

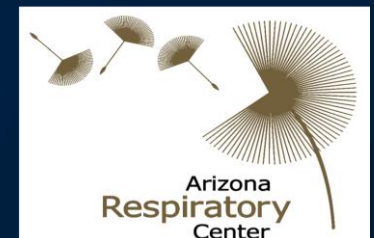
Relating Diesel Exhaust Exposure to Respiratory and Immune Outcomes in Early Life

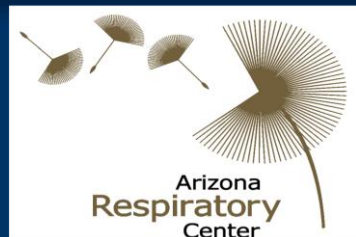
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Acknowledgements



- Arizona Respiratory Center
 - Fernando Martinez, MD
 - Anne Wright, PhD
 - Duane Sherrill, PhD
 - Lynn Gerald, PhD
- Other collaborators
 - Eric Betterton, PhD
 - Andrew Comrie, PhD
 - Nate Lothrop, MS
- Funding
 - Southwest Environmental Health Sciences Center (NIEHS)
 - National Heart Lung and Blood Institute (NHLBI)

Why traffic related exposures?

Community Traffic Studies

- Asthma
- Wheeze
- Decreased lung function
- Respiratory Illness
- Respiratory Symptoms
- Allergies
- Rhinitis
- Eczema

Human *in vivo* Studies

- Increased
 - Inflammation biomarkers
 - Th2 related cytokines (allergies)
 - Allergen specific IgE
 - Viral Receptors
- Decreased Th1 related Cytokines (immune system)
- Induced Allergic Response

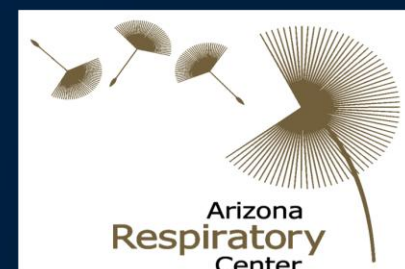
ARC Respiratory Children Cohorts

Tucson Children's Respiratory Study

- 1246 participants enrolled at birth
- Enrolled 1980-1984
- Respiratory questionnaires
- MD lower respiratory illness evaluations
- Serum IgE
- Lung Function Tests
- Bronchial Hyperresponsiveness

Infant Immune Study

- 484 infants enrolled at birth
- Enrolled 1997-2003
- Respiratory questionnaires
- Total and Specific IgE
- Cytokines



SWEHSC Pilot Project Aims

Specific Aims: We propose to conduct studies utilizing data from the CRS to examine the relationships between traffic-related pollution exposure and occurrence of LRIs during the first 3 years of life and persistence of wheeze through age 6 via the following specific aims:

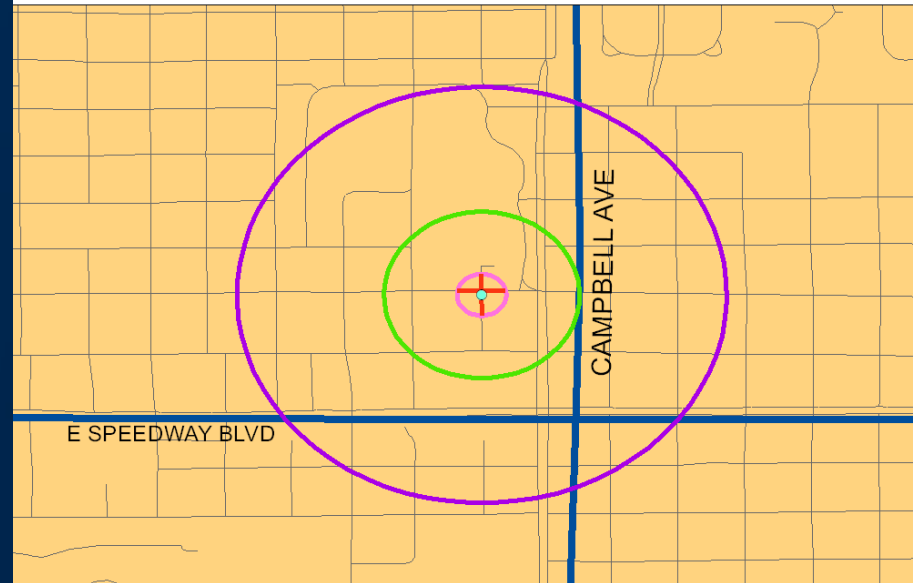
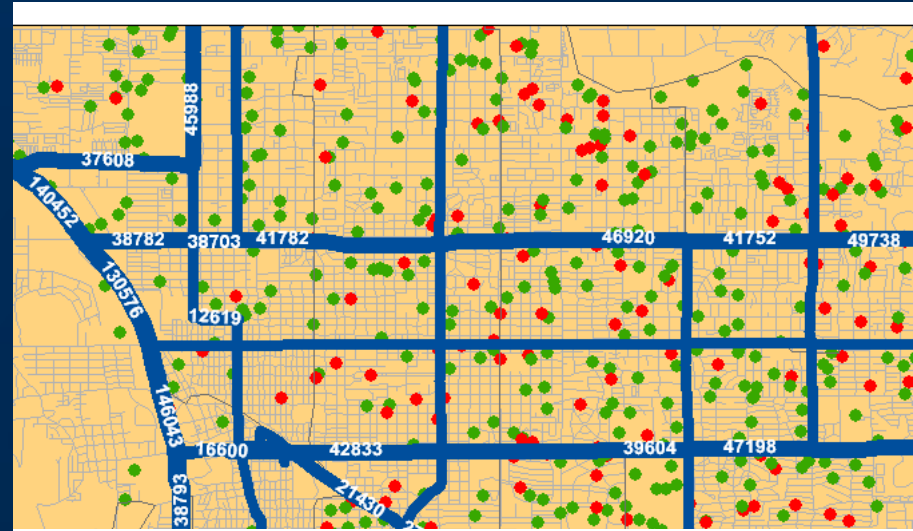
1. To evaluate associations between emissions of hazardous air pollutants at the census tract level and respiratory outcomes.
2. To develop an integrated traffic variable based on traffic density at each child's birth address and assess the relationship with respiratory outcomes.
3. To conduct a spatial analysis of occurrence of LRIs and determine geographic predictors that may be associated with environmental exposures

Aim 1: HAPs Assessment

- EPA National Air Toxics Database (1996)
 - DPM
 - Acetaldehyde
 - Acrolein
 - Arsenic
 - Benzene
 - Butadiene
 - Chromium
 - Formaldehyde
 - Lead
 - Manganese
 - Nickel
 - POM
- ▶ After accounting for auto-correlation with a spatial-lag model:
 - For DPM 1996 vs. 2002:
 - Continuous $p=0.006$; by quartiles $p=0.0008$
 - For traffic volumes 1980 vs. 1996
 - Continuous $p<0.00000001$

Aim 2: Traffic Volumes

- Traffic Volumes (50, 200, 500 m)
 - Nearest
 - Maximum
 - Vehicle Miles Traveled
 - Distance Weighted VMT
- Distance to Major Road



No significant associations were determined.

K25- Research

- ▶ \$660,000 for 5 years from NIH/NHLBI

- ▶ Aim 1. To assess longitudinally the role of early life diesel exhaust exposures in the incidence of asthma-related respiratory symptoms, lung function development, and bronchial hyperresponsiveness.
 - Hypotheses. Increased exposure to diesel-related pollutants in early life is associated with: 1) increased respiratory symptoms from age 4 months through 6 years, 2) decreased lung function, and 3) increased bronchial hyperresponsiveness at age 6.

- ▶ Aim 2. To assess longitudinally the role of early life diesel-related pollutant exposures in immune function and allergic sensitization.
 - Hypotheses. Increased exposure to diesel-related pollutants in early life is associated with: 1) predominance of Th2 versus Th1 cytokine production within first year of life, and 2) increased allergic sensitization as measured by total and allergen-specific IgE from 3 months through 6 years, and skin prick tests at age 6.

K25- Research

- Exposure Assessment
 - Year 1-2
- Aim 1
 - Year 2-3
- Aim 2
 - Year 3-4
- Develop Intervention
 - Year 3-5

Exposure Assessment

- Collecting Address Histories
- Map air pollution by census tract from US EPA NATA for 1990, 1996, 1999, and 2002
 - Assess co-linearity of pollutants
- Use CALINE4 to develop NO₂ and DPM estimates
 - Traffic Volume
 - Emission Rates (MOBILE6)
 - Atmospheric Conditions

The End



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