Latest Toxicological Ambient Air Monitoring Evaluations

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Toxicology, Risk Assessment, and Research Division

Texas Commission on Environmental Quality (TCEQ)

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Overview

- Terms and Definition
- Annual Health Effect Memos
- Type of Air Toxics Data
- Data Evaluation
- Region Map
- Evaluation Summary by Region
- Overall Conclusions

Terms and Definitions

Air Monitoring Comparison Values (AMCVs)

- Screening levels used to in the evaluation of ambient air data

Health-based AMCVs

- Safe levels at which exposure is unlikely to result in adverse health effects

Welfare-based AMCVs

- **Odor AMCVs -** set to prevent nuisance odorous conditions
- **Vegetation AMCVs -** set to prevent vegetation damage

Short-term

- Referring to a short exposure duration, typically 1 hour

Long-term

- Referring to a long exposure duration, typically a lifetime (70 years)

Standards – used for context only, these evaluations do not look at compliance with standards

- Hydrogen Sulfide Texas State Standard for a 30-minute net sample in a non-industrial area (80 ppb)
- Lead total suspended particulate (TSP) National Ambient Air Quality Standard (NAAQS) promulgated by USEPA (0.15 $\mu g/m^3$)

Annual Health Effect Memos

- Evaluation of air toxics collected at ambient air monitoring sites throughout the state to determine their potential to cause short- and long-term adverse health or welfare effects.
- Conclusions from the evaluations help the agency focus its resources.
- These evaluations are not designed to be comprehensive assessments of individual health risks.

Types of Air Toxics Data

Canister

- 24-hour sample collected every 3rd, 6th, or 12th day
- 85 Volatile organic compounds (VOCs)

AutoGC

- Hourly samples collected continuously
- 48 VOCs

Carbonyl

- Seasonal schedule: averaging time and frequency vary
- 17 Carbonyls

Speciated Metals $PM_{2.5}$

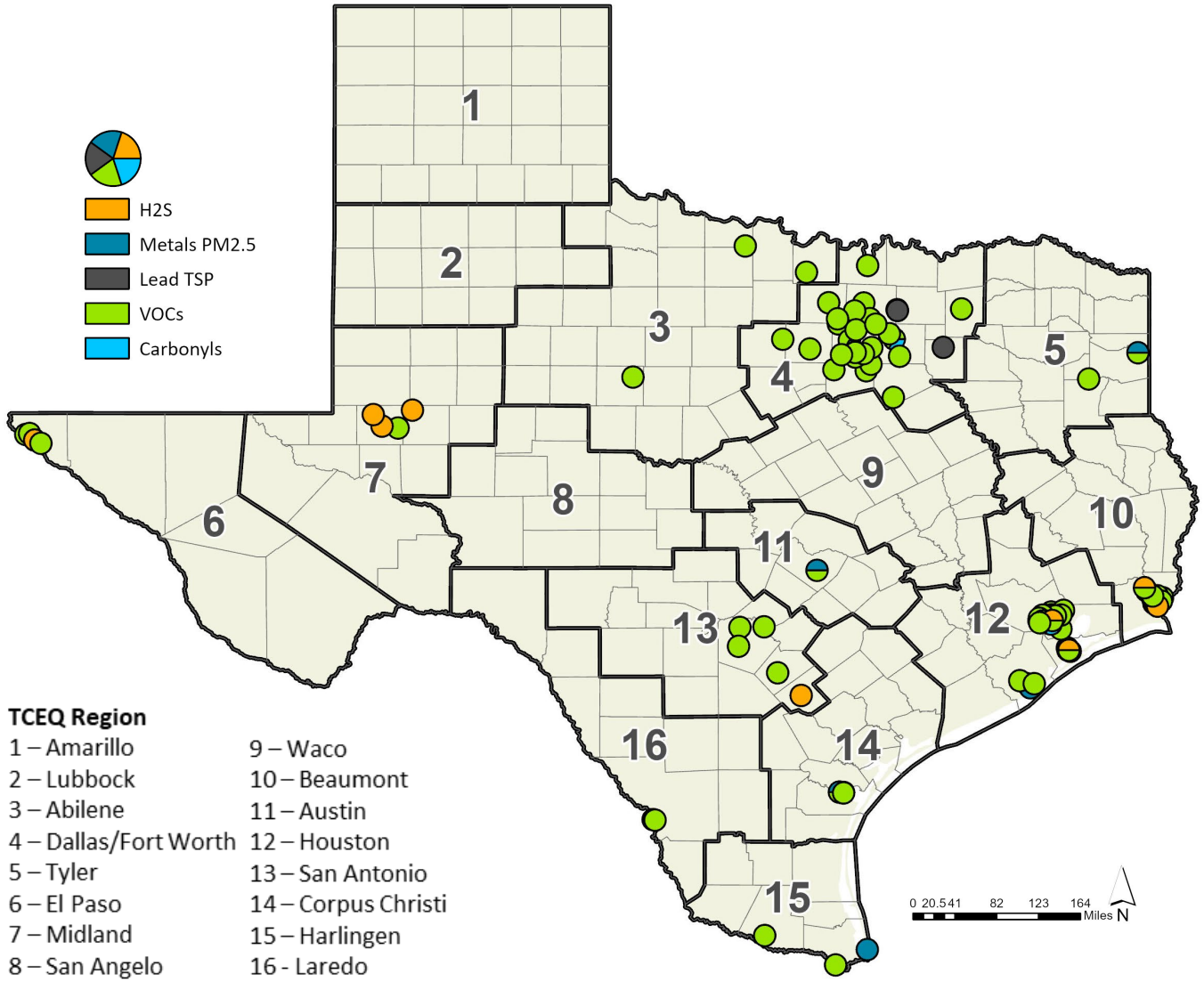
- 24-hour sample collected every 3rd or 6th day
- 16 speciated metals in particulate matter < 2.5 µm ($PM_{2.5}$)

Hydrogen Sulfide (H_2S)

- Compare 30-minute averages to the value of the 30-minute state standard

All short-term data may be used to calculate annual averages, if those data meet 75% completeness for the year

TCEQ Air Toxics Monitoring Sites



TCEQ Region

1 – Amarillo	9 – Waco
2 – Lubbock	10 – Beaumont
3 – Abilene	11 – Austin
4 – Dallas/Fort Worth	12 – Houston
5 – Tyler	13 – San Antonio
6 – El Paso	14 – Corpus Christi
7 – Midland	15 – Harlingen
8 – San Angelo	16 - Laredo

92 Air Toxics Monitoring Sites

Source: TCEQ Toxicology Division

Data Evaluation

Safe Levels

Short-Term

- Health-Based
- Odor
- Vegetation

Long-Term

- Health-Based
- Vegetation

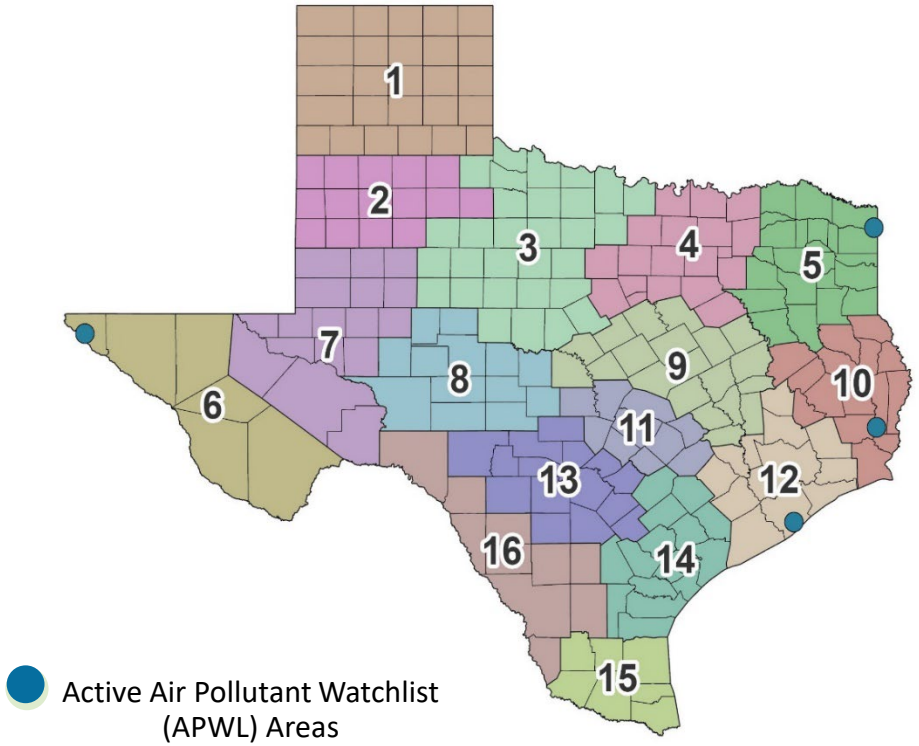
Exceedance

Not a bright line; adverse effects not expected

In-depth review

- Location of the population
- Potential for exposure
- Frequency & magnitude of detections
- Levels health effects are expected

Region Map



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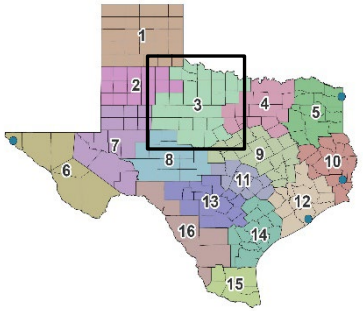
Region 3 - Abilene



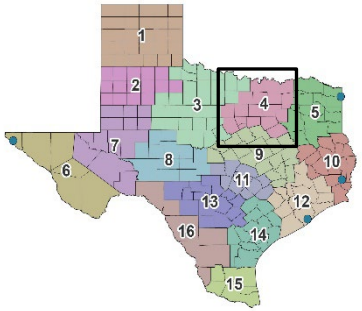
3 Sites

3 Canister

All VOCs

- Measured concentrations below:
  - Short-term AMCVs
  - Long-term AMCVs
- Not expected to cause short- or long-term adverse health or welfare effects

Region 4 - Dallas / Fort Worth



29 Sites

- 2 Carbonyl
- 13 Canister
- 15 AutoGC
- 2 Metals $PM_{2.5}$
- 3 Lead TSP
- 1 H_2S

All air toxics

- Measured concentrations below:
  - Short-term AMCVS
  - Long-term AMCVs
- Not expected to cause short- or long-term adverse health or welfare effects

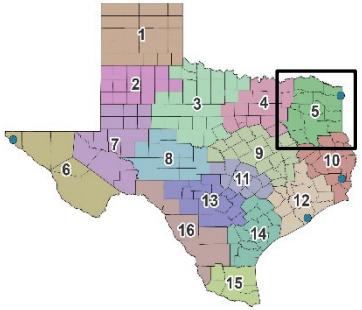
Lead total suspended particles (TSP)

- Measured concentrations below the value (0.15 µg/m^3) associated with the lead NAAQS

H_2S

- Not measured in 2023 due to monitor relocation

Region 5 - Tyler



2 Sites

- 2 Canister
- 1 Metals $PM_{2.5}$

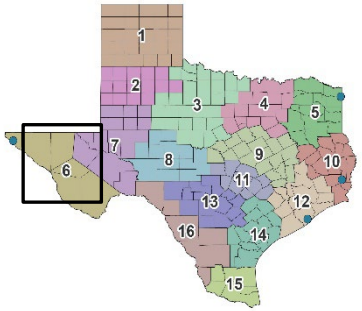
All air toxics

- Measured concentrations below:
  - Short-term AMCVS
  - Long-term AMCVs
- Not expected to cause short- or long-term adverse health or welfare effects

APWL Area 0501

- Located in Bowie & Cass Counties
- Listed for H_2S

Region 6 - El Paso



5 Sites

- 2 Canister
- 2 AutoGC
- 1 Metals $PM_{2.5}$
- 1 H_2S

All air toxics

- Measured concentrations below
  - Short-term AMCVS
  - Long-term AMCVs
- Not expected to cause short- or long-term adverse health or welfare effects

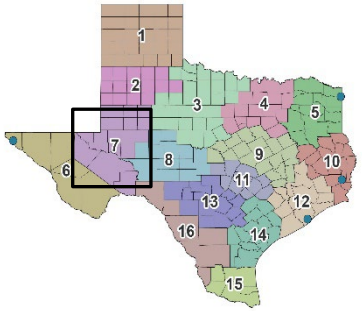
H_2S

- 30-minute concentrations higher than value of the state standard (80 ppb) but below level of health concern
- Potentially odorous

APWL Area 0601

- Located in El Paso, El Paso County
- Listed for H_2S

Region 7 - Midland



4 Sites

1 Canister

All air toxics

- Measured concentrations below:
  - Short-term AMCVS
  - Long-term AMCVs
- Not expected to cause short- or long-term adverse health or welfare effects

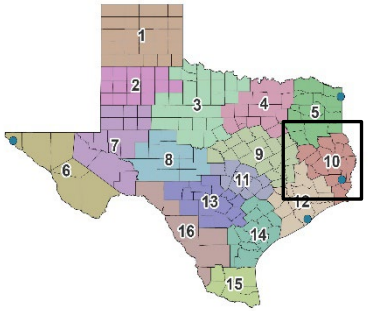
3 AutoGC

3 H_2S

H_2S

- 30-minute concentrations higher than value of the state standard (80 ppb) but below level of health concern
- Potentially odorous

Region 10 - Beaumont



15 Sites

- 13 Canister
- 3 AutoGC
- 2 H_2S

All air toxics

- Measured concentrations below:
  - Short-term AMCVS
  - Long-term AMCVs
- Not expected to cause short- or long-term adverse health or welfare effects

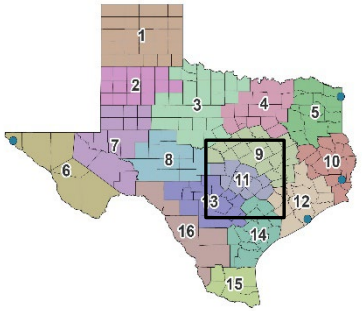
H_2S

- 30-minute values less than value of the state standard (80 ppb)

APWL Area 1001

- Located in Evadale, Jasper County
- Listed for H_2S

Region 11 - Austin



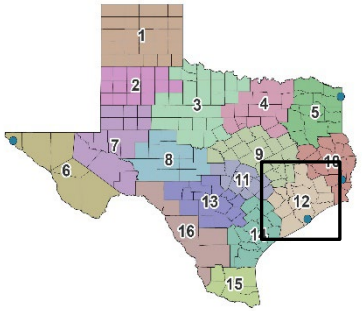
All VOCs

- Measured concentrations below:
  - Short-term AMCVs
  - Long-term AMCVs
- Not expected to cause short- or long-term adverse health or welfare effects

1 Site

1 Canister

Region 12 - Houston



- 33 Sites
  - 17 Canister
  - 20 AutoGC
  - 2 Carbonyl
  - 4 Metals $PM_{2.5}$
  - 5 H_2S

Most air toxics

- Measured concentrations below:
  - Short-term AMCVS
  - Long-term AMCVs
- Not expected to cause short- or long-term adverse health or welfare effects

Exceptions for air toxics

- Short-term exceedances:
  - One 1-hour exceedance of 1,3-butadiene health based AMCV
  - 24 1-hour exceedances of odor-based AMCVs
- Long-term exceedance:
  - Chromium $PM_{2.5}$ at Houston North Wayside

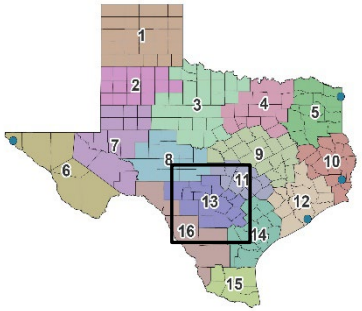
H_2S

- 30-minute values higher than value of the state standard (80 ppb) but below value of health concern
- Potentially odorous

APWL Area 1201

- Located in Freeport, Brazoria County
- Listed for arsenic, cobalt, nickel, & vanadium

Region 13 - San Antonio



5 Sites

- 1 Canister
- 4 AutoGC
- 1 H_2S

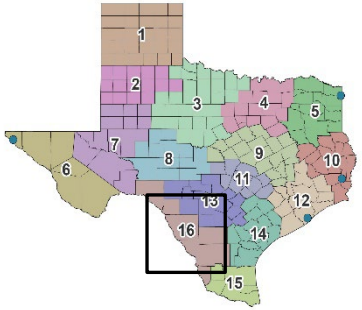
All air toxics

- Measured concentration below:
  - Short-term AMCVS
  - Long-term AMCVs
- Not expected to cause short- or long-term adverse health or welfare effects

H_2S

- 30-minute values less than value of the state standard (80 ppb)

Region 14 - Corpus Christi



13 Sites

- 9 Canister
- 4 AutoGC
- 1 Metals $PM_{2.5}$
- 1 H_2S

Most air toxics

- Measured concentrations at or below:
  - Short-term AMCVS
  - Long-term AMCVs
- Not expected to cause short- or long-term adverse health or welfare effects

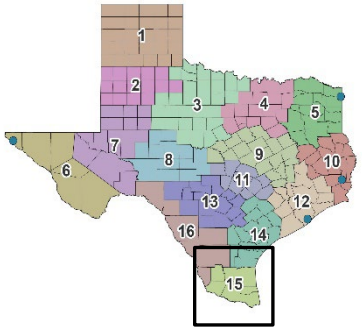
Exceptions for air toxics

- Long-term exceedances:
  - Benzaldehyde at Oak Park Elementary School
  - Ethylene dichloride at Point Comfort Plant

H_2S

- 30-minute values less than value of the state standard (80 ppb)

Region 15 - Harlingen



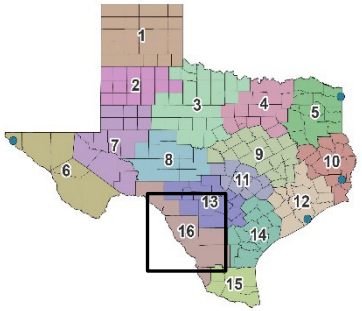
2 Sites

- 2 Canister
- 1 Metals $PM_{2.5}$

All Air Toxics

- Measured concentrations below:
  - Short-term AMCVs
  - Long-term AMCVs
- Not expected to cause short- or long-term adverse health or welfare effects

Region 16 - Laredo



All VOCs

- Measured concentrations below:
  - Short-term AMCVs
  - Long-term AMCVs
- Not expected to cause short- or long-term adverse health or welfare effects

1 Site

1 Canister

Overall Conclusions

Vast majority of measured concentrations were below their respective AMCVs or standards

There were a few exceptions where AMCVs or a state standard were exceeded:

- At times, the H_2S levels in 3 regions were above the state standard and could have caused odor issues (R6, R7, R12). However, the levels were below a value of health concern.
- After in-depth reviews of the AMCV exceedances, adverse health effects would not be expected if exposure to these concentrations occurred.
  - Short-term:
    - One 1-hr health based 1,3-butadiene exceedance in R12
    - 24 1-hr odor exceedances in R12
  - Long-term:
    - Chromium $PM_{2.5}$ exceedance at one site in R12
    - Benzaldehyde exceedance at one site in R14
    - Ethylene dichloride exceedance at one site in R14

Link to Memos

HTTPS://WWW.TCEQ.TEXAS.GOV/TOXICOLOGY/REGMEMO/AIRMAIN.HTML

TCEQ Environmental Health Update

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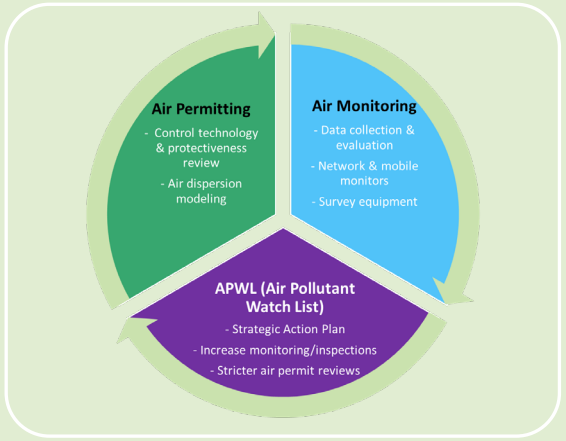
Overview

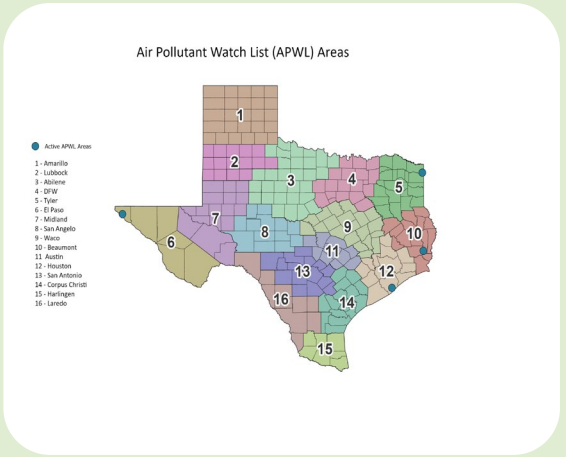


Programs to Decrease Ambient Air Toxics

- Ambient Air Monitoring
- Air Permitting
- APWL (Air Pollutant Watch List)

Health Indicators

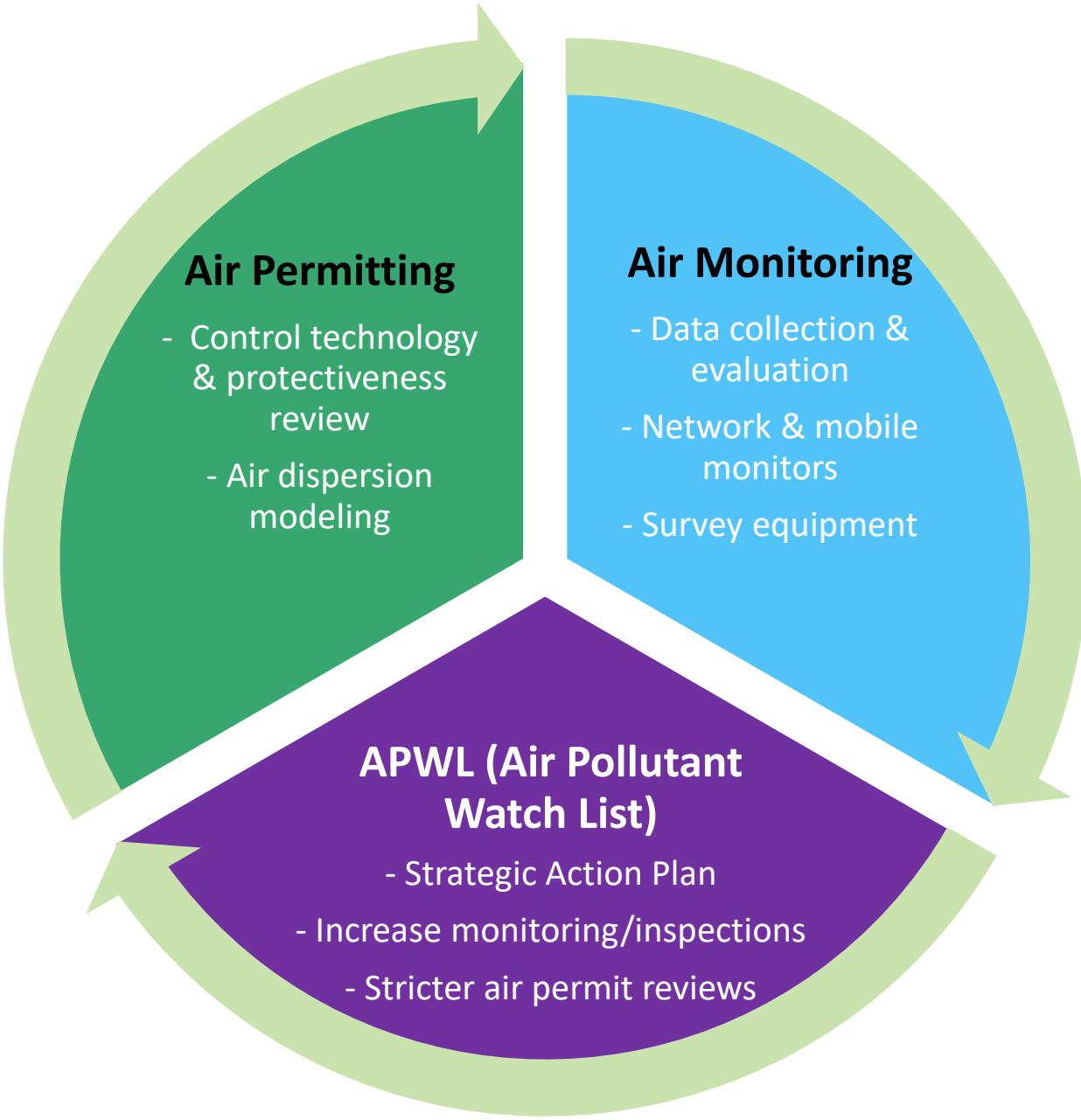
- Blood Lead Data
- Cancer Data
- Asthma Data
- Mortality Data



TCEQ Regional Updates

- Region 6: El Paso
- Region 12: Houston
- Region 14: Corpus Christi

TCEQ Programs to Decrease Ambient Air Toxics

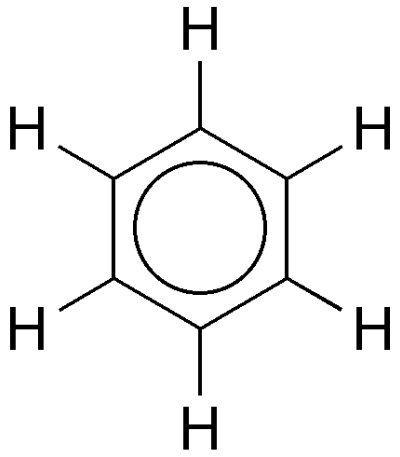


Ambient Air Monitoring

What is the monitoring data used for?

- ✓ finding pollution sources
- ✓ evaluating air permit applications
- ✓ identifying potential health concerns.

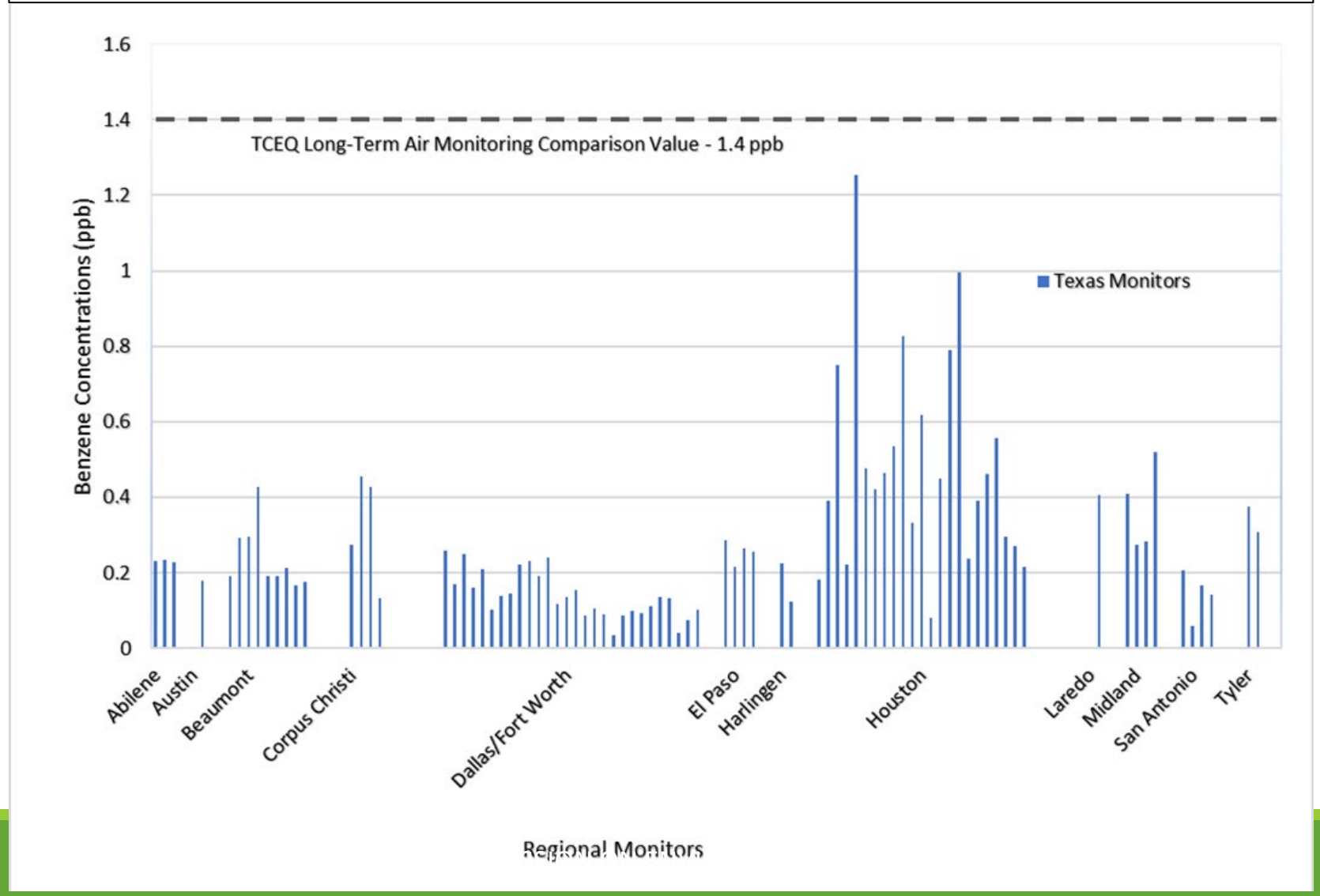
TCEQ toxicology staff uses it to **assess the potential** for measured concentrations of air toxics to **impair health** and/or cause odors.



In 2021 and 2022, all monitors in Texas had annual average **benzene** concentrations below the state's long-term Air Monitoring Comparison Value (AMCV).

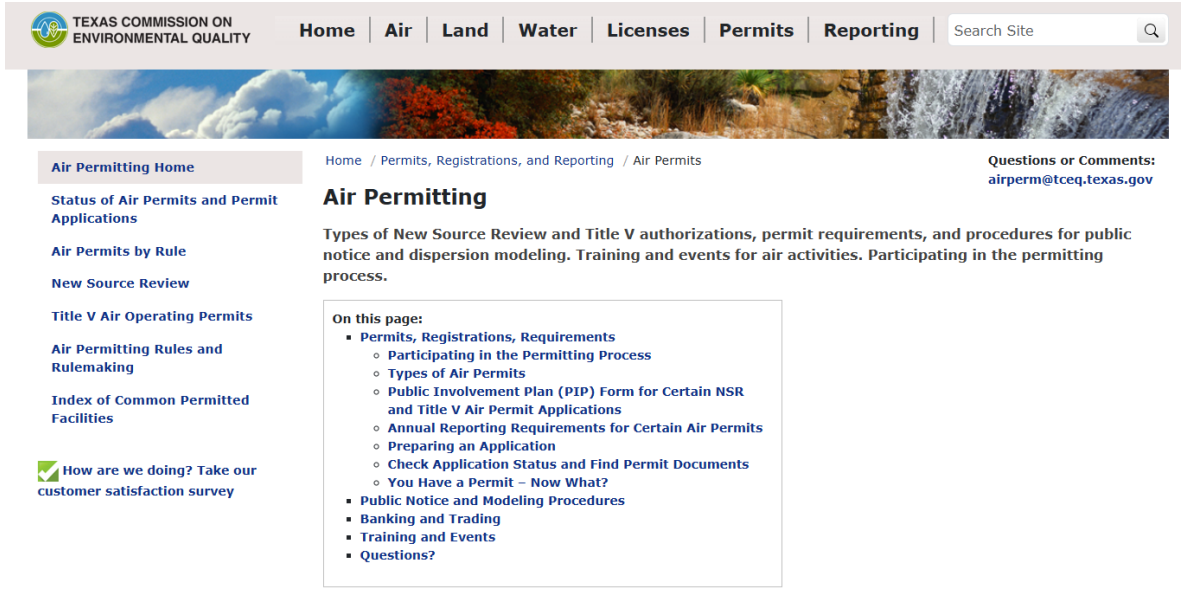
Ambient Air Monitoring

Average Benzene Concentrations at Monitoring Sites in Texas in 2022



Air Permitting

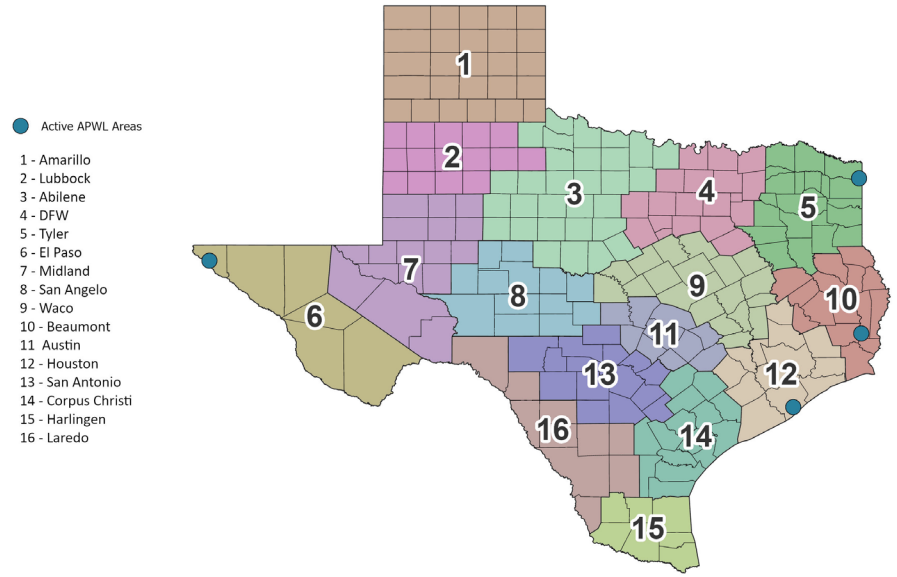
How do we ensure compliant operations?



Air Pollutant Watch List (APWL)

Air Pollutant Watch List (APWL) Areas

APWL	City	County	Pollutant(s)	Added
0501	N/A	Bowie and Cass	Hydrogen sulfide	1999
0601	El Paso	El Paso	Hydrogen sulfide	2004
1001	Evadale	Jasper	Hydrogen sulfide	2003
1201	Freeport	Brazoria	Arsenic, cobalt, nickel, vanadium	2005



Drinking Water Notices

Interagency team meets regularly

Within 30 days of confirmed contamination

Notify private drinking water well owners

TCEQ Region	Number of cases 2022
1 – Amarillo	0
2 – Lubbock	1
3 – Abilene	0
4 – Dallas/Ft Worth	2
5 – Tyler	2
7 – Midland	2
10 – Waco	1
11 – Austin	2
12 – Houston	9
14 – Corpus Christi	2
Statewide Total	21

Health Indicators

Health Indicators

Quantitative or qualitative measures used to assess the health of a given population

Data Sources:

- Texas Department of State Health Services (DSHS)
- Center for Disease Control and Prevention (CDC)

Limitations:

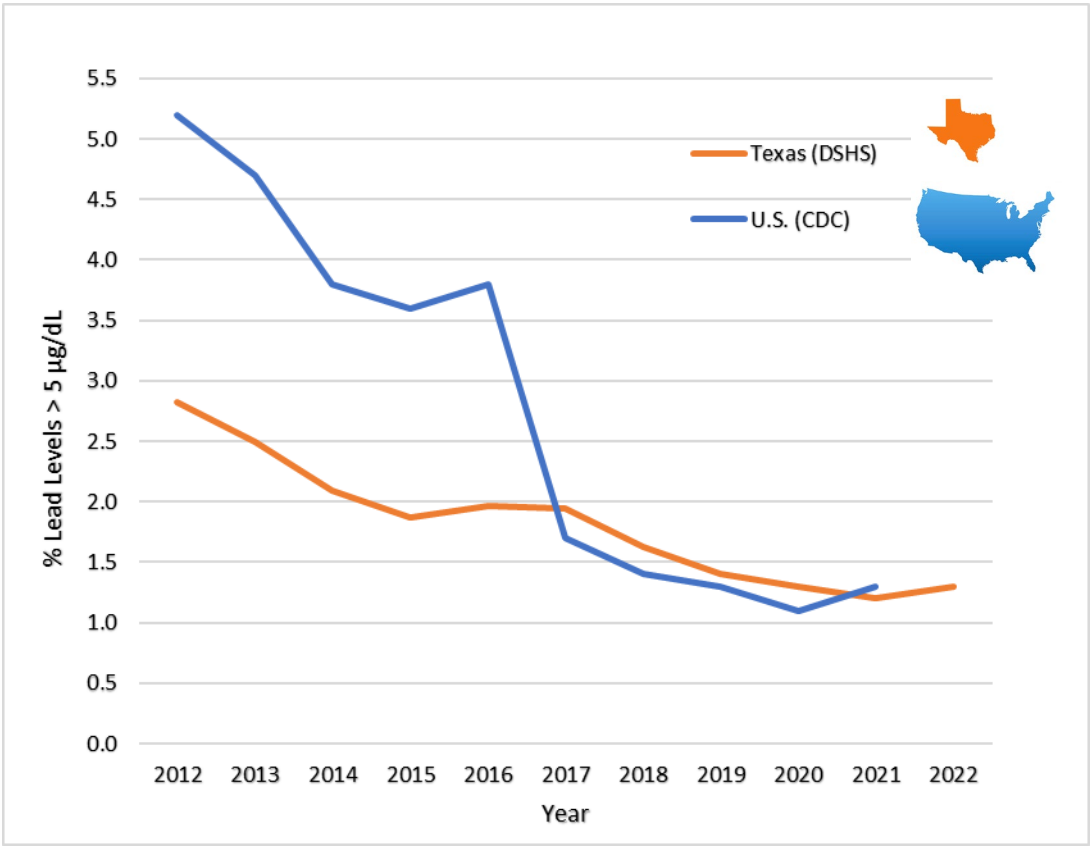
- Data are estimates; it may only include a sample of the population.
- Potential for self-reported and under-reported cases of disease and illness.
- Differences in results from various reporting agencies may also occur.

Blood Lead Data

Blood lead reference value lowered from 5 to 3.5 µg/dL

- ✓ 2021 CDC
- ✓ 2023 Texas DSHS

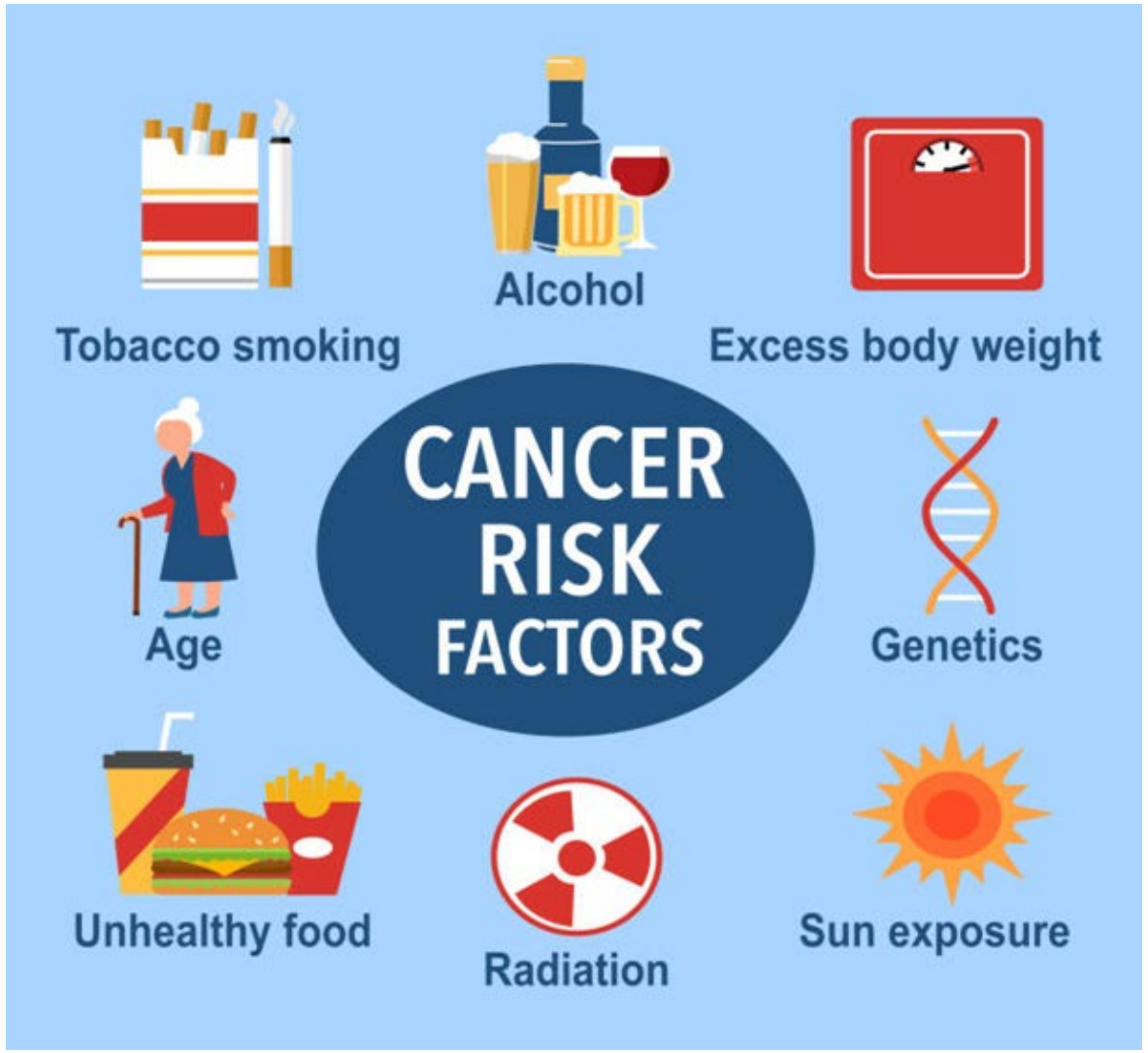
Percent Elevated Blood Lead Levels in Children (<6 years of age)



Cancer Data

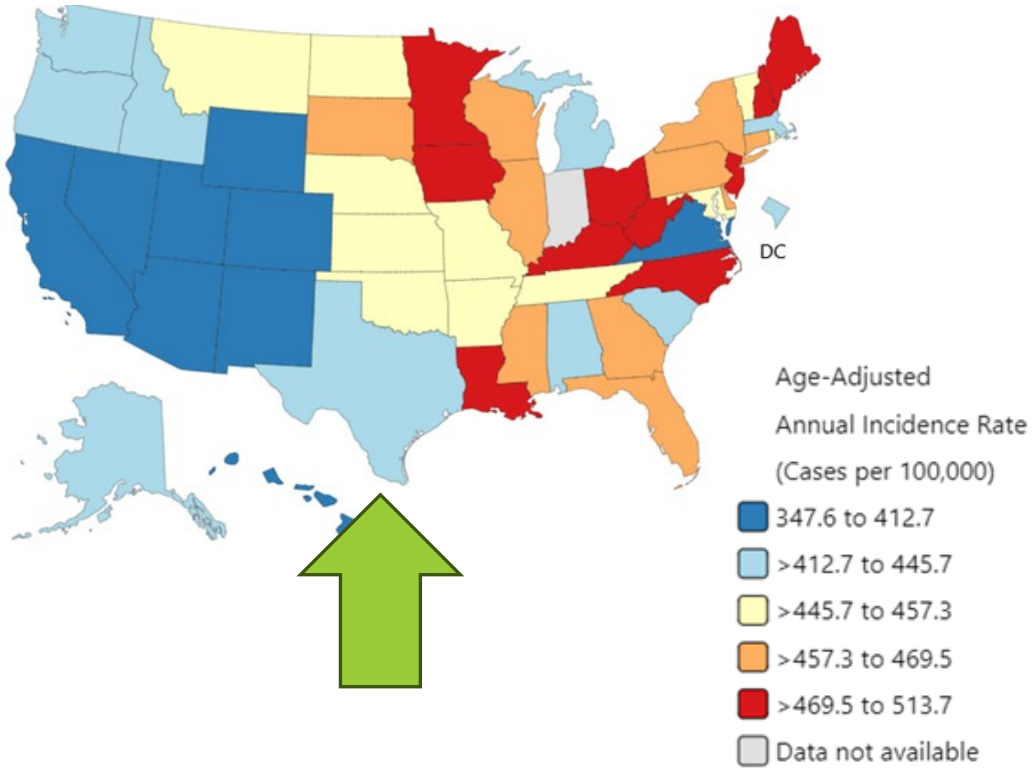
- Rates for all cancer types in Texas (2017- 2021) are amongst the lowest in the United States.

- Texas has more industry than any other state BUT Texans have no more, or less, cancer than many other states, and the nation as a whole. Cancer has many potential risk factors.

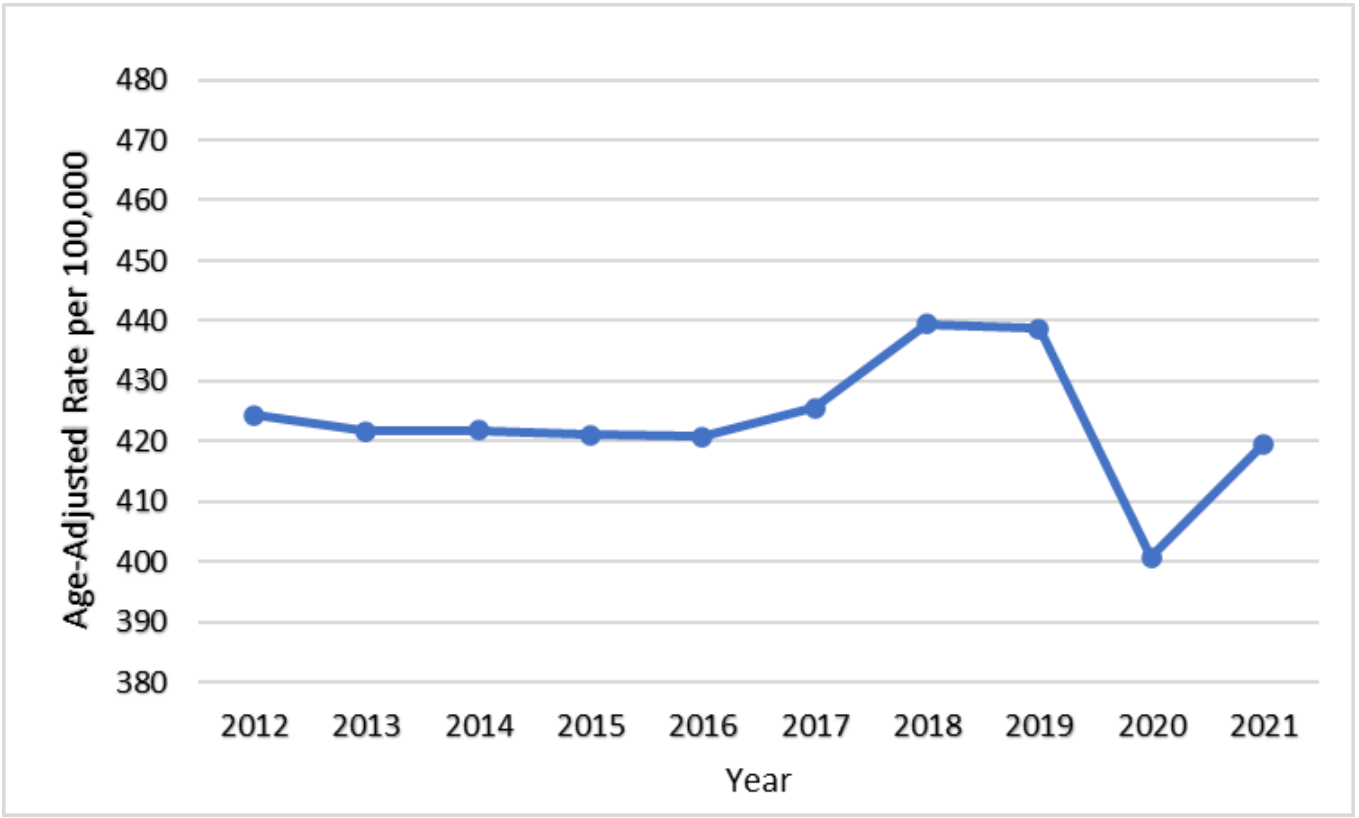


Cancer Data – All Cancer Types

Cancer Incidence Rates for the United States, by state.
All cancer sites, all races, both sexes, all ages
2017-2021



Cancer Incidence Rates in Texas
2012–2021

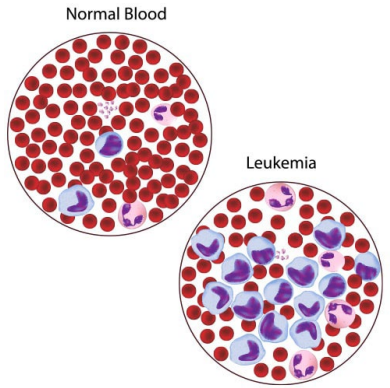


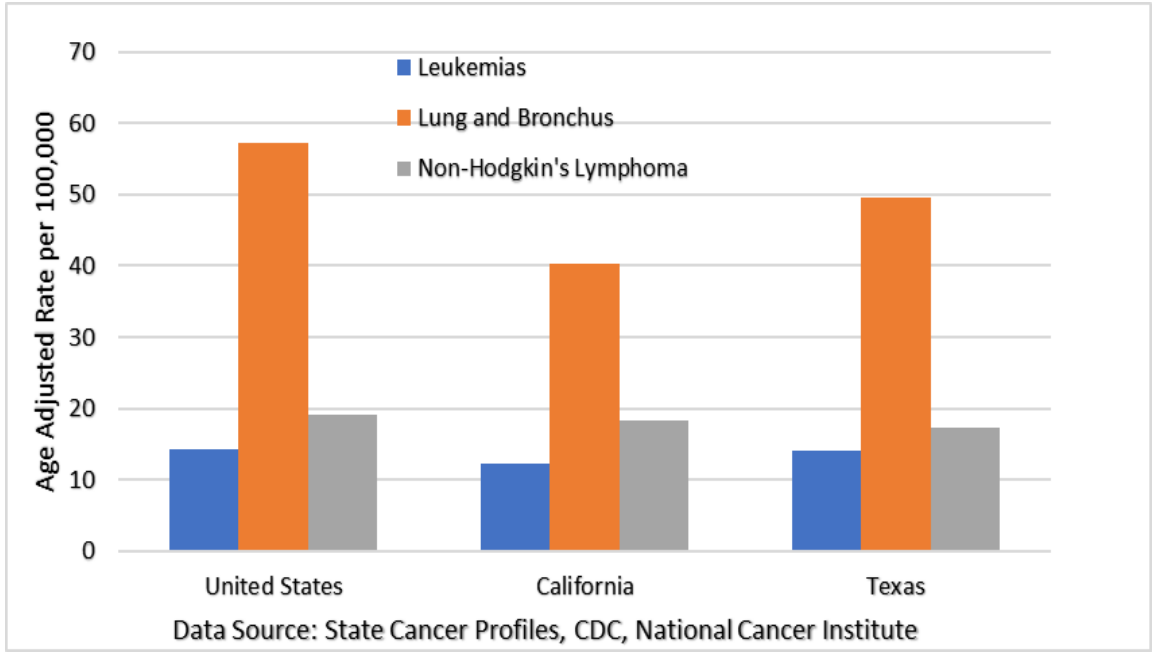
Source: Texas Cancer Registry

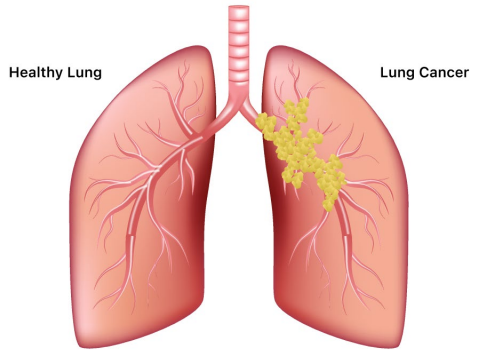
Cancer Data – Specific Cancer Types

Average Age-Adjusted Cancer Incidence Rates per 100,000 for Leukemias, Lung and Bronchus Cancers, and Non-Hodgkin's Lymphoma, 2017-2021

Texas cancer rates for all leukemias combined, and for non-Hodgkin's lymphoma were similar in California and the United States.





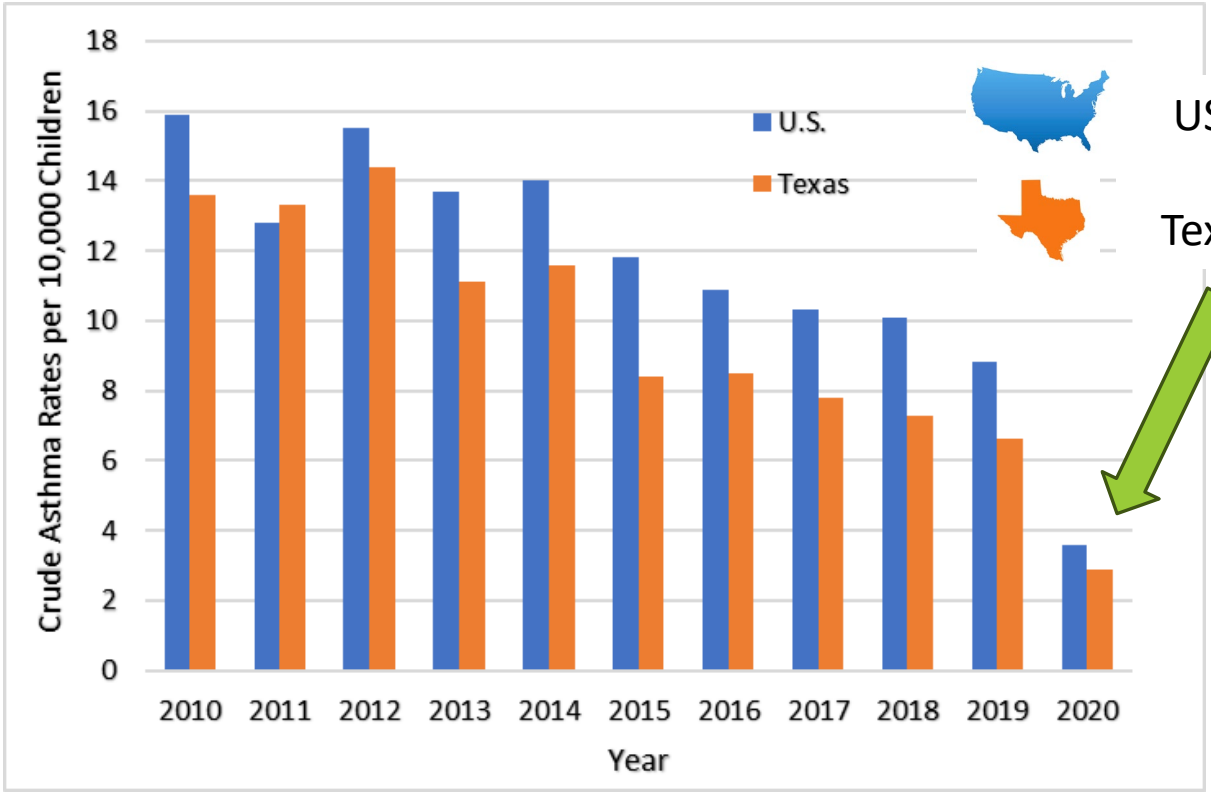


Texas's rates for lung and bronchus cancers were slightly higher than California's rates but were lower than the rates for the United States.

Asthma Data

Risk Factors

Crude (not-age-adjusted) Asthma Hospital Discharge Rates for Children under 18, 2010–2020

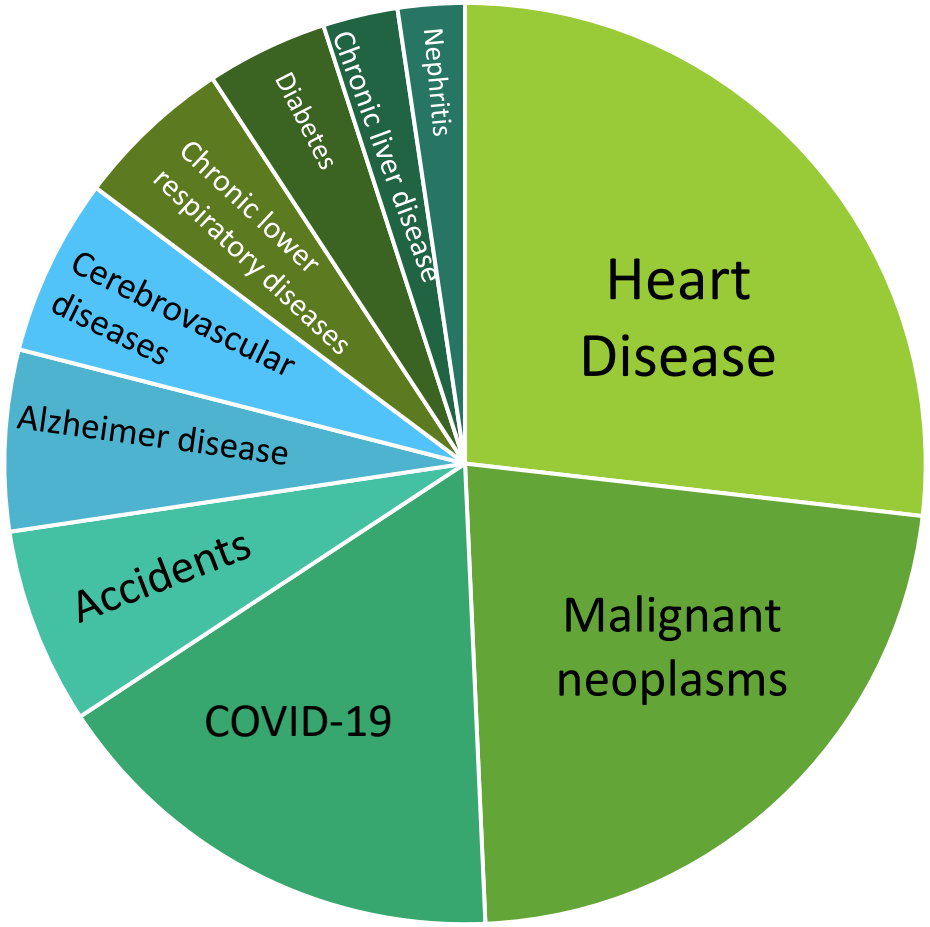


USA = 3.6

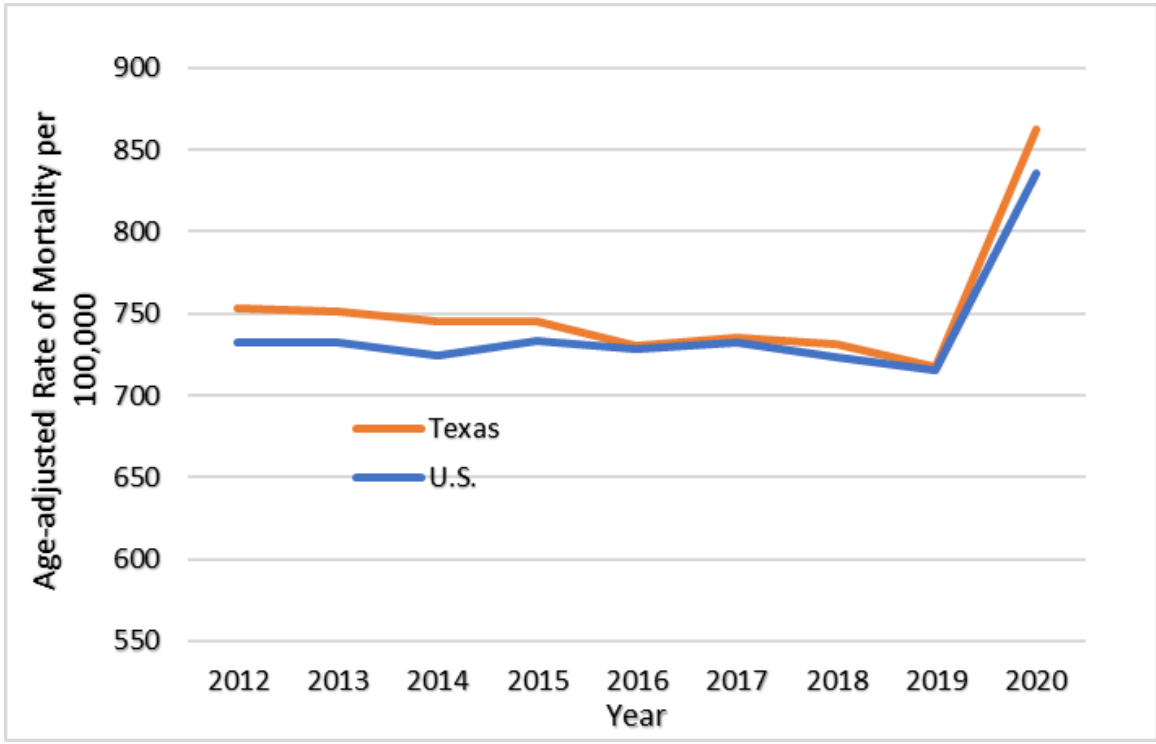
Texas = 2.9

Mortality Data

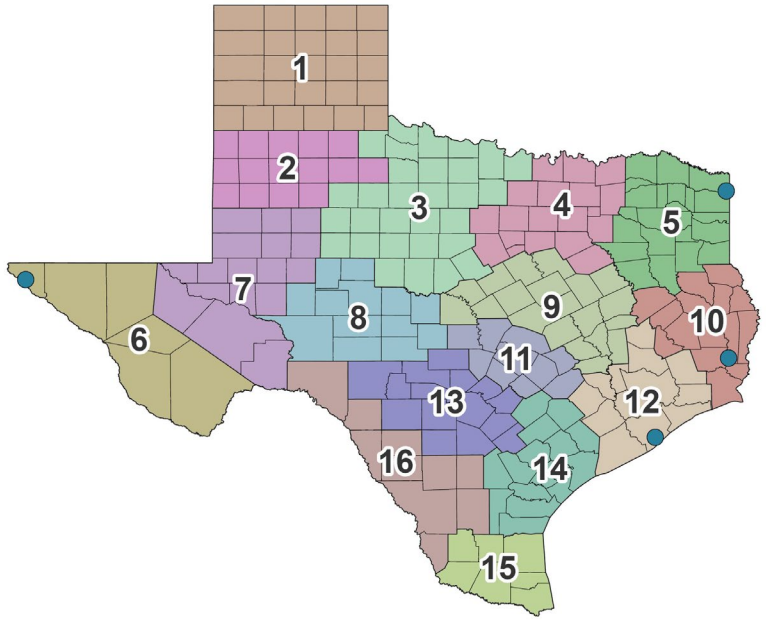
Top 10 Leading Causes of Death in Texas in 2020



Mortality Rates for All Causes, 2012-2020

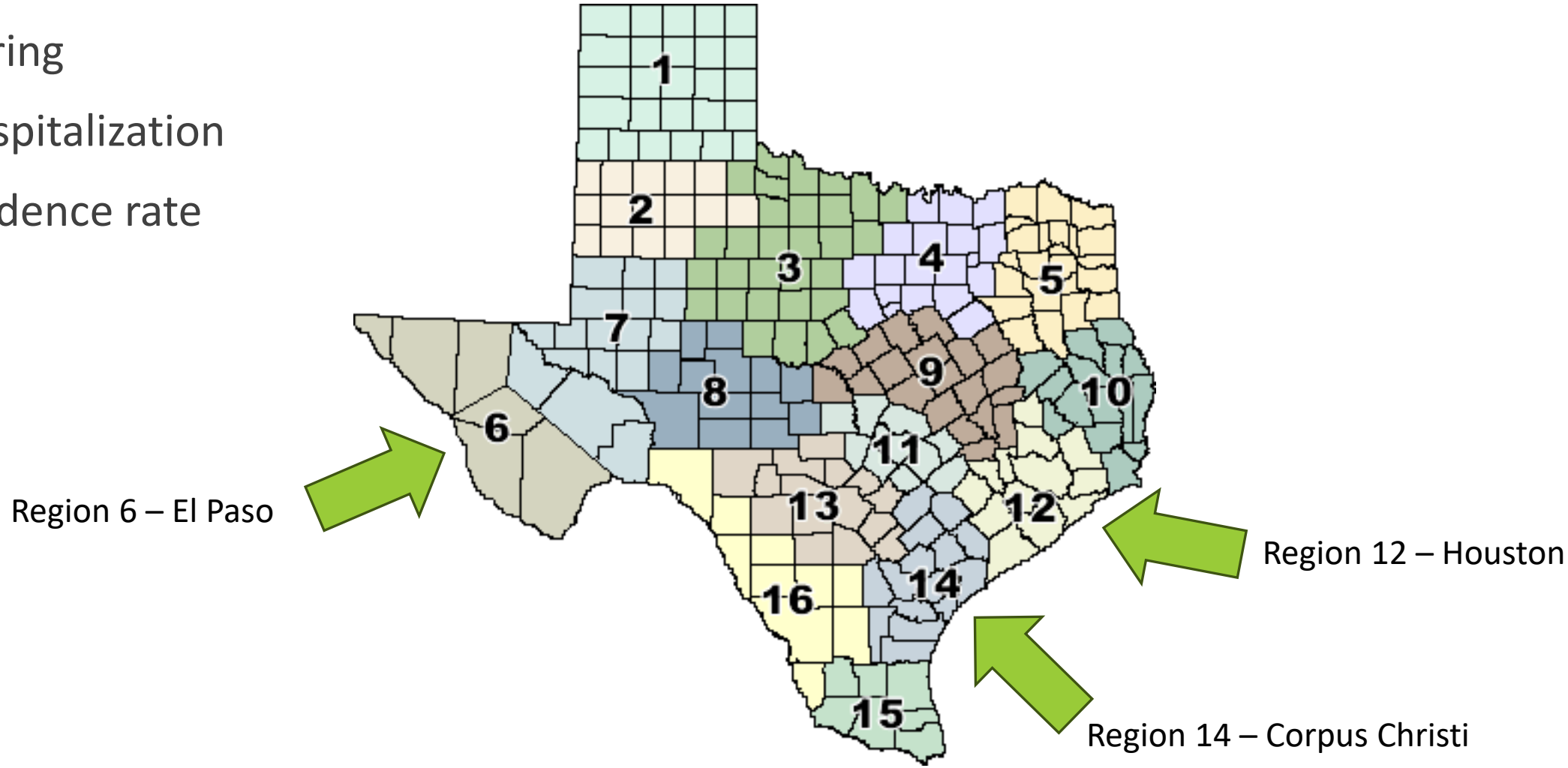


TCEQ Regional Updates



TCEQ Regional Updates

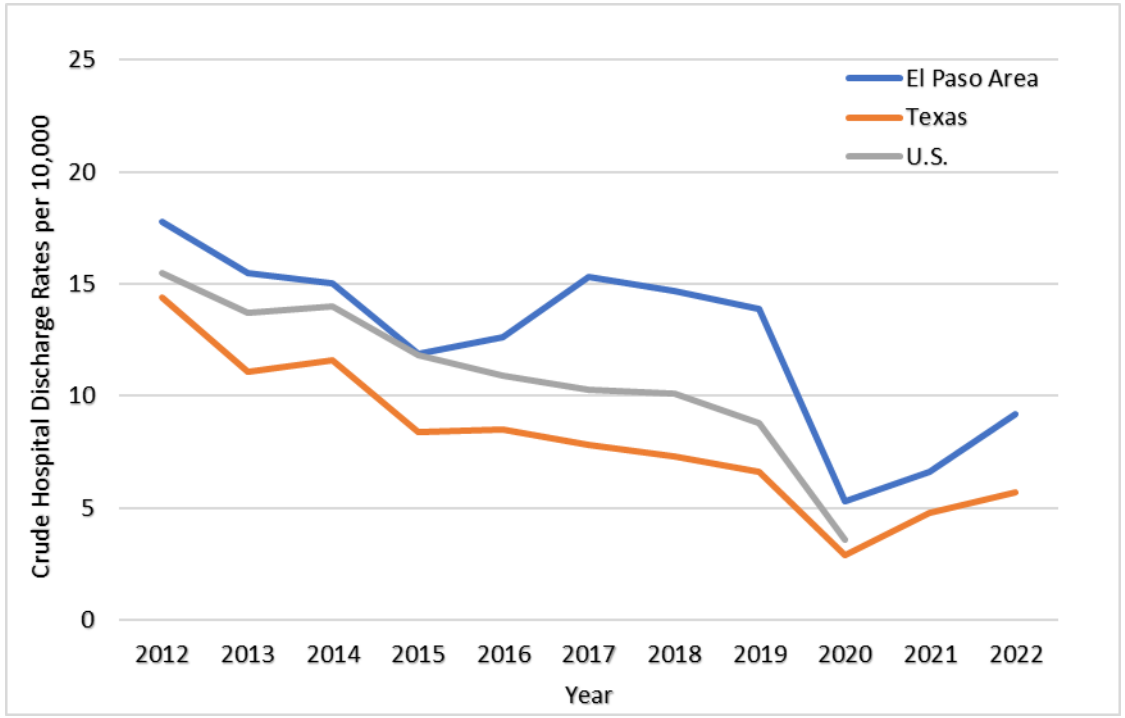
- Air monitoring
- Asthma hospitalization
- Cancer incidence rate



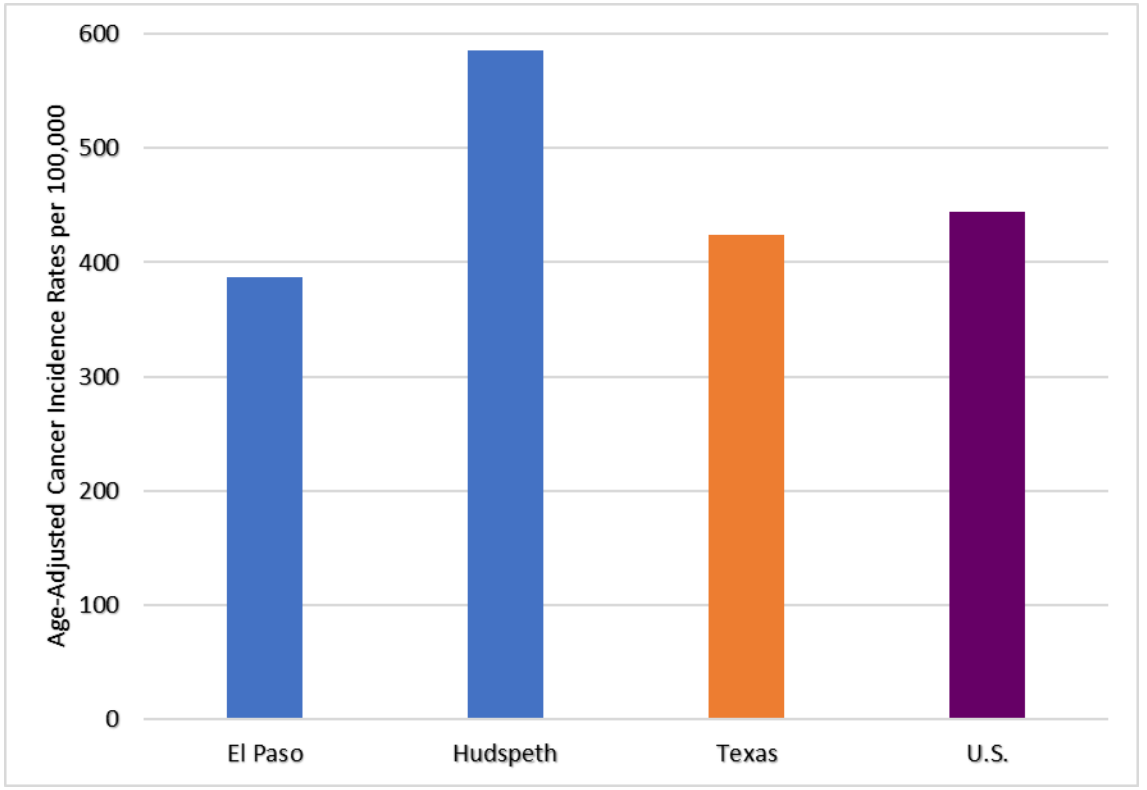
Region 6: El Paso Area

(El Paso and Hudspeth Counties)

El Paso Area: Crude Child Asthma Hospital Discharge Rates (per 10,000), 2012-2022



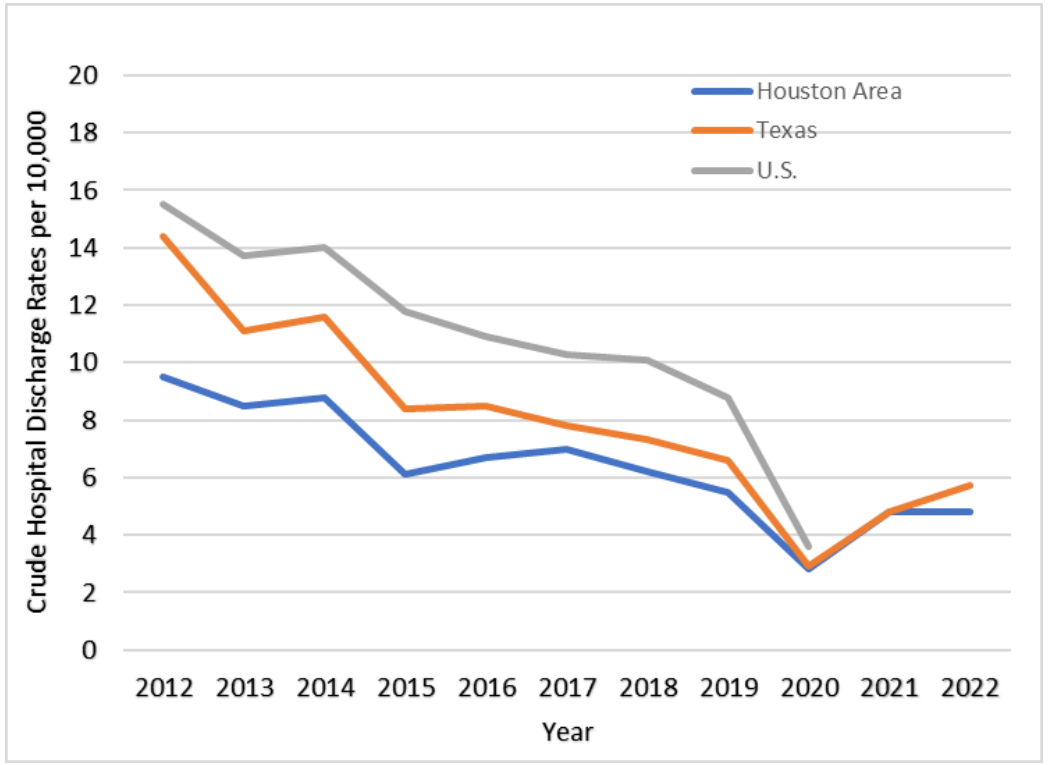
El Paso Area: 2017-2021 Average Cancer Incidence Rates per 100,000



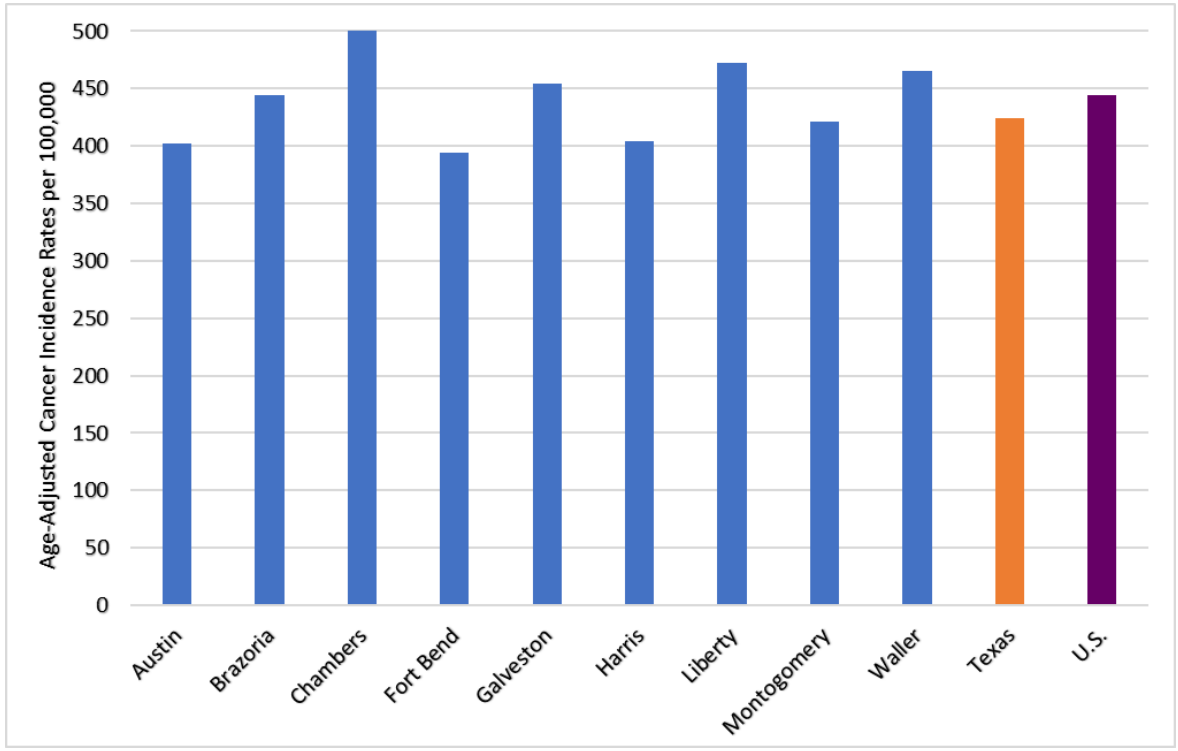
Region 12: Houston Area

(Austin, Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller Counties)

Houston Area: Crude Child Asthma Hospital Discharge Rates (per 10,000), 2012-2022



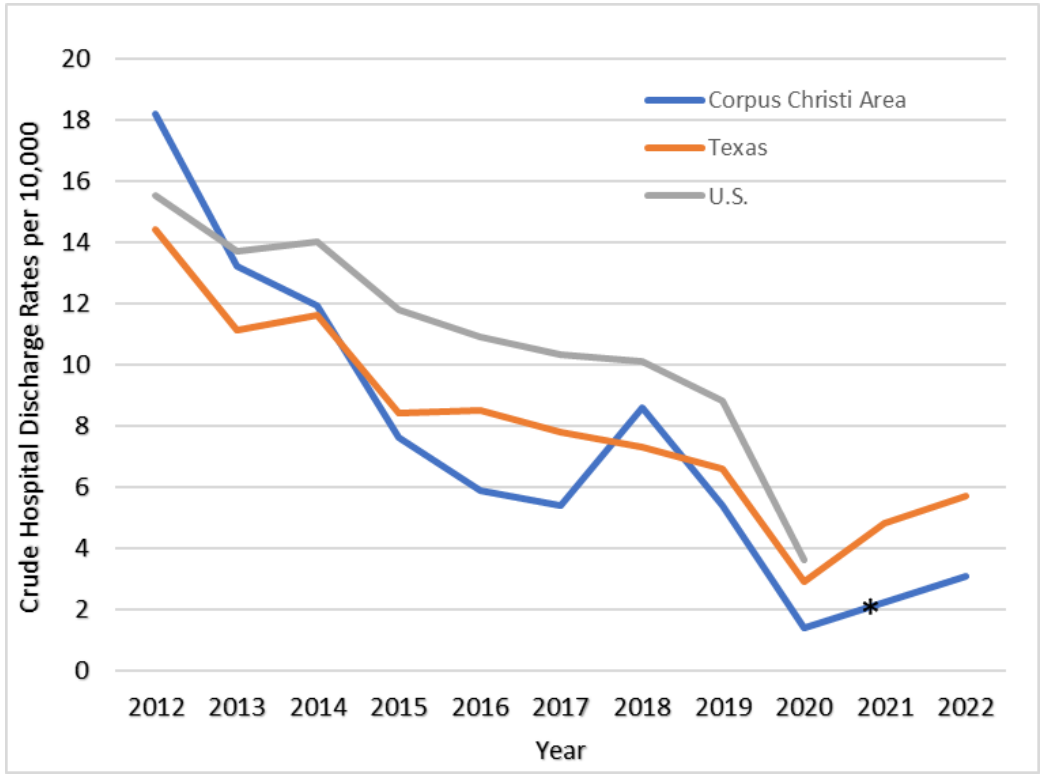
Houston Area: 2017-2021 Average Cancer Incidence Rates per 100,000



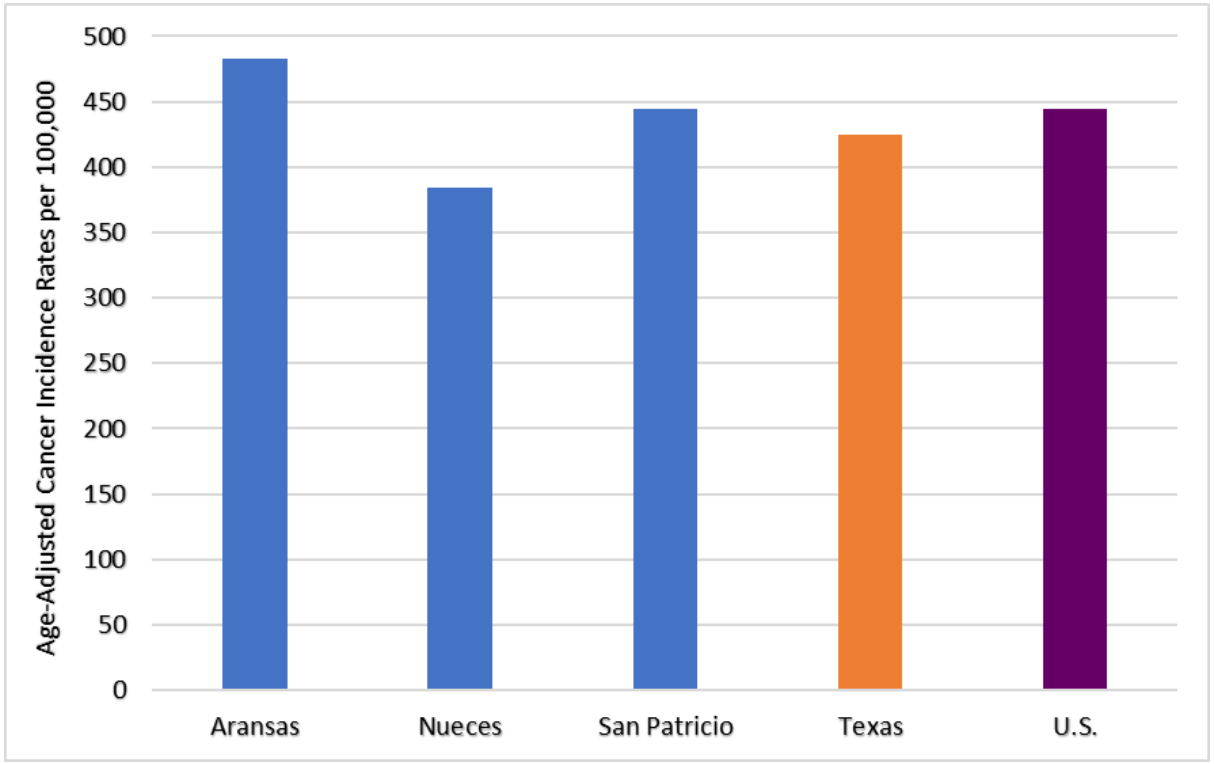
Region 14: Corpus Christi Area

(Aransas, Nueces, and San Patricio Counties)

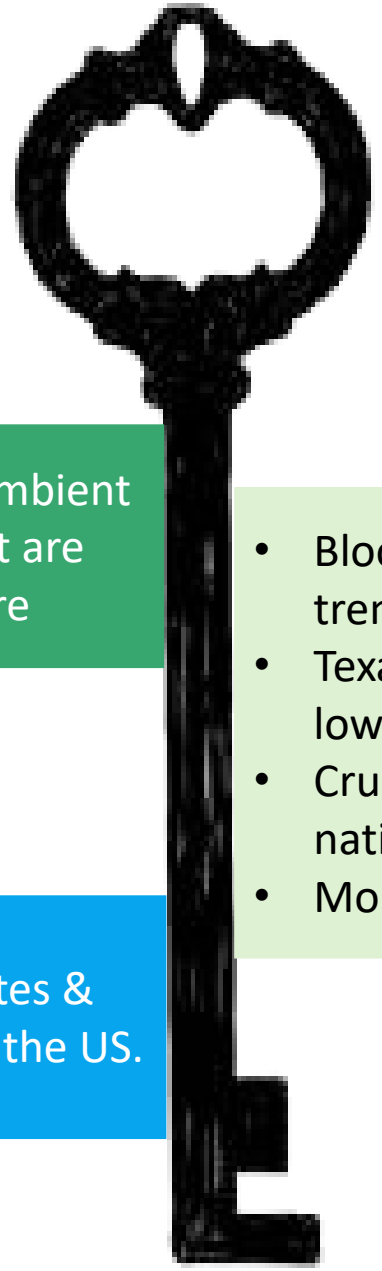
Corpus Christi Area: Crude Child Asthma Hospital Discharge Rates (per 10,000), 2012- 2022



Corpus Christi Area: 2017-2021 Average Cancer Incidence Rates per 100,000



Key Messages



The TCEQ has 3 programs to ensure that ambient air toxic concentrations are at levels that are protective of public health and welfare

- Blood lead levels in children: decreasing trend (2012 to 2022).
- Texas cancer incidence rates: among the lowest in the US.
- Crude asthma mortality rates: lower than national rates (2009-2021).
- Mortality rates: similar to the US.

Regions of concern (6, 12, 14): asthma rates & cancer rates are similar to overall Texas and the US.

Thank you

Questions?

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