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Asthma and Air Quality

July 24, 2025

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What is Asthma?

- A chronic (long-lasting or recurring) inflammatory disease that affects the lungs.
- Can cause wheezing, shortness of breath, chest tightness and coughing. During an asthma attack, the lungs become irritated and inflamed, making it difficult to breathe.
- **Symptoms of Asthma**
  - Shortness of breath
  - Rapid and difficult breathing
  - Chest tightness or pain
  - Coughing
  - Trouble sleeping caused by shortness of breath, coughing or wheezing
  - Whistling, wheezing, or rattling sound when exhaling
  - Increased mucus production

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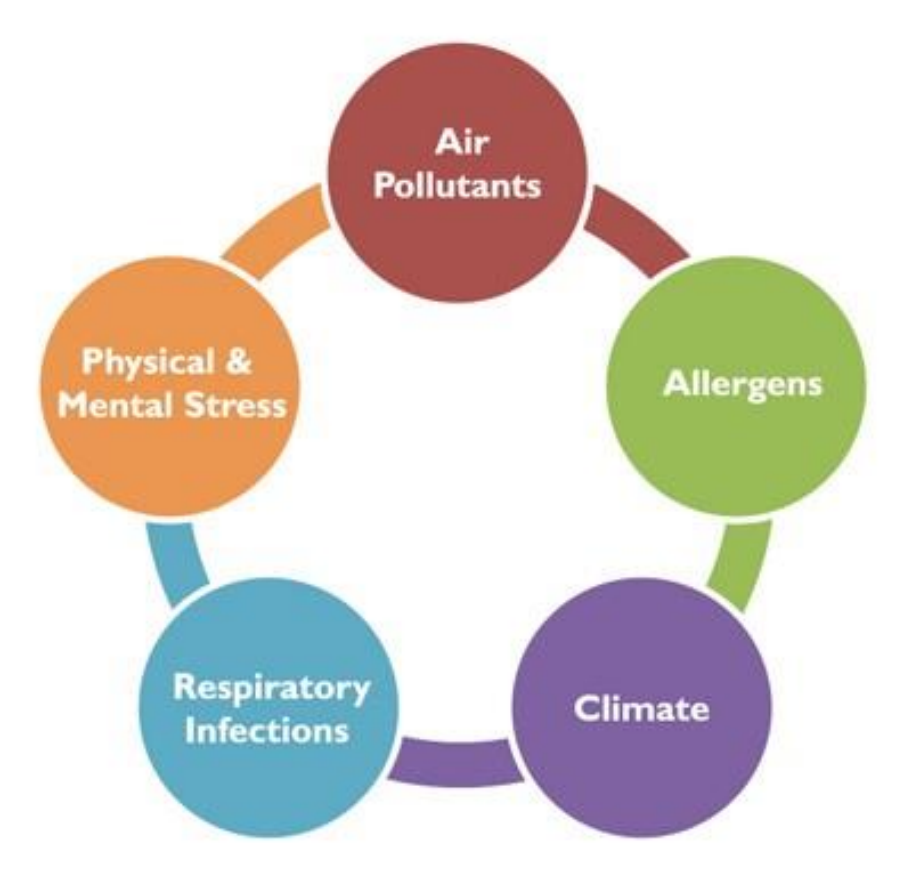
Texas Department of State Health Services. (2025). What is Asthma. https://dshs.texas.gov/asthma/overview.aspx

Asthma Triggers

- Asthma triggers
  - Things in the environment that a person with asthma could react to
  - Make it hard to breathe and can lead to an asthma attack
  - Will vary from person to person



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Texas Department of State Health Services. (2025). What is Asthma. https://dshs.texas.gov/asthma/overview.aspx

Asthma Triggers

- **Air pollutants**
  - Smoke, sprays and powders, ozone, particulate matter, chemical fumes, emissions from automobiles and trucks
- **Allergens**
  - Pollen, molds, dust, pet dander, cockroaches, dust mites, certain foods, beverages, or preservatives added to foods, certain medications
- **Climate**
  - Cold, dry air, freezing temperatures, high humidity, poor air quality
- **Respiratory infections**
  - Common cold, flu, bronchitis, pneumonia, upper respiratory infections
- **Physical and mental stress**
  - Strenuous exercising, emotional problems that can lead to hyperventilating, gastroesophageal reflux (GERD)

Texas Department of State Health Services. (2025). What is Asthma. https://dshs.texas.gov/asthma/overview.aspx

Asthma in Texas

Asthma in Texas

- More than 2.4 million adults and children in Texas are living with asthma in 2023[1]
  - Approximately 515,483 children in Texas have asthma
- Most common chronic condition among children and one of the leading causes of absenteeism in schools[2]
  - Among children with current asthma, 41.6 percent had activity limitations and 42.1 percent missed school days due to their asthma in 2019-2021[3]
- Responsible for over 109,000 emergency department visits and 8,500 hospitalizations across Texas in 2023[4,5]
  - More than $1.3 billion was charged to public and private payers for these encounters

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1. 2023 Texas Behavioral Risk Factor Surveillance System (BRFSS), Center for Health Statistics, Texas Department of State Health Services.
2. Centers for Disease Control and Prevention (2024, August 13). Managing Asthma in Schools. *Managing Health Conditions in School*. Retrieved from https://www.cdc.gov/school-health-conditions/chronic/asthma.html.
3. BRFSS, Child Asthma Call-Back Survey (ACBS). (2019-2021).
4. Texas Health Care Information Collection (THCIC), Emergency Department Hospital Discharge Public Use Data File, 2023 Population Data Source: Center for Health Statistics, Texas Department of State Health Services.
5. THCIC, Inpatient Hospital Discharge Public Use Data File, 2023 Population Data Source: Center for Health Statistics, Texas Department of State Health Services.

Impact of Asthma in Texas Report

Jude Batoon, MPH, Epidemiologist Team Lead

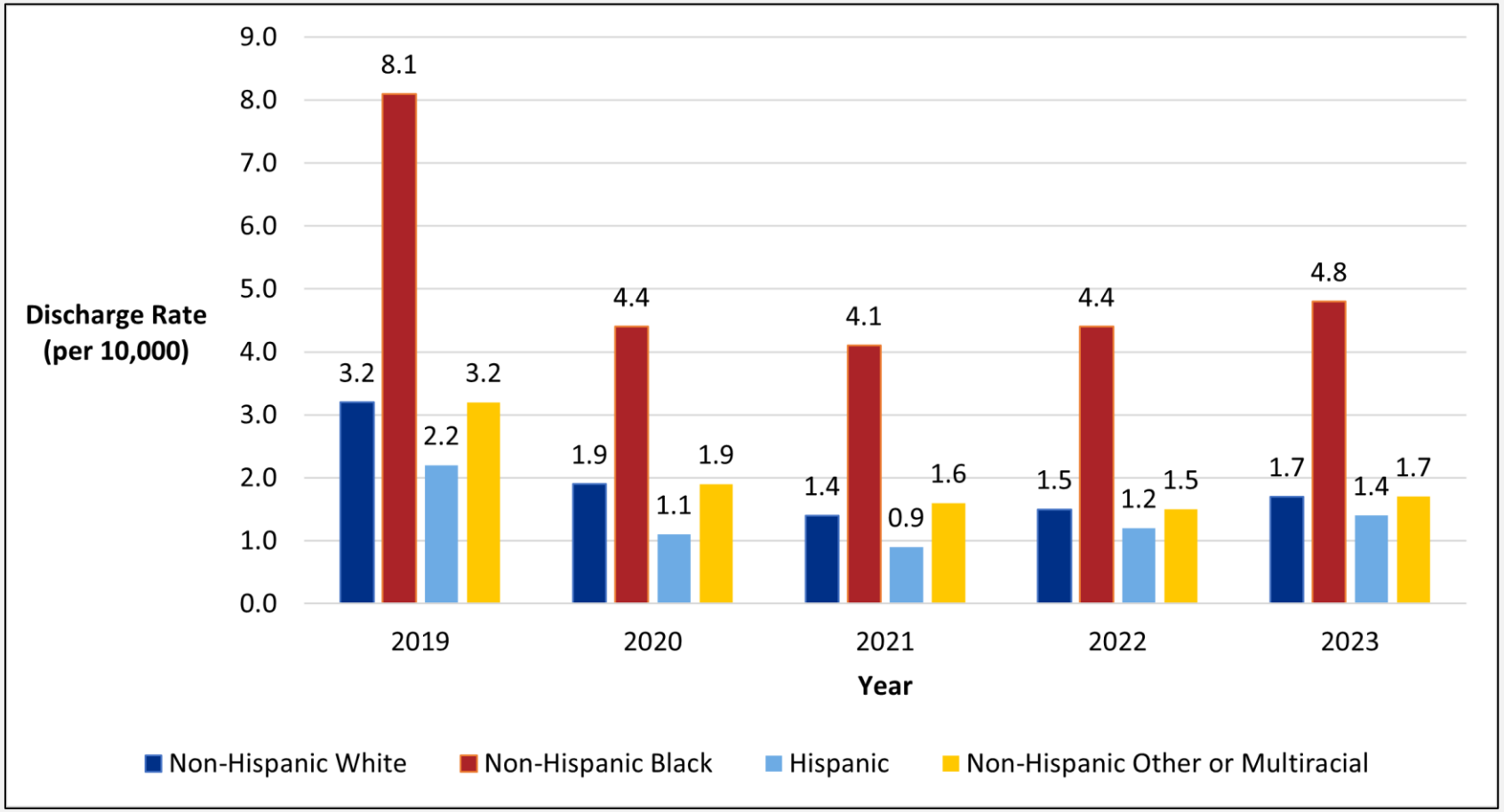
Impact of Asthma in Texas Report

- Collaborative report by the Texas Asthma Control Program and the Chronic Disease Epidemiology Branch
- Asthma stakeholders can use the data in the report to:
  - Identify asthma trends
  - Identify disparities among socio-economic groups, demographic groups, and geographic areas
  - Target priority populations

Key Findings

- Emergency department visits and hospitalizations due to asthma decreased in 2020 during the COVID-19 pandemic and have increased each year after
- Black children and adults with asthma have significantly higher emergency department and hospitalization rates when stratifying by population groups
- Asthma prevalence, emergency department visits, and hospitalizations vary by public health region
- Volume of asthma emergency department visits varies by month with peaks generally in April, October, and December
- Adults with asthma are more likely to currently smoke cigarettes than adults without asthma

Adult Asthma Inpatient Discharge Rates (per 10,000), by Demographic Group, Texas, 2019-2023



Data Source: Texas Health Care Information Collection (THCIC), Inpatient Hospital Discharge Public Use Data File, 2019-2023

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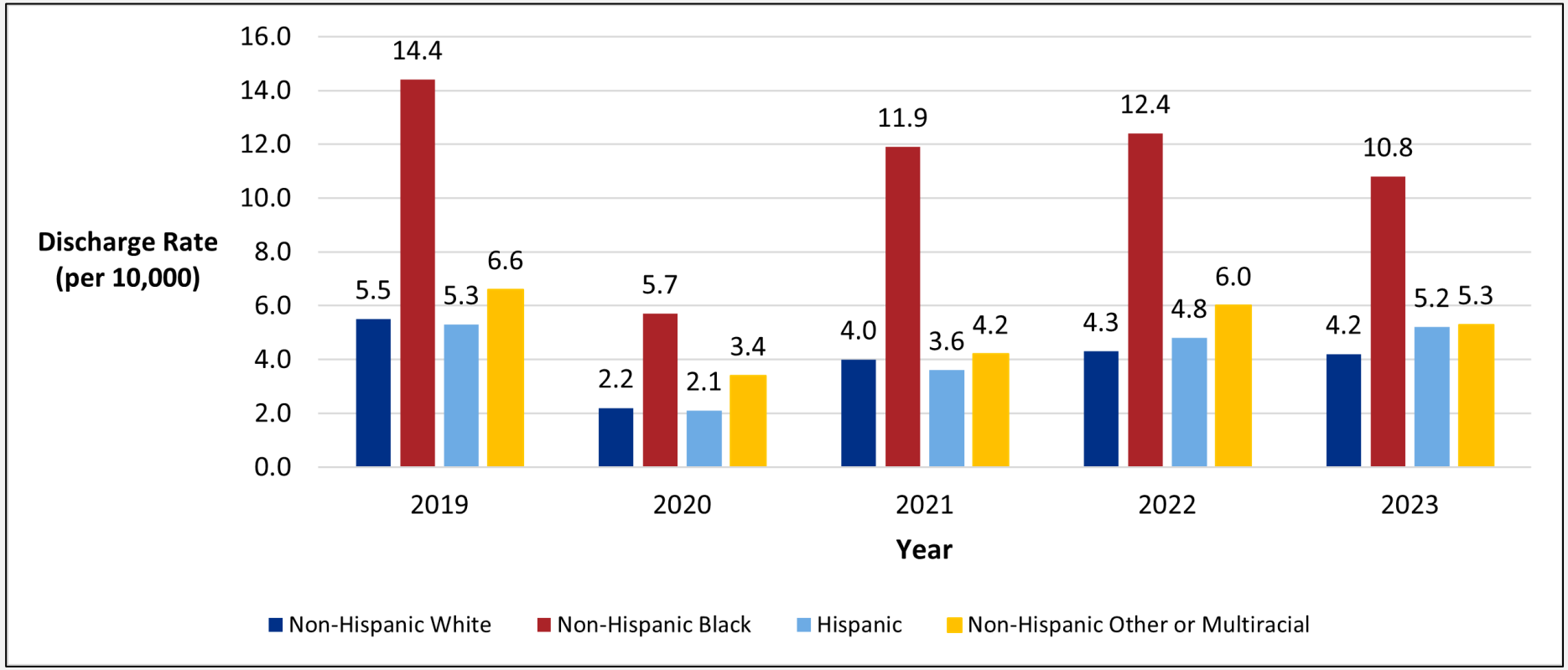
Child Asthma Inpatient Discharge Rates (per 10,000), by Demographic Group, Texas, 2019-2023



Data Source: Texas Health Care Information Collection (THCIC), Inpatient Hospital Discharge Public Use Data File, 2019-2023

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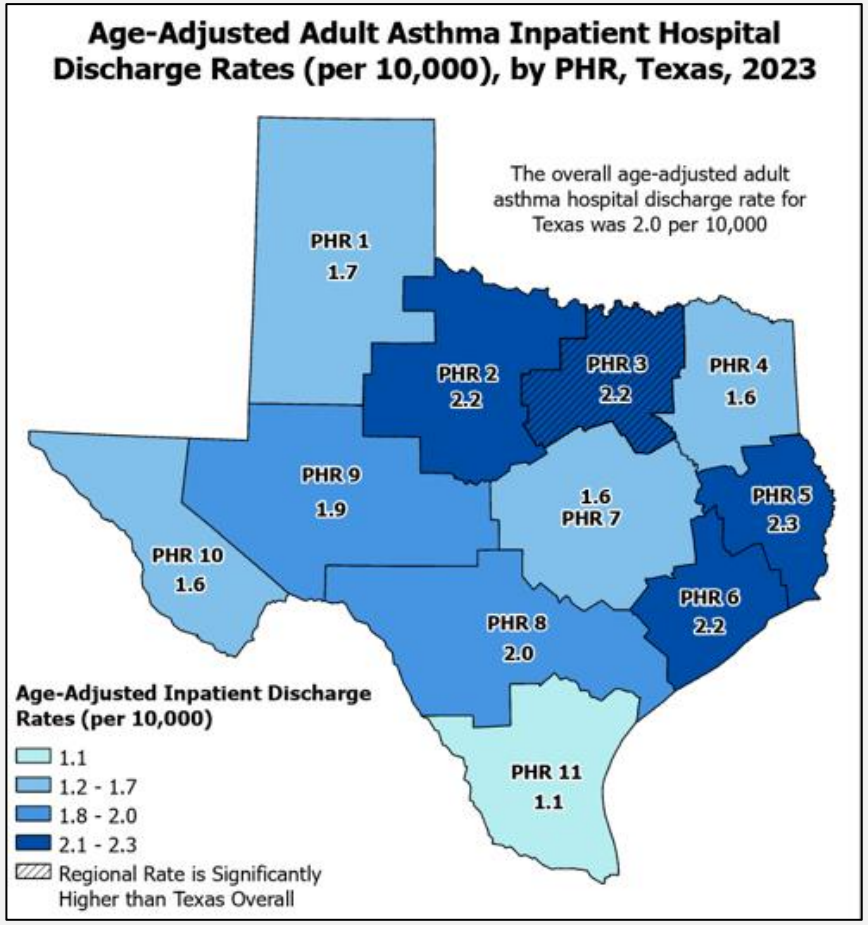
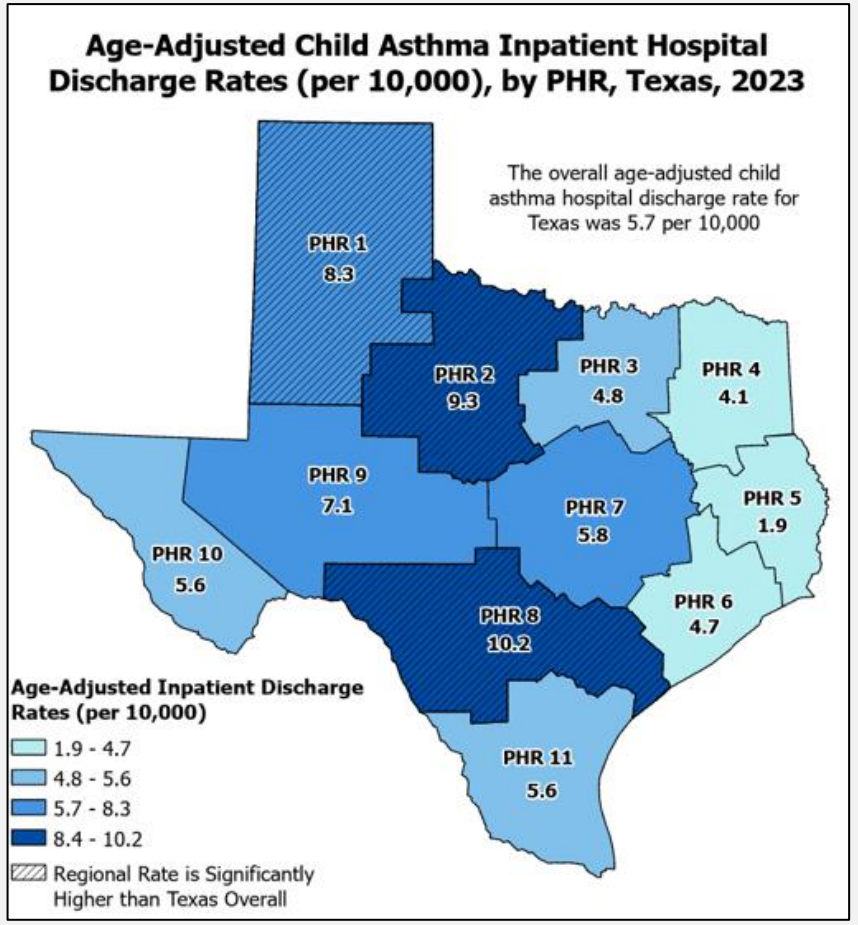
Inpatient Hospital Discharge Rates by Public Health Region (PHR)





Data Source: Texas Health Care Information Collection (THCIC), Inpatient Hospital Discharge Public Use Data File, 2023

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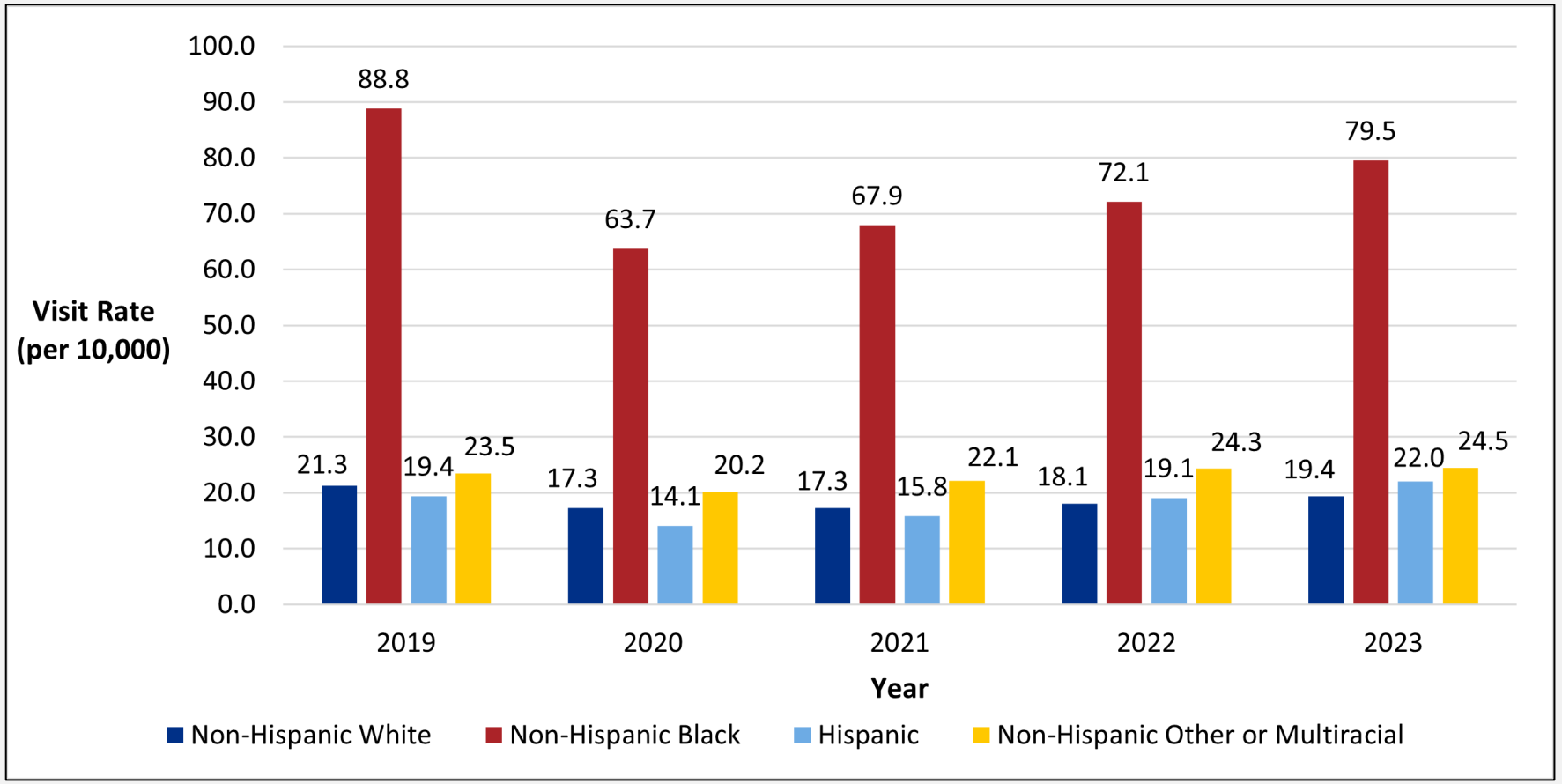
Adult Asthma Emergency Department Visit Rates (per 10,000), by Demographic Group, Texas, 2019-2023



Data Source: Texas Health Care Information Collection (THCIC), Emergency Department Visit Public Use Data File, 2019-2023

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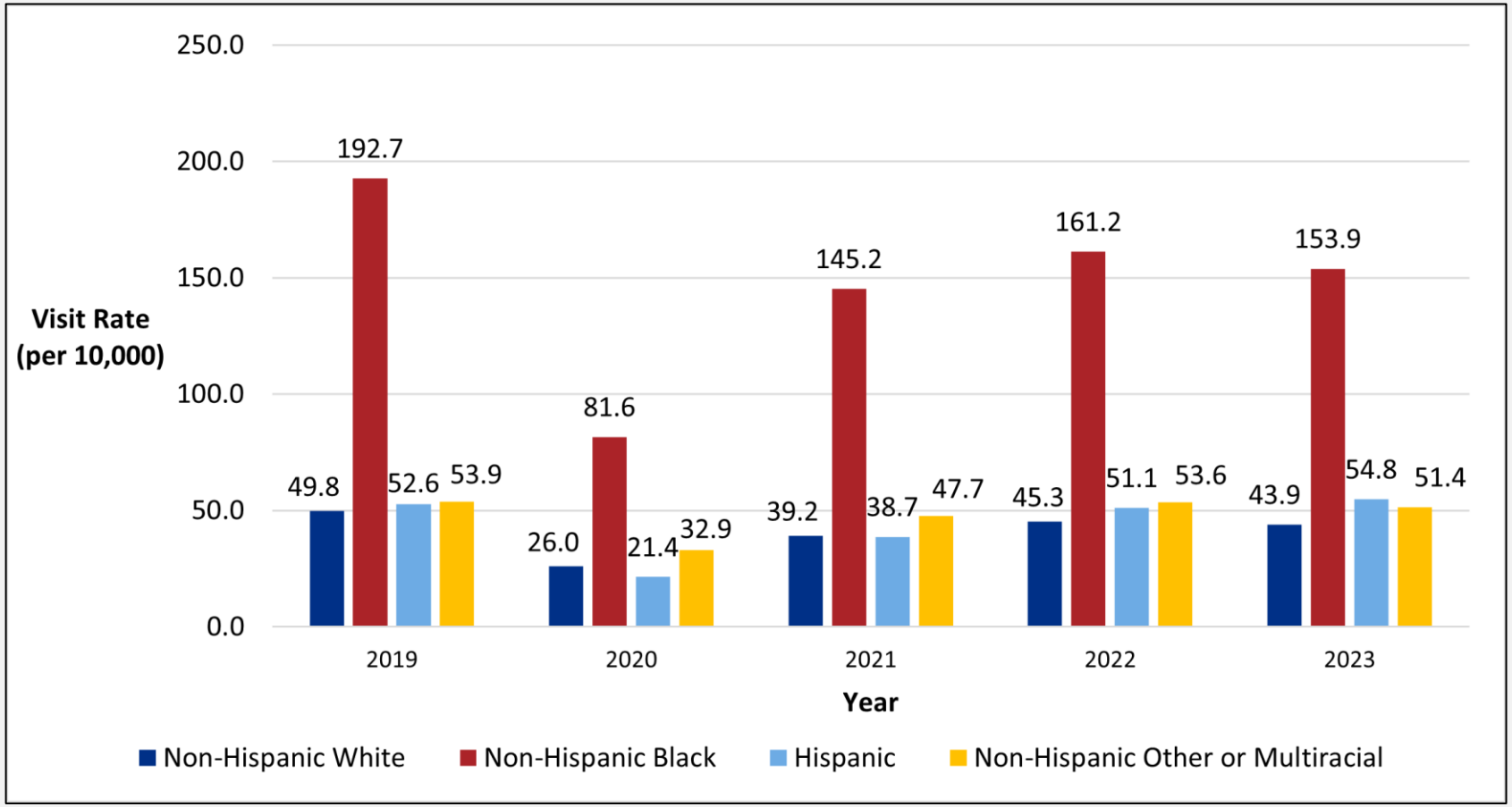

Data Source: Texas Health Care Information Collection (THCIC), Emergency Department Visit Public Use Data File, 2019-2023

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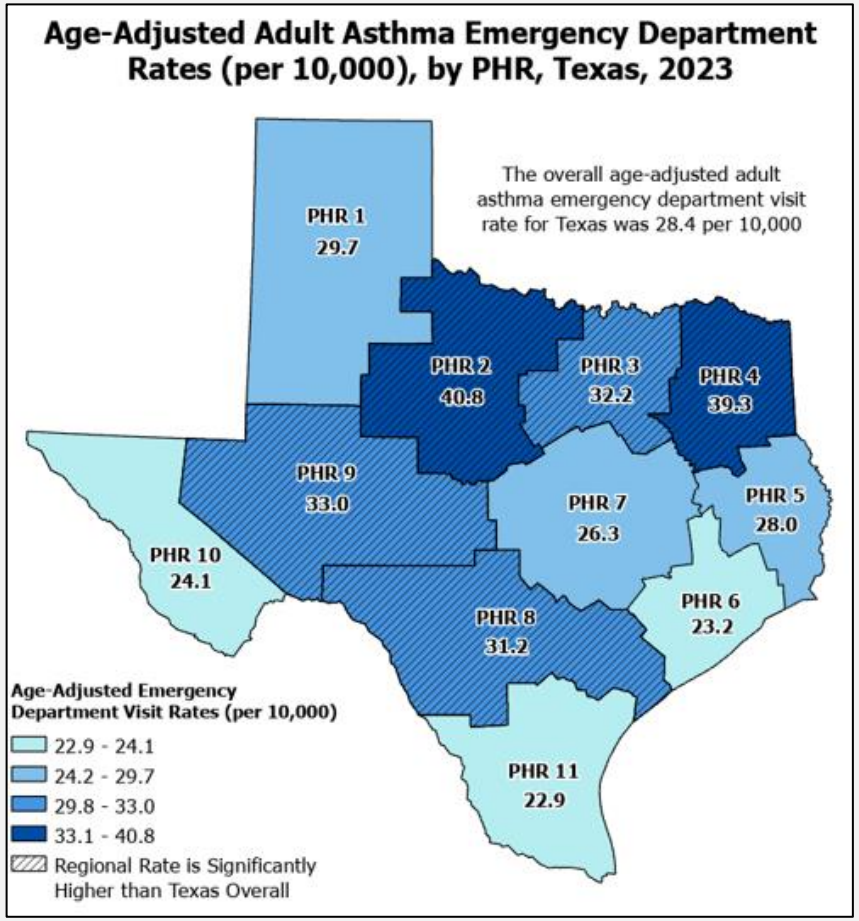
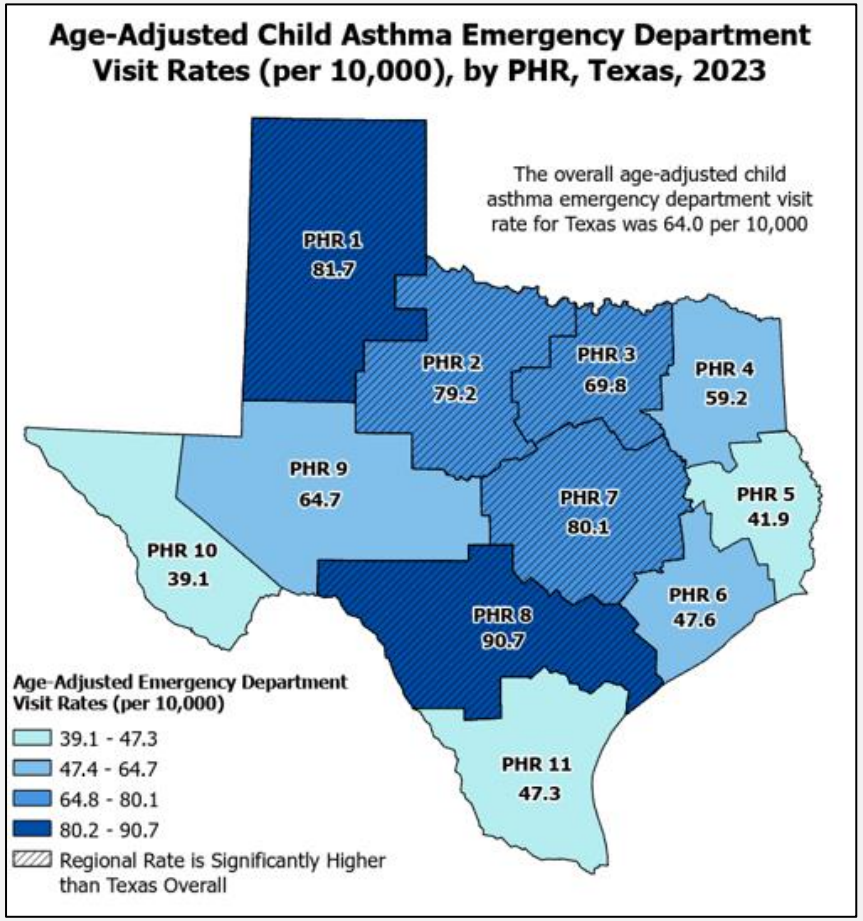
Emergency Department Rates by PHR





Data Source: Texas Health Care Information Collection (THCIC), Emergency Department Visit Public Use Data File, 2023

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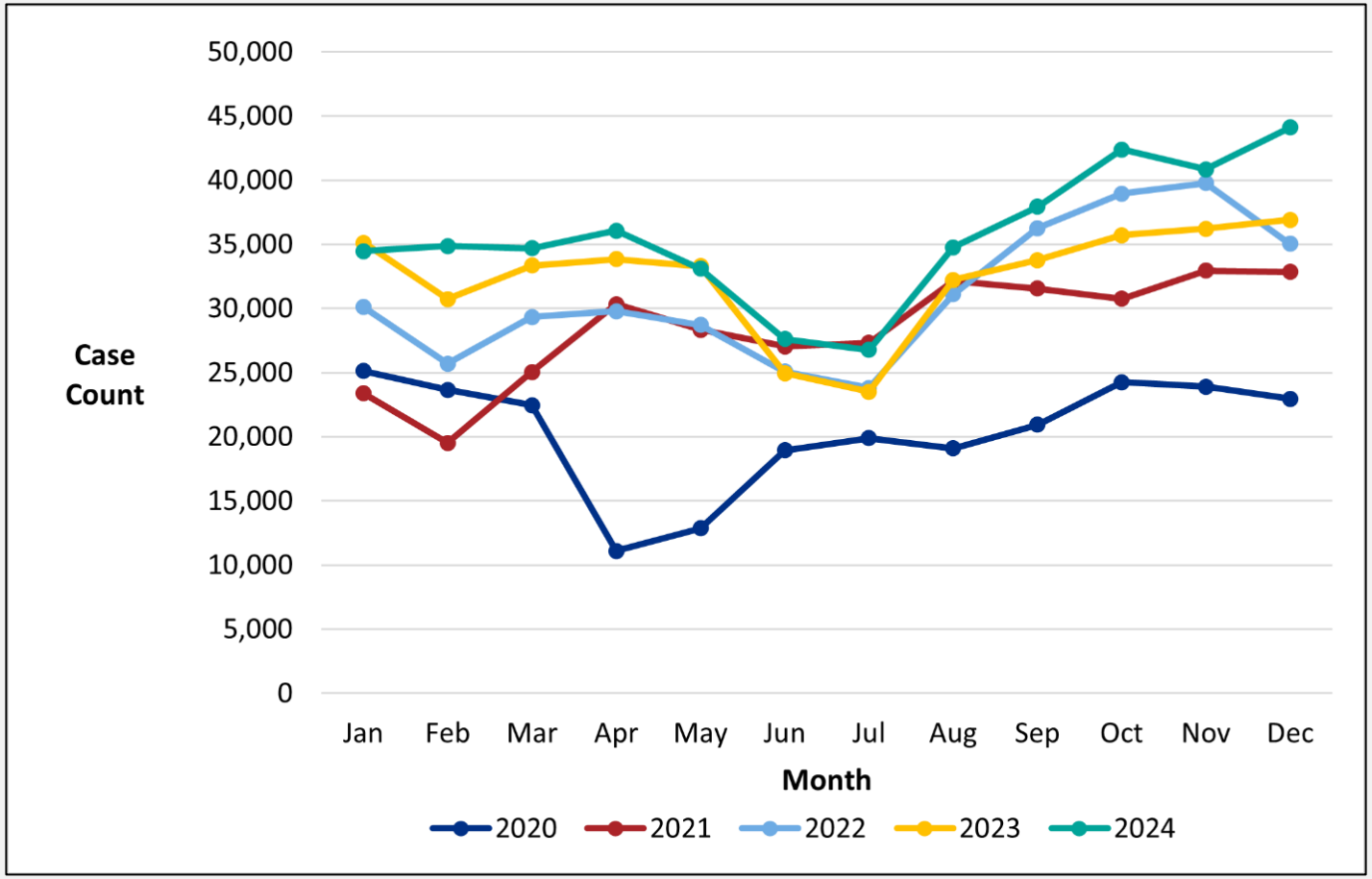
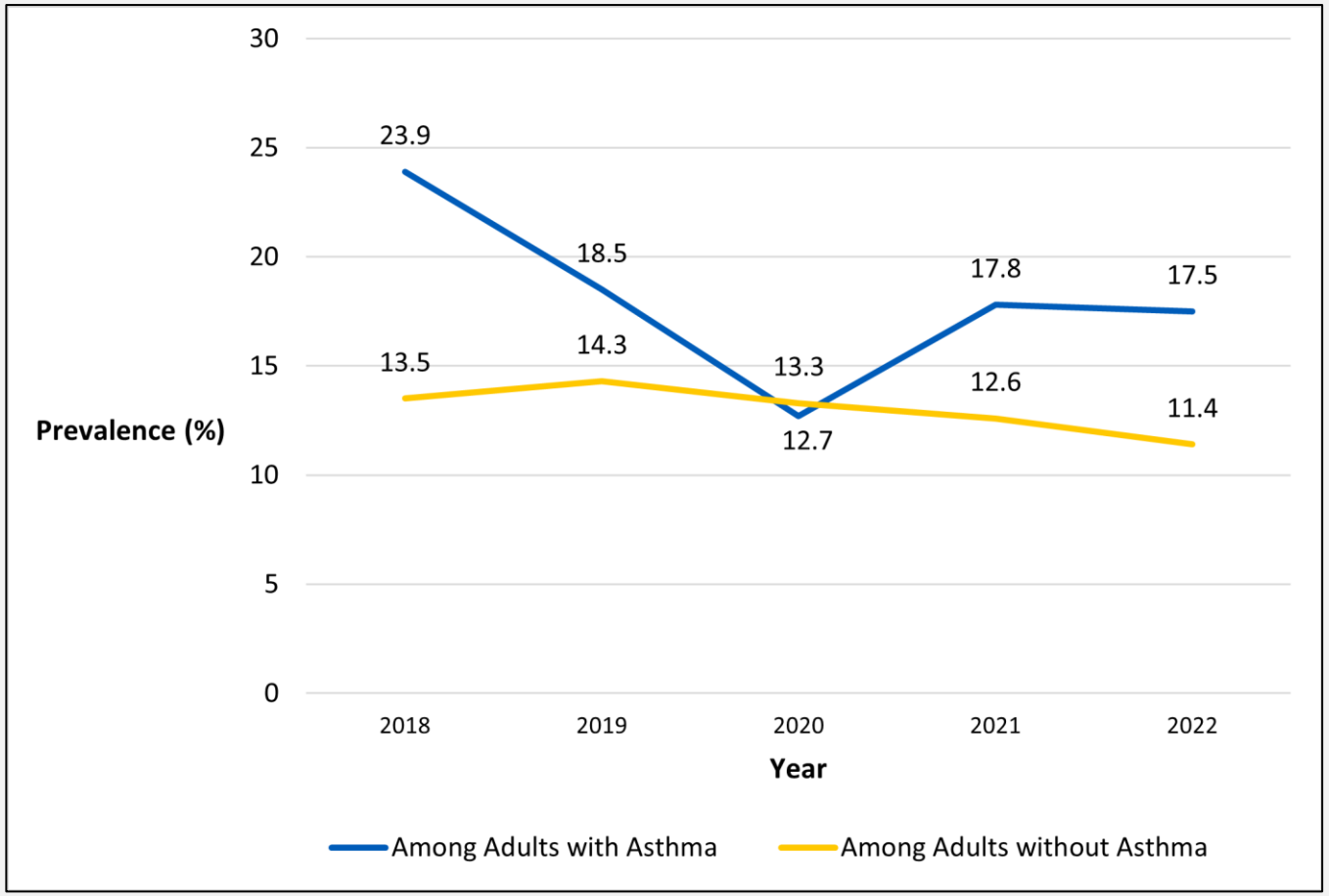
Syndromic Surveillance of Asthma Cases, by Month, Texas, 2020-2024



Data Source: Texas Electronic Surveillance System for the Early Notification of Community-Based Epidemics (ESSENCE), Texas Syndromic Surveillance (TxS2), 2020-2024

Prevalence of Current Cigarette Smoking Among Adults with and without Asthma, Ages 18 and Older, in Texas, 2018-2022



Data Source: Texas Behavioral Risk Factor Surveillance System Public Use Data File, 2018-2022, Texas Department of State Health Services, Center for Health Statistics

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Texas Asthma Control Program

Texas Asthma Control Program (TACP)

- Our Mission
  - To help Texans control their asthma, reduce visits to the emergency department, decrease hospitalizations, and improve their quality of life
- Our Goals
  - Connecting people with asthma, to asthma self-management education
  - Helping Texans quit tobacco and avoid secondhand smoke
  - Making asthma home visits a normal part of asthma care
  - Helping medical professionals stay up to date with best practices for asthma care
  - Connecting people with asthma to social services or community programs for extra support outside of the doctor's office
  - Supporting policies that improve air quality for everyone, indoors, outdoors, at work, or at home

EXHALE Framework

- **E**ducation on Asthma Self-Management Education (AS-ME)
- **X**-tinguishing smoking and secondhand smoke
- **H**ome visits for trigger reduction and AS-ME
- **A**chievement of guidelines-based medical management
- **L**inkages and coordination of care across settings
- **E**nvironmental policies or best practices to reduce asthma triggers from indoor, outdoor, and occupational sources

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Hsu J, Sircar K, Herman E, Garbe P. (2018). EXHALE: A Technical Package to Control Asthma. Atlanta, GA: National Center for Environmental Health, Centers for Disease Control and Prevention.

Environmental policies or best practices to reduce asthma triggers from indoor, outdoor, and occupational sources

- Rationale from EXHALE framework published in 2018:
  - Evidence links outdoor air pollutants to increased asthma-related emergency department visits and hospitalizations
    - Pollutants include: vehicle exhaust, factory emissions and smoke
  - Children with asthma are more vulnerable to negative health effects cause by air pollution
  - Interventions to reduce outdoor air pollution can improve asthma control. It can also be cost-saving for communities

Hsu J, Sircar K, Herman E, Garbe P. (2018). EXHALE: A Technical Package to Control Asthma. Atlanta, GA: National Center for Environmental Health, Centers for Disease Control and Prevention.

Air Quality and Asthma

- Overall Air Quality Index was associated with asthma emergency department visits and hospitalizations among children in Allegheny County, Pennsylvania.[1]
- A global study showed for every 10 microgram per cubic meter (µg/m3) increment in particulate matter $(PM)_{2.5}$, the risk of childhood and adult asthma (i.e., prevalence, incidence, and mortality of all asthma types) increases by 21.4% and 7.1% respectively.[2]
- Children exposed to outdoor coarse particulate matter ($PM_{10-2.5}$) were more likely to develop asthma and need emergency room or hospital treatment for it.[3]
- Multiple studies have shown a significant association between PM ($PM_{2.5}$ and PM_{10}) exposure and asthma development among children and adolescents.[4]

1. Rosser F, Han YY, Rothenberger SD, Forno E, Mair C, Celedón JC. Air quality Index and emergency department visits and hospitalizations for childhood asthma. Ann Am Thorac Soc. (2022) 19(7):1139–48. 10.1513/AnnalsATS.202105-539OC
2. Ruijing Ni, Hang Su, Richard T. Burnett, Yuming Guo, Yafang Cheng, Long-term exposure to PM2.5 has significant adverse effects on childhood and adult asthma: A global meta-analysis and health impact assessment, One Earth, Volume 7, Issue 11, 2024, Pages 1953-1969, ISSN 2590-3322.
3. Keet CA, Keller JP, Peng RD. Long-Term coarse particulate matter exposure is associated with asthma among children in medicaid. Am J Respir Crit Care Med. 2018;197(6):737–46.
4. Keleb, A., Abeje, E.T., Daba, C. *et al.* The odds of developing asthma and wheeze among children and adolescents exposed to particulate matter: a systematic review and meta-analysis. *BMC Public Health* **25**, 1225 (2025).

Air Quality and Other Chronic Conditions

- Multiple studies have shown a link between $PM_{2.5}$ and cancer.[1,2,3]
  - A study in Hong Kong showed that for every 10 µg/m3 of increased exposure to $PM_{2.5}$, risk of dying from any cancer rose by 22 percent.[1]
- Air pollution can exacerbate existing cardiovascular disease and contribute to the development of the disease.[4]
- Higher levels of $PM_{2.5}$ were linked to a higher number of dementia cases developing over time.[5]
- Air pollution exposure is associated with increased diabetes prevalence and diabetes severity.[6]

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1. Wong CM, Tsang H, Lai HK, Thomas GN, Lam KB, Chan KP, Zheng Q, Ayres JG, Lee SY, Lam TH, Thach TQ. Cancer Mortality Risks from Long-term Exposure to Ambient Fine Particle. Cancer Epidemiol Biomarkers Prev. 2016 May;25(5):839-45
2. Peleman, J., Ruan, M., Dey, T. et al. Air pollution exposure and head and neck cancer incidence. Sci Rep 14, 26998 (2024).
3. White AJ, Fisher JA, Sweeney MR, Freedman ND, Kaufman JD, Silverman DT, Jones RR. 2023. Ambient fine particulate matter and breast cancer incidence in a large prospective US cohort. Journal of the National Cancer Institute.
4. Environmental Protection Agency. (2025). Air Pollution and Cardiovascular Disease Basics. https://www.epa.gov/air-research/air-pollution-and-cardiovascular-disease-basics
5. Comparison of Particulate Air Pollution From Different Emission Sources and Incident Dementia in the US. Zhang B, Weuve J, Langa KM, D'Souza J, Szpiro A, Faul J, Mendes de Leon C, Gao J, Kaufman JD, Sheppard L, Lee J, Kobayashi LC, Hirth R, Adar SD. *JAMA Intern Med*. 2023 Aug 14:e233300.
6. Ying-Ying Meng, Yu Yu, Susan H. Babey, Jason Su, Long-term air pollution exposures on type 2 diabetes prevalence and medication use, Hygiene and Environmental Health Advances, Volume 7, 2023, 100062, ISSN 2773-0492.

Strategic Plan for Asthma Control in Texas, 2025-2028

- Provides a blueprint for a statewide coordinated approach to reduce the impact of asthma in Texas
- Strategies will guide work of Texas Asthma Control Program (TACP) and partners
  - Divided into six priority areas based on EXHALE framework
  - Based on policy, system, and environmental change efforts
  - Addresses asthma health disparities and sustainability

Priority Area 6: Environmental Policies or Best Practices to Reduce Asthma Triggers from Indoor, Outdoor and Occupational Sources

- Goal
  - Reduce exposure to asthma triggers through policy, system, and environmental change efforts

- Strategies
  - Strategy 6.1: Reduce exposure to secondhand smoke and e-cigarette aerosols
  - Strategy 6.2: Educate and engage decision makers on the benefits of smokefree policies including municipalities, multi-unit housing and college campuses
  - Strategy 6.3: Educate and engage decision makers on the benefits of asthma-friendly policies
  - Strategy 6.4: Remove barriers to home weatherization

Call-to-Action

- Includes a list of targeted strategic actions that everyone, including individuals, organizations, and communities can do to improve the impacts of asthma across Texas
- Strategic Actions are broken down by the following groups:
  - Individuals/General Public
  - Healthcare Providers/Health Systems
  - Schools and School Districts
  - Managed Care Organizations/Payers
  - Communities/Municipalities
  - Public Health

Communities/Municipalities

- Adopt and implement comprehensive smokefree and tobacco free policies
- Increase number of multi-unit housing complexes that are smokefree and tobacco free
- Implement policies and ordinances to improve air quality

Public Health

- Connect people with asthma to resources in the community to address factors that impact asthma control
- Provide education on reducing and avoiding asthma triggers from indoor, outdoor, and occupational sources
- Provide education on improving air quality and air quality alert days

TACP Partnerships

- Convene quarterly Texas Asthma Control Collaborative (TACC) general meetings and work group meetings
- TACC Work Groups include:
  - Asthma Education
  - Health Disparities
  - Medical Management
  - School Health
- Attend and participate in local asthma and air quality coalitions
- Engage and develop strategic partnerships with internal and external stakeholders across the state

Data Resources

- Texas Behavioral Risk Factor Surveillance System (BRFSS)
  - Prevalence data on health behaviors that contribute to the leading causes of death and chronic disease
- Texas Health Care Information Collection (THCIC)
  - Collects and reports on hospital data including emergency department visits and inpatient hospitalizations
- Texas Asthma Data and Reports
  - Impact of Asthma in Texas data report and Strategic Plan for Asthma in Texas
- Texas Cancer Data and Surveillance
  - Data fact sheets and maps on cancer in Texas

Resources

- Health Effects from Air Pollution (EPA)
- Asthma (EPA)
- Texas Asthma Control Program
  - Texas Asthma Control Collaborative
- Texas Comprehensive Cancer Control Program
  - The Texas Cancer Plan

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Thank you!

For questions/more information, please contact:

Texas Asthma Control Program
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