# Spatial Analysis and Modeling of Air Pollution Concentrations in El Paso, Texas

## Project Purpose

To advance the use of land use regression (LUR) models in spatial-based exposure and epidemiologic studies in urban areas, including the application of indicators to assess changes in human exposures to ambient air pollutants.

## Project Background

The University of New Mexico – University of Texas El Paso ARCH Program on Border Asthma is a population-based epidemiologic investigation of the role of air pollutants and children's respiratory health across El Paso County, TX. The Measurement and Modeling of Gaseous Air Pollutants (ARCH Project 3, M. Gonzales PI, UNM) is an enhanced investigation of spatial-based air pollution exposure in support of the main environmental health study.

Year-round NOx and VOCs were measured at 12 sites in El Paso County during the first year of Project 3. Additionally O3 was monitored during the summer months. Eight additional sites will be added to the sampling plan during the second year.

Project 3 addresses several of the limitations identified in the EPA-ORD El Paso Children's Health Study (EPCHS) including the additional of additional seasons beyond winter and the addition of an additional pollutant, ozone during summer. (See Completed Air Projects in the Environmental Health Workgroup site for details on the EPCHS.)

We have identified the following objectives relative to spatial-based exposure assessment for this health study. UNM investigators would take the lead on these objectives, receiving advisory support from NERL. The objectives are to:

- conduct statistically-based selection of 8 additional sites for air monitoring in El Paso,
- develop of a land use regression (LUR) model using the El Paso NO2 and VOC ambient data to be collected by UNM-UTEP, and
- compare LUR models from this effort to the previous EPCHS models.

## Expected Outcomes

The careful attention to and selection of covariates for both site placement and model development represents a step beyond the current exposure analyses currently being published for environmental epidemiologic studies, thus shaping the direction of ambient exposure assessments in future spatial-based epidemiology. Evaluation of temporal differences in LUR model development from this effort and EPCHS will advance the use of such models to determine their applicability in retrospective studies in which exposure and health data are collected in different time frames.

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**Key Collaborating institutions:**

UTEP, Alion Science and Technology, EPWU, TCEQ, UNM-LRRI NIEHS Health Sciences Center, UT Houston SPH, CEMRC

**Pilot Project Period:** 2007 - 2009