

Houston Asthma Burden Report 2021



A Report from the
Houston Asthma Prevention & Control Program

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INTRODUCTION

INTRODUCTION

HOUSTON

Houston is the 4th largest metropolitan area in the U.S. and the nexus of Harris County, the 3rd most populous county in the nation. As of 2019, an estimated 2.3 million people live in Houston, with 25.1% of the population under the age of 18¹. Houston is an incredibly diverse city - 43% of the population is of a racial minority group and 45% is of Hispanic or Latino origin¹. The median household income in the city is \$52,338, significantly lower than the national median of \$62,843¹. Similarly, approximately 20.1% of Houstonians are living below the poverty level, compared to the national percentage of 13.4%¹. Houston's poverty disproportionately affects its African American and Hispanic populations.

Houston hosts the largest medical center in the world, which is home to eight different academic and research institutions as well as 21 different hospital systems including the largest children's hospital in the nation – Texas Children's Hospital. In spite of the resources available, according to a study conducted by WalletHub using 2019 Census Bureau data, Houston had the highest uninsured rates for populations under the age of 65 in the U.S.². The uninsured rate for populations under age 65 in Houston in 2019 was 25.4%, more than tripling the national uninsured rate for children and adults of 8.0%^{1,3}. In 2017, a reported one in five uninsured children in the U.S. lived in Texas, accounting for about 835,000 children⁴.

ASTHMA

Asthma is a chronic respiratory condition that affects millions of people in the US, across all ages, sexes, and races/ethnicities. During an asthma attack, or exacerbation, the muscles of the airways in the lungs tighten, causing these passages to narrow and restrict airflow to the lungs. Common symptoms include coughing, wheezing, shortness of breath, and chest tightness. There are several factors that can increase an individual's risk of an asthma attack, including family history, tobacco use and secondhand smoke, poor air quality, allergies, to name a few. Environmental exposures, or "triggers", such as dust, mold/mildew, pests, chemicals, and more can also serve to bring on an exacerbation.

While there is no cure for asthma, exacerbations are largely preventable episodes that can be controlled through medical guidance and self-management behaviors. However, lack of awareness or access to care can contribute to the persistence of uncontrolled asthma. Episodes of asthma exacerbations can culminate in various ways that impact quality of life, such as activity limitations, missed school or work days, emergency department visits, hospitalizations, and even death.

Reduction of uncontrolled asthma has even been featured as part of several Healthy People 2030 goals, as outlined below⁵:

- Reduce asthma attacks
- Reduce hospitalizations for asthma in children under 5 years
- Reduce hospitalizations for asthma in people aged 5 to 64 years
- Reduce hospitalizations for asthma in adults aged 65 and over
- Reduce emergency department visits for children under 5 years with asthma
- Reduce emergency department visits for people aged 5 years and older with asthma
- Reduce asthma deaths

The background features a vertical gradient from light orange at the top to dark red at the bottom. Overlaid on this are several semi-transparent, overlapping circular shapes in shades of orange and yellow. A network of thin, light-colored lines connects various points across the page, creating a subtle geometric pattern.

BACKGROUND

➤ BACKGROUND

There are several factors that contribute to the burden of asthma in Houston, including but not limited to the factors listed below:

- **Petrochemical Complex:** Houston is home to the largest petrochemical complex in the nation. This complex stretches along almost half of the Ship Channel's 52-mile length and is composed of nearly 200 private and public industrial terminals and several major refineries⁶.
- **Outdoor Air Pollution:** According to the annual "State of the Air" reports published by the American Lung Association, the air quality in the Houston metropolitan area consistently ranks as one of the worst air quality regions in the nation for both ozone and annual particle pollution^{7,8}. For high ozone days, the Houston metropolitan area ranked 12th in 2017, 11th in 2018, 9th in 2019, and most recently 14th in 2020^{7,8}. For annual particle pollution, the Houston metropolitan area ranked 16th in 2017, 15th in 2018, 17th in 2019, and most recently 22nd in 2020^{7,8}.
- **Housing:** Houston is a city composed of older housing stock, where an estimated 36.0% of homes, accounting for 849,200 housing units, in the city were built prior to 1980 and 5.9%, accounting for 138,900 housing units, were built prior to 1950⁹. Older and poorer housing is at a higher risk of containing indoor environmental hazards, such as mold, mildew, and cockroaches, to name a few.
- **Outdoor Allergens:** Houston is known to have a variety of outdoor allergens, such as tree pollen, grass pollen, ragweed pollen, and mold spores. The City's allergy profile can be separated into three main allergy seasons, distinguished by the type of allergen that is most prolific at the time¹⁰. The presence of these allergens serves as an environmental stressor that can potentially trigger an asthma attack.
- **Climate:** Houston is located in the Gulf Coast region of Texas, classified as a humid sub-tropical climate, affecting the ease of breathing and increasing risk of breathing problems during periods of higher humidity¹¹. Summers in Houston can be especially brutal in terms of humidity, with an average relative humidity ranging from around 60% in the afternoon to as high as over 90% in the morning¹¹.
- **Hurricanes:** Its location also makes Houston vulnerable to the consequences of climate change. In August 2017, Hurricane Harvey dumped 33 trillion gallons of water across the Gulf Coast and set a continental US record for rainfall exceeding 50 inches¹². Following Hurricane Harvey, families in flooded areas were exposed to multiple asthma triggers including wet housing, poor indoor air quality (i.e., mold and cleaning chemicals), and particulate matter suspension from debris piles after remediation. In 2020, although much less devastating, Houston was impacted by an overactive Atlantic hurricane season which had 30 named storms, 13 hurricanes, and 6 major hurricanes - the most on record according to the National Oceanic and Atmospheric Administration¹³.

There are strategies through which individuals can mitigate the risks of these asthma triggers, such as practicing asthma self-management techniques, speaking with healthcare professionals to improve asthma control, utilizing integrated pest management in homes, and subscribing to the Asthma Air Aware Day alert system to be notified of days with poor outdoor air quality.



EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

The purpose of the Houston Asthma Burden Report is to provide a snapshot into the current burden of asthma in the City of Houston, as characterized by measures such as prevalence, hospitalizations, emergency department (ED) visits, and mortality due to asthma. It also serves to highlight specific areas and demographic populations of Houston that bear a disproportionate amount of the asthma burden in the City.

A summary of **Key Findings** featured in this report:

- The **adult current and lifetime asthma prevalence** in 2019 was **7.0%** and **12.0%**, respectively. The **child current and lifetime asthma prevalence** in 2019 was **4.2%** and **6.4%**, respectively.
- There were **1514** and **1509 asthma hospitalizations** in 2018 and 2019, respectively.
- There were **10801** and **11344 asthma ED visits** in 2018 and 2019, respectively.
- There were **21** and **18 asthma deaths** in 2018 and 2019, respectively.
- Houston has a lower prevalence of current and lifetime asthma (adults and children) as compared to national estimates in 2019.
- Houston has higher overall (adults and children) rates of asthma hospitalizations as compared to the national rate in 2018.
- Houston has lower overall (adults and children) rates of asthma ED visits as compared to the national rate in 2018.
- Children under the age of 18 years are more likely to have asthma hospitalizations and ED visits, as compared to adults ages 18 years and older.
- Males are more likely to have asthma hospitalizations and ED visits in the younger age groups, while females are more likely to have more asthma hospitalizations and ED visits in the older adult age groups.
- Black populations are more likely to have hospitalizations and ED visits due to asthma, as compared to all other races.
- Houston has a lower asthma mortality rate as compared to the national asthma mortality rate in 2019.

The **Houston Health Department** (HHD) has positioned asthma control as a priority component in improving the health of the City. As such, the HHD's **Asthma Prevention & Control Program** has identified asthma control goals as part of Houston's Community Health Improvement Plan (CHIP), developed a Strategic Asthma Plan for the City of Houston, and hosted the Texas Gulf Coast Asthma Coalition to coordinate asthma care and control services.

For more information on the findings presented in this report, to get involved as part of the Texas Gulf Coast Asthma Coalition, or to learn more about how the HHD is working to improve asthma control in the City, please contact the **Asthma Prevention & Control Program (APCP)** at **(832) 393 - 5141** and/or by visiting the APCP's website at <https://www.houstontx.gov/health/asthma/index.html>.

The background is a solid teal color with a complex pattern of overlapping, semi-transparent shapes. These shapes include circles of various sizes, some resembling leaves or petals, and a central vertical element that looks like a test tube or a pipette tip. The overall aesthetic is clean, modern, and scientific.

PREVALENCE

PREVALENCE

Data Source: Behavioral Risk Factor Surveillance System (BRFSS) 2017-2019 (adult) and combined 2014, 2015, and 2019 (child), as collected and analyzed by the Texas Department of State Health Services, Chronic Disease Epidemiology Branch, Health Promotion and Chronic Disease Prevention Section.

2019

- The **adult lifetime asthma prevalence** in Houston is **12.0%**, almost 2x the **child lifetime asthma prevalence** of **6.4%**.
 - Comparatively, in 2019 the **national lifetime asthma prevalence** is **13.5%** and **10.5%** for adults and children, respectively¹⁴.
- The **adult current asthma prevalence** in Houston is **7.0%**, an estimated 1.7x the **child current asthma prevalence** of **4.2%**.
 - Comparatively, in 2019 the **national current asthma prevalence** is **8.0%** and **7.0%** for adults and children, respectively¹⁵.

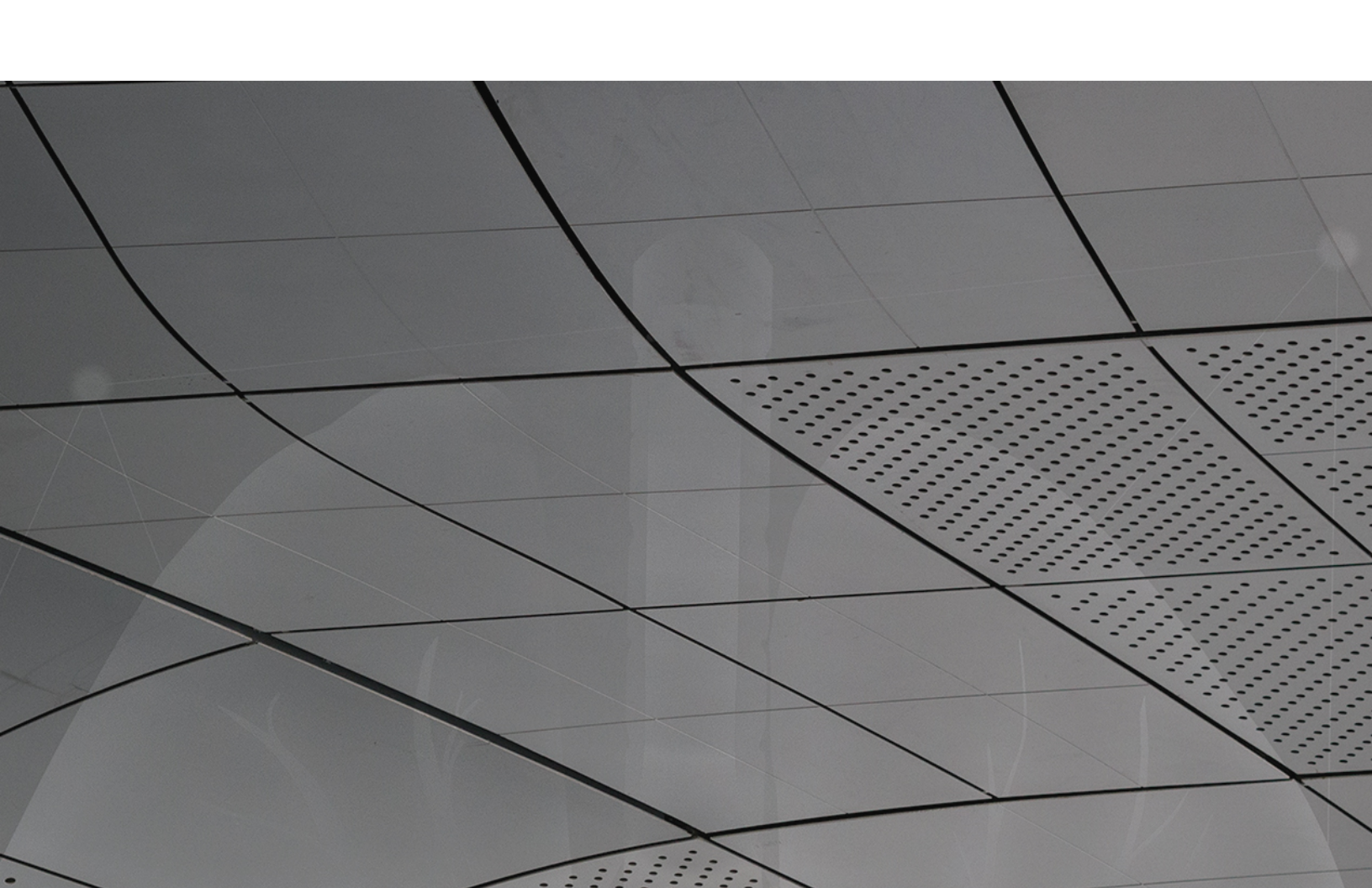
Notes:

Adult lifetime asthma prevalence is obtained from a “Yes” response to the BRFSS survey question: “Has a doctor, nurse, or other health professional ever told you that you had asthma?”

Adult current asthma prevalence is obtained from a calculated “Yes” response variable to the BRFSS survey question: “Do you still have asthma?”

Child lifetime asthma prevalence is obtained from a “Yes” response to the BRFSS survey question: “Has a doctor, nurse, or other health professional ever said that the child has asthma?”

Child current asthma prevalence is obtained from a calculated “Yes” response variable to the BRFSS survey question: “Does the child still have asthma?”



HOSPITALIZATIONS



HOSPITALIZATIONS

Data Source: Texas Department of State Health Services, Texas Health Care Information Collection.

Notes:

Hospitalizations due to asthma (or, asthma hospitalizations) are defined as hospitalizations where asthma (ICD-10 code J45.X) was listed as the Principal Discharge Diagnosis.

Children are defined as populations under the age of 18 years. Adults are defined as populations ages 18 years and older.

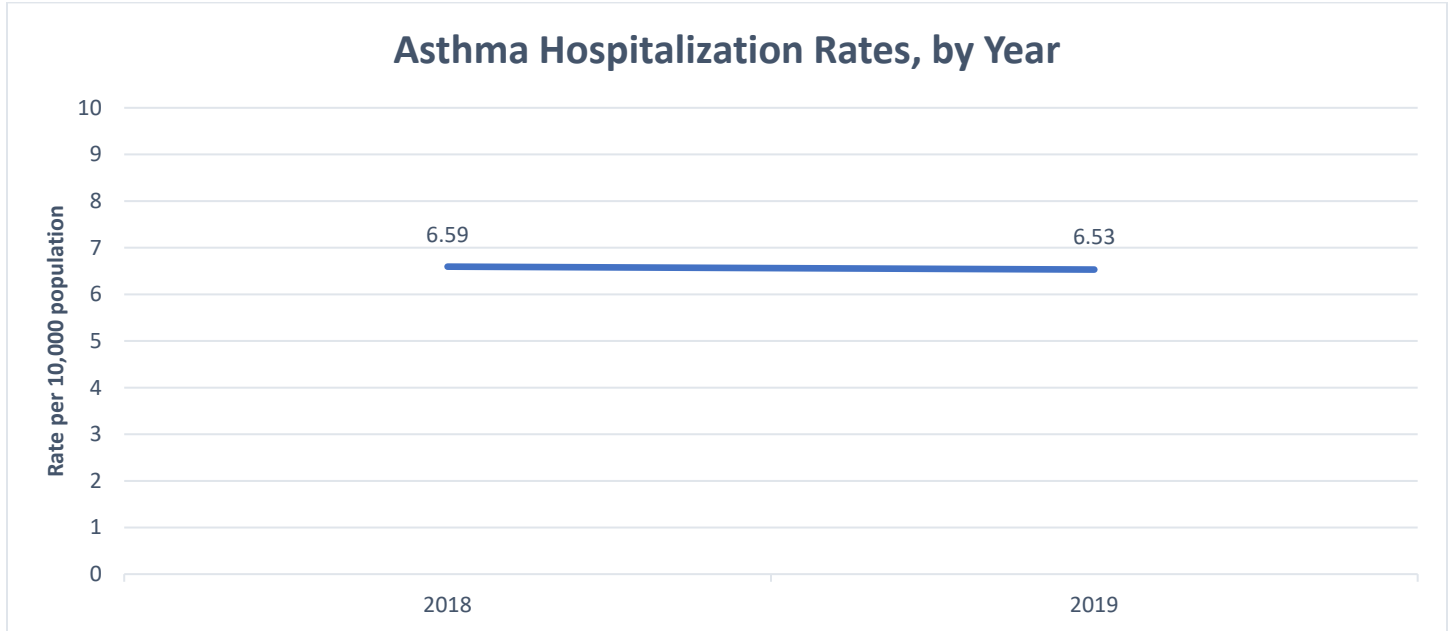
Tables with more detailed breakdowns of asthma hospitalizations by various characteristics in counts, percentages, and rates can be found in the **Appendix** (Tables A1 and A3).

Asthma Hospitalizations, Overall

The hospitalization rates due to asthma have remained fairly stable over the past couple of years.

- In 2018, there were **6.59** hospitalizations per 10,000 Houston population (adults and children) due to asthma.
 - This is higher than the **national rate of hospitalizations due to asthma** which comes out to **5.5** hospitalizations per 10,000 population (adults and children) due to asthma¹⁵.
- In 2019, there were **6.53** hospitalizations per 10,000 Houston population (adults and children) due to asthma.

Figure 1: Asthma Hospitalization Crude Rates per 10,000 population, by Year



Asthma Hospitalizations, by Sex

*Population estimates by sex obtained from 2018 ACS 5-Year Estimates and 2019 ACS 5-Year Estimates, "Age and Sex"

Overall, females typically account for more of the hospitalizations due to asthma, and have a higher rate of asthma hospitalizations, than males.

2018

- **Males** accounted for **40.6%** of hospitalizations due to asthma, and **females** accounted for **59.4%** of hospitalizations due to asthma.
- This translates to **5.4** asthma hospitalizations per 10,000 **male** population, and **7.8** asthma hospitalizations per 10,000 **female** population in Houston.

2019

- **Males** accounted for **37.3%** of hospitalizations due to asthma, and **females** accounted for **62.7%** of hospitalizations due to asthma.
- This translates to **4.9** asthma hospitalizations per 10,000 **male** population, and **8.2** asthma hospitalizations per 10,000 **female** population in Houston.

Asthma Hospitalizations, by Age

*Population estimates by age obtained from 2018 ACS 5-Year Estimates and 2019 ACS 5-Year Estimates, "Age and Sex"

Children under the age of 18 typically account for most of the hospitalizations due to asthma, and have had more than double the rate of asthma hospitalizations compared to adults ages 18 years and older in recent years.

2018

- **Children** accounted for **43.5%** of hospitalizations due to asthma, the majority of which come from children under the age of 10 years.
- **Adults between the ages of 35 to 65 years** composed the second largest chunk of hospitalizations due to asthma, accounting for **33.9%** of these hospitalizations.
- The rate of hospitalizations due to asthma for **children** was **11.4** hospitalizations per 10,000 children population in Houston, while the asthma hospitalization rate for **adults** was **5.0** hospitalizations per 10,000 adult population in Houston.

2019

- **Children** accounted for **37.9%** of hospitalizations due to asthma, the majority of which come from children under the age of 10 years.
- **Adults between the ages of 35 to 65 years** composed the second largest chunk of hospitalizations due to asthma, accounting for **36.2%** of these hospitalizations.
- The rate of hospitalizations due to asthma for **children** was **9.9** hospitalizations per 10,000 children population in Houston, while the asthma hospitalization rate for **adults** was **5.4** hospitalizations per 10,000 adult population in Houston.

Asthma Hospitalizations, by Race/Ethnicity

*American Indian/Alaska Native race category excluded due to low counts.

*Population estimates by race and ethnicity (separate) obtained from 2018 ACS 5-Year Estimates and 2019 ACS 5-Year Estimates, “ACS Demographic and Housing Characteristics”.

*Population estimates by race and ethnicity (combined) obtained from Houston State of Health, 2021 Demographics.

The distribution of hospitalizations due to asthma across race and ethnicity varied between 2018 and 2019. However, despite these differences over time, Black populations consistently account for most of the asthma hospitalizations.

2018

- The **Black** population accounted for **48.0%** of hospitalizations due to asthma, followed by the **White Hispanic** population which accounted for **19.7%** of asthma hospitalizations.
 - This translates to **13.6** hospitalizations due to asthma per 10,000 **Black** population, and **4.7** asthma hospitalizations per 10,000 **White Hispanic** population in Houston.
- **White non-Hispanics** and **Asians/Pacific Islanders** cumulatively accounted for **less than 10%** of total asthma hospitalizations.
 - There were **2.2** hospitalizations due to asthma per 10,000 **White non-Hispanic** population, and **1.6** asthma hospitalizations per 10,000 **Asian/Pacific Islander** population in Houston.
- Hospitalizations due to asthma were almost evenly split between **Hispanics** and **non-Hispanics** across all races, with **Hispanic** populations accounting for **53.7%** of asthma hospitalizations.
 - This translates to **7.9** hospitalizations due to asthma per 10,000 **Hispanic** population, and **5.5** asthma hospitalizations per 10,000 **non-Hispanic** population.

2019

- The **Black** population accounted for **45.9%** of hospitalizations due to asthma, followed by the **White non-Hispanic** population which accounted for **16.2%** of asthma hospitalizations.
 - This translates to **13.0** hospitalizations due to asthma per 10,000 **Black** population, and **4.5** asthma hospitalizations per 10,000 **White non-Hispanic** population in Houston.
- **White Hispanics** and **Asians/Pacific Islanders** accounted for **12.3%** and **3.0%** of total asthma hospitalizations, respectively.
 - There were **2.9** hospitalizations due to asthma per 10,000 **White Hispanic** population, and **2.6** asthma hospitalizations per 10,000 **Asian/Pacific Islander** population in Houston.
- There was a big shift in the distribution of hospitalizations due to asthma by ethnicity. Across all races, **non-Hispanics** populations accounted for an estimated **2.5x** the amount of asthma hospitalizations as compared to **Hispanic** populations.
 - This translates to **4.1** hospitalizations due to asthma per 10,000 **Hispanic** population, and **8.5** asthma hospitalizations per 10,000 **non-Hispanic** population.

Figure 2: Proportions (%) of Asthma Hospitalizations, by Demographic Characteristic

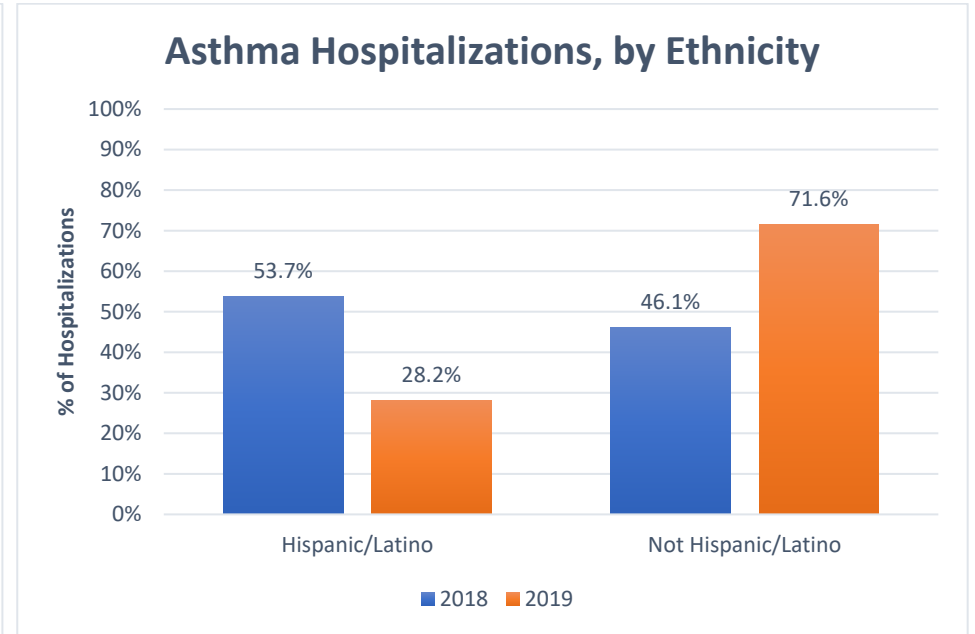
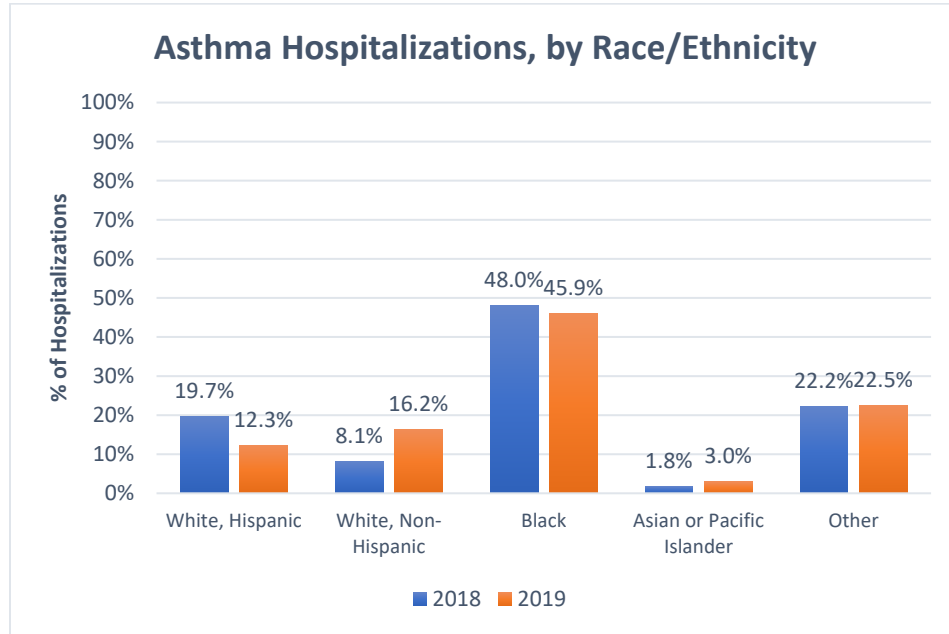
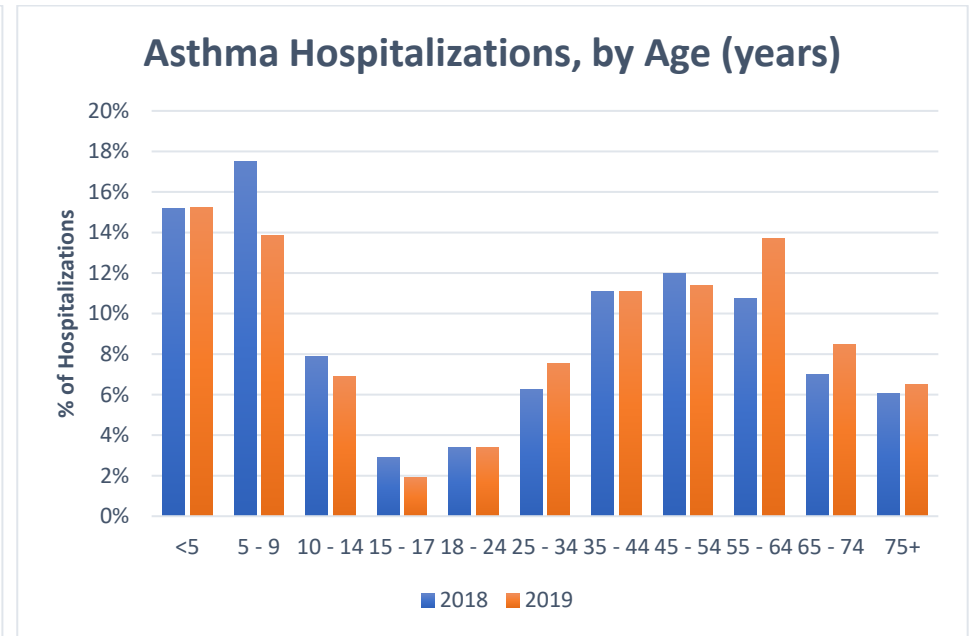
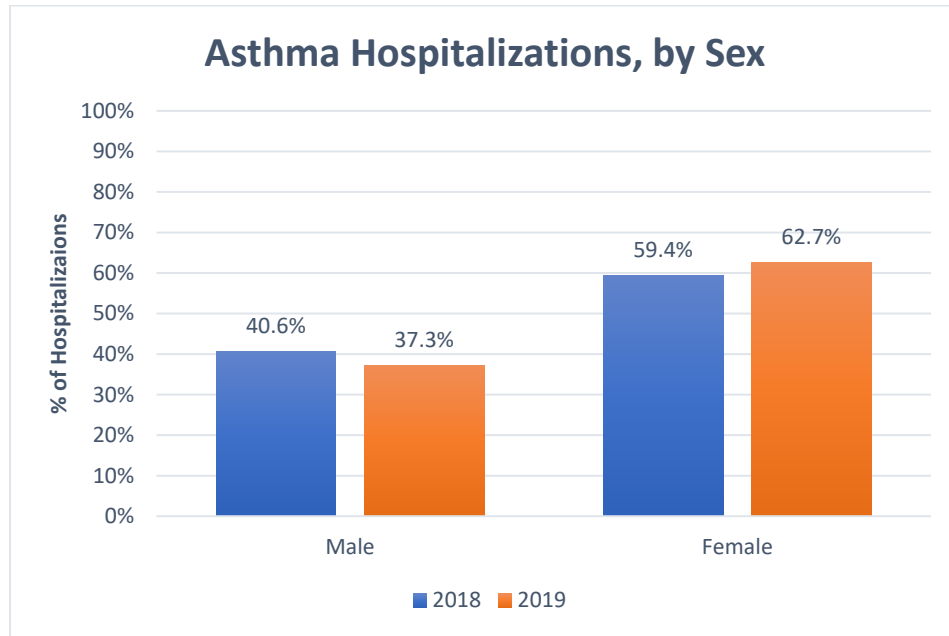
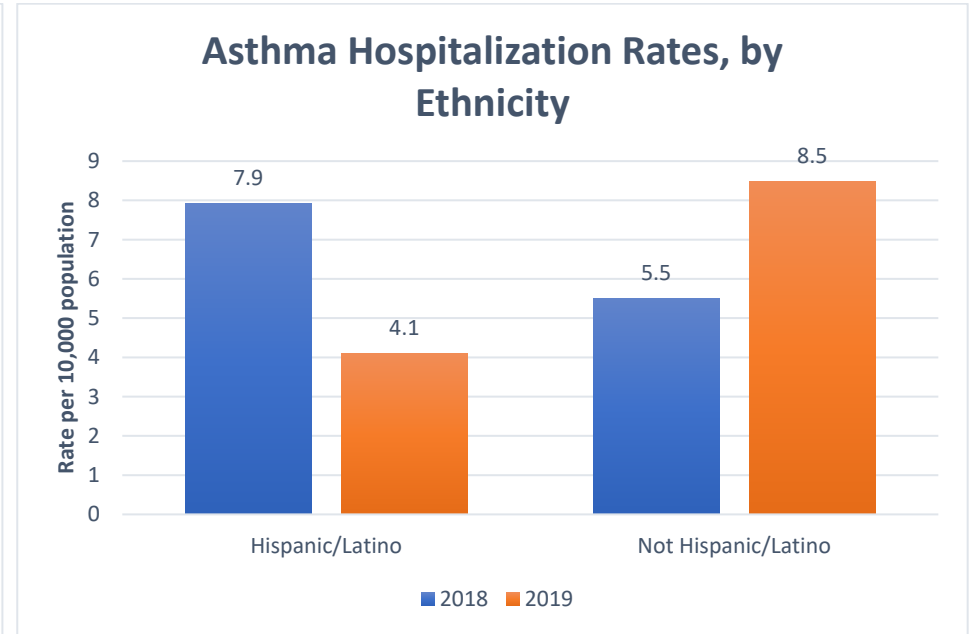
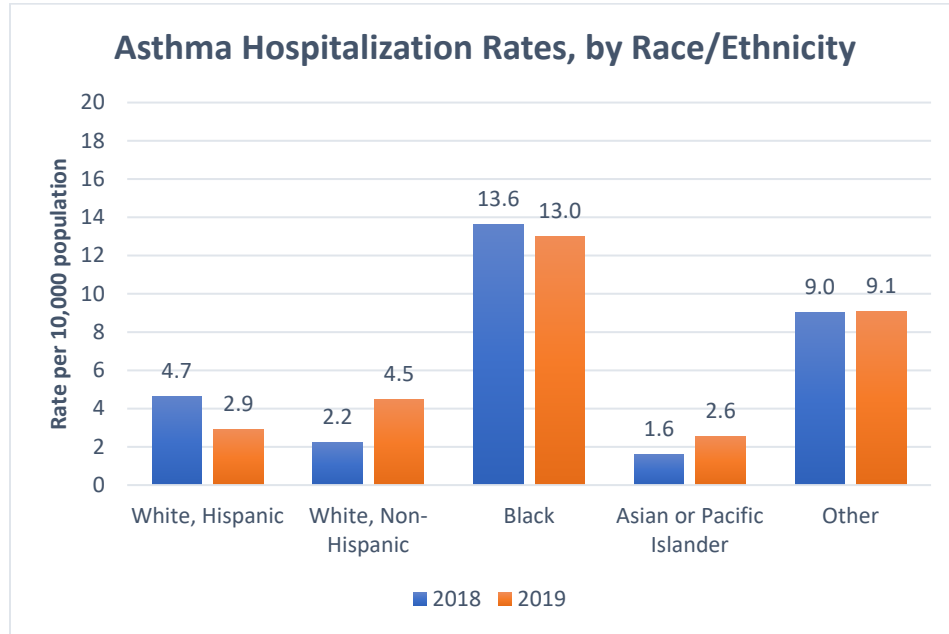
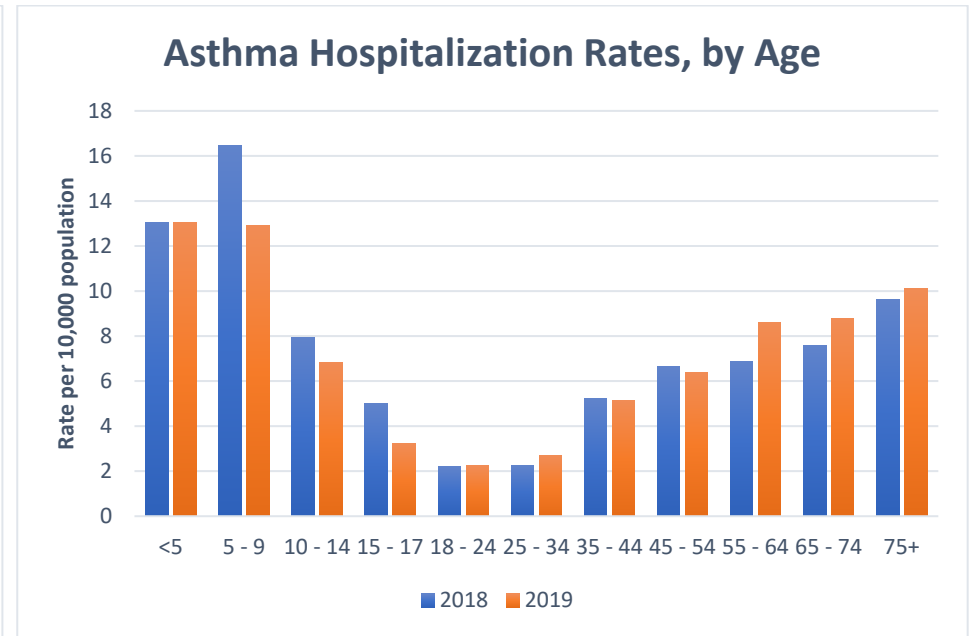
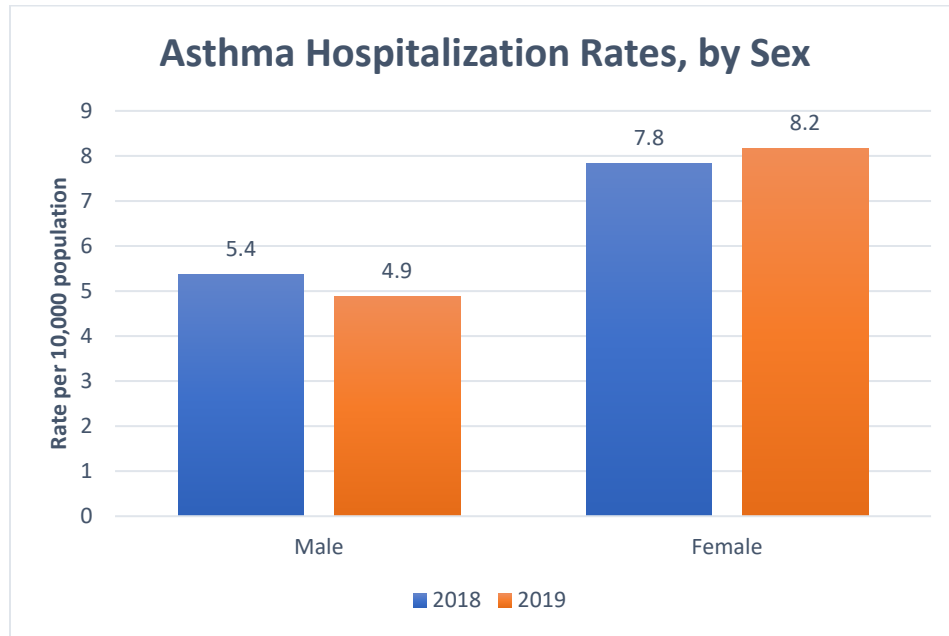


Figure 3: Asthma Hospitalization Crude Rates per 10,000 population, by Demographics Characteristics



Asthma Hospitalizations, by Sex and Age

Males tended to have more hospitalizations due to asthma in the younger age groups; conversely, females had more asthma hospitalizations in the adult age groups.

Males

- **Males under the age of 10 years** consistently made up the largest proportion of the total hospitalizations due to asthma for the male population, accounting for **50%** and **44%** of asthma hospitalizations in 2018 and 2019, respectively.
- **Males in the 20-44 years age group** made up the next largest chunk of asthma hospitalizations (**16%** and **17%** for 2018 and 2019, respectively) for the male population.

Females

- **Females in the 20-64 age group** consistently made up the largest proportion of the total hospitalizations due to asthma for the female population, accounting for **54%** and **53%** of asthma hospitalizations in 2018 and 2019, respectively.
- **Females in the 65+ years age group** made up the next largest chunk of asthma hospitalizations (**19%** and **20%** for 2018 and 2019, respectively) for the female population.

Asthma Hospitalizations, by Sex and Race/Ethnicity

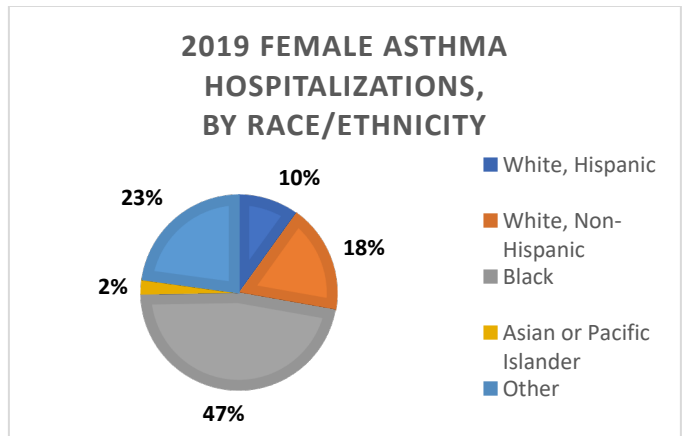
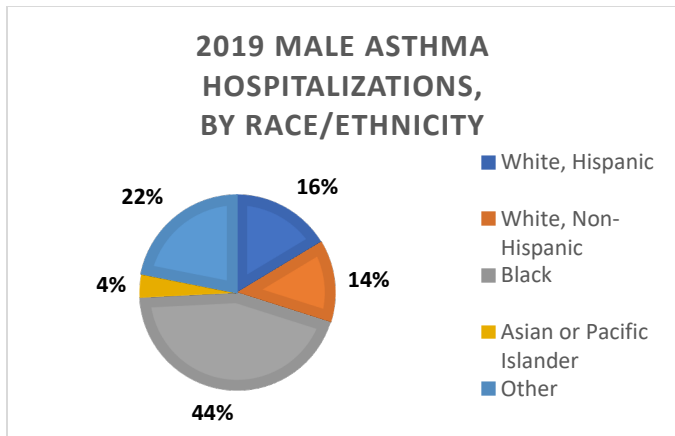
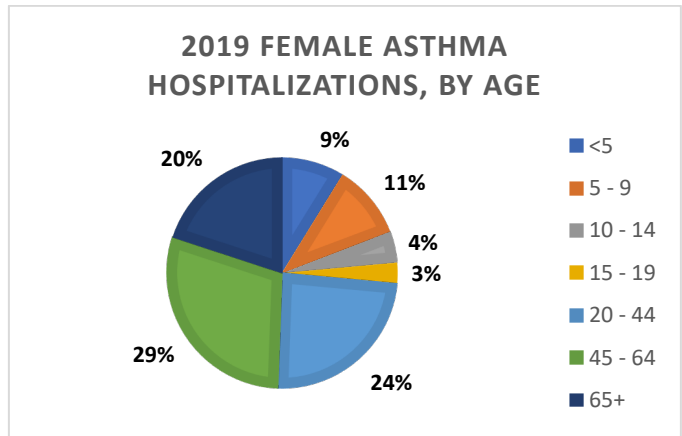
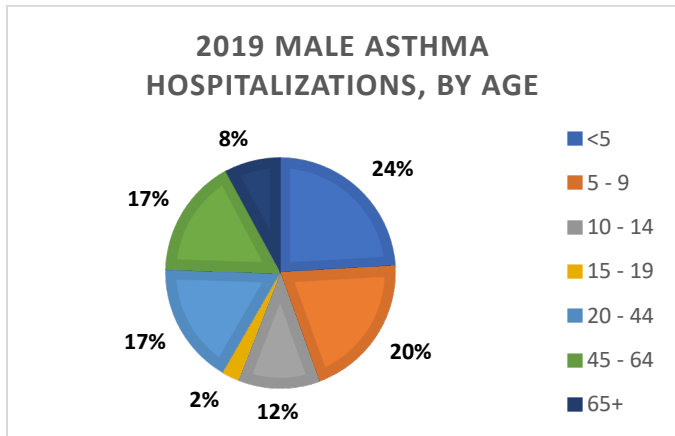
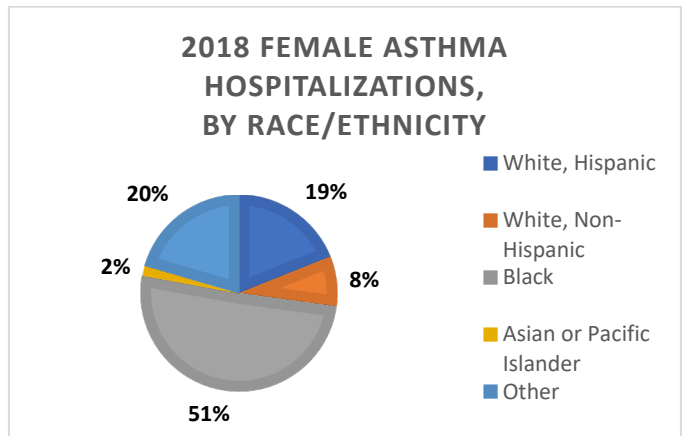
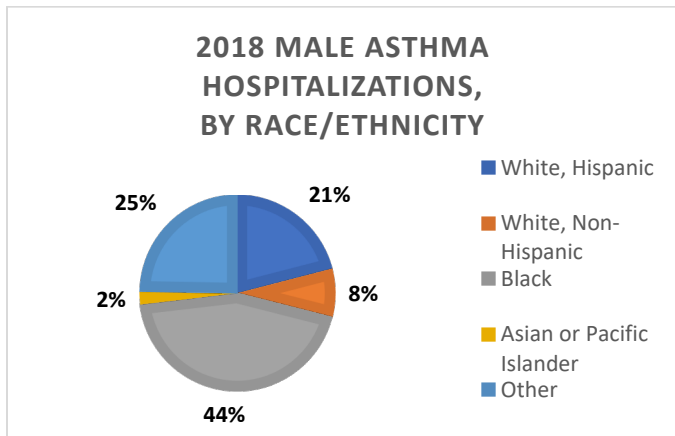
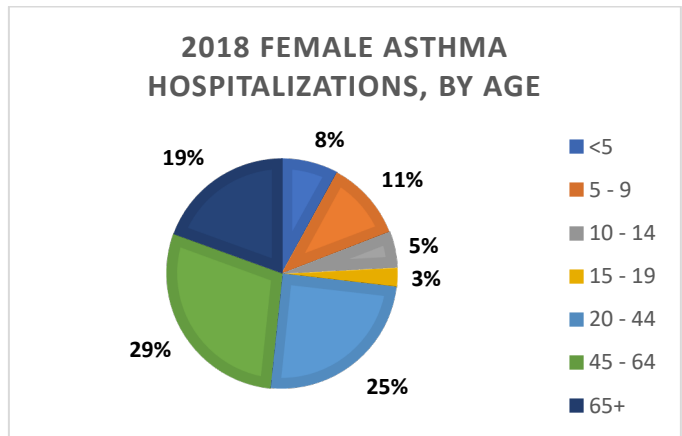
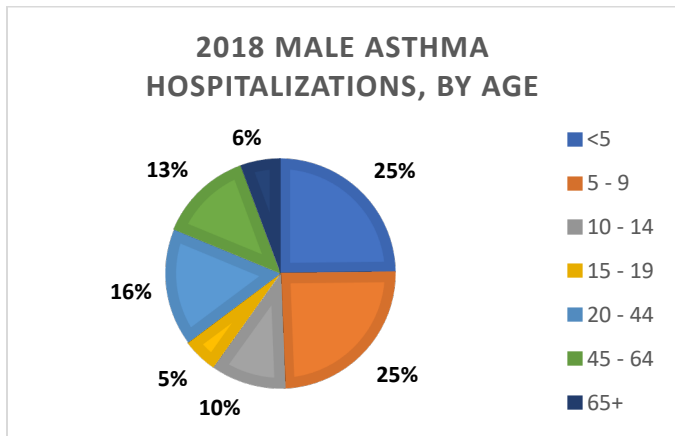
Males

- **Blacks males** consistently made up the largest proportion of the total hospitalizations due to asthma for the male population, accounting for **44%** of asthma hospitalizations in both 2018 and 2019.
 - This is an estimated **2.8x**, **3.1x**, and **11.0x** the proportion of total male asthma hospitalizations for the **White Hispanic**, **White non-Hispanic**, and **Asian/Pacific Islander** male populations, respectively, in 2019.

Females

- **Black females** consistently made up the largest proportion of the total hospitalizations due to asthma for the female population, accounting for **51%** and **47%** of asthma hospitalizations in 2018 and 2019, respectively.
 - This is an estimated **4.7x**, **2.6x**, and **23.5x** the proportion of total female asthma hospitalizations for the **White Hispanic**, **White non-Hispanic**, and **Asian/Pacific Islander** female populations, respectively, in 2019.

Figure 4: Proportion (%) of 2018 and 2019 Asthma Hospitalizations, by Sex/Age and Sex/Race





EMERGENCY DEPARTMENT (ED) VISITS



EMERGENCY DEPARTMENT (ED) VISITS

Data Source: Texas Department of State Health Services, Texas Health Care Information Collection.

Notes:

Emergency Department (ED) visits due to asthma (or, asthma ED visits) are defined as ED visits where asthma (ICD-10 code J45.X) was listed as the Principal Discharge Diagnosis.

Children are defined as populations under the age of 18 years. Adults are defined as populations ages 18 years and older.

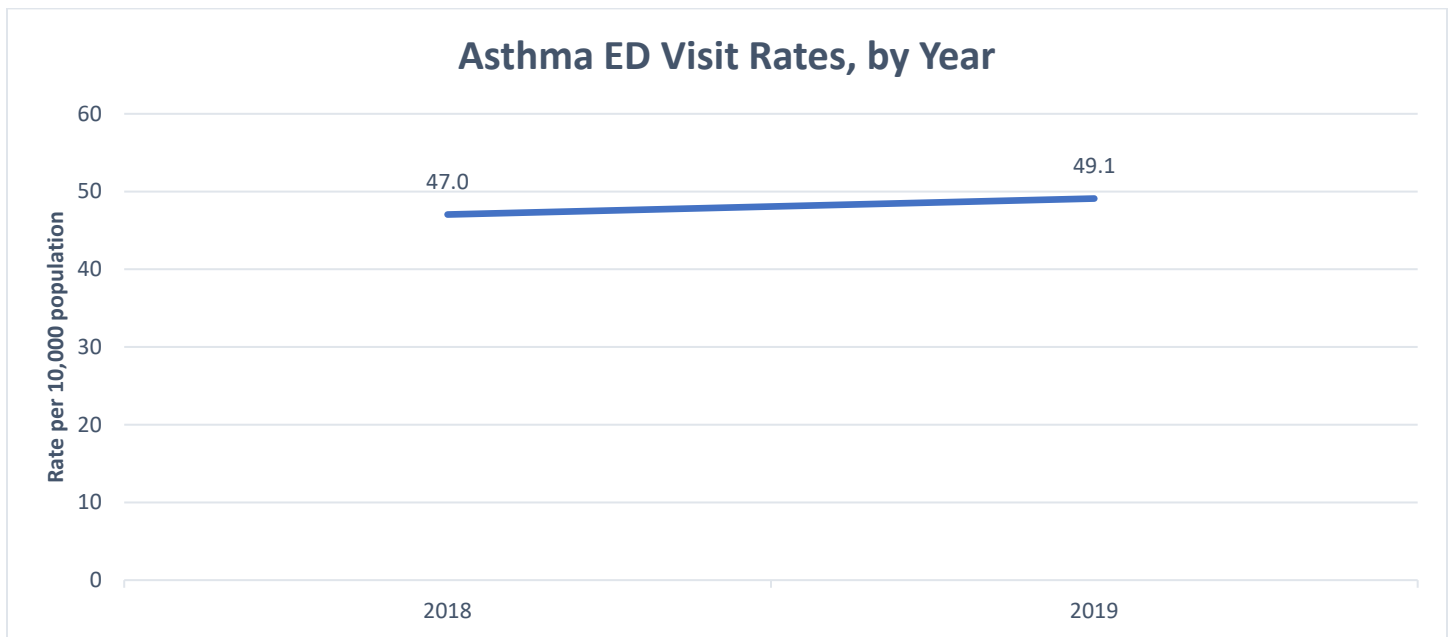
Tables with more detailed breakdowns of asthma ED visits by various characteristics in counts, percentages, and rates can be found in the **Appendix** (Tables A2 and A3).

Asthma ED Visits, Overall

The emergency department (ED) rates due to asthma have slightly increased over the past couple of years.

- In 2018, there were **47.0** ED visits per 10,000 Houston population (adults and children) due to asthma. This is lower than the **national rate of ED visits due to asthma** which comes out to **50.6** ED visits per 10,000 population (adults and children) due to asthma¹⁵.
- In 2019, there were **49.1** ED visits per 10,000 population (adults and children) due to asthma.

Figure 5: Asthma ED Visit Crude Rates per 10,000 population, by Year



Asthma ED Visits, by Sex

*Population estimates by sex obtained from 2018 ACS 5-Year Estimates and 2019 ACS 5-Year Estimates, "Age and Sex"

Overall, females typically account for slightly more of the ED visits due to asthma, and have a higher rate of asthma ED visits, than males.

2018

- **Males** accounted for **47.6%** of ED visits due to asthma, and **females** accounted for **52.4%** of ED visits due to asthma.
- This translates to **44.8** asthma ED visits per 10,000 **male** population, and **49.3** asthma ED visits per 10,000 **female** population in Houston.

2019

- **Males** accounted for **47.8%** of ED visits due to asthma, and **females** accounted for **52.2%** of ED visits due to asthma.
- This translates to **47.0** asthma ED visits per 10,000 **male** population, and **51.2** asthma ED visits per 10,000 **female** population in Houston.

Asthma ED Visits, by Age

*Population estimates by age obtained from 2018 ACS 5-Year Estimates and 2019 ACS 5-Year Estimates, "Age and Sex"

Children under the age of 18 typically account for most of the ED visits due to asthma, and have had more than double the rate of asthma ED visits compared to adults ages 18 years and older in recent years.

2018

- **Children** accounted for **46.1%** of ED visits due to asthma, the majority of which come from children under the age of 10 years.
- **Adults between the ages of 25 to 44 years** composed the second largest chunk of ED visits due to asthma, accounting for **25.2%** of these ED visits.
- The rate of ED visits due to asthma for **children** was **86.7** visits per 10,000 children population in Houston, while the asthma ED visit rate for **adults** was **33.8** visits per 10,000 adult population in Houston.

2019

- **Children** accounted for **41.8%** of ED visits due to asthma, the majority of which come from children under the age of 10 years.
- **Adults between the ages of 25 to 44 years** composed the second largest chunk of ED visits due to asthma, accounting for **27.4%** of these ED visits.
- The rate of ED visits due to asthma for **children** was **81.7** visits per 10,000 children population in Houston, while the asthma ED visit rate for **adults** was **38.2** visits per 10,000 adult population in Houston.

Asthma ED Visits, by Race/Ethnicity

*American Indian/Alaska Native race category excluded due to low counts.

*Population estimates by race and ethnicity (separate) obtained from 2018 ACS 5-Year Estimates and 2019 ACS 5-Year Estimates, "ACS Demographic and Housing Characteristics".

*Population estimates by race and ethnicity (combined) obtained from Houston State of Health, 2021 Demographics.

The distribution of ED visits due to asthma across race and ethnicity varied between 2018 and 2019. However, despite these differences over time, Black populations consistently account for most of the asthma ED visits.

2018

- The **Black** population accounted for **54.3%** of ED visits due to asthma, followed by the **White Hispanic** population which accounted for **15.4%** of asthma ED visits.
 - This translates to **110.1** ED visits due to asthma per 10,000 **Black** population, and **26.0** asthma ED visits per 10,000 **White Hispanic** population in Houston.
- **White non-Hispanics** and **Asians/Pacific Islanders** cumulatively accounted for **less than 10%** of total asthma ED visits.
 - There were **13.1** ED visits due to asthma per 10,000 **White non-Hispanic** population, and **9.9** asthma ED visits per 10,000 **Asian/Pacific Islander** population in Houston.
- ED visits due to asthma were evenly split between the **Hispanic** and **non-Hispanics** populations, with each accounting for **50.0%** of the asthma ED visits.
 - This translates to **52.5** ED visits due to asthma per 10,000 **Hispanic** population, and **42.6** asthma ED visits per 10,000 **non-Hispanic** population in Houston.

2019

- The **Black** population accounted for **56.5%** of ED visits due to asthma, followed by the **White non-Hispanic** population which accounted for **11.0%** of asthma ED visits.
 - This translates to **120.2** ED visits due to asthma per 10,000 **Black** population, and **22.7** asthma ED visits per 10,000 **White non-Hispanic** population in Houston.
- **White Hispanics** and **Asian/Pacific Islanders** cumulatively accounted for **just over 10%** of total asthma ED visits.
 - There were **17.6** ED visits due to asthma per 10,000 **White Hispanic** population, and **9.3** asthma ED visits per 10,000 **Asian/Pacific Islander** population in Houston.
- There was a big shift in the distribution of ED visits due to asthma by ethnicity. Across all races, **non-Hispanics** populations accounted for **almost 3x** the amount of asthma ED visits as compared to **Hispanic** populations.
 - This translates to **27.7** ED visits due to asthma per 10,000 **Hispanic** population, and **66.5** asthma ED visits per 10,000 **non-Hispanic** population.

Figure 6: Proportions (%) of Asthma ED Visits, by Demographic Characteristic

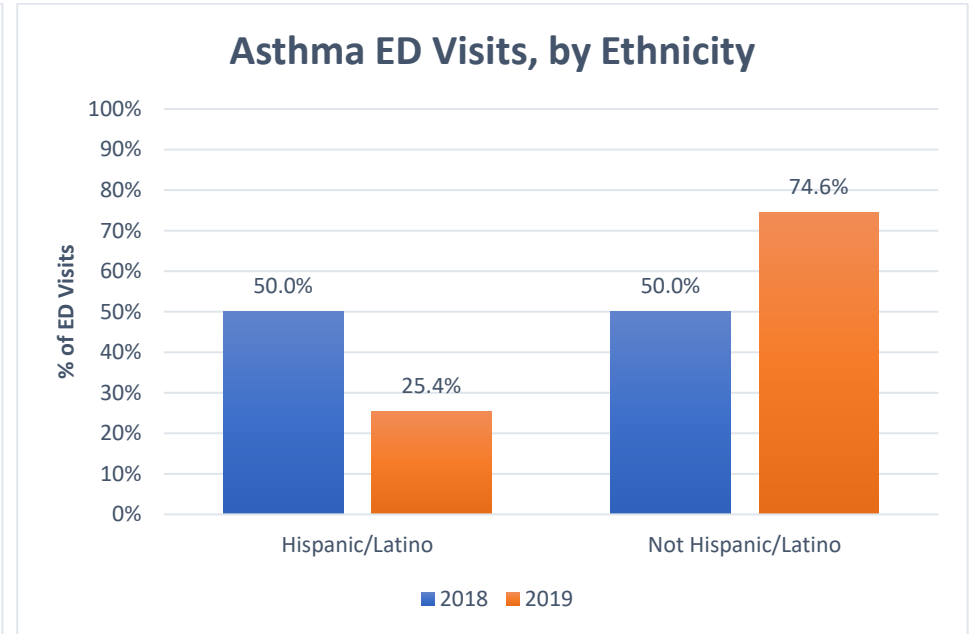
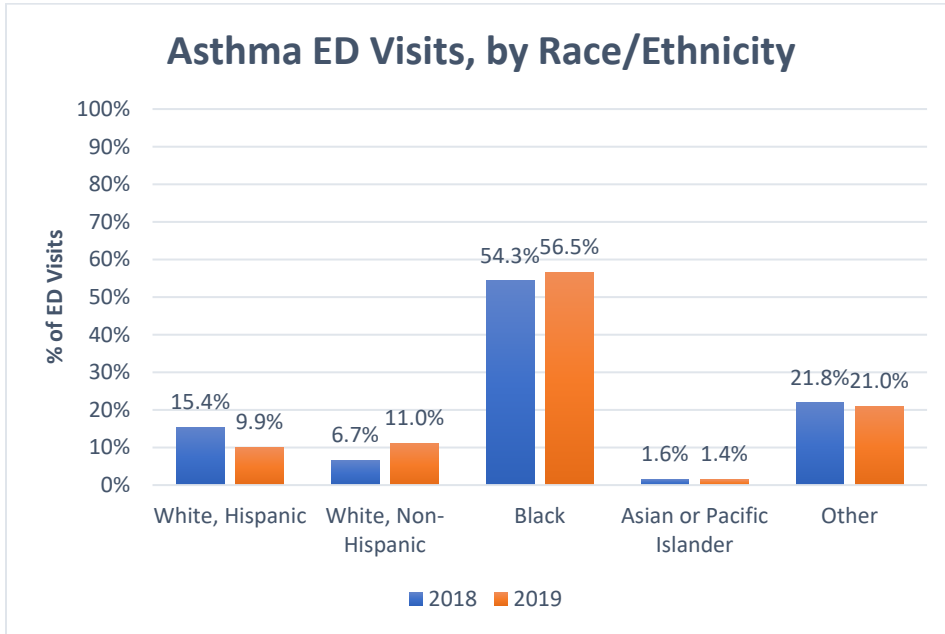
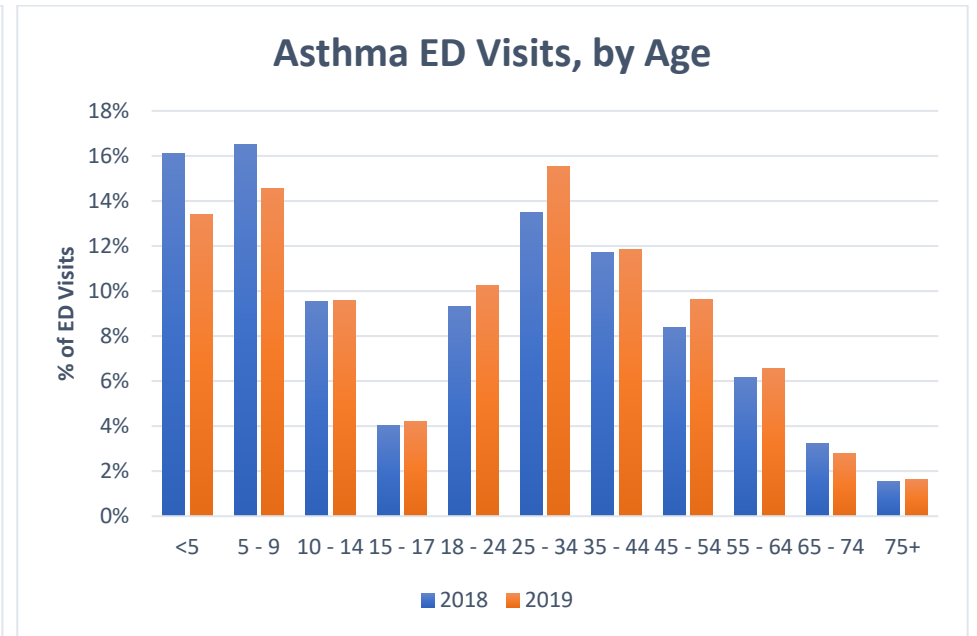
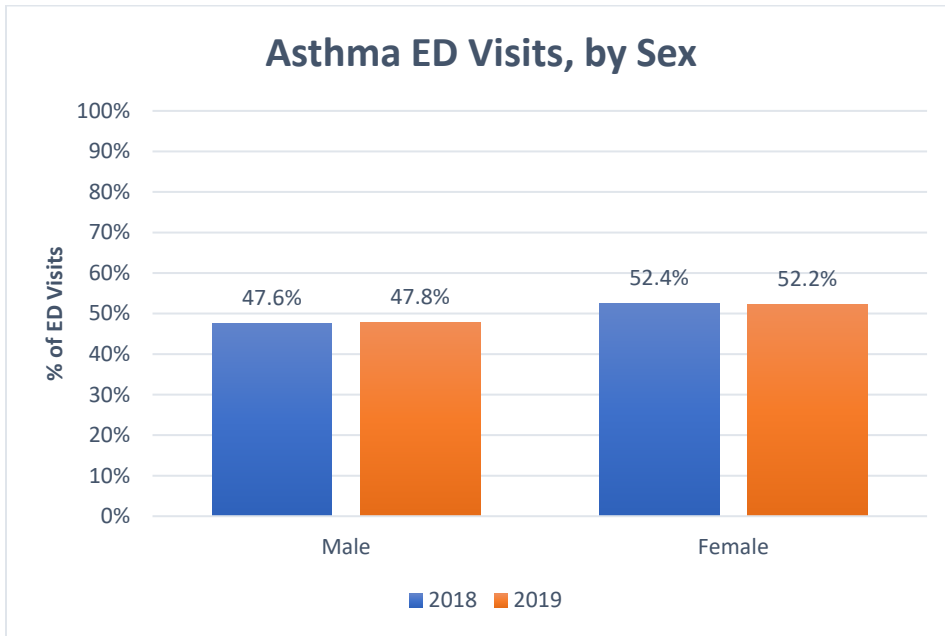
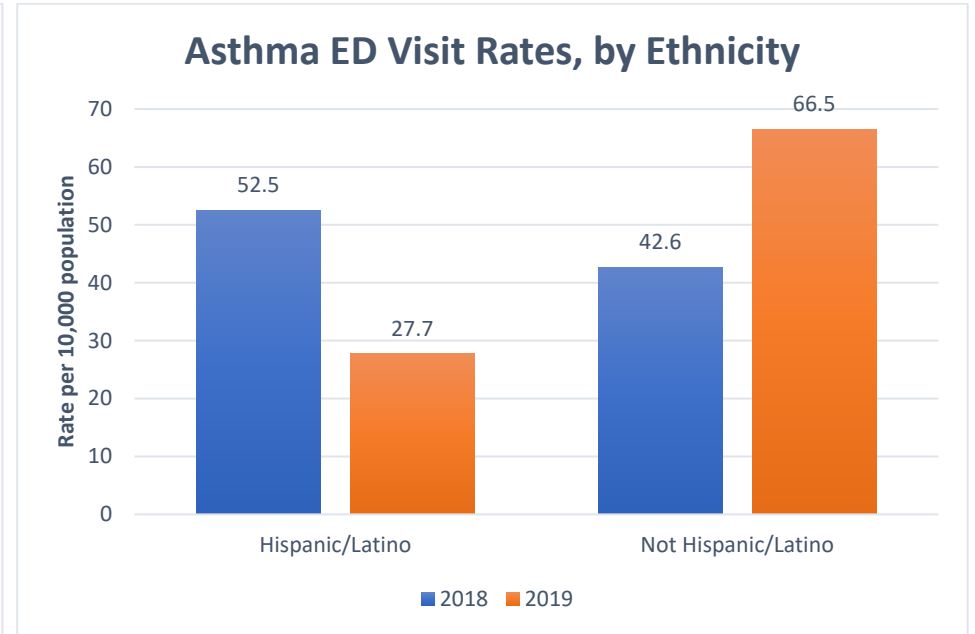
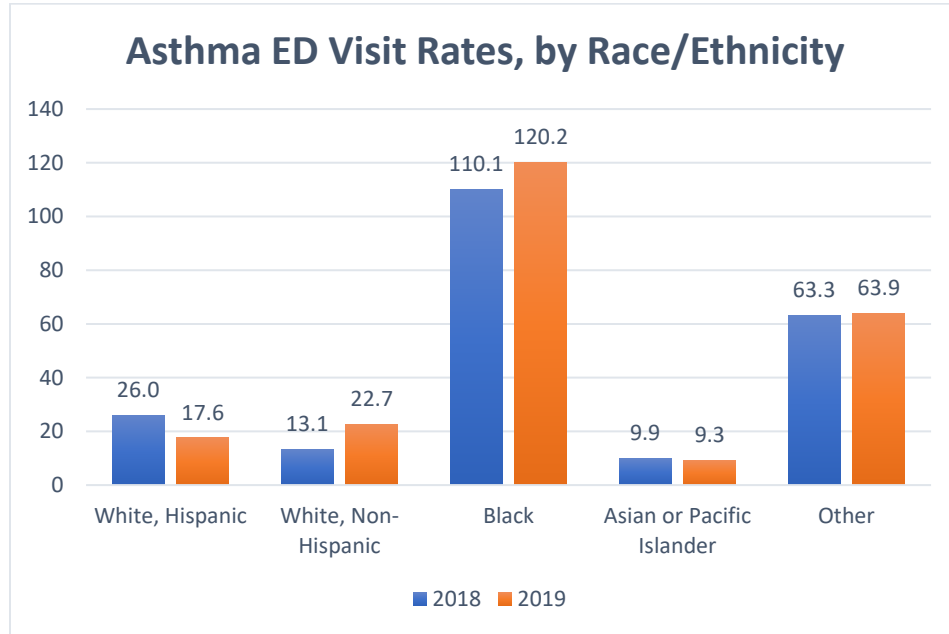
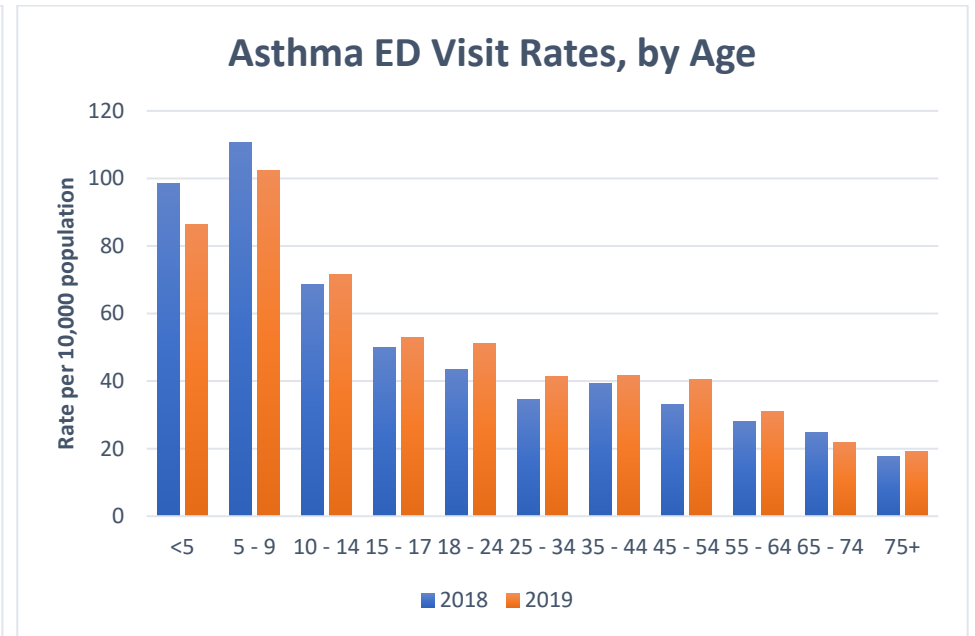
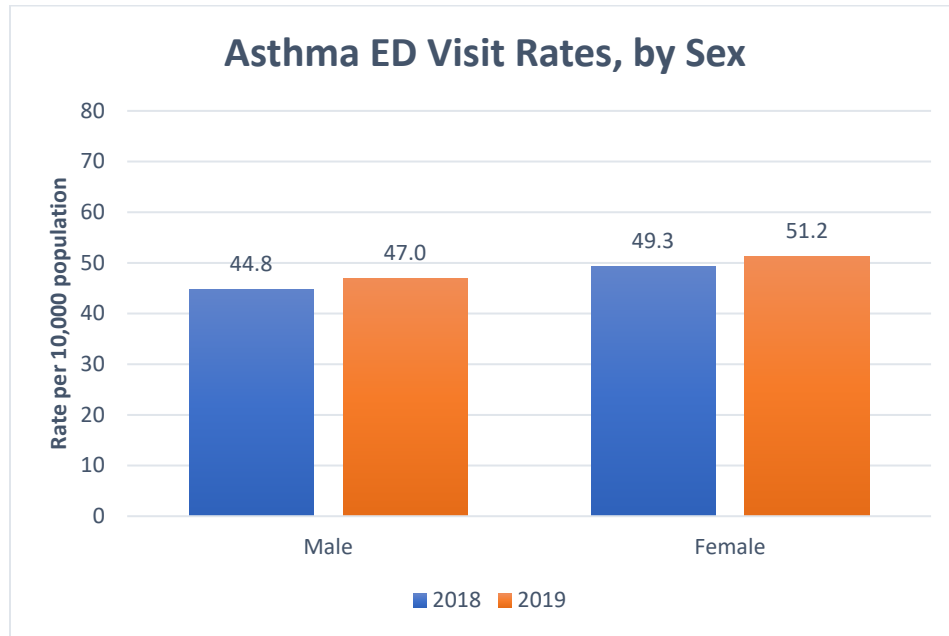


Figure 7: Asthma ED Visit Crude Rates per 10,000 population, by Demographics Characteristics



Asthma ED Visits, by Sex and Age

Males tended to have more ED visits due to asthma in the younger age groups; conversely, females had more asthma hospitalizations in the adult age groups.

Males

- **Males under the age of 15 years** consistently made up the largest proportion of the total ED visits due to asthma for the male population, accounting for **58%** and **51%** of asthma ED visits in 2018 and 2019, respectively.
- **Males in the 20-44 years age group** made up the next largest chunk of asthma ED visits (**24%** and **28%** for 2018 and 2019, respectively) for the male population.

Females

- **Females in the 20-44 years age group** consistently made up the largest proportion of the total hospitalizations due to asthma for the female population, accounting for **38%** and **41%** of asthma ED visits in 2018 and 2019, respectively.
- **Females in the 45-64 years age group** made up the next largest chunk of asthma ED visits (**18%** and **19%** for 2018 and 2019, respectively) for the female population.

Asthma ED Visits, by Sex and Race/Ethnicity

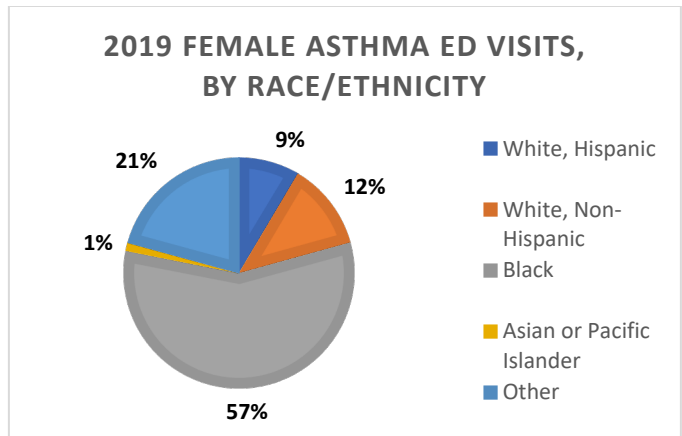
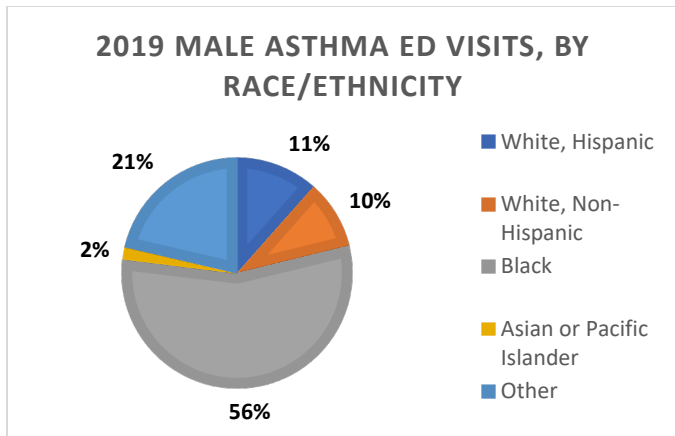
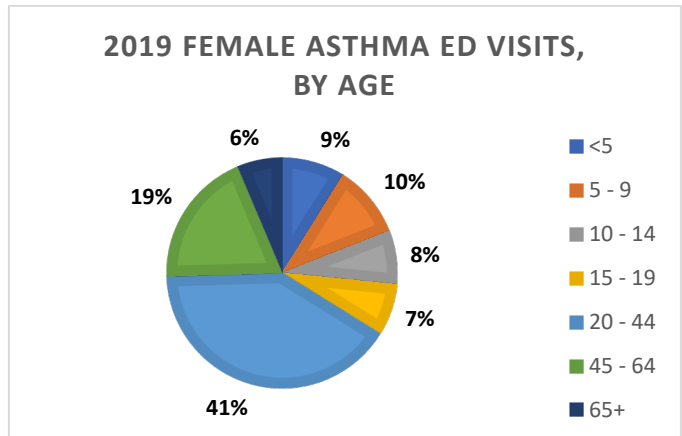
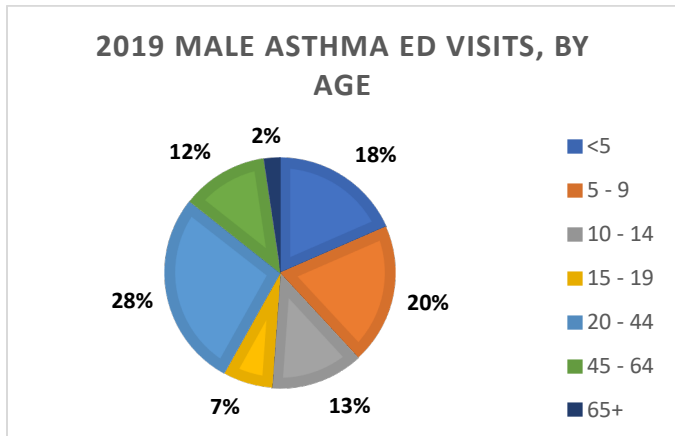
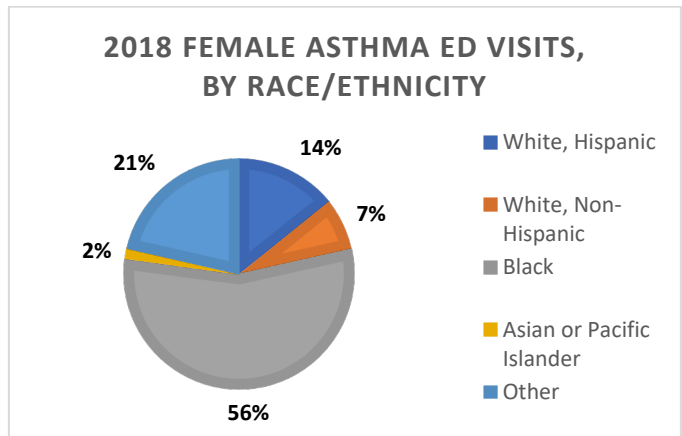
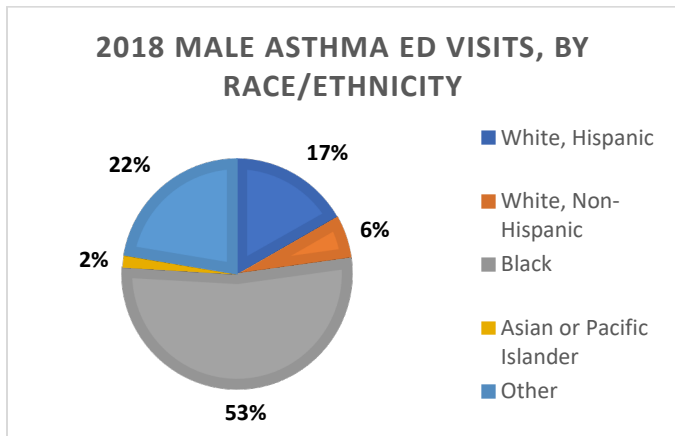
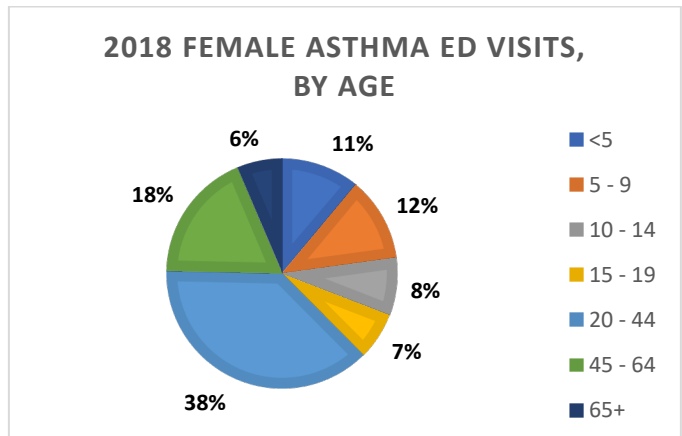
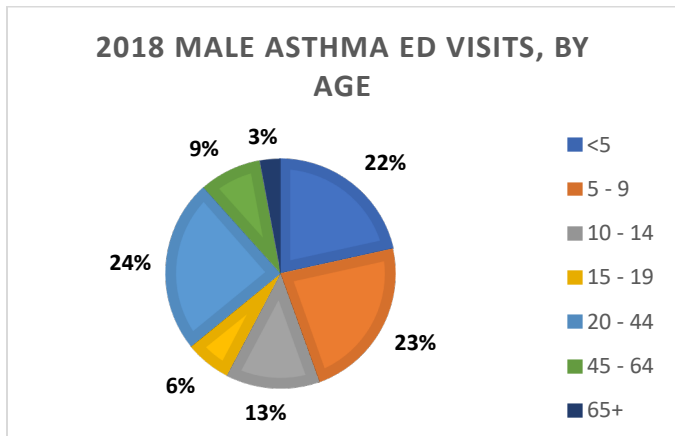
Males

- **Blacks males** consistently made up the largest proportion of the total ED visits due to asthma for the male population, accounting for **53%** and **56%** of asthma ED visits in 2018 and 2019, respectively.
 - This is as estimated **5.1x**, **5.6x**, and **28x** the proportion of total male asthma ED visits for the **White Hispanic**, **White non-Hispanic**, and **Asian/Pacific Islander** male populations, respectively, in 2019.

Females

- **Black females** consistently made up the largest proportion of the total ED visits due to asthma for the female population, accounting for **56%** and **57%** of asthma ED visits in 2018 and 2019, respectively.
 - This is an estimated **6.3x**, **4.8x**, and **57x** the proportion of total female asthma ED visits for the **White Hispanic**, **White non-Hispanic**, and **Asian/Pacific Islander** female populations, respectively, in 2019.

Figure 8: Proportion (%) of 2018 and 2019 Asthma ED Visits, by Sex/Age and Sex/Race





MORTALITY

MORTALITY

Data Source: Houston Health Department, Bureau of Vital Statistics.

Notes:

Mortality due to asthma is defined as a death where asthma was listed as factor contributing to death.

Further breakdowns by demographic characteristics not provided due to low counts.

Houston, as compared to the rest of the nation, has relatively low mortality due to asthma.

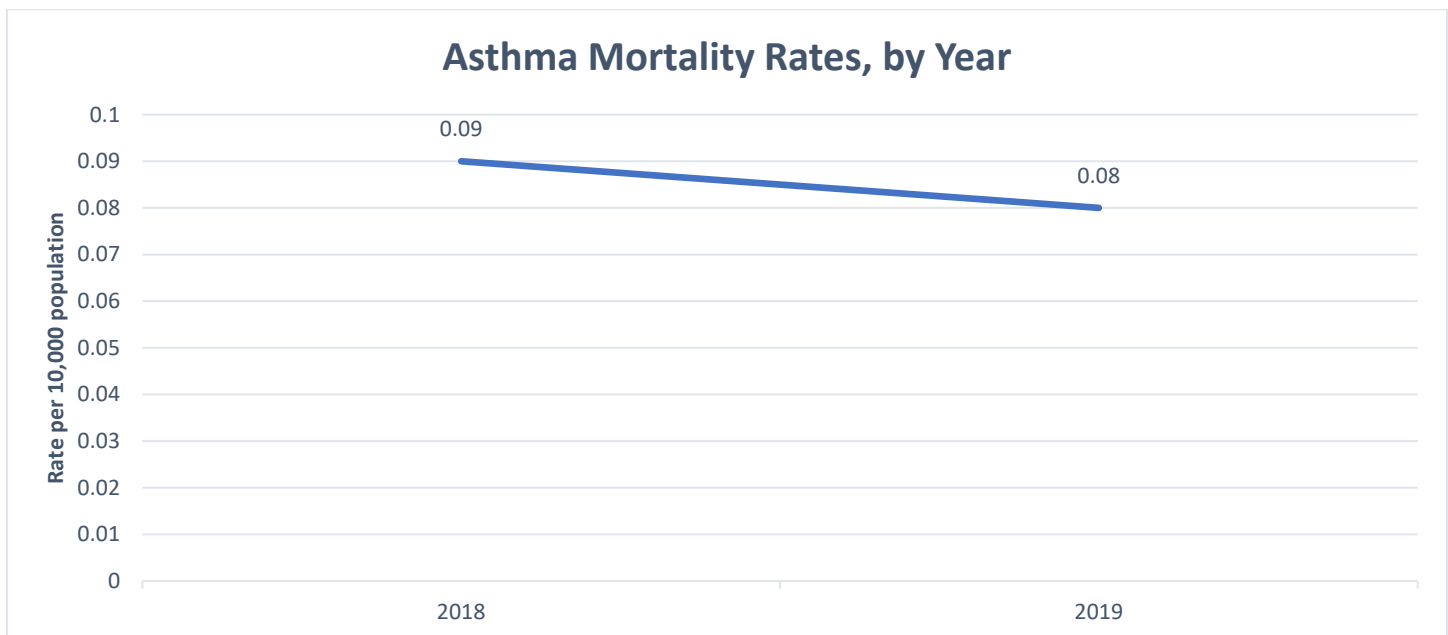
2018

- There were **21 deaths** reported where asthma was listed as a contributing factor. This accounts for **0.27%** of all deaths reported in the City for that year.
- This translates to a mortality rate of **0.09** deaths where asthma was a contributing factor per 10,000 Houston population (adults and children).

2019

- There were **18 deaths** reported where asthma was listed as a contributing factor. This accounts for **0.54%** of all deaths reported in the City for that year.
- This translates to a mortality rate of **0.08** deaths where asthma was a contributing factor per 10,000 Houston population (adults and children).
- In comparison, there were **3,524 deaths** due to asthma nationally, which translates to a **national asthma mortality rate** of an estimated **0.107** per 10,000 population (adults and children)¹⁵.

Figure 9: Asthma Mortality Rates per 10,000 population, by Year



The background features a stylized, semi-transparent orange silhouette of a human torso, showing the ribcage and spine. Overlaid on this is a network of thin white lines connecting several small white circular nodes, suggesting a data or communication network. The overall color palette is monochromatic, consisting of various shades of orange and white.

HIGH-BURDEN ZIP CODES

HIGH-BURDEN ZIP CODES

Notes:

Maps showing the distribution of the asthma burden around the City of Houston can be found in the **Appendix** (Figures A1 and A2).

There are certain areas within the City of Houston that are hotspots where the population bears a disproportionate amount of the city's asthma burden. Below are 20 zip codes that have been identified as "high-burden zip codes" in which asthma exacerbations are more prevalent and access to care is limited. The Houston Asthma Prevention and Control Program will target intervention efforts in these areas to alleviate this inequity.

Overall, the City of Houston encompasses **104 zip codes**. The criteria used to identify these high-burden zip codes include:

- 2018 hospitalization rates due to asthma,
- 2019 hospitalization rates due to asthma,
- 2018 emergency department visit rates due to asthma,
- 2019 emergency department visit rates due to asthma,
- Median household income, and
- Number of hospital facilities.

High-Burden Zip Codes:

77026	77028	77051	77032	77016	77021	77033	77090	77078	77598
77091	77048	77035	77047	77489	77067	77071	77053	77014	77082

The **20 zip codes** (as determined by the above-listed criteria) account for:

- **22.4%** of all hospitalizations due to asthma in 2018,
- **22.6%** of all hospitalizations due to asthma in 2019,
- **32.7%** of all ED visits due to asthma in 2018,
- **24.6%** of all ED visits due to asthma in 2019,
- **11.8%** of the population of Houston, and
- include **19.5%** of hospital facilities in Houston.
- The median household income in these zip codes ranges from an estimated **\$28,000 to \$68,000**.

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APPENDIX

Table A1: 2018, 2019 Hospitalizations due to Asthma – COUNTS

	2018				2019			
	Asthma-Related ¹		Asthma Principal Dx ²		Asthma-Related ¹		Asthma Principal Dx ²	
TOTAL	13733	-	1514	11.0%	14828	-	1509	10.2%
Facilities reporting	178	-	69	-	154	-	55	-
Quarter								
Q1	3734	27.2%	487	32.2%	3610	24.3%	438	29.0%
Q2	3232	23.5%	334	22.1%	3594	24.2%	345	22.9%
Q3	3191	23.2%	308	20.3%	3606	24.3%	337	22.3%
Q4	3576	26.0%	385	25.4%	4018	27.1%	389	25.8%
Sex								
Male	4052	29.5%	615	40.6%	4139	27.9%	563	37.3%
Female	9681	70.5%	899	59.4%	10689	72.1%	946	62.7%
Age								
< 5	663	4.8%	230	15.2%	739	5.0%	230	15.2%
5 - 9	628	4.6%	265	17.5%	474	3.2%	209	13.9%
10 - 14	539	3.9%	119	7.9%	426	2.9%	104	6.9%
15 - 17	484	3.5%	44	2.9%	257	1.7%	29	1.9%
18 - 24	1058	7.7%	51	3.4%	1124	7.6%	51	3.4%
25 - 34	1844	13.4%	95	6.3%	2100	14.2%	114	7.6%
35 - 44	2046	14.9%	168	11.1%	1547	10.4%	167	11.1%
45 - 54	1557	11.3%	181	12.0%	1704	11.5%	172	11.4%
55 - 64	2020	14.7%	163	10.8%	2189	14.8%	207	13.7%
65 - 74	1864	13.6%	106	7.0%	2151	14.5%	128	8.5%
75+	1783	13.0%	92	6.1%	2116	14.3%	98	6.5%
Race								
White, Hispanic	2585	18.8%	299	19.7%	1469	9.9%	186	12.3%
White, non-Hispanic	2505	18.2%	123	8.1%	4200	28.3%	245	16.2%
Black	5437	39.6%	727	48.0%	5828	39.3%	693	45.9%
Asian or Pacific Islander	390	2.8%	28	1.8%	453	3.1%	45	3.0%
American Indian or Alaska Native	16	0.1%	<5	-	12	0.1%	<5	-
Other	2800	20.4%	336	22.2%	2866	19.3%	339	22.5%
Ethnicity								
Hispanic	6194	45.1%	813	53.7%	3228	21.8%	425	28.2%
Non-Hispanic	7521	54.8%	698	46.1%	11567	78.0%	1080	71.6%
Originated in ED								
Yes	9173	66.8%	1285	84.9%	10467	70.6%	1315	87.1%
No	4560	33.2%	229	15.1%	4361	29.4%	194	12.9%
Risk of Mortality								
Minor	7248	52.8%	961	63.5%	7412	50.0%	883	58.5%
Moderate	3037	22.1%	307	20.3%	3249	21.9%	350	23.2%

Major	2521	18.4%	220	14.5%	3065	20.7%	238	15.8%
Extreme	927	6.8%	26	1.7%	1102	7.4%	38	2.5%
Illness Severity								
Minor	2955	21.5%	568	37.5%	2844	19.2%	504	33.4%
Moderate	5411	39.4%	518	34.2%	5605	37.8%	509	33.7%
Major	4170	30.4%	382	25.2%	4632	31.2%	383	25.4%
Extreme	1197	8.7%	46	3.0%	1747	11.8%	113	7.5%
Average Length of Stay (days)	4.9	-	2.8	-	4.6	-	2.7	-

Source: Texas Department of State Health Services, Texas Health Care Information Collection (THCIC).

¹ Asthma-Related is defined as any hospitalization in which asthma was listed as a discharge diagnosis.

² Asthma Principal Dx is defined as a hospitalization in which asthma was listed as the principal discharge diagnosis.

Table A2: 2018, 2019 Emergency Department Visits due to Asthma – COUNTS

	2018				2019			
	Asthma-Related ¹		Asthma Principal Dx ²		Asthma-Related ¹		Asthma Principal Dx ²	
TOTAL	42214	-	10801	25.6%	55013	-	11344	20.6%
Facilities reporting	242	-	150	-	232	-	159	-
Quarter								
Q1	10236	24.2%	3176	29.4%	14029	25.5%	3225	28.4%
Q2	9147	21.7%	2401	22.2%	13141	23.9%	2634	23.2%
Q3	10522	24.9%	2336	21.6%	12711	23.1%	2400	21.2%
Q4	12309	29.2%	2888	26.7%	15132	27.5%	3085	27.2%
Sex								
Male	15529	36.8%	5143	47.6%	20077	36.5%	5420	47.8%
Female	26685	63.2%	5658	52.4%	34934	63.5%	5923	52.2%
Age								
< 5	3715	8.8%	1738	16.1%	4200	7.6%	1521	13.4%
5 - 9	4245	10.1%	1783	16.5%	5447	9.9%	1652	14.6%
10 - 14	3195	7.6%	1028	9.5%	4480	8.1%	1089	9.6%
15 - 17	1721	4.1%	437	4.0%	2466	4.5%	475	4.2%
18 - 24	4978	11.8%	1005	9.3%	6833	12.4%	1163	10.3%
25 - 34	7312	17.3%	1458	13.5%	10012	18.2%	1760	15.5%
35 - 44	5264	12.5%	1265	11.7%	6812	12.4%	1346	11.9%
45 - 54	4401	10.4%	904	8.4%	5673	10.3%	1091	9.6%
55 - 64	3606	8.5%	667	6.2%	4440	8.1%	742	6.5%
65 - 74	2237	5.3%	347	3.2%	2686	4.9%	318	2.8%
75+	1539	3.6%	168	1.6%	1964	3.6%	187	1.6%
Race								
White, Hispanic	6053	14.3%	1667	15.4%	4174	7.6%	1127	9.9%
White, non-Hispanic	3778	8.9%	720	6.7%	8894	16.2%	1244	11.0%
Black	21726	51.5%	5865	54.3%	28394	51.6%	6405	56.5%
Asian or Pacific Islander	567	1.3%	173	1.6%	683	1.2%	164	1.4%
American Indian or Alaska Native	59	0.1%	16	0.1%	82	0.1%	18	0.2%
Other	10031	23.8%	2360	21.8%	12777	23.2%	2383	21.0%
Ethnicity								
Hispanic	21447	50.8%	5396	50.0%	13280	24.1%	2878	25.4%
Non-Hispanic	20765	49.2%	5404	50.0%	41724	75.8%	8462	74.6%

Source: Texas Department of State Health Services, Texas Health Care Information Collection (THCIC).

¹ Asthma-Related is defined as any hospitalization in which asthma was listed as a discharge diagnosis.

² Asthma Principal Dx is defined as a hospitalization in which asthma was listed as the principal discharge diagnosis.

Table A3: 2018, 2019 Hospitalization and ED Visits Crude Rates by Demographic Characteristics (per 10,000 population*)

	Hospitalizations				ED Visits			
	2018		2019		2018		2019	
	Asthma-Related ¹	Asthma Principal Dx ²	Asthma-Related ¹	Asthma Principal Dx ²	Asthma-Related ¹	Asthma Principal Dx ²	Asthma-Related ¹	Asthma Principal Dx ²
TOTAL	59.8	6.6	64.2	6.5	183.9	47.0	238.1	49.1
Sex								
Male	35.3	5.4	35.9	4.9	135.3	44.8	174.1	47.0
Female	84.3	7.8	92.4	8.2	232.4	49.3	301.9	51.2
Age								
< 5	37.6	13.0	41.9	13.0	210.8	98.6	238.2	86.3
5 - 9	39.0	16.5	29.3	12.9	263.5	110.7	337.1	102.2
10 - 14	35.9	7.9	28.0	6.8	213.0	68.5	294.7	71.6
15 - 17	55.2	5.0	28.7	3.2	196.2	49.8	275.1	53.0
18 - 24	45.8	2.2	49.4	2.2	215.4	43.5	300.1	51.1
25 - 34	43.6	2.2	49.3	2.7	173.1	34.5	235.1	41.3
35 - 44	63.5	5.2	47.7	5.2	163.4	39.3	210.3	41.5
45 - 54	57.1	6.6	63.1	6.4	161.3	33.1	209.9	40.4
55 - 64	85.3	6.9	91.2	8.6	152.4	28.2	185.0	30.9
65 - 74	133.3	7.6	147.2	8.8	160.0	24.8	183.8	21.8
75+	186.3	9.6	218.1	10.1	160.8	17.6	202.4	19.3
Race/Ethnicity								
White, Hispanic	40.3	4.7	22.9	2.9	94.3	26.0	65.0	17.6
White, non-Hispanic	45.7	2.2	76.6	4.5	68.9	13.1	162.2	22.7
Black	102.0	13.6	109.4	13.0	407.7	110.1	532.8	120.2
Asian or Pacific Islander	22.2	1.6	25.8	2.6	32.3	9.9	38.9	9.3
American Indian or Alaska Native	8.7	-	6.5	-	32.0	8.7	44.5	9.8
Other	75.1	9.0	76.9	9.1	269.1	63.3	342.7	63.9
Ethnicity								
Hispanic	60.3	7.9	31.1	4.1	208.7	52.5	127.8	27.7
Non-Hispanic	59.3	5.5	91.0	8.5	163.7	42.6	328.1	66.5

Source: Texas Department of State Health Services, Texas Health Care Information Collection (THCIC).

*Population estimates taken from ACS 2018 5-year Estimates and ACS 2019 5-year Estimates for Houston city, Texas.

¹ Asthma-Related is defined as any hospitalization in which asthma was listed as a discharge diagnosis.

² Asthma Principal Dx is defined as a hospitalization in which asthma was listed as the principal discharge diagnosis.

Figure A1: 2018 and 2019 Asthma Hospitalizations by Zip Code – Counts and Rates

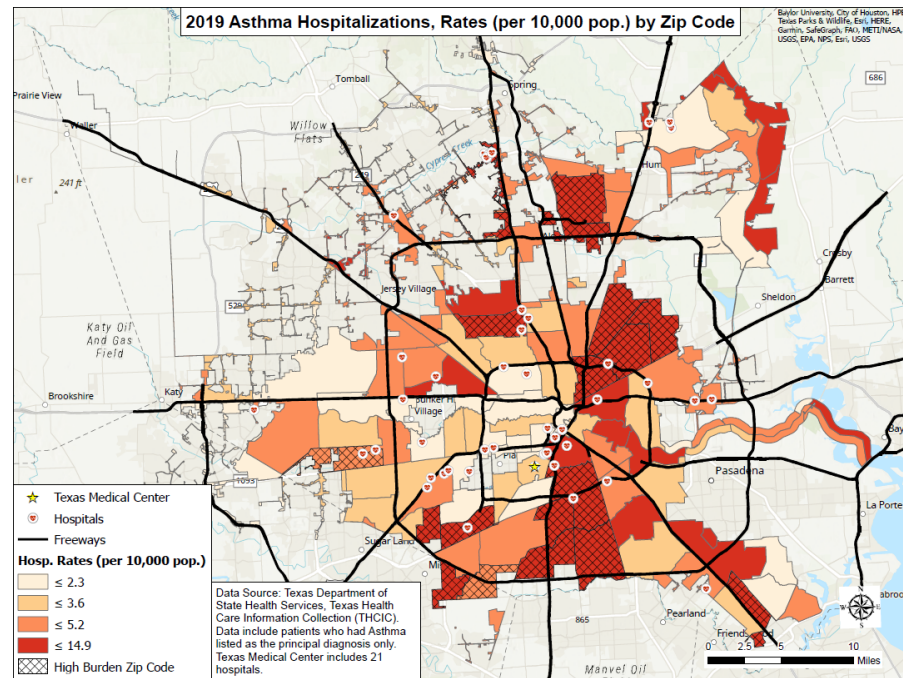
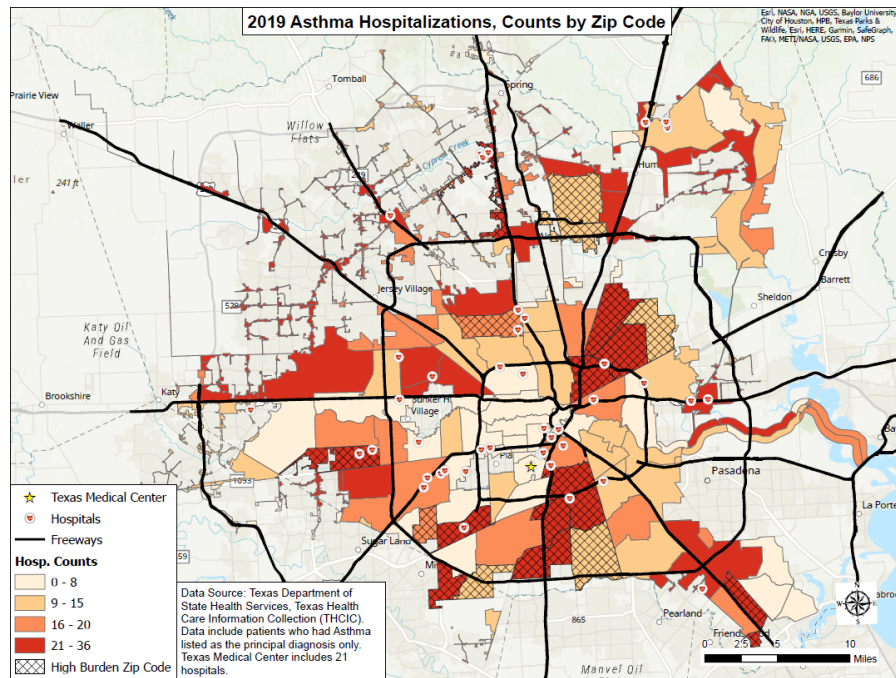
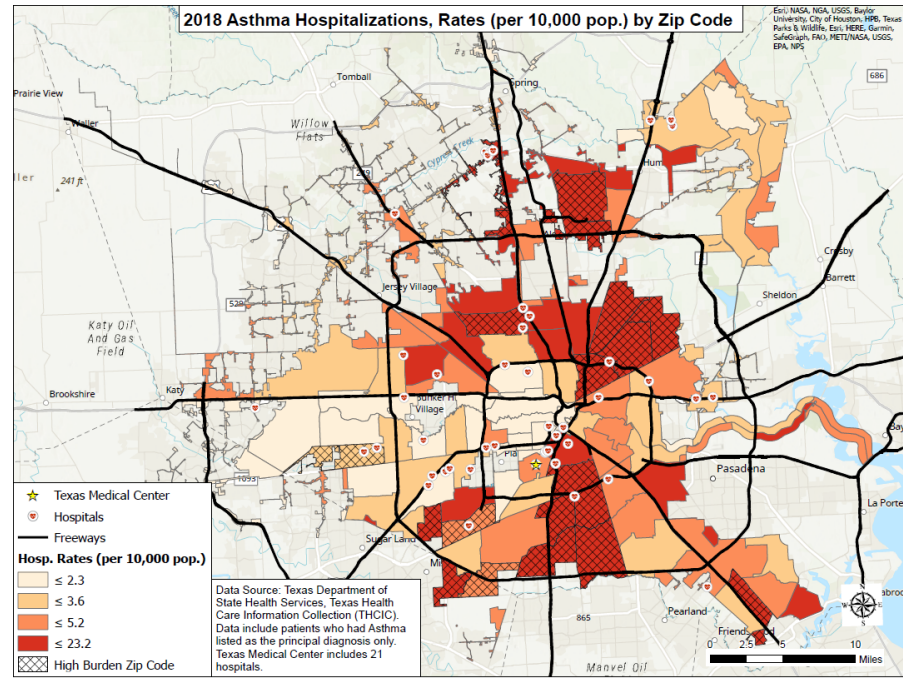
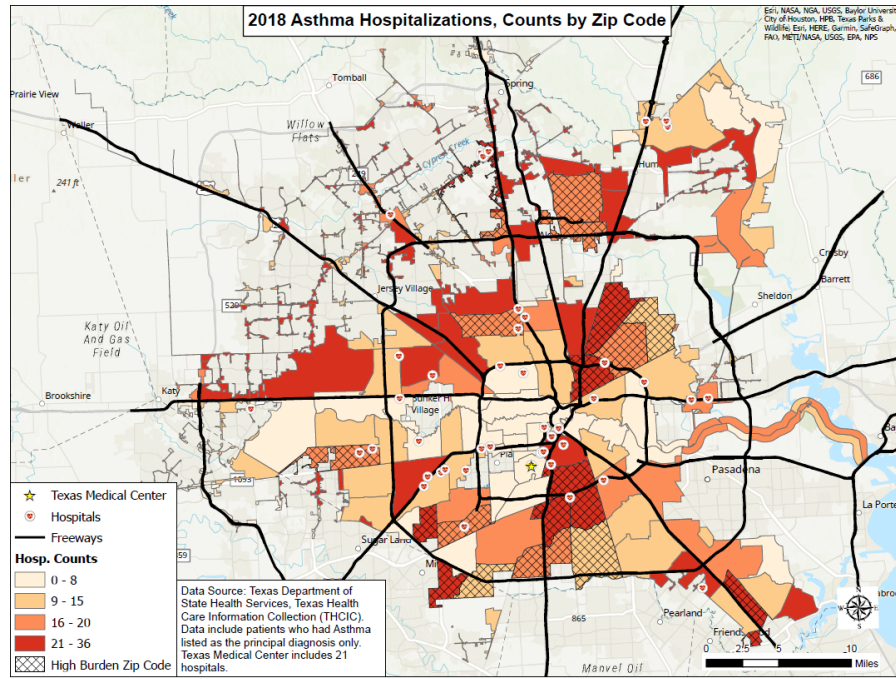


Figure A2: 2018 and 2019 Asthma Emergency Department Visits by Zip Code – Counts and Rates

