

US EPA ARCHIVE DOCUMENT

# Effects of Diesel Exposure and Traffic-related Air Pollution on Asthmatic Children in Ciudad Juárez

Total Extramural \$\$

Start Date: 2003

Completion Date: ongoing

## Project Purpose:

This project will determine the health effects associated with exposure to diesel and traffic-related air pollution in a cohort of a 100 non-asthmatic and 100 asthmatic school children (ages 6 – 12) living in Ciudad Juarez.

## Project Description:

From January 2003 through December 2003, a total of 100 asthmatic children ages 6 – 12 who had a history of at least 2 exacerbations of asthma in the last year and had a medical diagnosis of asthma, were recruited to participate in this study. Another 100 children were selected from the same schools as healthy controls. After enrollment, participants answered questions regarding asthma symptoms, medications, underwent spirometry, exhaled nitric oxide, skin testing for allergens, exhaled breath analysis, and provided urine samples. During follow up, each participant attended the research center every other week for a total of 8 visits at which time exhaled nitric oxide and spirometry were repeated. We selected 5 monitoring zones based on the areas of Ciudad Juarez reporting the highest volume of daily traffic (data obtained from the Ciudad Juarez department of motor vehicle transportation), subsequently, we selected schools in each zone at varying distances from the roads with highest daily traffic counts (5m to 800m) from which the cases and controls were obtained. PM<sub>2.5</sub> Minivolt samplers (including quartz filters for elemental carbon) and NO<sub>2</sub> passive samplers were located within the schools and at varying distance intervals in relation to the major traffic arteries for each monitoring zone. In this new project, we will utilize the information collected during this project (including health effects and environmental measurements) to develop an exposure model based on Geographic Information System (GIS), and we will conduct personal monitoring on a group of children who participated in the original study to validate the GIS model.

## Accomplishments:

Our preliminary findings suggests that asthmatic children from schools in close proximity to main roads (many of which are main access to the US-Mexico crossing bridges) experience more respiratory symptoms and have increased airway inflammation.

## Expected Outcome(s):

We expect that a GIS model, based on traffic counts, type of roads, and environmental measurements of pollutants, will be able to more accurately predict exposure to pollutants in relation to distance to roads and be a useful exposure model to assess respiratory health effects. The information obtained from this project may be useful to other border cities with similar problems.

**Presentations or Publications:**

[A13] Exhaled Nitric Oxide in Asthmatic Children and Traffic Density in the US-Mexico Border: Preliminary Results from the EVA Study (Vehicular Emissions and Asthma)

*F. Holguin, S. Flores, M. Cortez, M. Ramirez, A. Barrasa, M. Molina, L. Molina, C. Rincon, D.M. Mannino, S.C. Redd, I. Romieu Instituto Nacional de Salud Publica, Cuernavaca, Morelos, Mexico; Centers for Disease Control and Prevention, Atlanta, GA; Massachusetts Institute of Technology, Cambridge, Boston; Environmental Defense Fund, El Paso, TX; US-Mexico Foundation for the Sciences, Mexico City, Mexico; Department of Medicine, Division of Pulmonary and Critical Care, Emory University, Atlanta, GA Presented on Sunday, May 23, 2004 9:35 AM Mini-Symposium (Abstract Page: A19) Session: 8:15 am-11:00 am, AIR POLLUTION HEALTH EFFECTS IN CHILDREN*

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**Participant(s):**

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