The 2020 Burden of Asthma in Ohio (Featuring 2019 Data)

Key Findings

- In 2019, there were a total of 54,616 asthma Emergency Department (ED) visits in Ohio.
    - 19,313 were by children, a rate of 74.1 ED visits per 10,000 residents.
    - 35,303 were by adults, a rate of 39.0 ED visits per 10,000 residents.
- Comparable to a total of 1,522,677 ED visits in the United States (2019).
    - Children aged 0-17 years accounted for 546,313 ED visits, at a rate of 74.8 per 10,000 residents.
    - Adults aged 18+ accounted for 976,344 visits, a rate of 38.3 per 10,000 residents.
- Inpatient Hospitalizations In 2019, there were a total of 5,945 asthma inpatient hospitalizations in Ohio.
    - 2,217 were by children, a rate of 8.5 hospitalizations per 10,000 residents.
    - 3,728 were by adults, a rate of 4.1 ED visits per 10,000 residents.
- Comparable to a total of 169,330 inpatient hospitalizations in the United States (2019).
    - Children (aged 0-17 years) accounted for 64,525 of the inpatient hospitalizations, at a rate of 8.8 per 10,000 residents.
    - Adults (aged 18+ years) accounted for 104,805 of the inpatient hospitalizations, at a rate of 4.1 per 10,000 residents.

- Medicaid was listed as the primary payer for the majority of child asthma-related hospital encounters (71%) and almost half (45%) of adult asthma-related hospital encounters.

- The rate of asthma ED visits for women is more than 1.5 times that of the rate for men. However, the asthma ED visit rate for boys was nearly 1.5 times that of girls.

- Asthma ED visit rates and hospitalization rates are both associated with age in Ohio.
    - The highest ED visit and hospitalization rates are those of children under the age of five (96.4 per 10,000 residents and 13.4, respectively). These rates drop dramatically with increasing age.

- Black adults in Ohio visit the ED for asthma at a rate nearly six times that of White adults (139.9 per 10,00 residents vs. 23.9, respectively).

- Black children comprised an estimated 16.2% of the Ohio population under age 18 but accounted for over one-half (51.8%) of the asthma ED visits in 2019.

- Most of the counties with the highest asthma ED visit rates in Ohio from 2016-2019 were urban counties.

Introduction

Asthma is a major public health concern in the United States. Asthma-related ED visits and asthma-related hospitalizations are important proxies of asthma burden and can be used to identify individuals with asthma that are at higher risk of morbidity and mortality due to poor asthma control. As of 2014, asthma is one of the top 20 reasons for ED visits in the U.S., accounting for approximately 1.7 million visits every year.[1] Of the 10 U.S. cities that had the highest rate of asthma-related ED visits, four were in Ohio: Dayton, Cleveland, Akron, and Columbus.[1] While emergency care may be necessary due to an asthma attack, effective asthma management, increased access to adequate care and a statewide focus on health equity can help reduce asthma-related ED visit rates and hospitalization rates.

Using Asthma Hospital Discharges to Assess Asthma Severity

Tracking rates of hospital admissions can aid in identifying populations with inadequate access to basic medical care. Hospital encounters, such as ED visits or hospitalizations, for the treatment of asthma represent severe asthma events that might have been prevented with proper management. Consequently, asthma hospital encounter data can be used as a proxy measurement for uncontrolled or severe asthma among Ohioans. The Ohio Hospital Association Clinical-Financial Data Set can be used to identify:

- Numbers and rates of hospital discharges and ED visits.
- Hospital discharge and ED visit rates by age, race, sex, or county.
- Annual trends for asthma hospital discharges and ED visits.
- Seasonality of asthma inpatient hospital visits and ED visits.

Source of Asthma Discharge and Emergency Department (ED) Visits Data

Asthma hospital discharge data and ED visits are collected by the Ohio Hospital Association (OHA) which shares the data with the Ohio Department of Health (ODH). The data are given by Ohio hospitals to OHA on a voluntary basis.

What is Considered a Hospitalization for Asthma

The Council of State and Territorial Epidemiologists (CSTE) and the Centers for Disease Control and Prevention (CDC) developed a standardized case classification for asthma to identify probable and possible asthma cases in hospital discharge and ED visit data. This report uses the probable case definition of asthma with hospital discharges and ED visits. A probable case is defined as a hospital record listing the ICD-10-CM code J45.X as the primary diagnosis. Beginning in October 2015, hospital records transitioned from ICD-9 to ICD-10 coding of diagnoses. This report contains data beginning in 2016 since that was the first complete year of hospital data using ICD-10 diagnosis codes to define an asthma hospital visit.

Limitations of Data Set

All Ohio hospitals currently contribute data to OHA. It should be noted that these data are collected for billing and other administrative purposes rather than for surveillance purposes. As a result, some of the variables that would be of interest for surveillance, such as education level or income, are not collected. Variables such as ethnicity or language are not currently reported consistently.

Additionally, unique identifiers are not assigned, so there is no way of identifying multiple hospital discharges for individuals. However, the count and rate of total hospital discharges and ED visits are good representations of the asthma burden.

The OHA discharge data set may not contain all hospital discharges for residents of Ohio, even with all hospitals reporting. While efforts are made to record asthma visits in other states, it is challenging to report individuals from Ohio who travel to other states.

In counties with few cases in a year, numbers and calculations will be redacted.

List of Figures

The Current Burden of Asthma in Ohio

Adults

In 2019, about one in nine Ohio adults (11.6%) currently have asthma.[2] The prevalence of current asthma among adults is higher among women (13.8%) compared to men (8.3%). The prevalence of current asthma is lowest among adults ages 65 and older (7.6%) but does not notably differ among any other age groups. The prevalence of current asthma among adults in Ohio does not remarkably differ by race/ethnicity. The prevalence of current asthma among adults is correlated with annual household income. Current asthma prevalence generally decreases as household income increases, from a high of 19.9% among households earning less than $15,000 per year, to a low of 7.7% among households earning more than $75,000 annually. The prevalence of current asthma is also correlated with education level. The prevalence of current asthma is higher among adults with less than a high school education (15.4%) compared to college graduates (8.9%).[2]

Children

An estimated one in 13 Ohio children (7.7%) currently have asthma.[2] The prevalence of asthma in children in Ohio does not notably differ by sex, age, or household income. However, Black, non-Hispanic children are nearly three times more likely to currently have asthma than White, non-Hispanic children (17.0% vs. 6.5%).[2]

National Data

Emergency Department Visits (2019)

- There was a total of 1,522,677 ED visits in the United States.
- Children aged 0-17 years accounted for 546,313 ED visits, at a rate of 74.8 per 10,000 residents.
- Adults aged 18+ accounted for 976,344 visits, a rate of 38.3 per 10,000 residents.

Inpatient Hospitalizations (2019)

- There was a total of 169,330 inpatient hospitalizations in the United States.
- Children (aged 0-17 years) accounted for 64,525 of the inpatient hospitalizations, at a rate of 8.8 per 10,000 residents.
- Adults (aged 18+ years) accounted for 104,805 of the inpatient hospitalizations, at a rate of 4.1 per 10,000 residents.

Source: Centers for Disease Control and Prevention. (2022, December 13). *Most recent national asthma data*. Centers for Disease Control and Prevention. Retrieved March 3, 2023, from https://www.cdc.gov/asthma/most_recent_national_asthma_data.htm

Emergency Department Visits and Hospitalizations

ED visits and inpatient hospitalizations with a primary diagnosis of asthma are metrics used to estimate the rate of severe acute respiratory events among persons with asthma. The consensus in the healthcare system is that most acute asthma events, particularly ED visits, can be prevented if asthma is properly managed according to established medical guidelines. These guidelines include using long-acting controller medications, using an asthma action plan, avoiding exposure to environmental triggers, and the provision of culturally and linguistically appropriate care. The data in this report indicate that asthma patients may not have access to adequate comprehensive asthma management including education on environmental triggers and creating an asthma action plan. Additionally, vulnerable populations are more likely to be exposed to potential triggers due to housing conditions neighborhood air quality and decreased access to guidelines-based care. Addressing these and other social determinants of health may improve quality of life and decrease reliance on ED and hospitals for chronic disease management, including for asthma.

In 2019, there were a total of 54,616 asthma ED visits in Ohio. Of those 54,616 visits, 19,313 were by children, a rate of 74.1 ED visits per 10,000 residents, and 35,303 were by adults, a rate of 39.0 ED visits per 10,000 residents. These rates did not remarkably change from 2016 to 2019.

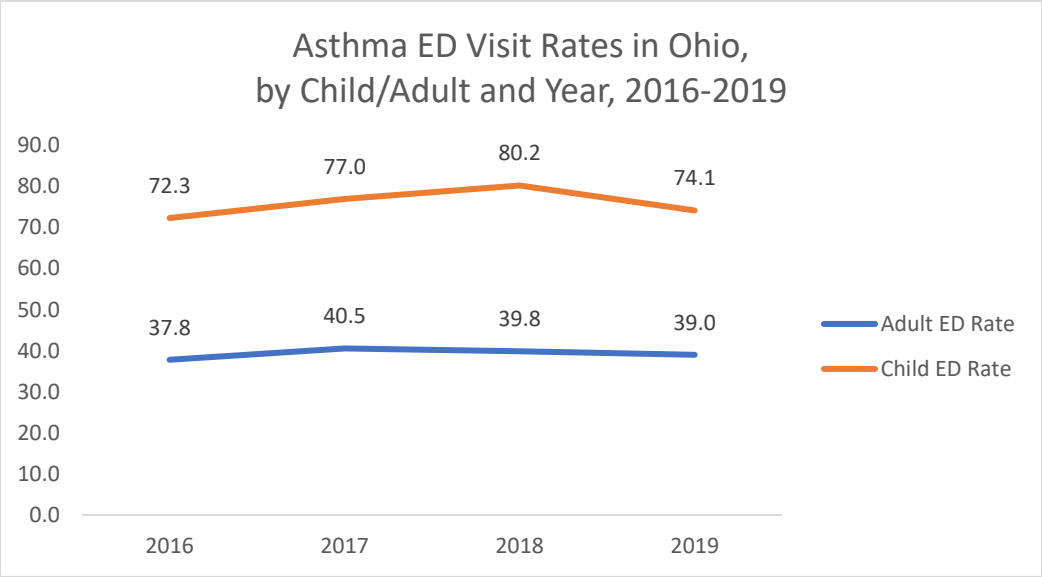

Figure 1. Asthma ED Visit Rates in Ohio (per 10,000 Residents), by Child/Adult Age Group and Year, 2016-2019

There were 5,945 inpatient hospitalizations with the primary diagnosis of asthma in Ohio in 2019. The adult hospitalization rate remained stable from 2016 to 2019, with 3,728 hospitalizations in 2019 and a rate of 4.1 hospitalizations per 10,000 residents. However, there was a slight decrease in the child hospitalization rate from 11.6 in 2016 to 8.5 in 2019, with a total of 2,217 child asthma hospitalizations in 2019.

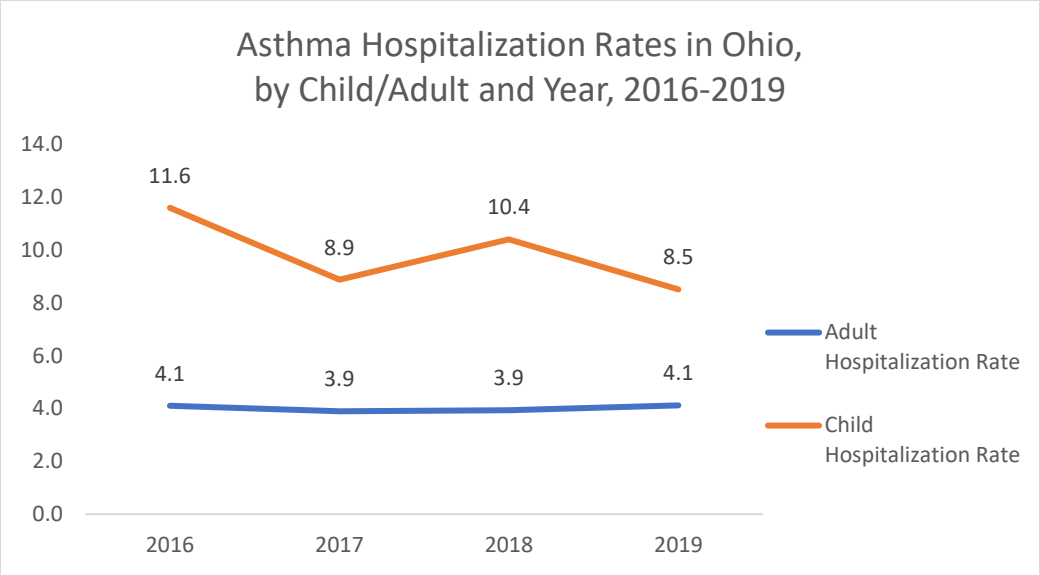

Figure 2. Asthma Hospitalization Rates in Ohio (per 10,000 Residents), by Child/Adult Age Group and Year, 2016-2019

Asthma ED visits and inpatient hospitalizations fluctuate throughout the year. In 2019, asthma ED visits and hospitalizations among Ohio children peaked in May as well as August through October. The same trends are seen for asthma ED visits and hospitalizations for adults.

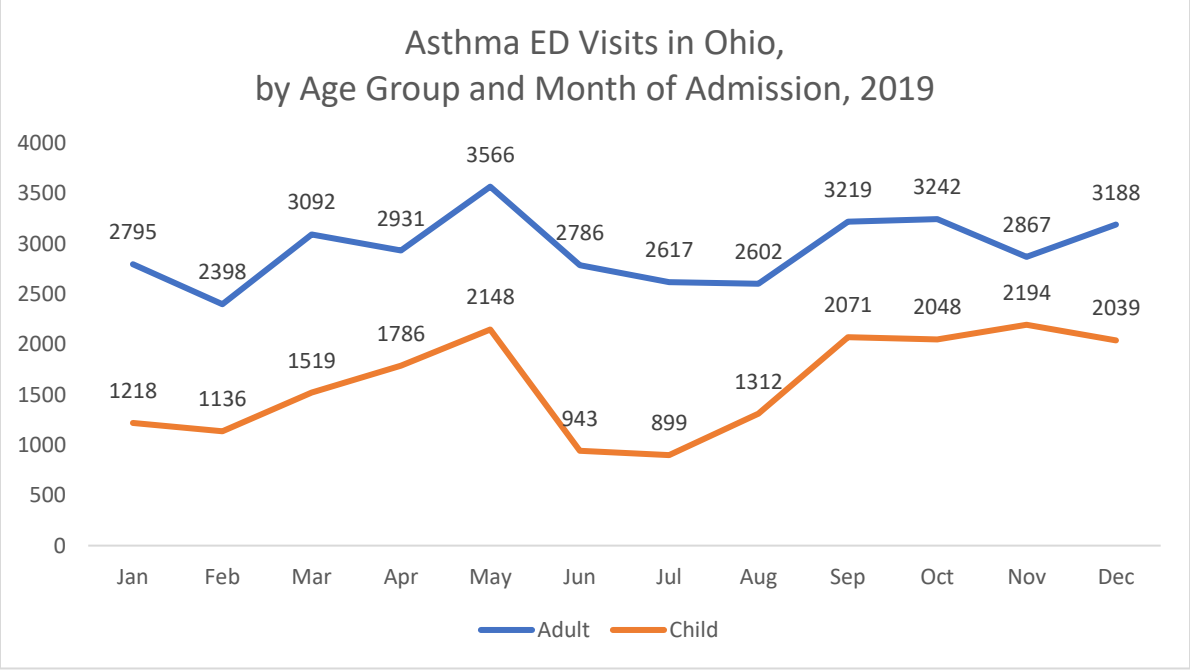

Figure 3. Asthma ED Visits in Ohio, by Child/Adult Group and Month of Admission, 2019

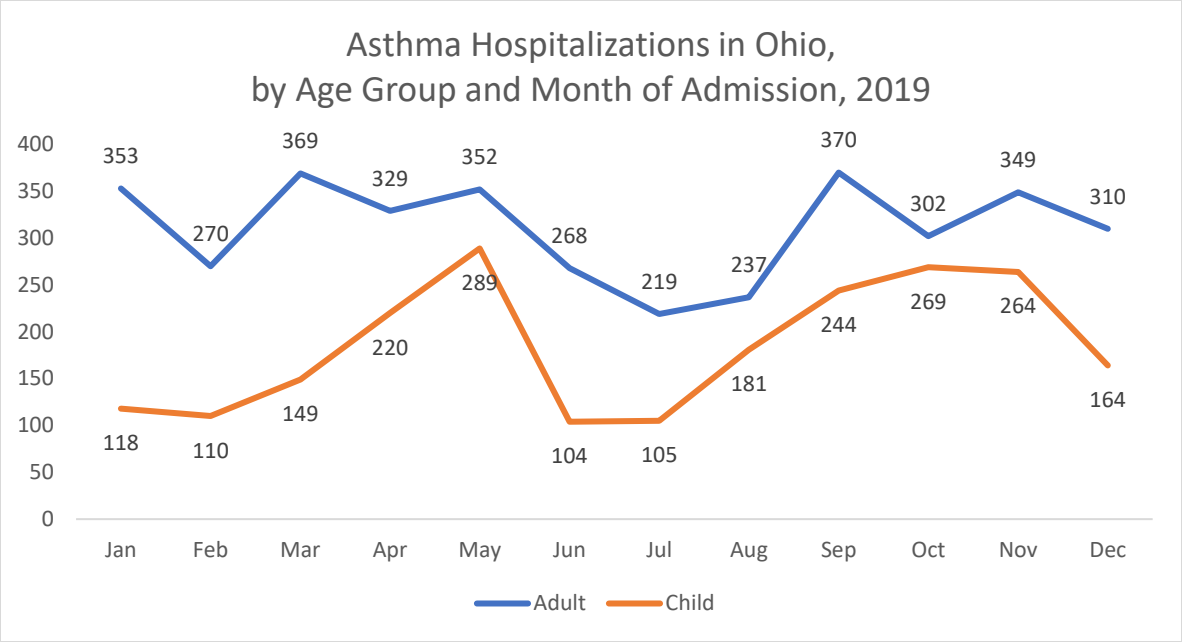

Figure 4. Asthma Hospitalizations in Ohio, by Child/Adult Age Group and Month of Admission, 2019

Insurance Coverage and Payments

Limited data is provided statewide regarding charges or amounts paid for asthma ED visits or hospitalizations. OHA data does report insurance payer for asthma-related hospital encounters. In 2019, Medicaid was listed as the primary payer for the majority of asthma-related hospital encounters (45% of adult encounters and 71% of child encounters). Around one quarter of all child or adult hospital encounters were paid by commercial insurance.

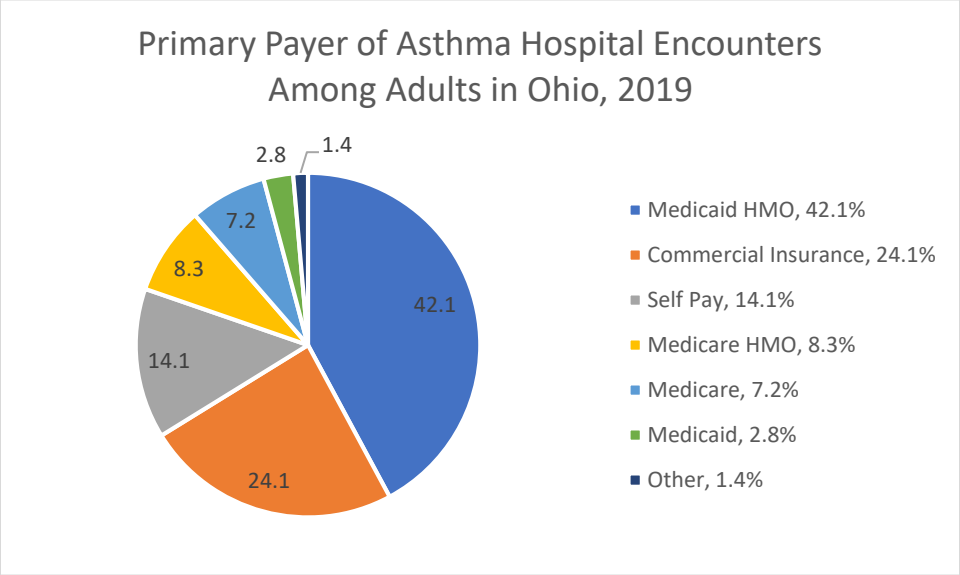

Figure 5. Primary Payer of Asthma Hospital Encounters (ED Visits and Hospitalizations) Among Adults in Ohio, 2019

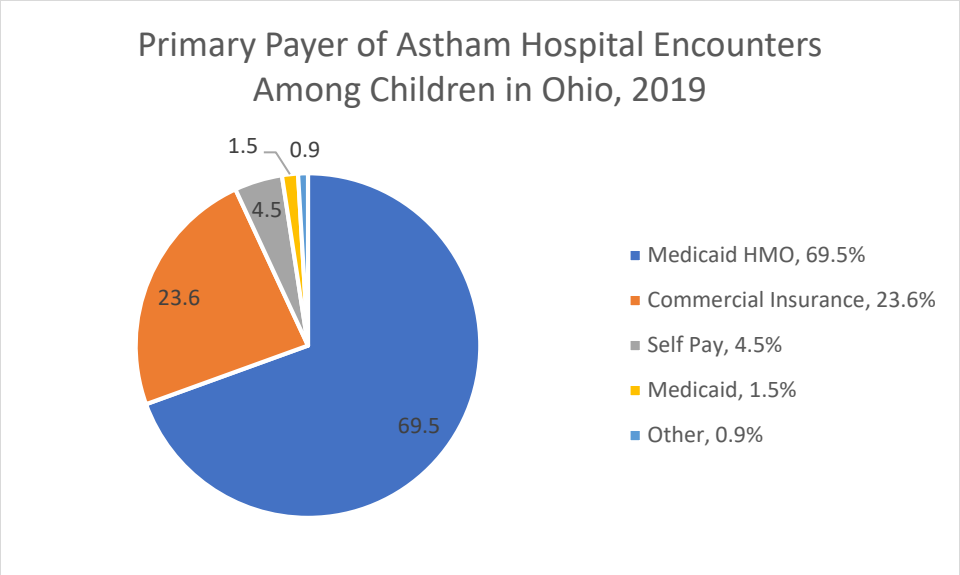

Figure 6. Primary Payer of Asthma Hospital Encounters (ED Visits and Hospitalizations) Among Children in Ohio, 2019

Disparities in Emergency Department Visits and Hospitalizations

Sex

Among adults, women are more likely to use the ED for an asthma event in Ohio than men. The rate of asthma ED visits for women is more than 1.5 times that of the rate for men in 2019 (46.9 per 10,000 residents vs. 30.5, respectively). This disparity in ED visits by sex has been notable and unchanged from 2016 to 2019. The sex disparity in children, however, is opposite that of adults. In 2019, the asthma ED visit rate for boys was nearly 1.5 times that of girls (87.4 per 10,000 residents vs. 60.2, respectively). This contrasts current prevalence data that shows there is no notable difference in prevalence of asthma by sex in Ohio children, even though there is a difference in ED utilization.

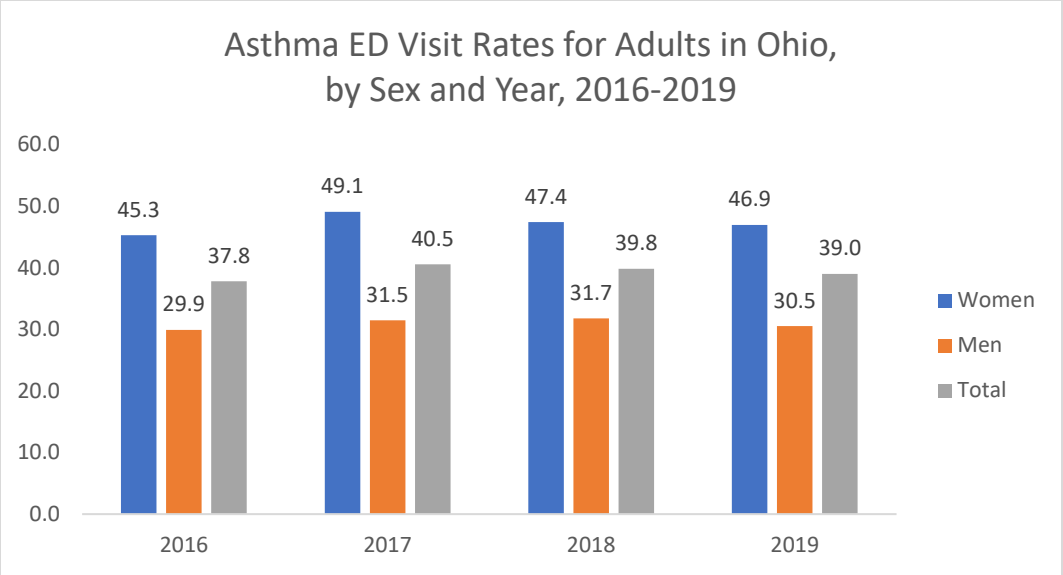

Figure 7. Asthma ED Visit Rates (per 10,000 residents) for Adults in Ohio, by Sex and Year, 2016-2019

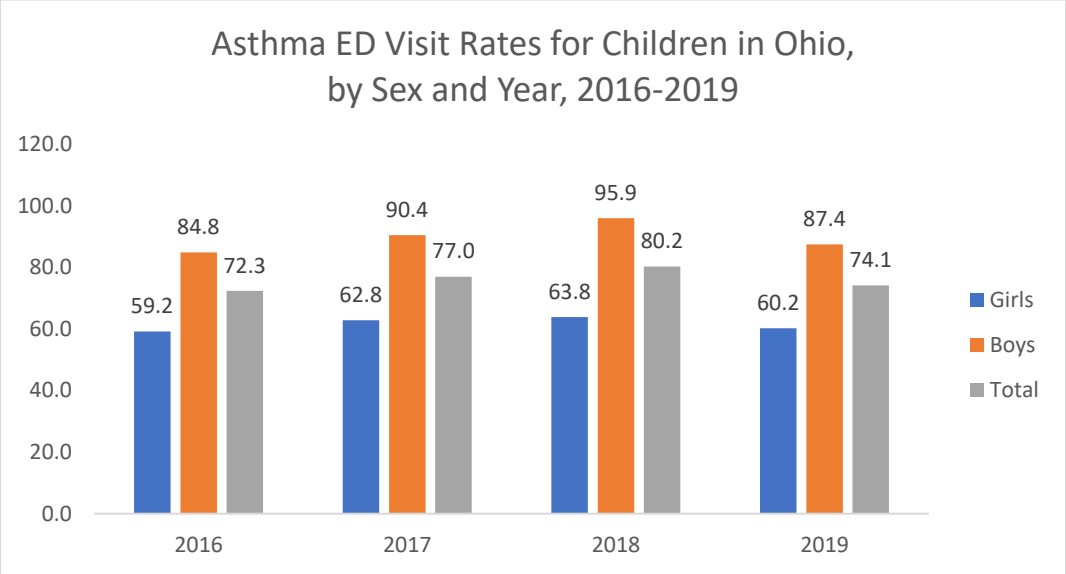

Figure 8. Asthma ED Visit Rates (per 10,000 residents) for Children in Ohio, by Sex and Year, 2016-2019

The sex disparity for asthma inpatient hospitalizations in Ohio follows similar trends to that of ED visits. Women had a greater rate of hospitalizations than men in 2019 (5.9 per 10,000 residents vs. 2.2, respectively), and this disparity remained stable from 2016-2019. The sex disparity for adults in Ohio is even greater for asthma hospitalizations than for asthma ED visits, with a hospitalization rate over two times greater for women than for men. The sex disparity among children does still exist as well, but it is less apparent for asthma hospitalizations than it is for asthma ED visits. The rate of ED visits for boys in 2019 was 8.5 per 10,000 residents, a modest difference from 7.1 for girls.

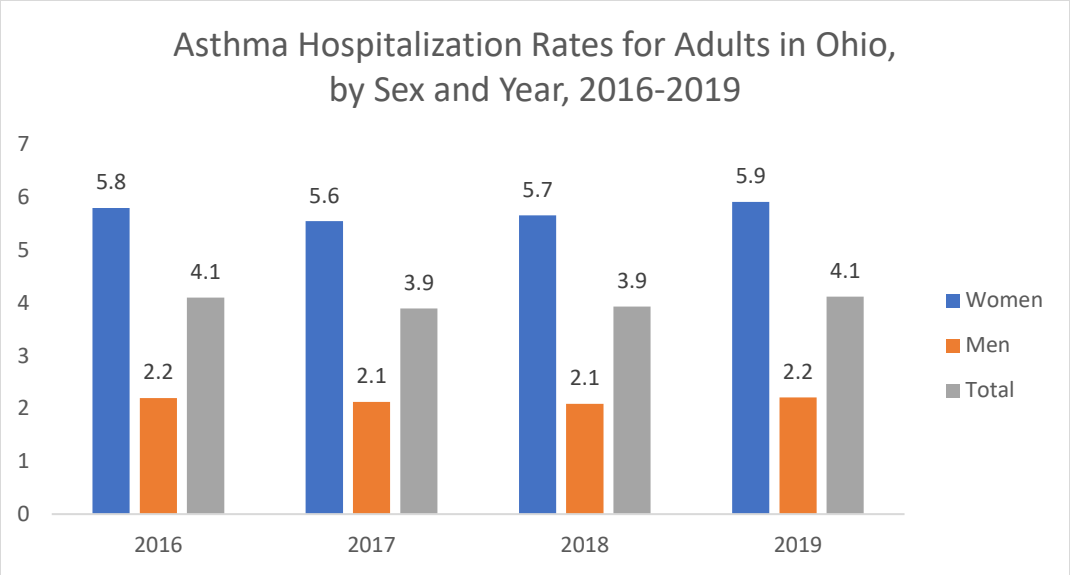

Figure 9. Asthma Hospitalization Rates (per 10,000 Residents) for Adults in Ohio, by Sex and Year, 2016-2019

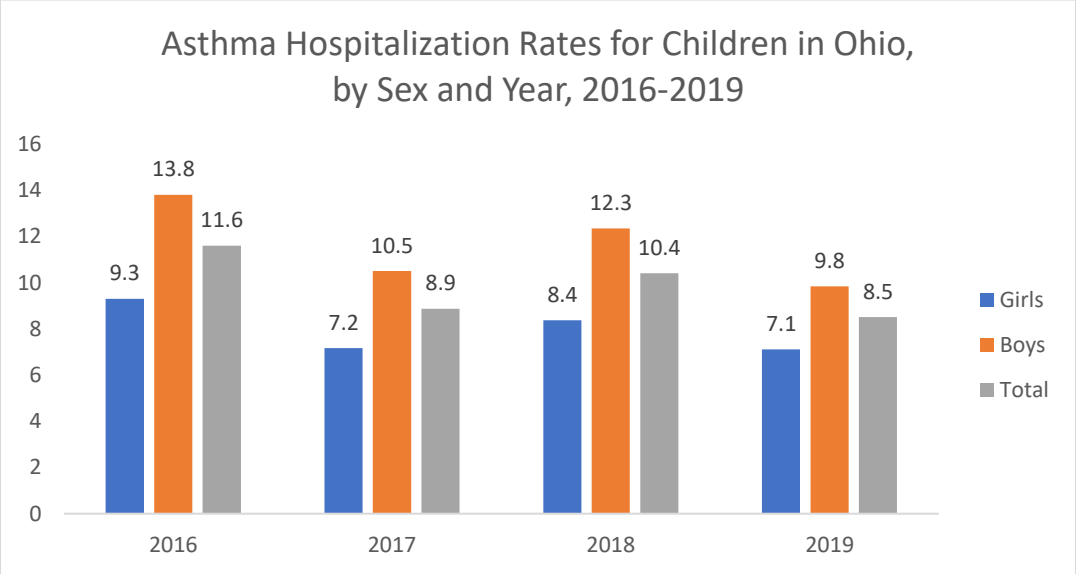

Figure 10. Asthma Hospitalization Rates (per 10,000 Residents) for Children in Ohio, by Sex and Year, 2016-2019

Age

Asthma ED visit rates and hospitalization rates are both associated with age in Ohio. The highest ED visit and hospitalization rates are those of children under the age of five (96.4 per 10,000 residents and 13.4, respectively). These rates drop dramatically with increasing age. The lowest ED visit rate is seen in older Ohioans (65+ years of age) age group, with a rate of 13.3 per 10,000 residents, while the lowest hospitalization rate is seen in the 15-34 age group, with a rate of 3.1 per 10,000 residents. While there is no notable association between current asthma prevalence and children's age, children under the age of five are

more likely to visit the ED or requirement hospitalization for asthma than children ages 5-14.

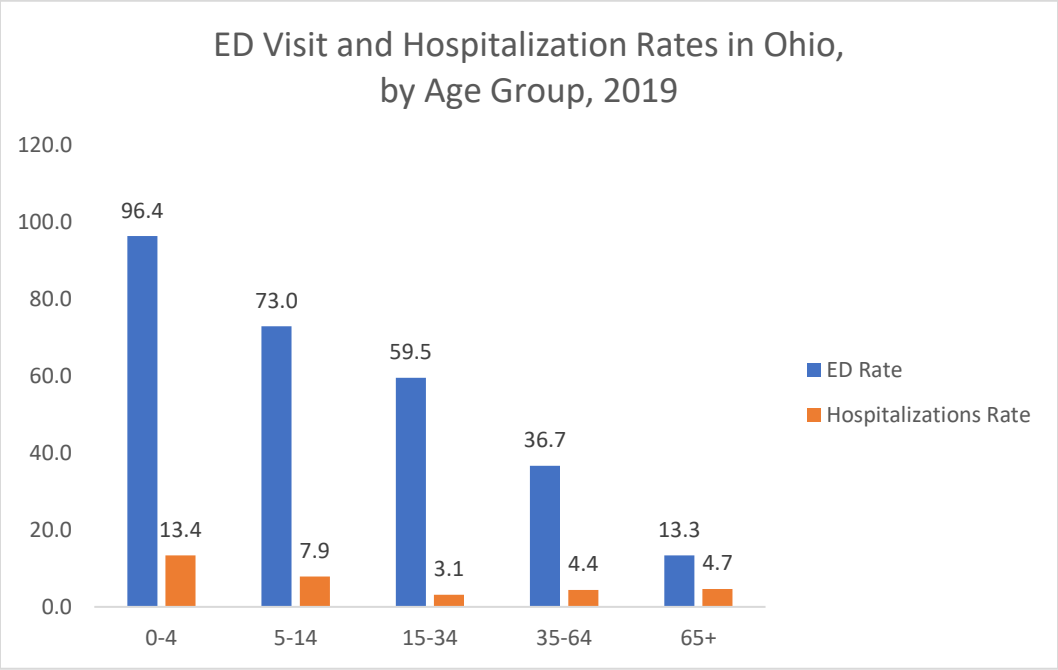

Figure 11. Asthma ED Visit and Hospitalization Rates (per 10,000 Residents) in Ohio, by Age Group, 2019

Healthy People 2030 sets data-driven national objectives to improve health and well-being over the next decade. It is an initiative of the U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. These include ED and hospitalization rates for people with asthma that municipalities should aim to reach by 2030. These objectives were set for age groups 0-4 years and 5+ years. For 2019, the Healthy People 2030 asthma ED rate objective for the 5+ years group, a rate of 44.0 per 10,000 residents, was just narrowly met by a small margin at 43.7 per 10,000 residents. However, the asthma ED visit rate for children under age 4 in Ohio far exceeded the Healthy People 2030 objective of 65.7 per 10,000 residents.

Healthy People 2030 intends to set target asthma hospitalization rates for children under the age of 4 and among older adults (age 65+) but doesn't yet have reliable baseline data. Comparisons are made to Healthy People 2020 H targets as a result. Healthy People 2020 objectives for asthma hospitalization rates were met in Ohio for all three age groups in 2019, with the Ohio hospitalization rates being lower than the Healthy People 2020 objectives.

Healthy People 2030 sets data-driven national objectives to improve health and well-being over the next decade. It is an initiative of the U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion.

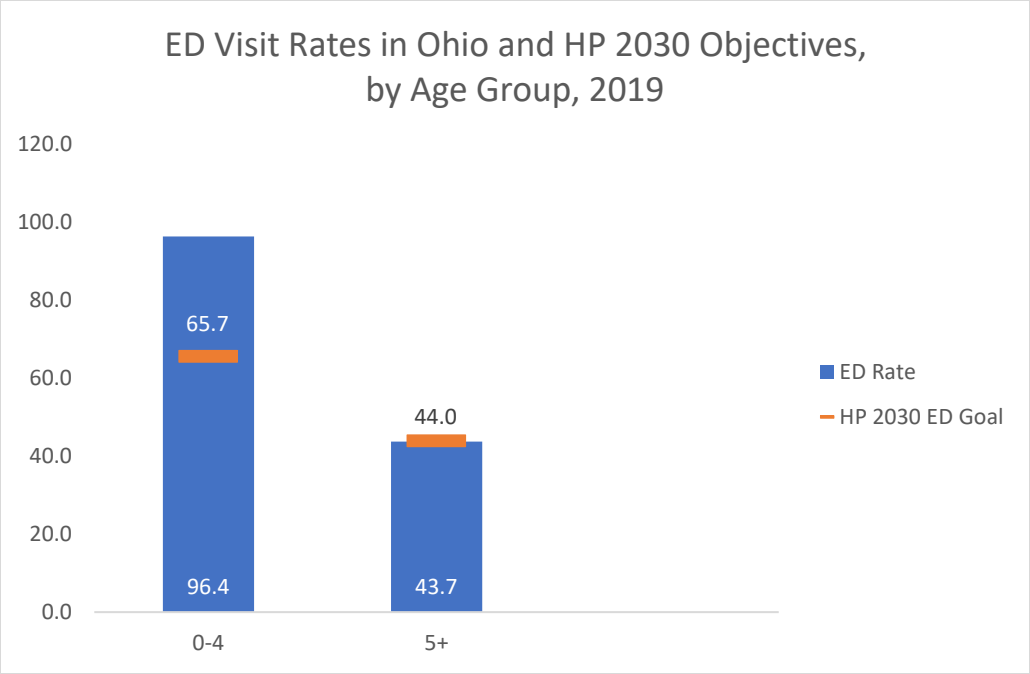

Figure 12. Asthma Emergency Department Visit Rates in Ohio and Healthy People 2030 Objectives, by Age Group, 2019

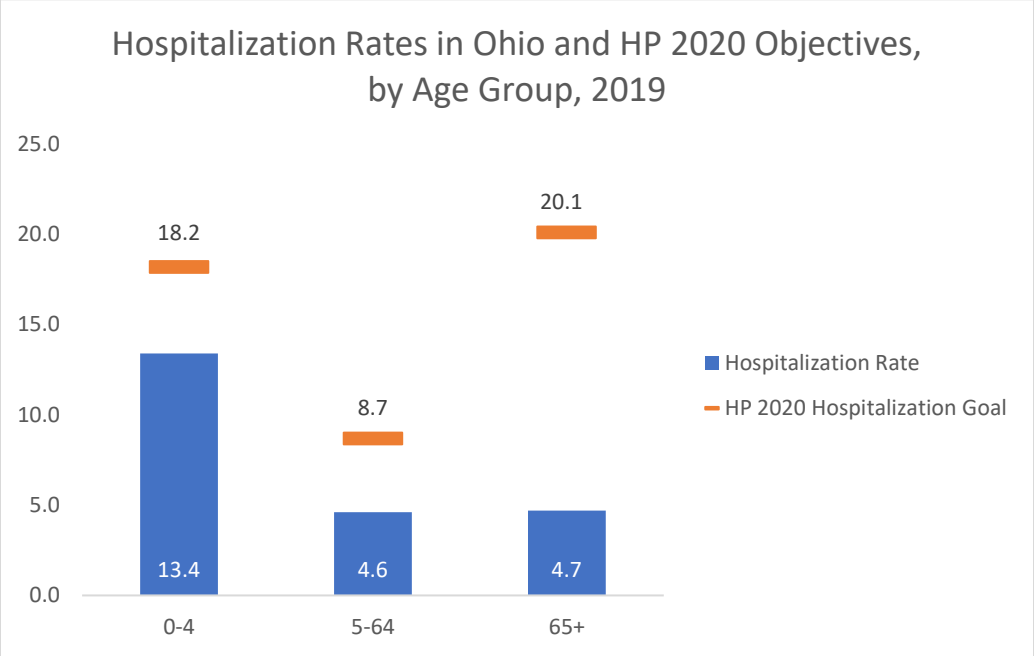

Figure 13. Asthma Hospitalization Rates in Ohio and Healthy People 2020 Objectives, by Age Group, 2019

Race

As of 2019, Black adults in Ohio visit the ED for asthma at a rate nearly six times that of White adults (139.9 per 10,00 residents vs. 23.9, respectively). This gap in White asthma ED rates and Black rates widened from 2016 to 2019. Similarly, Black children in Ohio have an asthma ED visit rate over five times that of White children (230.0 per 10,000 residents vs. 41.6, respectively). Black children comprised an estimated 16.2% of the Ohio population under age 18, but Black children accounted for over one half (51.8%) of the asthma ED visits in 2019. This demonstrates that Black Ohioans, and the communities in which they reside, carry the greatest burden of asthma.

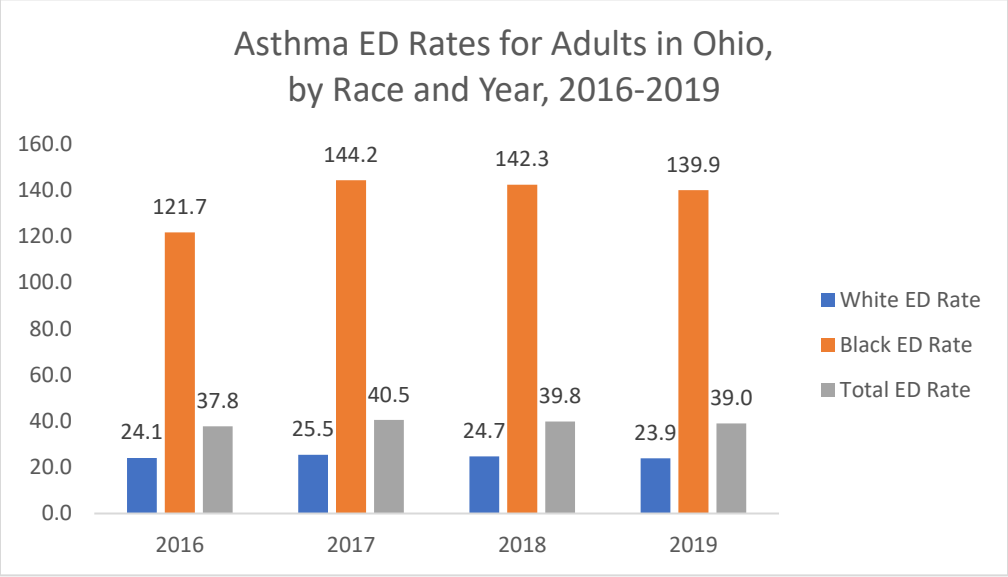

Figure 14. Asthma ED Rates (per 10,000 Residents) for Adults in Ohio, by Race and Year, 2016-2019

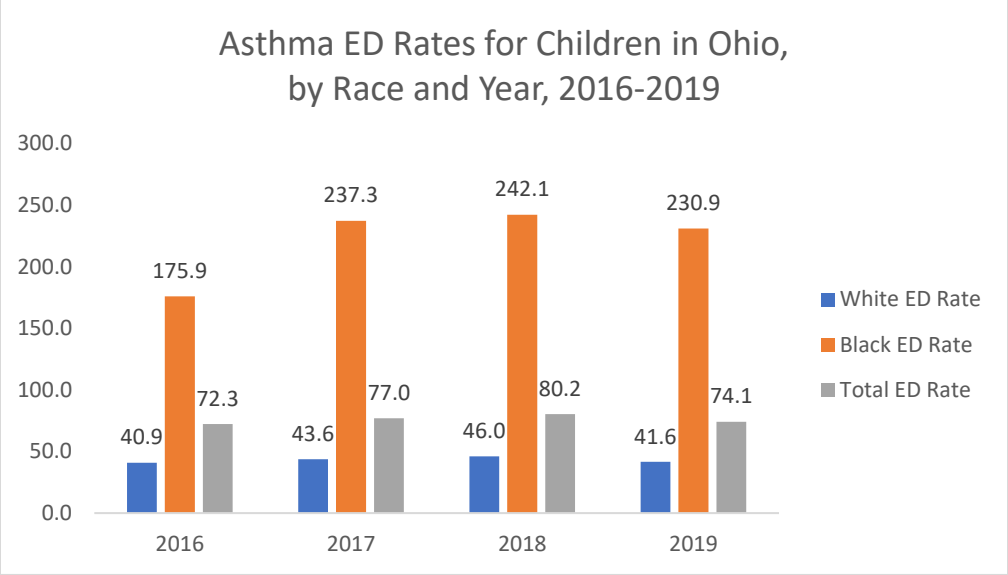

Figure 15. Asthma ED Rates (per 10,000 Residents) for Children in Ohio, by Race and Year, 2016-2019

Black adults in Ohio also have higher asthma inpatient hospitalization rates than White adults (13.5 per 10,000 residents vs. 2.8 in 2019). The Black hospitalization rate exceeds the White hospitalization rate by more than four-fold, a smaller gap than the asthma ED visit rates but still a striking difference. Similarly, Black children in Ohio were hospitalized for asthma in 2019 at a rate over seven times greater than White children (30.1 per 10,000 residents vs. 4.2, respectively).

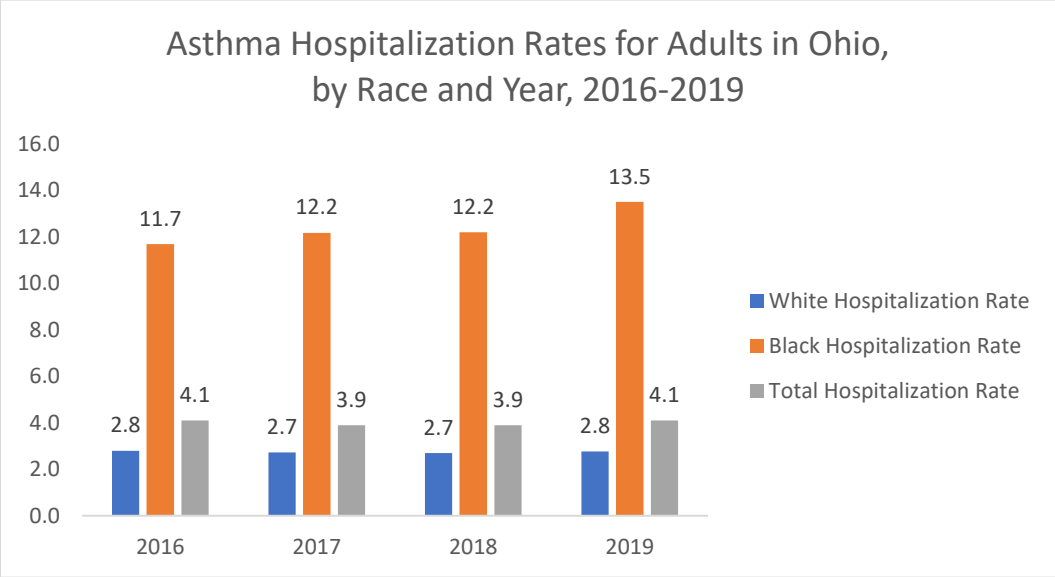

Figure 16. Asthma Hospitalization Rates (per 10,000 Residents) for Adults in Ohio, by Race and Year, 2016-2019

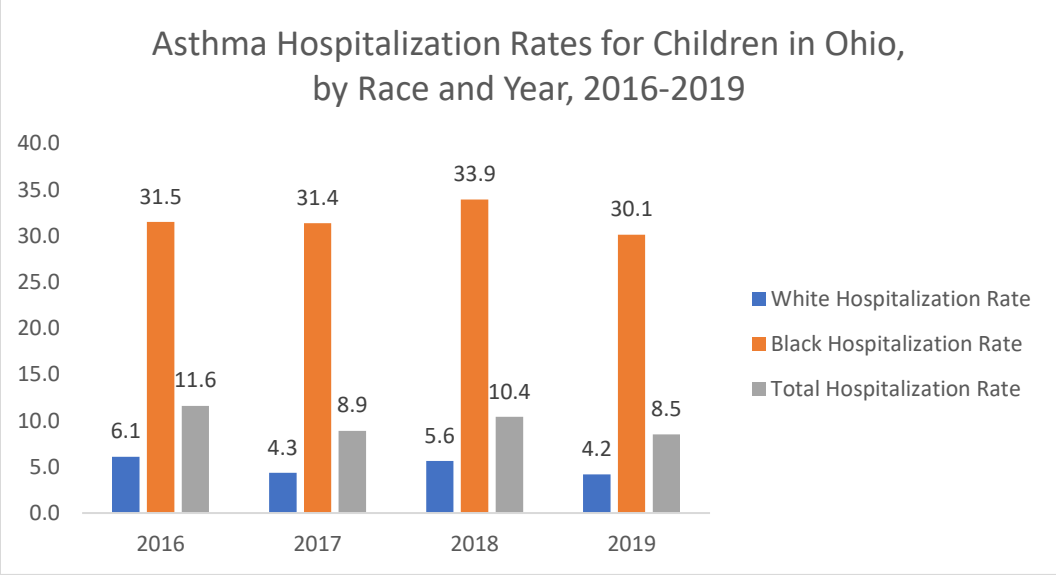

Figure 17. Asthma Hospitalization Rates (per 10,000 residents) for Children in Ohio, by Race and Year, 2016-2019

Region

Most counties with the highest asthma ED visit rates in Ohio from 2016-2019 are urban counties, including Cuyahoga, Franklin, Hamilton, Lorain, Lucas, Mahoning, Montgomery and Summit counties (see Table 1 in the Appendix for county-level asthma ED visit rates). Hospitalization rates are not available at the county-level due to relatively low numbers of asthma hospitalizations in many Ohio counties.

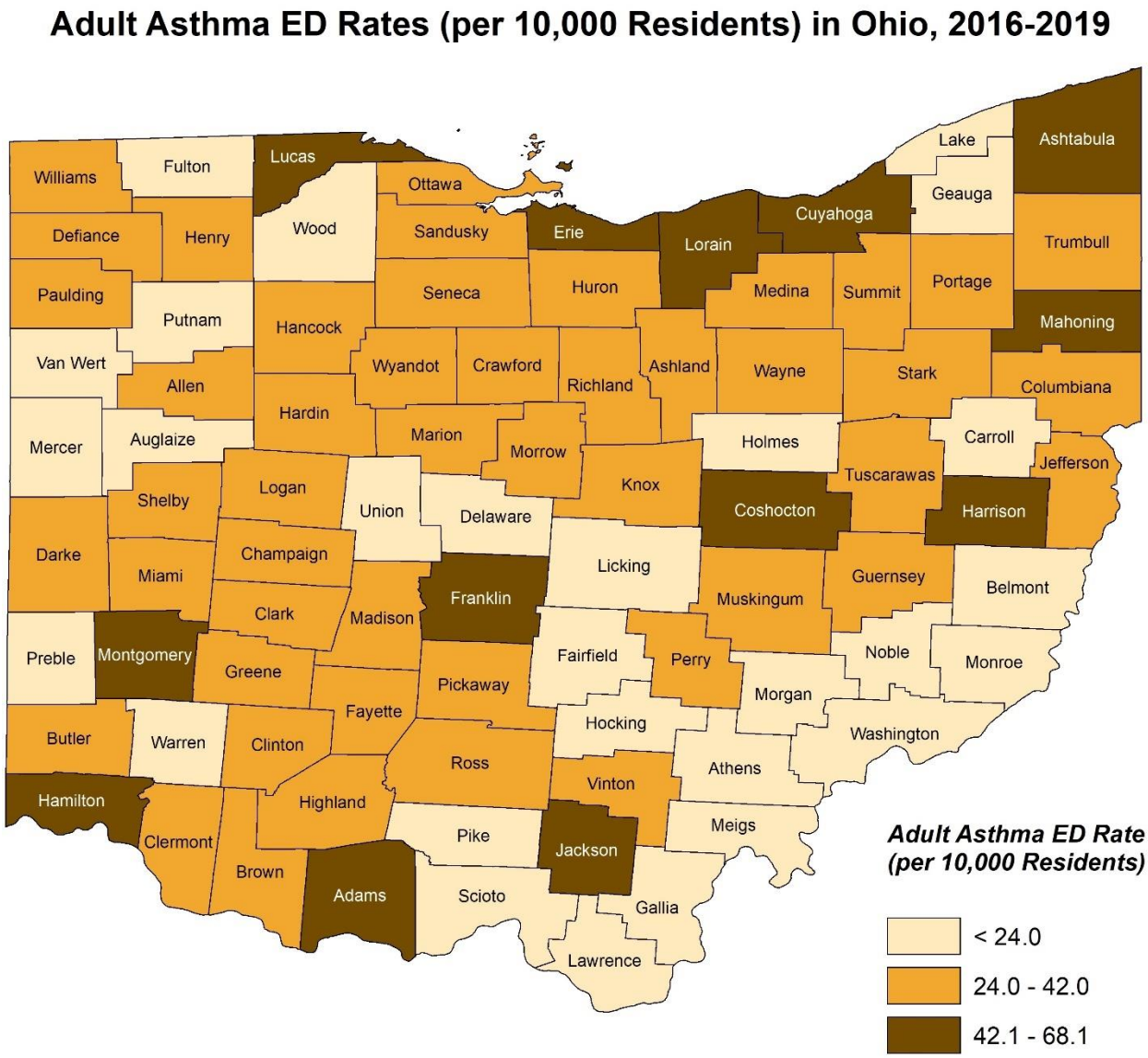

Figure 18. Asthma ED Rates (per 10,000 Residents) For Adults in Ohio, by County, 2016-2019

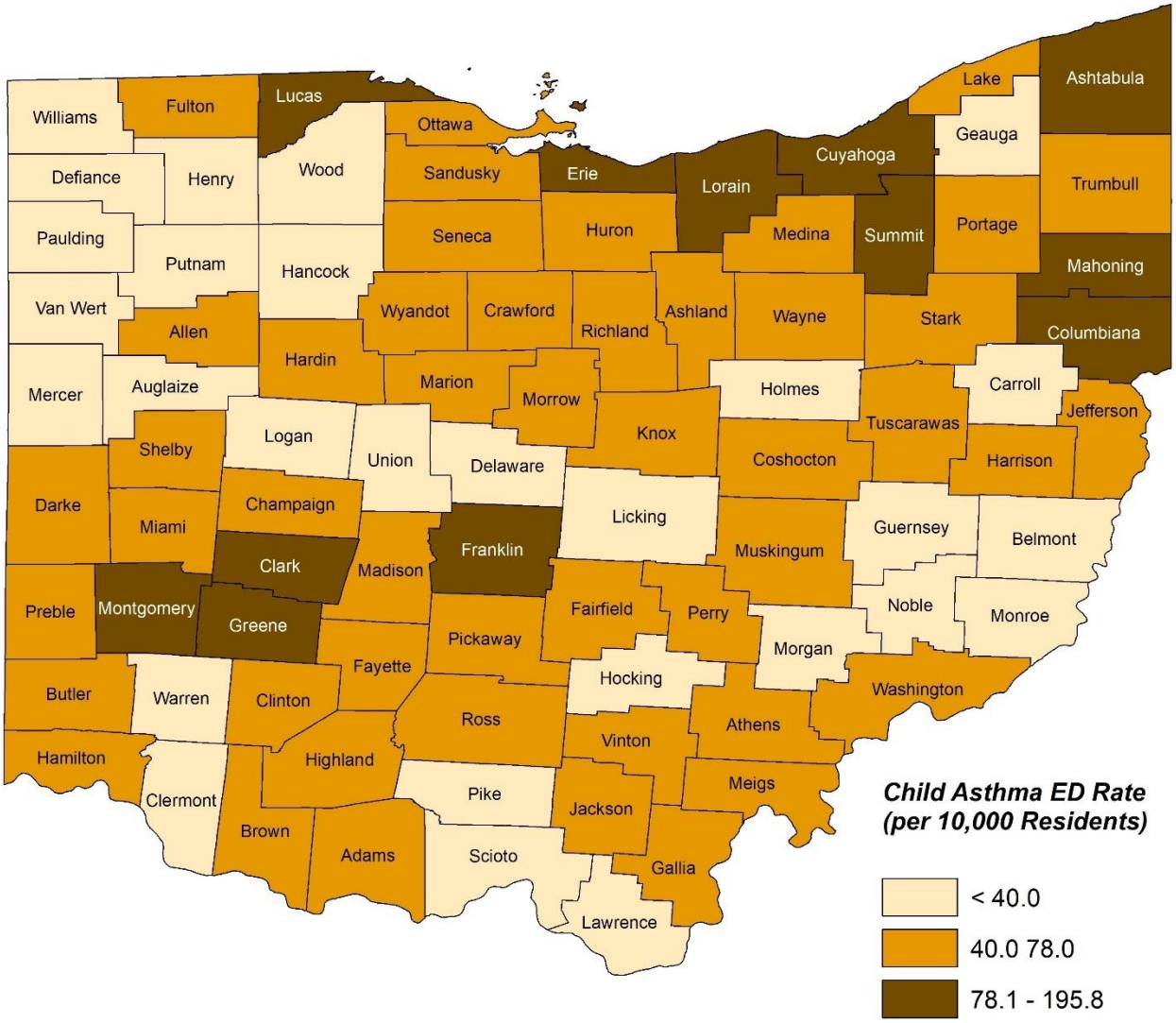

Figure 19. Asthma ED Rates (per 10,000 Residents) For Children in Ohio, by County, 2016-2019

Recommendations

Coordinated efforts that address patient-level care and the policies and systems that drive inequity are critical to addressing root causes that drive hospital utilization and asthma disparities. The following equitable, multi-systems strategies are provided for local, regional, and state partners from various sectors to reduce ED and inpatient hospital visits in Ohio.

Recommendations to Drive Equity

- Target asthma interventions in areas of high disease burden and identify strategic partnerships to support upstream projects focused on making a collective and lasting impact in the reduction of asthma disparities.
- Increase access to high-quality, culturally appropriate, guidelines-based care that empowers patients and caregivers to better manage asthma and help patients advocate for themselves in clinical and community settings.
- Convene a network of trusted messengers who have opportunities to provide "teachable moments" to people with asthma.

1. Leverage partnerships and policies to expand CDC EXHALE strategies to ensure availability, efficiency, effectiveness, and health equity across sectors.

   CDC's EXHALE Strategies
   The CDC has determined that, based on the best available evidence, EXHALE strategies can improve asthma control and reduce healthcare costs. These strategies are intended as a resource to inform decision-making in communities, organizations, and states. The ODH Asthma Program will seek to strengthen existing organizational infrastructure to expand the reach of services through the six EXHALE strategies:

   Education on asthma self-management.
   e**X**tinguishing smoking and exposure to second-hand smoke.
   Home visits for trigger reduction and asthma.
   Achievement of guidelines-based medical management.
   Linkages and coordination of care across settings.
   Environmental policies or best practices to reduce asthma triggers from indoor, outdoor, or occupational sources.

2. Improve and expand current data monitoring systems to support improved comprehensive asthma management efforts and advance health equity for children with asthma in Ohio.
3. Increase provider capacity to refer to and deliver culturally appropriate, coordinated, guidelines-based asthma care and other integrated, sustainable comprehensive asthma control services among a cadre of diverse professionals.

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Appendix

Table 1. Asthma ED Rates in Ohio, by County, 2016-2019

County	Adult ED Rate	Child ED Rate
Adams	46.2	46.7
Allen	40.2	58.5
Ashland	29.1	49.5
Ashtabula	44.9	84.9
Athens	14.4	62.8
Auglaize	15.3	34.1
Belmont	17.7	13.3
Brown	26.7	41.8
Butler	29.5	54.6
Carroll	14.6	28.1
Champaign	28.4	50.6
Clark	38.2	94.1
Clermont	27.7	36.8
Clinton	33.9	56.7
Columbiana	28.9	89.1
Coshocton	53.9	76.0
Crawford	38.8	53.9
Cuyahoga	64.3	125.3
Darke	31.1	52.5
Defiance	31.9	33.3
Delaware	16.8	36.4
Erie	68.1	98.0
Fairfield	22.3	48.6
Fayette	37.0	52.0
Franklin	43.0	80.6
Fulton	22.6	46.5
Gallia	19.1	42.4
Geauga	12.5	33.7
Greene	37.2	88.3
Guernsey	29.1	31.3
Hamilton	52.8	69.2
Hancock	25.5	34.5
Hardin	26.1	45.9
Harrison	45.9	49.5
Henry	28.4	34.9
Highland	32.3	47.4
Hocking	21.5	32.7
Holmes	16.6	18.8

Huron	36.6	54.7
Jackson	44.2	57.9
Jefferson	31.0	41.6
Knox	29.9	45.3
Lake	23.4	65.1
Lawrence	0.6	0.5
Licking	19.7	37.8
Logan	24.1	32.4
Lorain	49.9	99.0
Lucas	50.0	103.3
Madison	25.8	67.0
Mahoning	51.9	195.8
Marion	33.3	70.5
Medina	25.0	44.0
Meigs	21.2	54.2
Mercer	14.4	27.1
Miami	29.9	55.7
Monroe	13.6	19.1
Montgomery	57.8	152.0
Morgan	15.3	30.7
Morrow	36.5	51.7
Muskingum	29.3	43.2
Noble	6.5	18.8
Ottawa	33.1	41.7
Paulding	30.0	38.4
Perry	29.3	44.0
Pickaway	25.3	56.2
Pike	18.9	25.3
Portage	24.2	70.1
Preble	23.4	52.1
Putnam	15.3	25.5
Richland	40.7	69.4
Ross	26.0	47.4
Sandusky	41.5	72.8
Scioto	12.9	22.6
Seneca	32.5	49.6
Shelby	33.2	47.8
Stark	40.5	69.0
Summit	41.3	142.9
Trumbull	36.9	76.4
Tuscarawas	37.9	57.2
Union	19.6	25.9
Van Wert	18.1	24.3
Vinton	32.3	65.9
Warren	19.8	33.2
Washington	23.1	43.4

Wayne	32.5	44.2
Williams	37.0	38.7
Wood	17.4	29.0
Wyandot	28.9	51.7
Total	39.5	77.8