituto Mexicano del Seguro Social, Universidad Autonoma de Ciudad Juarez