



CITY OF SAN ANTONIO
METROPOLITAN HEALTH DISTRICT

Air Quality and Public Health

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Outdoor Air Quality

Has improved since the 1990s but many challenges remain in protecting communities from air quality problems



Public Health Importance

- Exacerbates respiratory illness
- Harmful to heart health
- Vulnerable populations more susceptible



Air Quality Standards

- The Clean Air Act (1970) was designed to control air pollution on a national level
- Requires the EPA to set standards for pollutants considered harmful to public health and the environment



6 Principal Air Pollutants

Nitrogen Dioxide

Ozone

Particulate Matter

Sulfur Dioxide

Carbon Monoxide

Lead

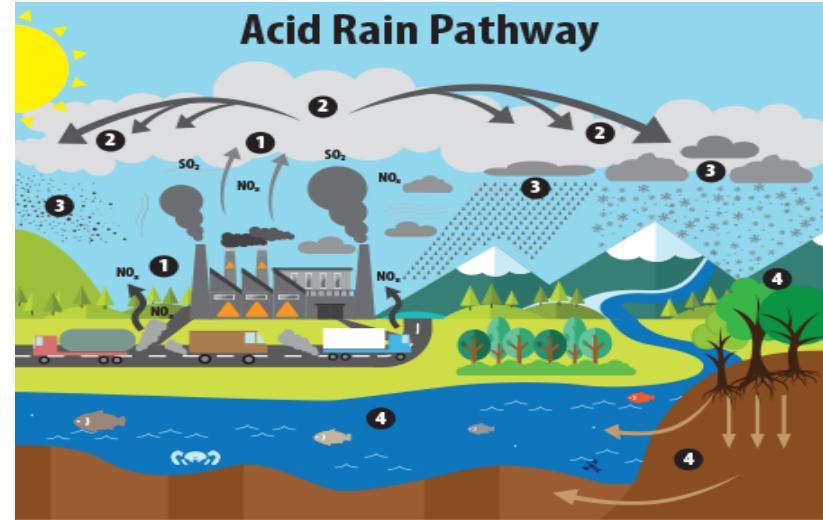
Nitrogen Dioxide

- Nitrogen Dioxide (NO_2)
 - One of many nitrogen oxide (NO_x) gases
 - Forms from emissions
 - Contributes to formation of ground-level ozone & fine particle pollution



NO₂ Environmental Effects

- The interaction of NO₂ and other nitrogen oxides with water, oxygen and other chemicals in the atmosphere forms acid rain
- Acid rain harms sensitive ecosystems



This image illustrates the pathway for acid rain in our environment: (1) Emissions of SO₂ and NO_x are released into the air, where (2) the pollutants are transformed into acid particles that may be transported long distances. (3) These acid particles then fall to the earth as wet and dry deposition (dust, rain, snow, etc.) and (4) may cause harmful effects on soil, forests, streams and lakes.

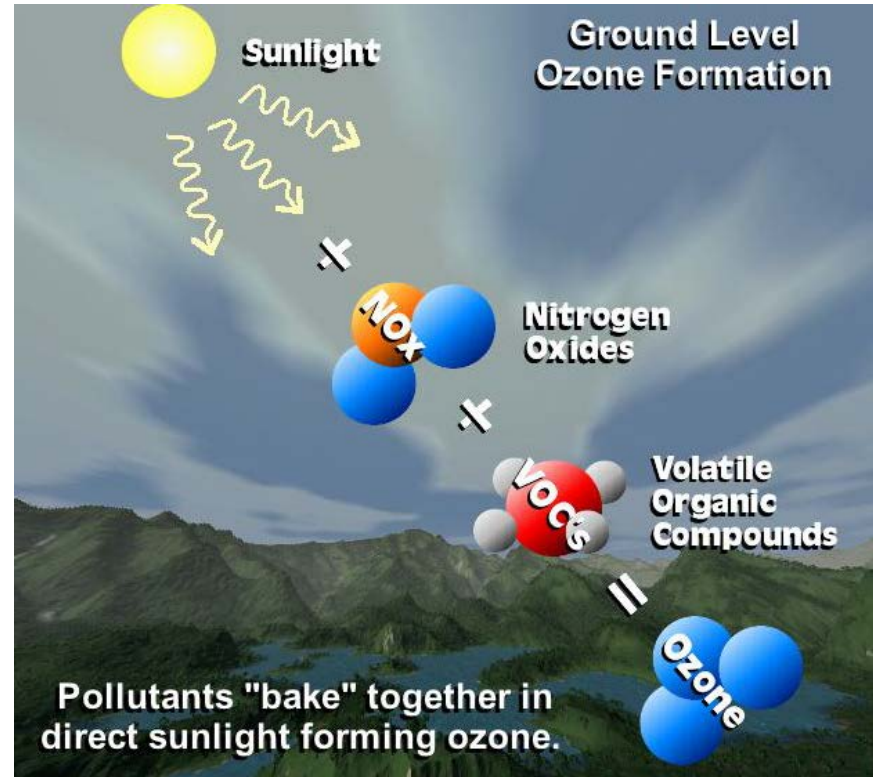
NO₂ Health Effects

- Breathing air with high concentrations of NO₂ can irritate respiratory system
- Long and short-term exposure contributes to and aggravates respiratory illnesses



Ground Level Ozone

Created by chemical reactions between nitrogen oxides (NO_x) and volatile organic compounds (VOCs) in the presence of sunlight



Ozone Environmental Effects

Ozone affects sensitive vegetation and ecosystems, including:

- Forests
- Parks
- Wildlife
- Wilderness areas



Ozone Health Effects

- May make it difficult to breathe deeply
- Cause shortness of breath
- Aggravate lung diseases such as asthma, emphysema, and chronic bronchitis
- Exacerbate COPD



Particulate Matter (PM)

- A mix of small particles and liquid droplets
- Particles can be made of:
 - Acids and organic chemicals
 - Metal
 - Dust
 - Soil



PM Environmental Effects

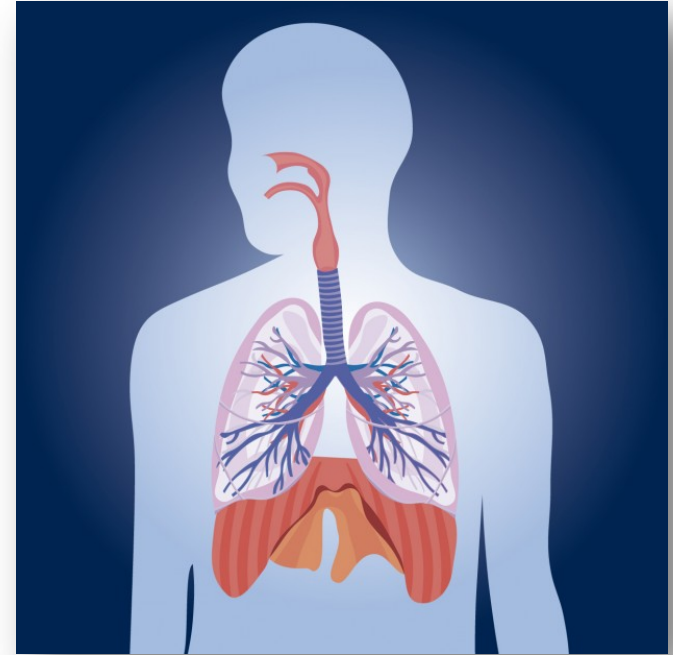
PM from the air can deposit on water and soil harming:

- Ecosystems
- Soil
- Crops



PM Health Effects

- Exposure to high concentrations of PM has been linked with a variety of problems, including:
 - Irregular heartbeat
 - Aggravated asthma
 - Heart attacks
 - Premature death in people with heart or lung disease



Sulfur Dioxide

Sulfur dioxide (SO_2)

- From a group of highly reactive gases called sulfur oxides (SO_x)
- Largest source of SO_2 emissions is fossil fuel combustion at power plants and other industrial facilities



SO₂ Environmental Effects

At high concentrations, SO₂ can harm trees and plants by damaging foliage and decreasing growth

SO₂ and other sulfur oxides can contribute to acid rain which may harm sensitive ecosystems



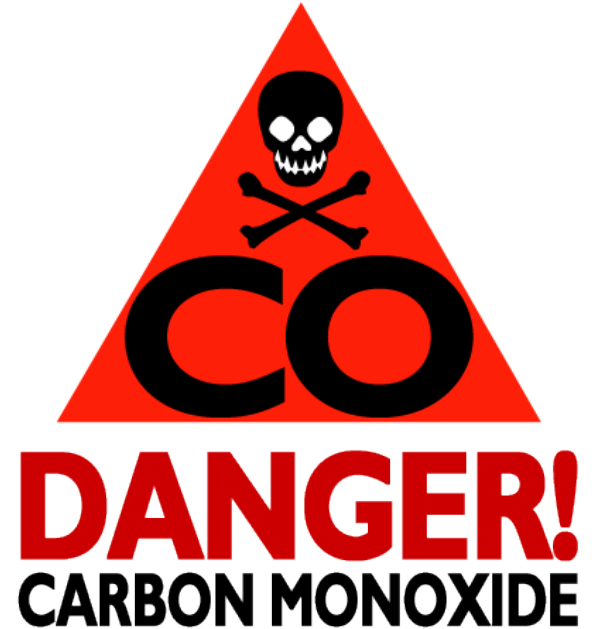
SO₂ Health Effects

- SO₂ can harm the respiratory system and make breathing difficult
- Children, the elderly, and those who suffer from asthma are particularly sensitive to effects of SO₂



Carbon Monoxide

- A colorless, odorless gas that can be harmful when inhaled in large amounts
- Released whenever something is burned
- Greatest sources
 - Vehicles or machinery that burn fossil fuels



CO Environmental Effects

Contributes indirectly to climate change because it participates in chemical reactions in the atmosphere, producing ozone—a climate change gas



CO Health Effects

Carbon Monoxide can cause:



Lead

Lead (Pb) is an elemental heavy metal found naturally in the environment as well as in manufactured products



Lead Environmental Effects

Lead is persistent in the environment and can be added to soils and sediments through deposition from sources of lead air pollution



Lead Health Effects

- Most common: neurological effects in children and cardiovascular effects in adults
- Infants and young children are especially sensitive to even low levels of lead
 - May contribute to behavioral problems, learning deficits and lowered IQ



Lead Monitoring

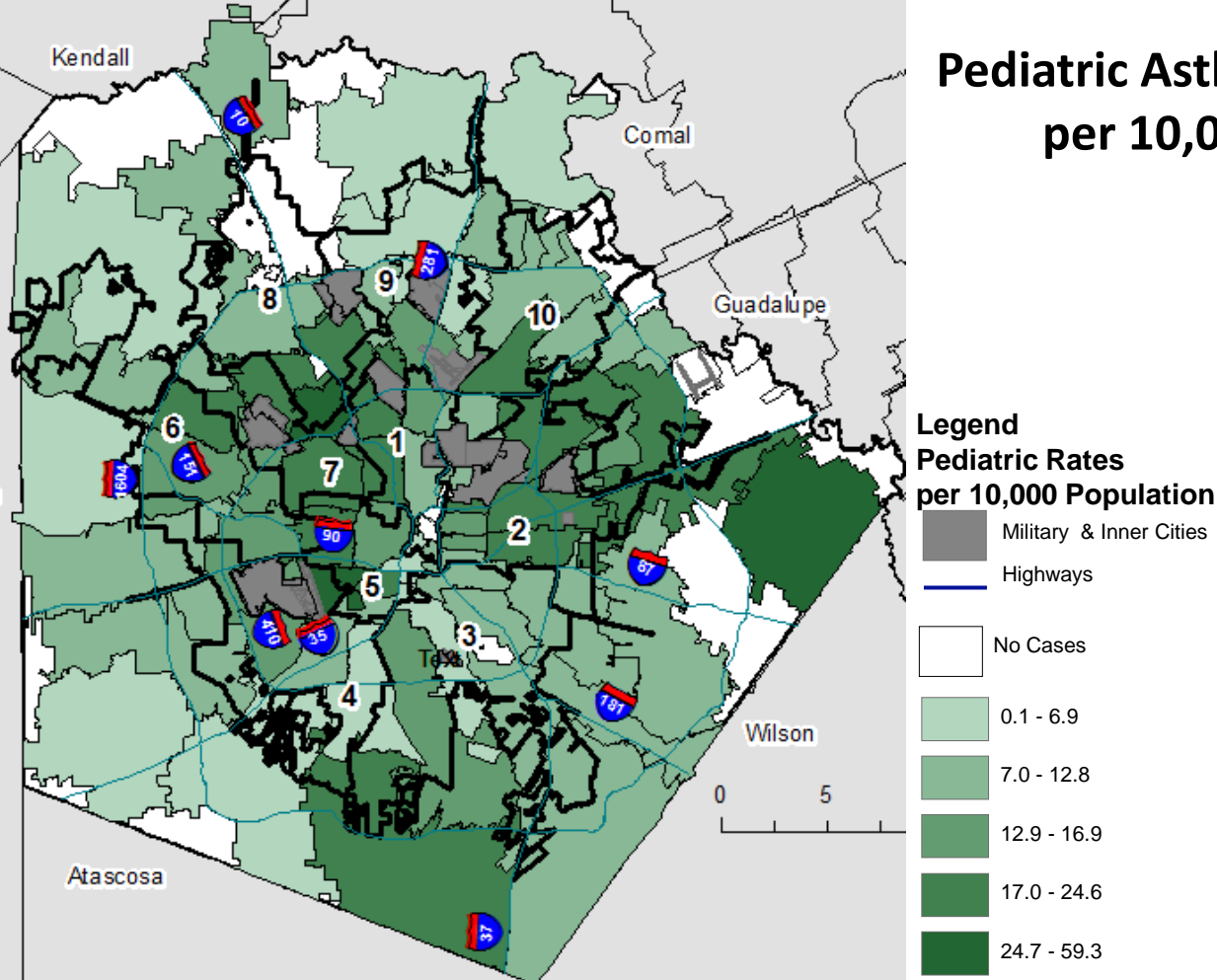
Only 6 counties in Texas have active lead air monitors

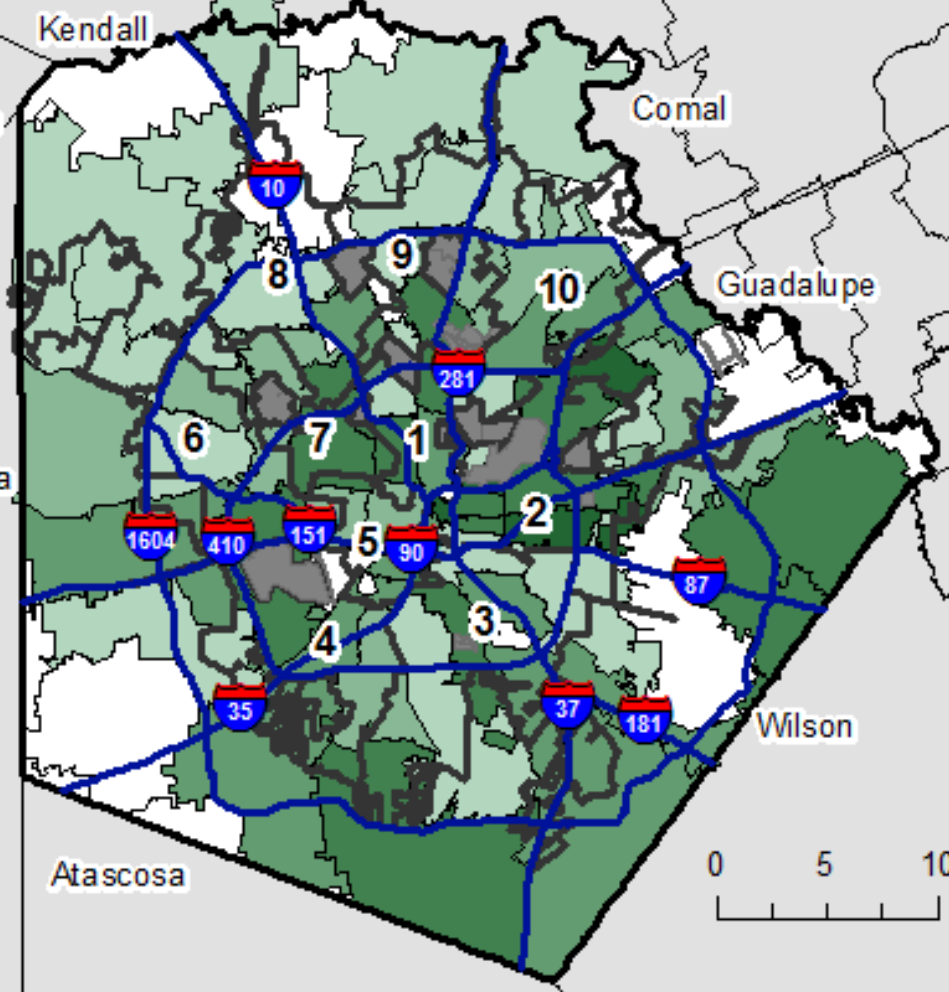
- Cameron
- Collin
- El Paso
- Kaufman
- Potter
- Webb



Pediatric Asthma Hospital Discharges Rate per 10,000 Population by ZCTA, Bexar County, 2015

Overall Rate
13.9 per 10,000





Adult Asthma Hospital Discharges Rate per 10,000 Population by ZCTA, Bexar County, 2015

Overall Rate
3.7 per 10,000

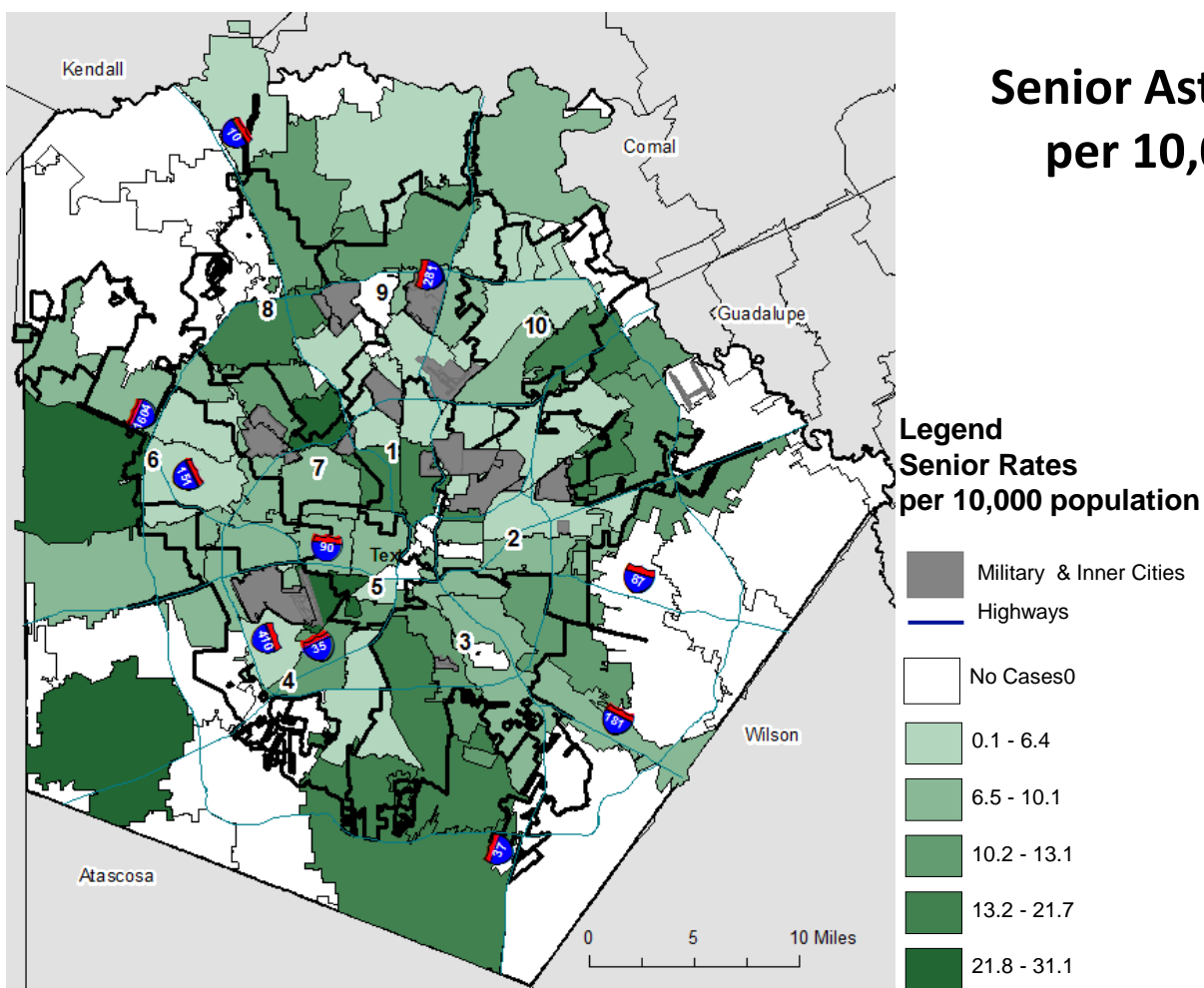
Legend

Asthma Adult 18- 64 years Rate
per 10,000 Population

- Highways
- Military & Inner Cities
- 0.00
- 0.1 - 2.4
- 2.5 - 3.6
- 3.7 - 5.3
- 5.4 - 8.6
- 8.7 - 14.8

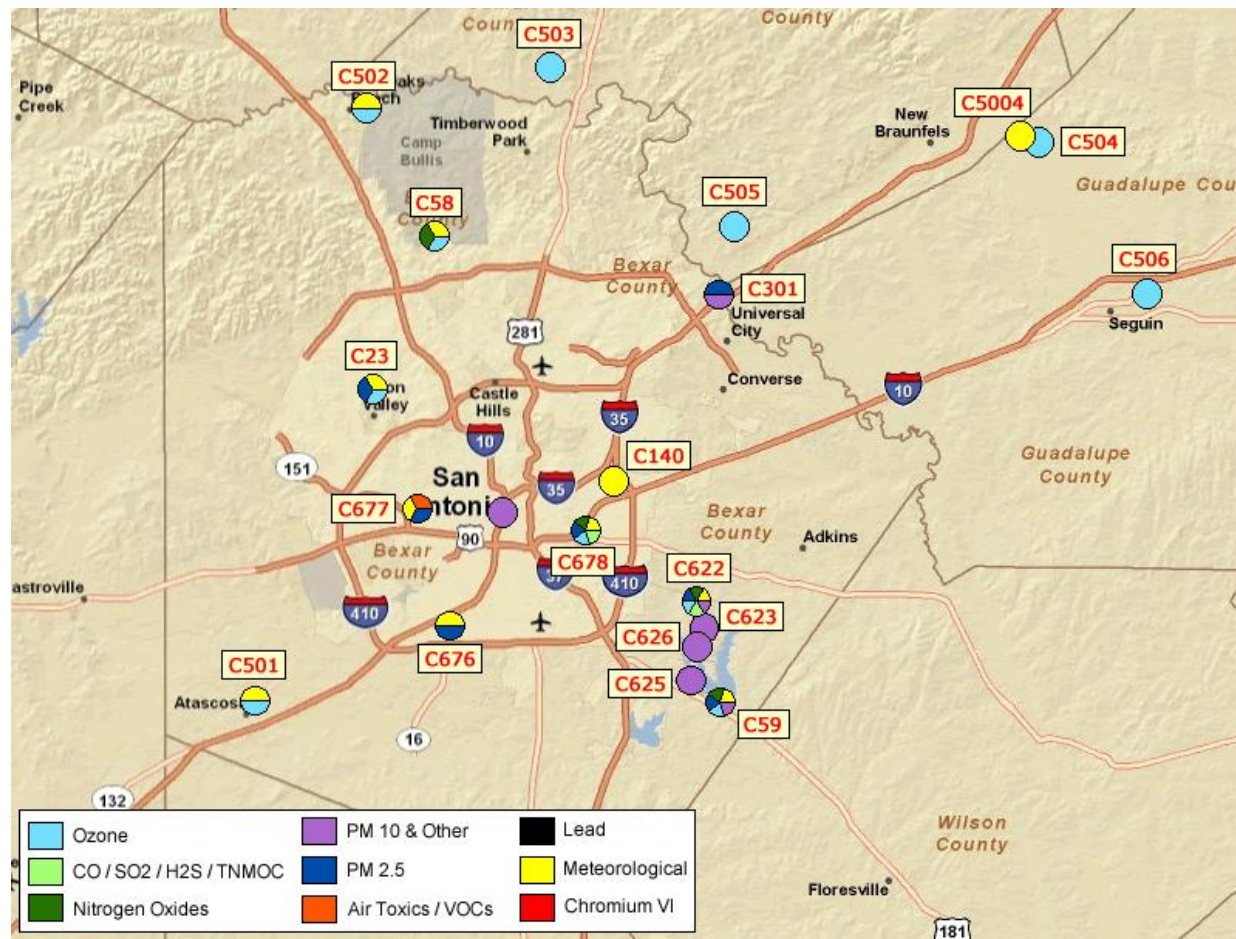
Senior Asthma Hospital Discharges Rate per 10,000 Population by ZCTA, Bexar County, 2015

Overall Rate
8.6 per 10,000



Air Pollutants Monitored in San Antonio Region

- Nitrogen Dioxide
- Ozone
- Particulate Matter
- Sulfur Dioxide
- Carbon Monoxide



Air Monitoring Activities

- Metro Health staff operate and maintain 29 separate monitors from 15 different air monitoring sites in the San Antonio area
 - Including Bexar, Wilson, and Karnes County



Reducing Air Pollution

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Reducing Air Pollution

There are many things that individuals can do to reduce air pollution

- Carpool/walk/bike
- Maintain yard equipment
- Mulch or compost leaves and yard waste
- Set your thermostat higher in the summer and lower in winter



Reducing Air Pollution

There are many things that the city can do to reduce air pollution

- Encourage use of public transit & other transportation alternatives
- Alternative fuel sources
- More green spaces
- Neighborhood planning



Thank you. Any Questions?



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