

# Exposure and Health Overview

**MILAGRO-MCMA2006**

# Participants

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# Objectives

- To analyze the contribution of the regional transportation of air pollutants from the Metropolitan Area of México City in the personal exposure to air pollutants of children (9-12 years old) and their parents during the MILAGRO-MCMA2006 campaign.
- To collect personal and microenvironmental samples of air pollutants (ozone, PM<sub>2.5</sub>, ultrafine particles, carbon monoxide, VOCs) in three selected sites in urban, suburban and rural areas.
- To compare the indoor, outdoor concentrations, and personal exposures to air pollutants in the three different sites.
- To determine the association between the exposures and the level of oxidative stress markers among the volunteers.
- To analyze the relationship between the exposures and the respiratory health of the volunteers.

# Type of study

- This was an exposure assessment study of children and young adults.
- They were recruited in three different areas along the path of transportation of air pollutants from Mexico City to the neighbor states of Mexico and Hidalgo

# Study population

- A convenience sample of 590 children 9-12 years old, from elementary schools close to the selected sites.
- Another convenience sample of parents.



# Exposure study

- For two sub-samples, 200 children and 60 parents
- Their personal exposure to VOCs, ozone PM2.5, ultrafine particles, and carbon monoxide and measurements at their schools and homes were performed.



# Exposure monitoring

The following air pollutants were monitored

- PM<sub>2.5</sub>: micro-environmental and personal monitoring
  - Method: SKC personal pumps and a single stage impactor with 37 mm Teflon filters.
  - Parameters: mass, organic and elemental carbon, elements by PIXE, endotoxins and sulfates and nitrates.
- Ultrafine particles: micro-environmental monitoring
  - Method: Sioutas cascade sampler and SKC pumps. Dust-Track and CPC monitors.
  - Parameters: mass, elements by PIXE, endotoxins.



# Exposure monitoring

- VOCs: personal and micro-environmental monitoring
  - Method: 3M series 3500 and SKC-Ultra passive samplers. Perkin-Elmer stainless steel prepacked ATD sample tubes B 60/80 to take one-week samples.
  - Parameters : 21 VOCs, alkanes, cicloalkanes, aromatic, halogenated, terpenes.
- Ozone: personal and micro-environmental
  - Method: Radiello passive sampler.
  - Parameter: 3-day ozone concentration
- Carbon Monoxide: personal and micro-environmental monitoring
  - Method: Langan carbon monoxide dosimeters
  - Parameter: every 15 min. measurements



# Health Impacts

- The pollution related health impacts that were studied are:
  - Evaluation of oxidative stress markers in population from the three sites.
  - Parameters: Anti-oxidant enzymes, lipid peroxidation and carbonile groups.
  - Respiratory health conditions.
  - Olfactory thresholds.

and their association with the air pollutants local concentrations and personal exposure.



# General results



# PM analyses

**Tabla 1. Número de filtros con partículas y tipo de análisis**

<b>Método</b>	<b>Cantidad de muestras</b>
Gravimetría	399
Reflectancia térmica óptica	60
XRF	399
Cromatografía de iones	60
Prueba de Limulus	399



# VOCs, Ozone and CO

**Tabla 2. Número de muestras colecta de COV, ozono y CO colectadas**

<b>Contaminante</b>	<b>No.</b>
Compuestos orgánicos volátiles con 3M	360
Compuestos orgánicos volátiles con SKC	56
Compuestos orgánicos volátiles con PerkinElmer	56
Ozono con monitores Radiello	110
Monóxido de carbono con monitores Langan	120



# Health examination

**Tabla 3. Análisis biológicos y clínicos realizados pos sitio**

	T2		T1		T0	
<b>Monitoreo</b>	<b>Padres</b>	<b>Escolares</b>	<b>Padres</b>	<b>Escolares</b>	<b>Padres</b>	<b>Escolares</b>
Estado antioxidante	26	19	54	63	41	27
Peroxidación de lípidos	22	19	42	63	41	27
Enzimas antioxidantes	22	19	42	63	41	27
Biometría hemática y química sanguínea	22	19	42	63	41	27
Exámenes médicos		19		63	41	27
Espirometrías		10		20		27
Aplicación de cuestionarios de salud, dieta y actividad física	65	170	83	220	41	190
Detección de umbrales olfatorios		19		63		27

# Reports

- In this conference 12 oral and poster presentations are presented:
  - VOCs
  - PM<sub>2.5</sub>
  - Ultrafine particles
  - Oxidative stress in children
  - Oxidative stress in adults
  - Olfactory threshold

Thanks for all  
and come back  
soon!