

US EPA ARCHIVE DOCUMENT

# National Human Exposure Assessment Survey (NHEXAS) Border Project (1996-2002)

Start Date: 1996

Completion Date: 2005

## Project Purpose:

- a. Test if exposures of the Arizona border population are higher than exposures of the population of the State.
- b. Test for the effects of sources (i.e., reported product usage) on environmental, exposure, and biological media concentrations.
- c. Provide exposure data (reference databases) for the population of the U.S./Mexico Border area of Arizona.
- d. Test the associations between chemical measurements – for example, associations between exposure and biological markers, between exposure and environmental media measurements, or between two (or more) exposure pathways.
- e. Test the contribution of measured pathways to exposure, and the independence of pathway contributions.
- f. Serve as a pilot for future multimedia-multipathway studies along the U.S./Mexico Border.

## Project Description:

The NHEXAS Border Project is a probability-based survey of the population of Arizona in proximity to the U.S./Mexico Border. The study included the collection of questionnaire data and samples for the measurement of contaminants in the air, house dust, water, food, and soil. Blood and urine samples of the participants were measured for evidence of exposure to environmental contaminants. Samples were collected for classes of pollutants that are potentially harmful to human health, and for which little information on population exposure is available. The pollutant classes include metals, pesticides, volatile organic compounds (VOCs), and polynuclear aromatic hydrocarbons (PAHs). There are multiple sources (air, water, soil, food, dusts, etc.) of exposure to these chemicals. Certain populations, including low-income individuals, minorities, and the biologically susceptible, are potentially at increased risk, so their exposures need to be identified. Further, little is known about temporal and spatial distributions of pollutants, and trends in these distributions.

## Accomplishments:

- a. Field sample collection completed on July 15, 1998, and,
- b. Identification of elevated manganese levels in drinking water (often above the aesthetic value of 50ug/L) in Yuma County, an agricultural area. The levels found are equivalent to levels found in mining communities.
- c. The following presentations based on the NHEXAS Border Project were made at the International Society for Exposure Assessment, 2000 Conference, Monterey, CA, October 24-27, 2000:

Demographic Characteristics of the NHEXAS-Arizona Border Study Population.

Fixed-site Air and Biomarker Measurements of VOCs in a Non-occupationally Exposed Population along the Arizona-Mexico Border.

Lead, Arsenic and Cadmium Concentrations: Comparative results from the Arizona

Border Study and NHEXAS Arizona.

Comparisons of Pesticide Levels and Exposures in NHEXAS Arizona and Arizona-Mexico Border Populations.

Residential Environmental Distributions of PAH in a Non-Occupationally Exposed Population along the Arizona-Mexico Border.

Application of Semipermeable Membrane Devices to Indoor Air Sampling.

- d. The following presentations based on the NHEXAS Border Project were made at the International Society for Exposure Assessment, 2001 Conference, Charleston, SC, Nov. 4-8, 2001:

Concentrations of Pesticide from Dermal Surfaces: A comparison of NHEXAS & AZ Border Samples.

Modeling of Macroscale Agricultural Elements in Pesticide Exposure.

Characteristics of Time and Activity Patterns for Population Subgroups in NHEXAS AZ and AZ Border Survey. 1Rogan, S.P.

Hispanic Dietary Components and Proximity to the US-Mexico Border.

- e. The following peer-reviewed journal articles have been published.

Moschandreas, D.J., Karuchit, S., Ari, H., Lebowitz, M.D., O'Rourke, M.K., Gordon, S., Robertson, G., On Predicting Multi-Route and Multimedia Residential Exposure to Chlorpyrifos and Diazinon, *Journal of Exposure Analysis and Environmental Epidemiology* (2000)11, 56-65

Moschandreas, D.J., Ari, H., Karuchit, S., Kim, Y., Lebowitz, M.D., O'Rourke, M.K., Gordon, S., Robertson, G., Exposure to Pesticides by Medium and Route: The 90th Percentile and Related Uncertainties, *Journal of Environmental Engineering*, (2002) 9, 857-864.

Expected accomplishments include:

- a. Delivery of quality assured databases to EPA by July 2004.
- b. Databases on EPA HEDS Website by February 2005
- c. Additional peer-reviewed journal articles are anticipated by September 2005.

**Expected Outcome(s):**

1. The study results will be used to determine the need for and guide future data collection and intervention efforts to reduce exposures in the border population.
2. Methods evaluated in this study will be used in the future to focus exposure reducing interventions to the appropriate population.

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