



Emergency Department and Hospital Visits for Asthma in Ohio





Key Findings



Asthma Emergency Department Visits

2016 is the first complete year of data with the ICD-10 definition of asthma and will serve as the new baseline going forward. In 2016:

- Most Emergency Department (ED) visits could be prevented by ensuring all asthma patients receive education in asthma symptoms, triggers, medication adherence, and inhaler technique at regular office visits.
- Changes in ICD 9 to ICD 10 coding contributed to a 15 percent drop in emergency department visits for primary diagnosis of asthma since 2014, the last year of all ICD-9 data.
- There were 52,955 asthma emergency department visits, with a rate of 45.6 per 10,000 residents. Of these discharges, 34,070 were for adults.
- Children under five years of age had the highest rate of asthma emergency department visits, with 6,250 discharges, at a rate of 89.6 per 10,000 residents. Boys had a significantly higher rate at 114.4 per 10,000 residents, compared to girls at 63.4 per 10,000 residents.



- The asthma emergency department visit rate among adults over 65 years of age was significantly higher among adult women, with the rate per 10,000 residents at 11.8 compared to 6.6 for men.
- Medicaid was the intended payer for four in ten of adult emergency department visits, with an additional one in four visits being paid for by commercial insurance.
- For all age groups, and both sexes, black rates of emergency department visits were at least twice as high as white rates.
- While approximately 15 percent of Ohio's children are black, black children account for almost half of asthma ED visits for children under years old and over half of asthma ED visits for children 5-14 years old (54 percent).
- ED visit rates did not drop from 2014 to 2016 for black children. However, white children, white adults and black adults experienced lower ED visit rates between 2014-2016.
- There were 18,885 asthma emergency department visits reported among children. For every 10,000 children in Ohio, 11.6 asthma emergency department visits occurred.
- The child asthma emergency department visit rate was significantly higher among boys, with 13.8 visits per 10,000 residents, compared to 9.3 for girls.
- The average charge for an emergency department visit for a primary diagnosis of asthma was \$2,164.

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Asthma Inpatient Hospitalizations

2016 is the first complete year of data with the ICD-10 definition of asthma and will serve as the new baseline going forward. In 2016,

- Many inpatient asthma visits can be prevented by making sure a follow-up visit with a primary care provider is scheduled after an exacerbation.
- Changes in ICD 10 coding contributed to a 60 percent drop in inpatient hospital visits for primary diagnosis of asthma since 2014, the last year of all ICD-9 data.
- There were 6,691 asthma inpatient hospital discharges reported, with a rate of 5.8 per 10,000 residents. Of these discharges, 3,660 were for adults.
- Children under five years of age had the highest rate of inpatient hospital discharges, with 1,394 discharges, at a rate of 20.0 per 10,000 residents.
- The asthma hospital discharge among adults over 65 years of age was significantly higher among women, with the rate per 10,000 residents at 5.8 compared to 1.7 for men.
- There were 3,031 asthma hospital discharges reported among children. For every 10,000 children, 11.6 asthma hospital discharges occurred.
- The child asthma hospital discharge rate was significantly higher among boys, with 13.8 visits per 10,000 residents, compared to 9.3 for girls.
- For all age groups, and both sexes, black rates of inpatient hospital discharge were at least twice as high as white rates.
- While approximately 15 percent of Ohio's children are black, black children account for almost half of asthma inpatient visits for under five years old and almost half of asthma inpatient visits for children 5-14 years old.
- Medicaid was the intended payer for three in 10 (28.9 percent) of adult asthma hospital discharges.
- Medicaid was the intended payer for six in 10 (62.6 percent) of child asthma hospital discharges, much higher than the percentage of children using Medicaid overall.
- The average charge for an inpatient hospital discharge for a primary diagnosis of asthma was \$19,311.



Introduction

Asthma is a major public health concern in the United States. Although asthma mortality in the United States is among the lowest in the world, approximately 3,500 asthma-related deaths still occur each year in this country (Centers for Disease Control and Prevention, 2015).

Increasing asthma prevalence, especially among children, is another cause for concern. It is estimated that more than one in ten children in Ohio (10.2 percent) have asthma (Behavioral Risk Factor Surveillance System, 2016).

The burden of asthma can be estimated through a number of asthma-related events. Inpatient hospital discharge rates and emergency visit rates are important proxies for burden. Data on inpatient hospitalizations for asthma can be used to examine the severity of asthma. It is important to note that asthma hospital discharge and emergency department visit rates measure severe outcomes of the disease. Hospital discharge and emergency department visit rates can be used to help identify people with asthma that are at higher risk of morbidity and mortality due to poor asthma control.



According to the National Asthma Education and Prevention Program, asthma is an ambulatory care-sensitive condition, because with regular, effective outpatient care, the vast majority of hospitalizations and emergency department visits due to asthma are preventable (National Heart, Lung and Blood Institute, 2007).

How can we determine asthma severity and costs with asthma hospital discharges?

Tracking rates of hospital discharge can aid in identifying groups or areas with inadequate access to basic medical care. Hospital discharge rates help identify a group of people whose asthma might not be adequately controlled; hospitalizations and emergency department visits represent severe asthma events that might have been prevented with proper management.

Asthma inpatient hospital discharge and emergency department visits data also give us important information about the severity and cost of asthma in Ohio. With the Ohio Hospital Association Clinical-Financial Data Set, we can identify:

- numbers and rates of hospital discharges and emergency department visits
- hospital discharge and emergency department visits rates by age, race, sex or county
- annual trends for asthma hospital discharges and emergency department visits
- seasonality of asthma inpatient hospital visits and emergency department visits
- charges associated with asthma hospitalization and emergency department visits



How do we get asthma discharge and emergency department visits data?

Asthma hospital discharge data and emergency department visits are collected by the Ohio Hospital Association (OHA), a private organization that has agreed to share the data with the Ohio Department of Health. The data are given by the 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 emergency department visit data.

Confirmed Case: There are no confirmed case classifications for hospital discharge or emergency department visit data.

Probable Case: Hospital records listing the ICD-9-CM Code 493.0–493.9X as the primary diagnosis, before October 1, 2015, and listing ICD-10-CM Code J45.X on October 1, 2015 and after.

Possible Case: Hospital records listing the ICD-9-CM Code 493.0–493.9X as the secondary diagnosis, before October 1, 2015, and listing ICD-10-CM Code J45.X on October 1, 2015 and after.

Unless otherwise specified, this report will use the probable case definition of asthma with hospital discharges and emergency department visits that have a primary diagnosis of asthma.

What are the limitations of this data set?

Currently, all hospitals in Ohio contribute data to OHA. It should be noted that these data are collected for billing and other administrative purposes, rather than 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 reported consistently at this time.

There are some limitations to the OHA Discharge Data Set. 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 emergency department visits are good representations of the asthma burden experienced by a community.

Even with all hospitals reporting, the OHA discharge data set may not be a complete census of hospital discharges for Ohio residents. While efforts are employed to capture visits for asthma in other states, Ohio residents visiting other states cannot be reported in the data set.

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

It is also important to note that charges are not necessarily reflective of reimbursement received by any given hospital.



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Narrative

What is the Current Burden of Asthma in Ohio?



Adults

In 2016, about one in ten Ohio adults (9.6 percent) reported that they currently have asthma. The prevalence current asthma among adults is significantly higher among women (11.3 percent) compared to men (7.9 percent). The prevalence of current asthma is significantly lower among adults ages 65 and older (8.7 percent) compared to adults ages 45-54 (12.2 percent). The prevalence of current asthma among adults does not significantly differ by race/ethnicity. Nationally, African American residents are significantly more likely to report having asthma.

The prevalence of current asthma among adults generally decreases significantly as household income increases, from a high of 20.7 percent among households earning less than \$15,000 per year, to a low of 7.0 percent among households earning \$75,000 and over annually. The prevalence of current asthma among adults is significantly higher among respondents with less than a high school education compared to college graduates. Among respondents who did not finish high school, 20.1 percent report having asthma, compared to 7.5 percent of college graduates reporting asthma.

Children

In 2016, about in 1 in 11 children in the United States has asthma. An estimated one in ten of Ohio children ages 0-17 (10.1 percent) were ever told by a doctor, nurse or other health professional that they had asthma; an estimated 6.5 percent of Ohio children currently have asthma (BRFSS, 2016).

The prevalence of asthma in children in Ohio does not significantly differ by gender, race, household income or parents' education level. When it comes to age, Ohio children under the age of five years have significantly less asthma than children aged ten to seventeen years.

Nationally, boys are significantly more likely to have asthma than girls. African American children are more likely to have current asthma than white children. Children who live in households with income below the poverty level are significantly more likely to have asthma than children above the poverty level.



Emergency Department Visits

The consensus in the health care system is that most of acute asthma events, particularly emergency department visits, can be prevented if asthma is properly managed according to established medical guidelines. These guidelines include using appropriate long-term medications, using an asthma action plan, and reducing or avoiding exposure to environmental triggers. The data here indicate that asthma patients may not be adhering to guidelines, and are relying on the emergency department for chronic disease management, which can be expensive and ineffective compared to maintaining regularly scheduled visits with a medical home physician.

Data on emergency department visits have been systematically collected in Ohio since 2005. In 2016, there were 52,955 asthma emergency department (ED) visits in Ohio. This translates to a rate of 49.8 ED visits per 10,000 residents. While the rates for emergency department visits in 2016 were all below the recommended Healthy People 2020 targets for all age groups, the target rates were calculated based on ICD-9 coding and may no longer be a valid measure of burden (Office of Disease Prevention and Health Promotion, 2016.) ED visits for asthma represent a treatment failure, and most can be prevented with appropriate medication and routine care.

Disparities in ED Visits

Sex

Among youth, boys make close to a third more visits than girls (11,327 compared to 7,557, respectively). After the age of eleven, girls start to have more visits, and the trend continues into adulthood. As adults, women are significantly more likely to use the emergency department than men by over a third (21,052 versus 13,017, respectively).

Age

With children, there were no significant differences in prevalence, except for age (BRFSS, 2016). Among older children, 13.4 percent of those aged 10-17 were diagnosed with asthma, compared 6.0 percent of preschool children (under age five). Yet, the ED visit rate for children under the age of five years is the highest of any age adult or child age group, by at least 27 percent. It is more difficult to diagnose children under age five with asthma than adults.

Preschool children are not usually given a breathing test. Instead, the doctor may ask about certain signs and symptoms and prescribe medication if they think it might be asthma and monitor the child's response to therapy (National Heart, Lung and Blood Institute, 2007.) As a result, many young children with asthma remain undiagnosed for their disease.

Race

ED visit rates for black children under five years of age, and black children aged five to fourteen years, are over four times higher than white children. As a whole, black children have five times the ED visit rate of white children (31.5 versus 6.1 visits per 10,000 residents).

Among adults, black residents are also overrepresented in ED visits, where they are two to four times as likely to make an ED visit as white residents. Rates for black males and females are particularly striking when compared to the rates for white males. In 2016, rates for black males and females exceeded those of white males by over six fold.



Region

While no geographic region stood out as having higher rates of emergency department visits, there exists a definite pattern to where rates were the highest in 2016. Among children, ED visits were significantly higher in metropolitan counties that were home to large cities such as Dayton, Toledo, Cleveland and Youngstown. Counties where adults had the highest rates were also mostly urban ones that encompass large metropolitan areas such as the ones listed above, as well as Cincinnati and Lorain.

Prevalence

It deserves to be noted that the disparities in asthma ED rates are not necessarily matched by disparities in current asthma prevalence. In the Behavioral Risk Factor Surveillance System 2016, the prevalence of current asthma was 9.6 percent for all adults. The prevalence rate was significantly higher for women compared to men, similar to ED visit rates (11.3 percent versus 7.9 percent, respectively). With children, there were no significant differences in prevalence with regard to sex, but boys were significantly more likely to have ED visits.

While adults aged 65 years and older were less likely to have asthma than adults aged 45-54 years, they had significantly higher ED visit rates. Children did not show any significant differences in asthma prevalence, except for age. Older children were significantly more likely to be diagnosed with asthma, with 13.4 percent of those aged 10-17 diagnosed, compared 6.0 percent of preschool children (BRFSS, 2016). However, preschool children had a far higher ED visit rate than any adult age group, children age five to fourteen years, and children aged fifteen to seventeen years.

The most recent year of asthma prevalence data does not show a difference between white residents and black residents, in either children or adults. This contrasts with national statistics and previous years' data for Ohio (BRFSS, 2000-2016). However, ED utilization rates remain differ sharply between these races, with black children and black adults having significantly higher ED rates.

There are no significant differences in region or county regarding asthma prevalence, however metropolitan counties display significantly higher rates for ED visits than suburban, Appalachian or rural non-Appalachian counties.



Emergency Department Rates per 10,000 Residents for Children with a Primary Diagnosis of Asthma, by Sex, 2013-2016

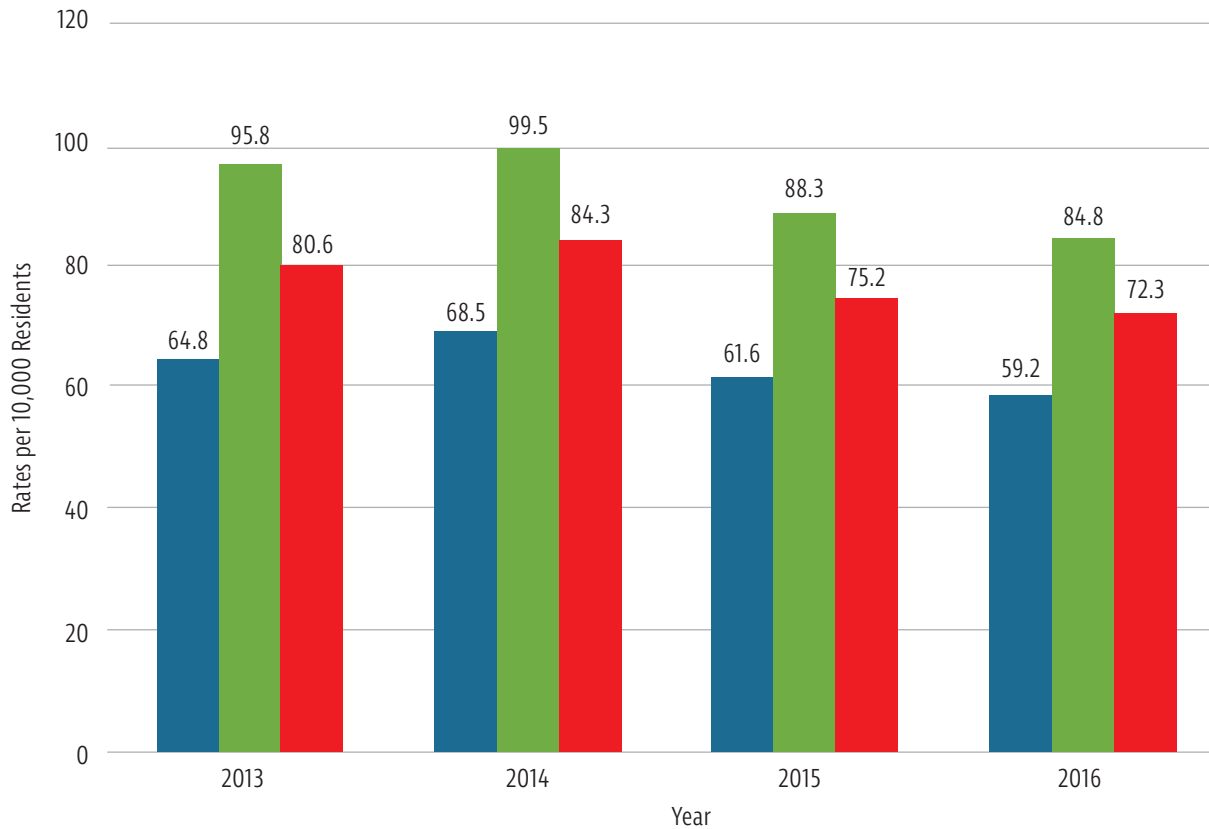


Figure 1

Sources: Ohio Hospital Association Clinical-Financial Database, Years 2013-2016; U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.

The sex disparity in asthma ED visits varies by age. Among children, boys have higher rates than girls, while among adults, women have higher rates than men.

For children, asthma ED visit rates for boys are consistently about one-third higher than for girls.



Emergency Department Rates per 10,000 Residents for Patients with a Primary Diagnosis of Asthma, by Age Group, 2016

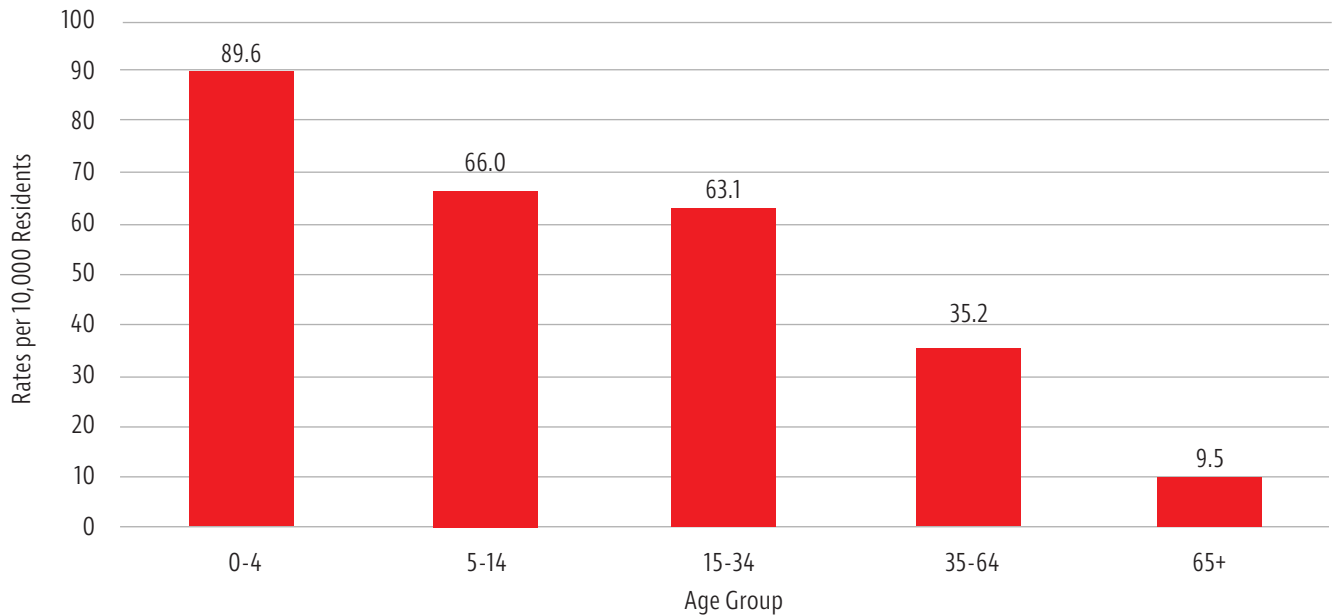


Figure 2

Sources: Ohio Hospital Association Clinical-Financial Database, Year 2016; U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.

Asthma ED visit rates have been consistently highest in children under the age of five — over 25 percent higher than other age groups.



Emergency Department Rates per 10,000 Residents for Adults with a Primary Diagnosis of Asthma, by Sex, 2013-2016

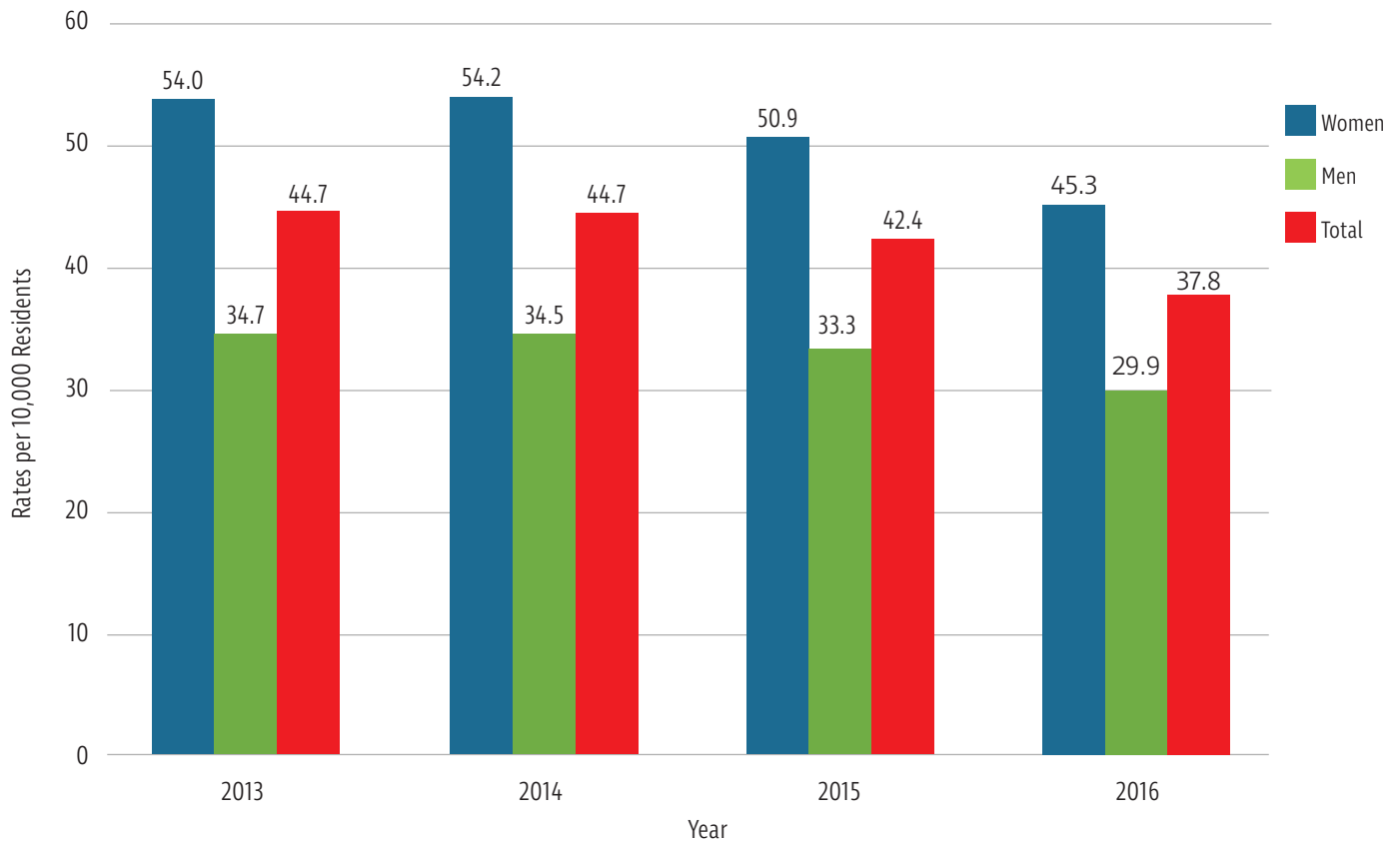


Figure 3

Sources: Ohio Hospital Association Clinical-Financial Database, Years 2013-2016; U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.

Among adults, women have a higher ED visit rate by approximately 30 percent.



Emergency Department Rates per 10,000 Residents for Preschool Children with a Primary Diagnosis of Asthma, by Sex, 2013-2016

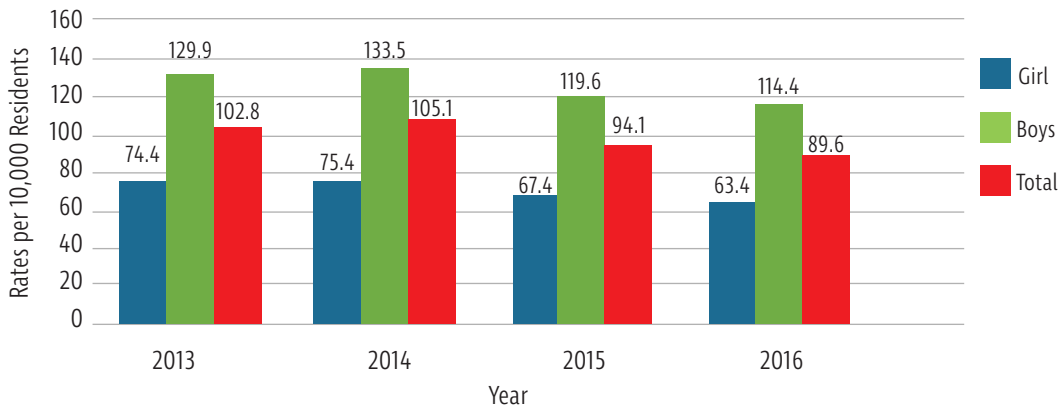


Figure 4

Sources: Ohio Hospital Association Clinical-Financial Database, Years 2013-2016; U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.

Emergency Department Rates per 10,000 Residents for Older Adults by Sex, 2013-2016

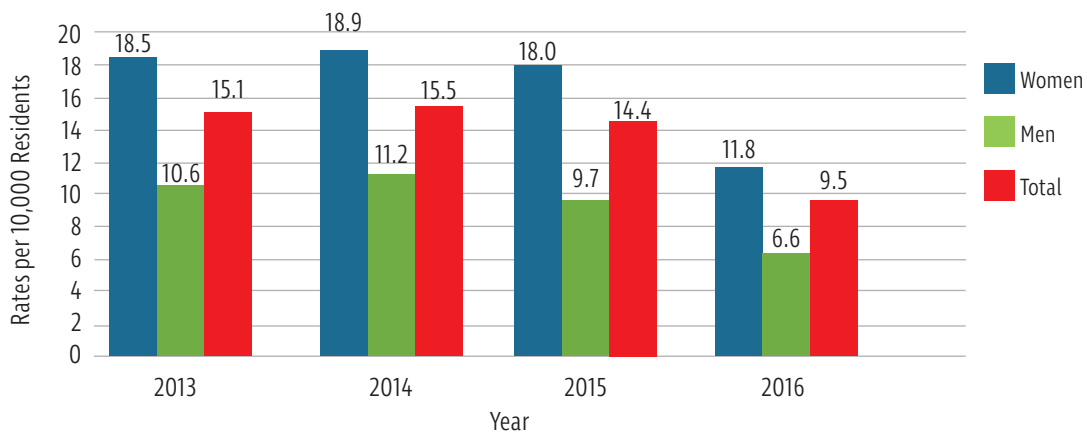


Figure 5

Sources: Ohio Hospital Association Clinical-Financial Database, Years 2013-2016; U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.

Among children under 5 years of age, the difference between boys and girls is particularly striking, with the boys' rate exceeding the girls by close to 75 percent. Among adults over 65 years of age, women have twice the rate of ED visits for asthma compared to men.



Emergency Department Rates per 10,000 Residents for Adults with a Primary Diagnosis of Asthma, by Race, 2013-2016

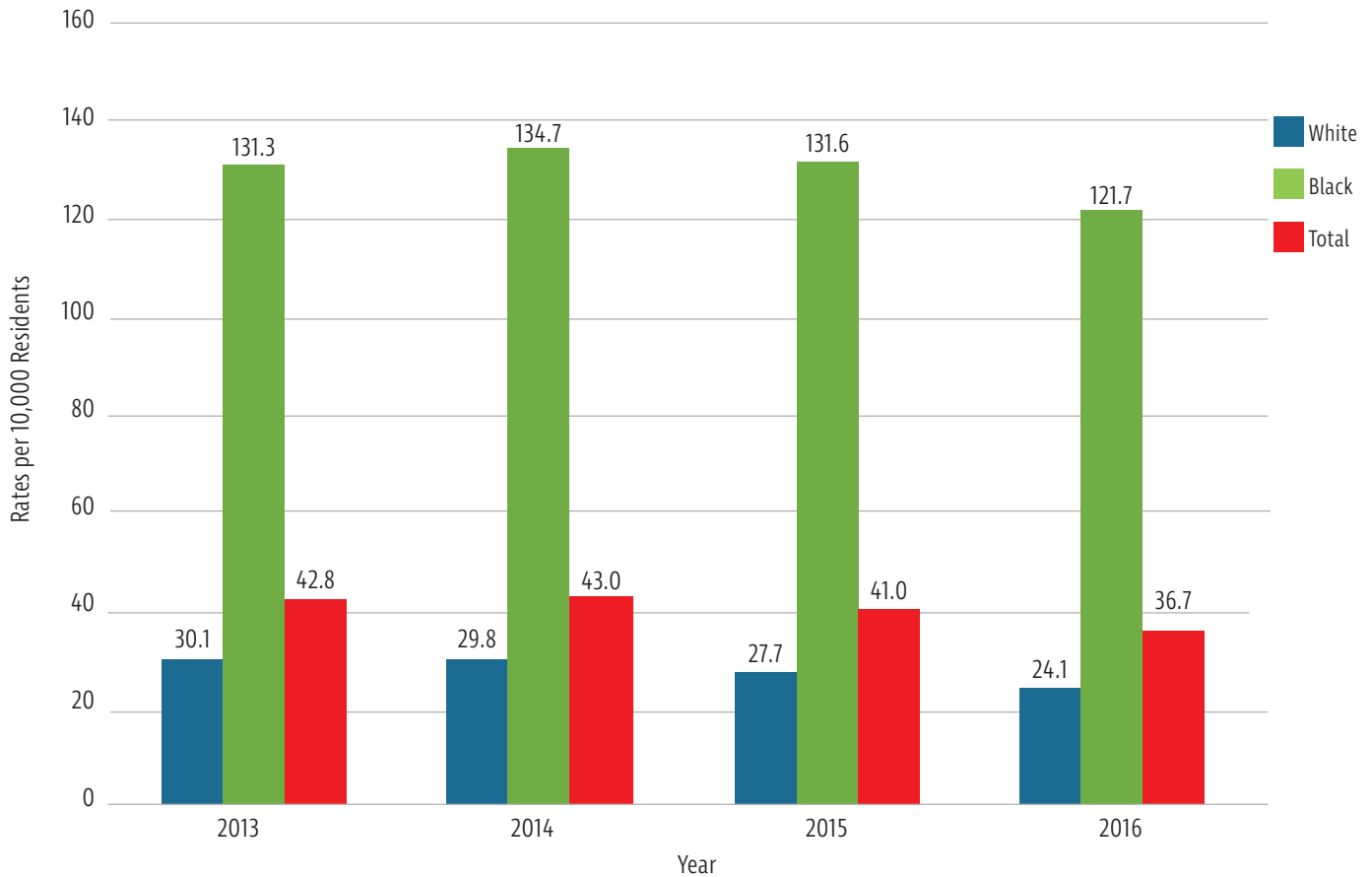


Figure 6

Sources: Ohio Hospital Association Clinical-Financial Database, Years 2013-2016; U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.

Black adults have a higher asthma ED visit rate — 121.7 per 10,000 residents in 2016. This rate is over four times higher than the rate among white adults.



Emergency Department Rates per 10,000 Residents for Children with a Primary Diagnosis of Asthma, by Race, 2013-2016

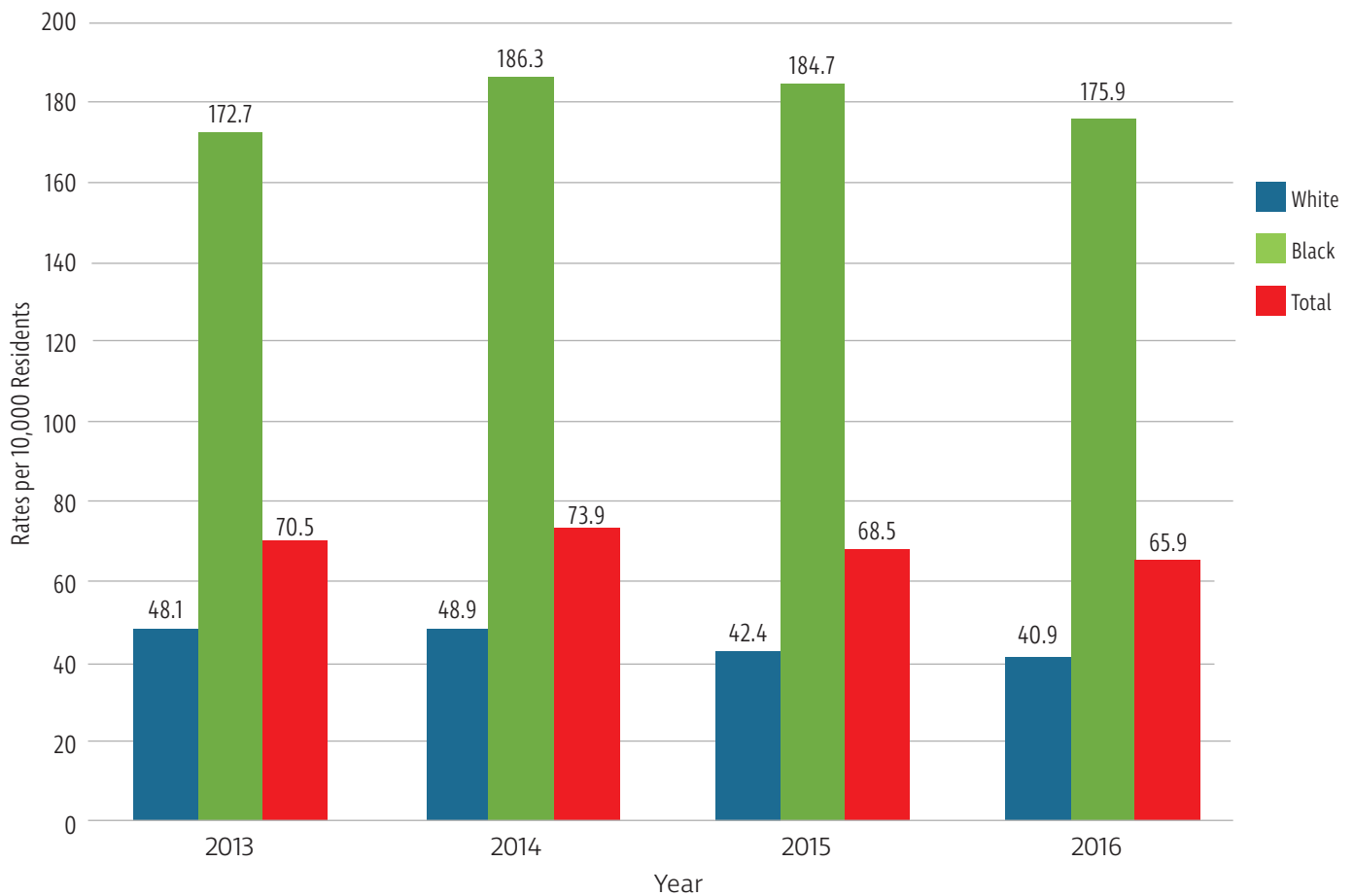


Figure 7

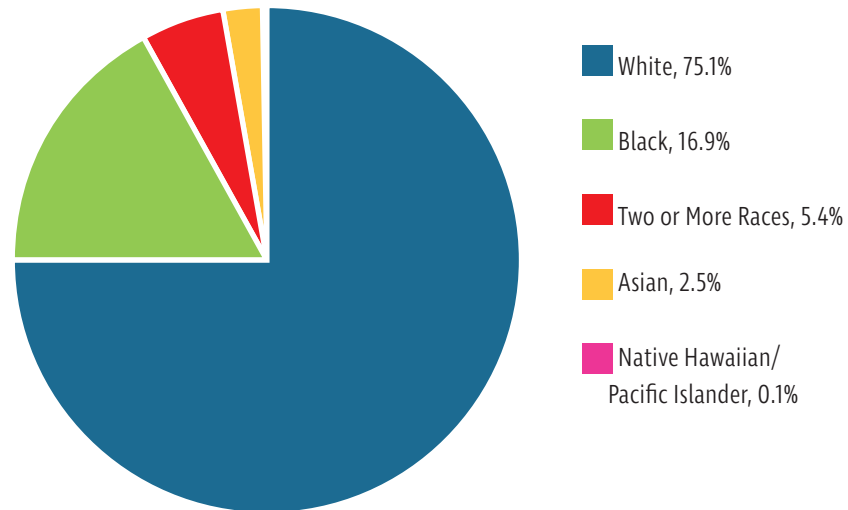
Sources: Ohio Hospital Association Clinical-Financial Database, Years 2013-2016; U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.

In 2016, black children have a rate of asthma ED visits which is four times higher than white children.



Disparity in Emergency Department Use for Asthma Among Preschool Age Black Children, 2016

Race Among Preschool Children, Ohio, 2016



... and the Race Among Emergency
Department Visits for Asthma, 2016

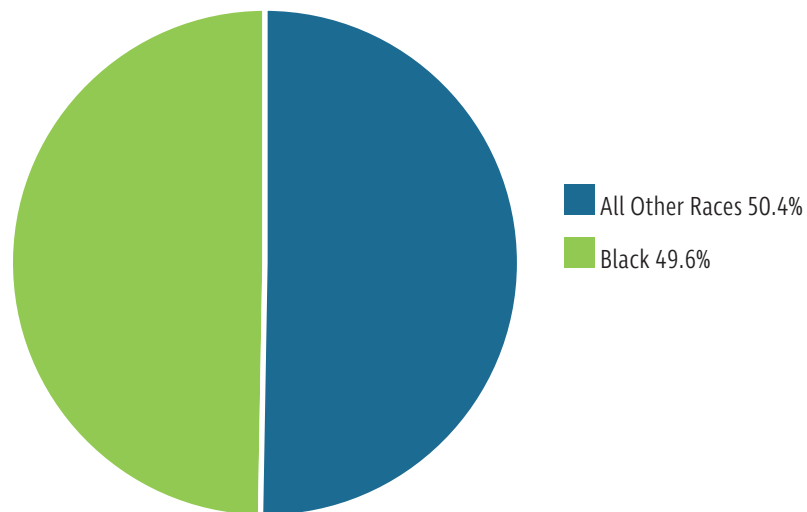


Figure 8

Sources: Ohio Hospital Association Clinical-Financial Database, Year 2016; U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.

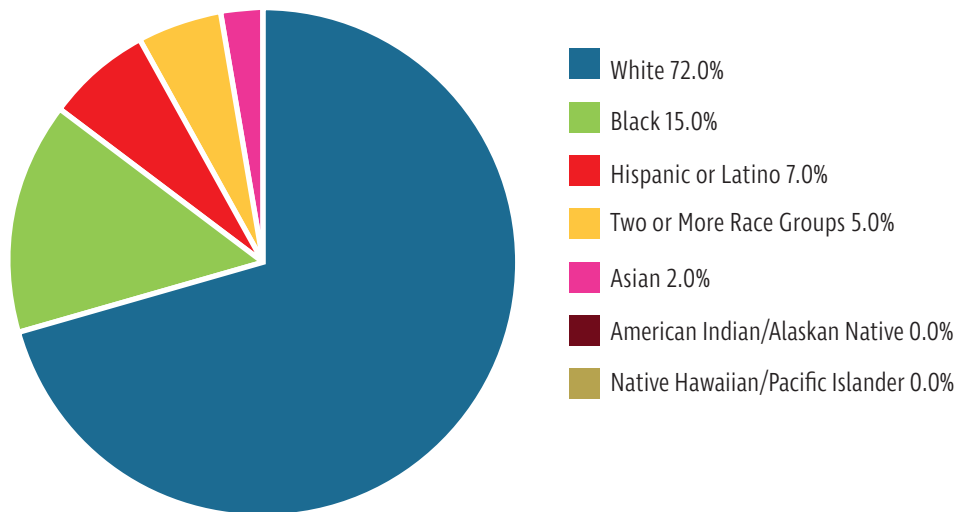
In 2016, there were almost 19,000 asthma ED visits in Ohio among children.

Among the population of children under five years of age in Ohio, less than one in five (16.9 percent) was black. However, black children accounted for nearly half (49.6 percent) of the ED visits.



Disparity in Emergency Department Use for Asthma Among Elementary and Middle School Age Black Children, 2016

Race Among Children Aged Five to Fourteen Years, Ohio, 2016



... and the Race Among Emergency Department Visits for Asthma, 2016

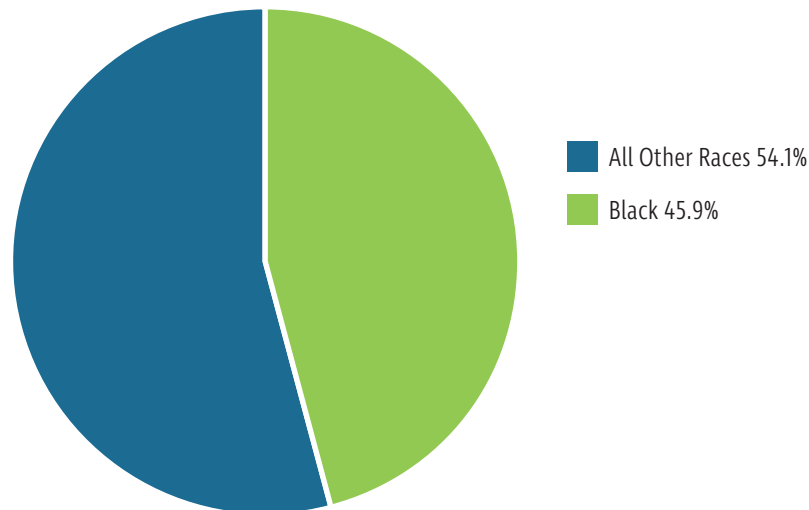


Figure 9

Sources: Ohio Hospital Association Clinical-Financial Database, Year 2016; U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.

In 2016, over 11,000 ED visits were made by children ages 5-14. Close to half of these visits (45.9 percent) were from black children, even though they comprise less than 20 percent of Ohio children.



Emergency Department Rates per 10,000 Residents for Primary Diagnosis of Asthma, by Race and Sex, 2013-2016

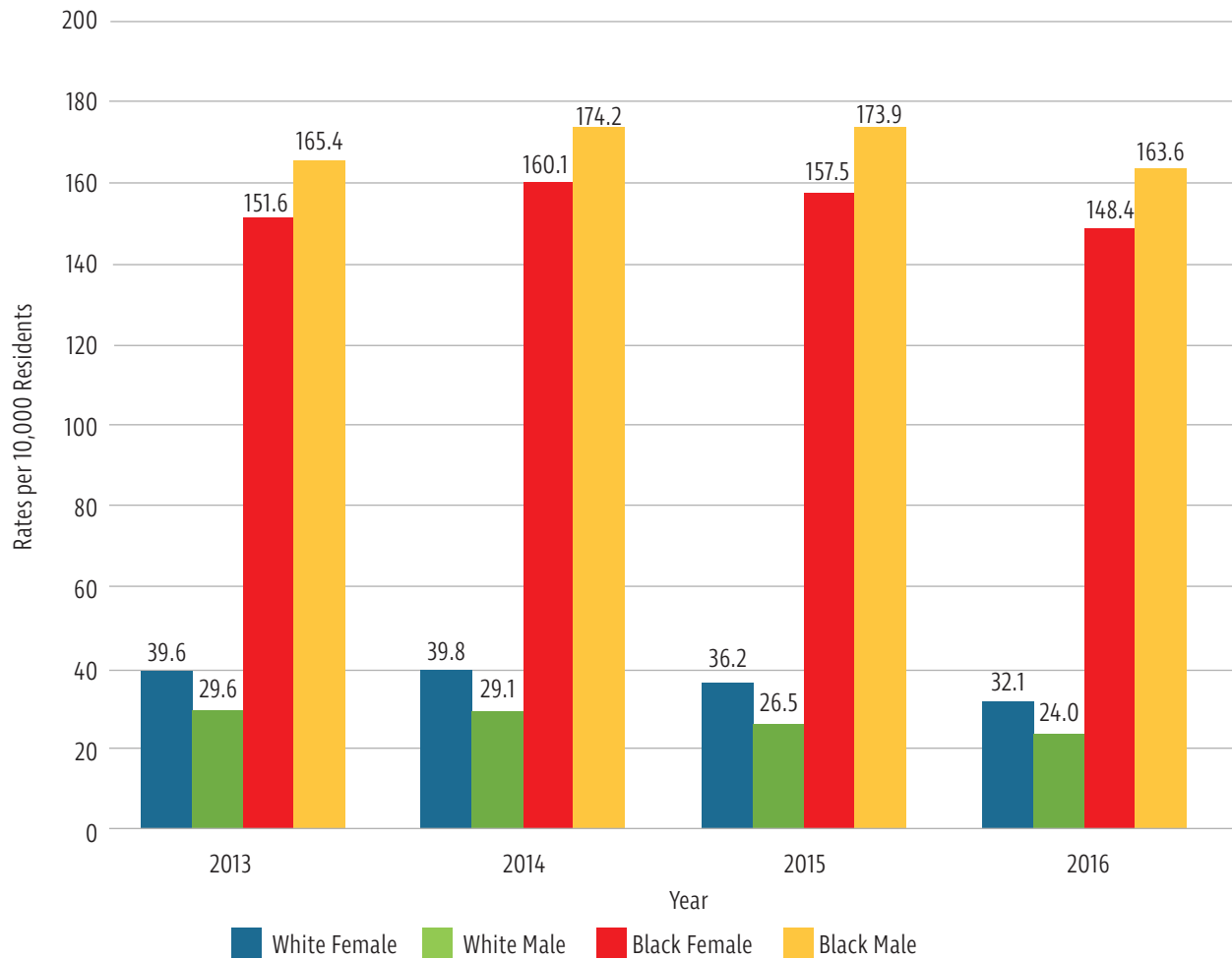


Figure 10

Sources: Ohio Hospital Association Clinical-Financial Database, Years 2013-2016; U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.

Black males and females have particularly high emergency department visits compared to white males. In 2016, the rate of emergency department visits was 6.8 times higher (24.0 versus 163.6 per 10,000 residents).



Counties with Significantly Higher Child Emergency Department Rates per 10,000 Residents for Patients with a Primary Diagnosis of Asthma, 2016



Figure 11

Sources: Ohio Hospital Association Clinical-Financial Database, Years 2013-2016; U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates; Ohio Department of Development, 2018.

Except for Erie County, counties with child emergency department rates significantly above the state average are urban. These counties hold the cities of Dayton, Toledo, Cleveland, Akron and Youngstown.



Counties with Significantly Higher Adult Emergency Department Rates per 10,000 Residents for Patients with a Primary Diagnosis of Asthma, 2016

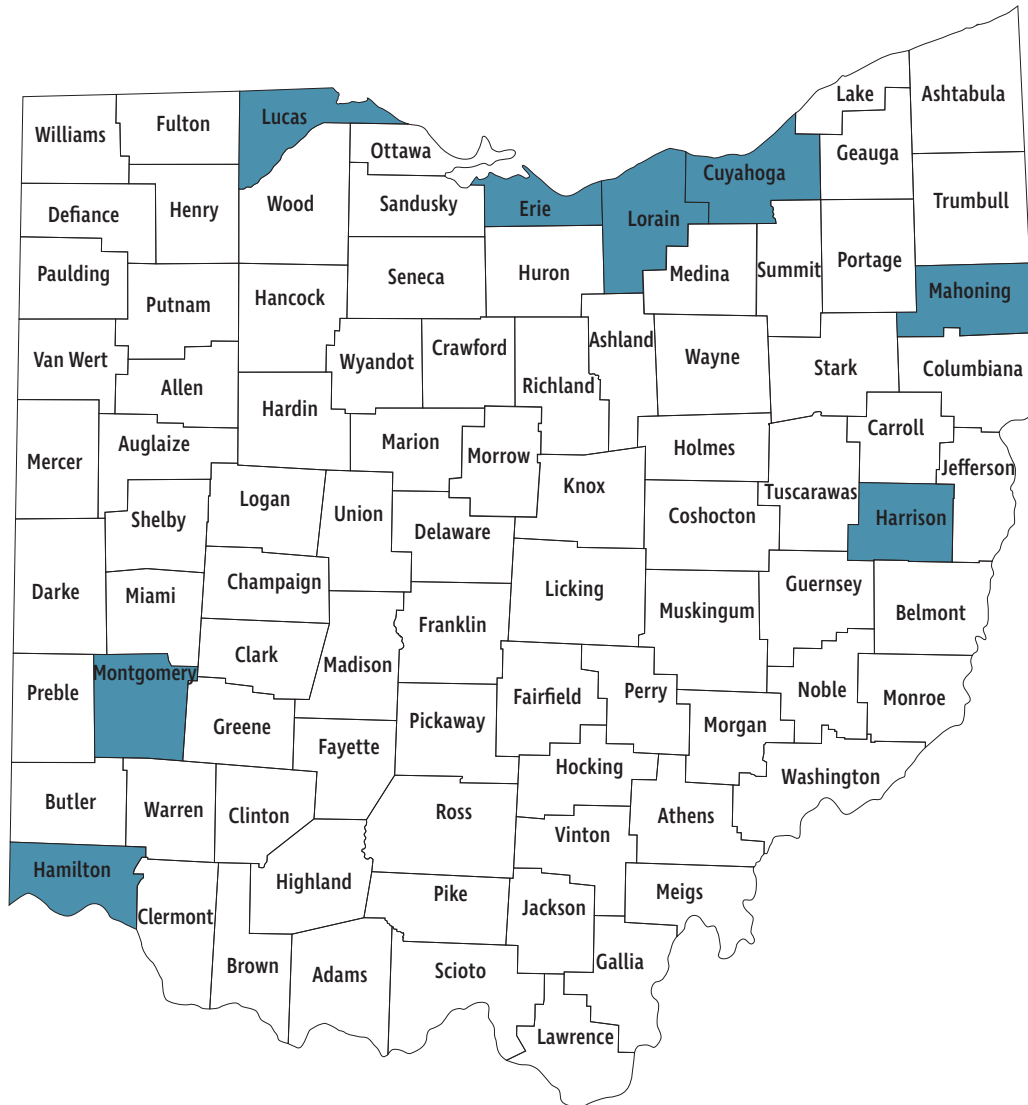


Figure 12

Sources: Ohio Hospital Association Clinical-Financial Database, Years 2013-2016; U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates; Ohio Department of Development, 2018.



Emergency Department for Patients with a Primary Diagnosis of Asthma, by Age Group and Month of Admission, 2013-2016

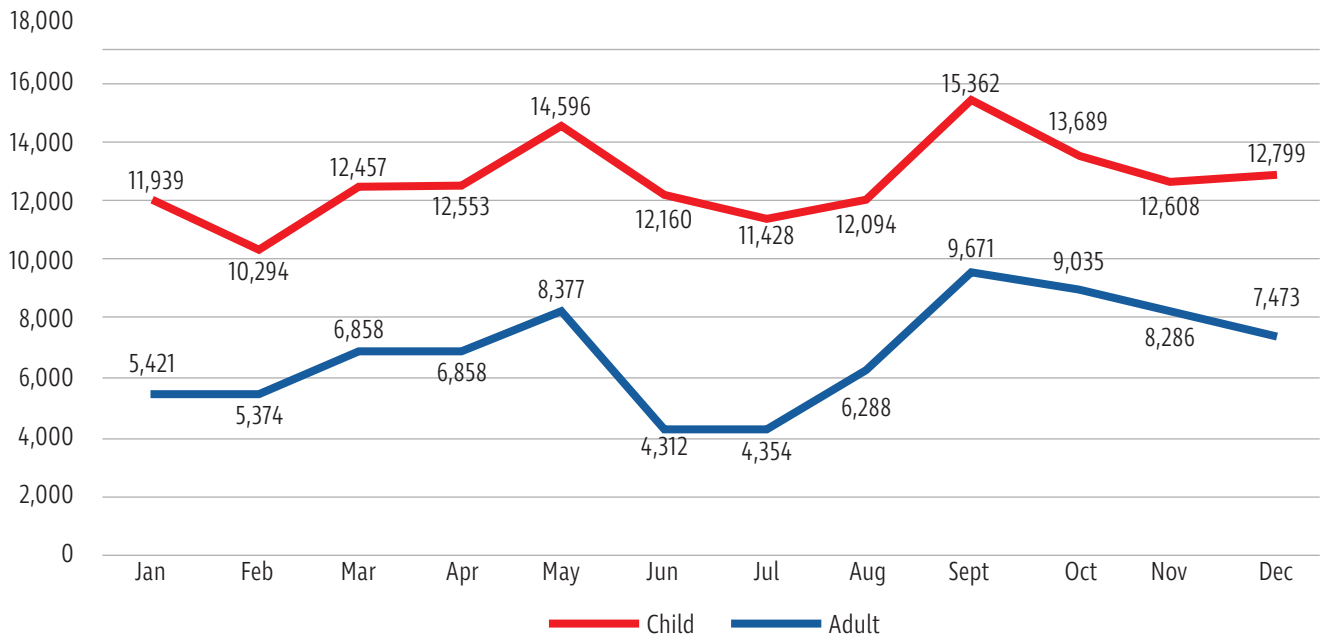


Figure 13

Source: Ohio Hospital Association Clinical-Financial Database, Years 2013-2016.

Asthma ED visits show some consistent trends by season. There are bimodal peaks in May and September. The number decreases in the summer months for both children and adults.

Charges for Asthma ED Visits, Ohio 2013-2016

Total charges for all asthma ED visits in 2016 were over \$114 million. The average charge per asthma emergency department visit increased 19 percent since 2013, without adjusting for inflation. In 2013, the average charge was \$1,811 versus \$2,164 in 2016. Adjusted for inflation, the average charge increased to \$2,344 in 2013 dollars, an increase of 29 percent (Bureau of Labor Statistics, 2018).

Asthma emergency department visit charges are mainly paid for with public funds, such as Medicaid and Medicare. Commercial insurance pays about a quarter of ED visits for both children and adults. The payer mix for ED visits has not changed appreciably from 2013 to 2016. (Note: Charges are not necessarily equivalent to the payment received by the hospital or the total costs incurred.)



Average Emergency Department Visit Charges for Patients with a Primary Diagnosis of Asthma, by Age Group, 2013-2016

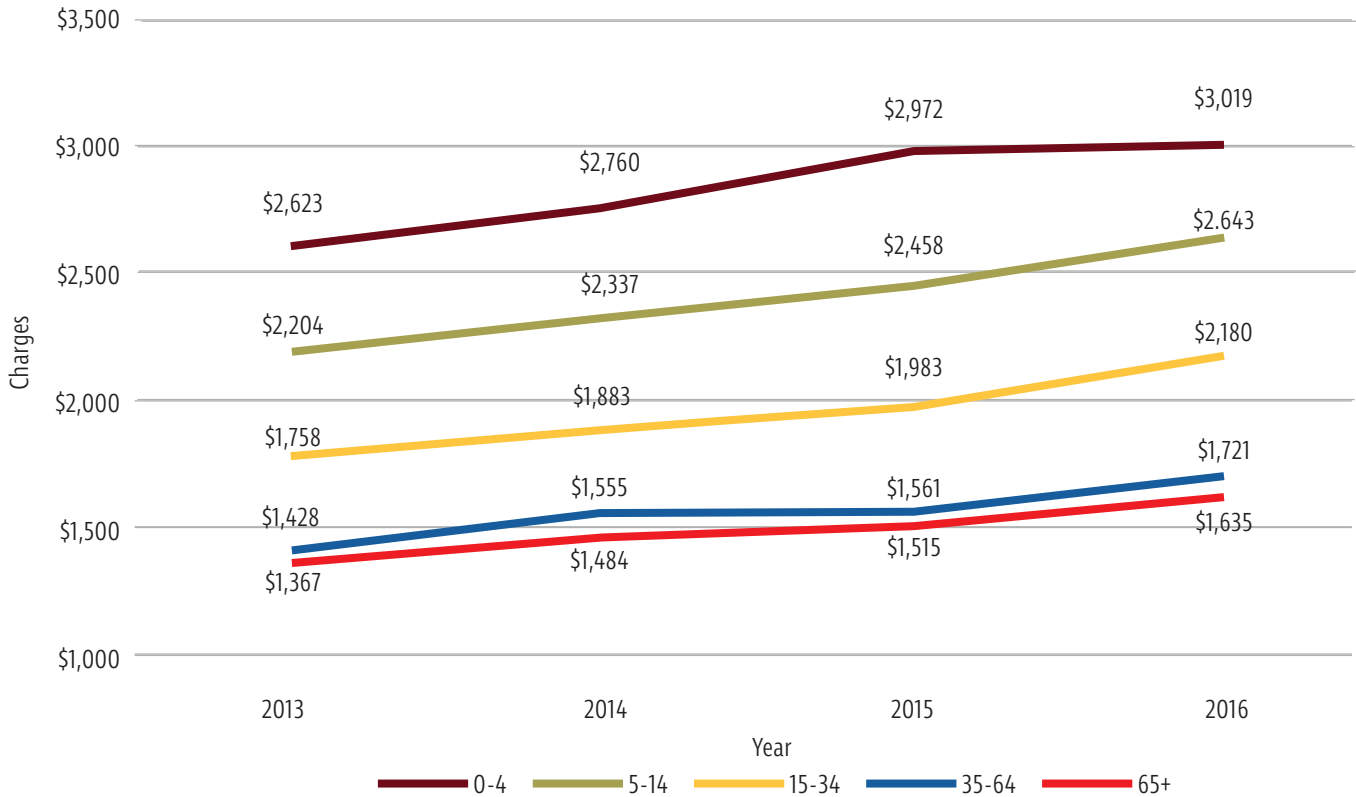


Figure 14

Source: Ohio Hospital Association Clinical-Financial Database, Years 2013-2016.

Charges for emergency department visits, increase with age. The average charge of \$3,019 for people age 65 and over was about 75 percent higher than for children between the ages of five and fourteen in 2016, ranging between \$1,600 and \$1,750.



Average Charges for Emergency Department Visits for Patients with a Primary Diagnosis of Asthma, by Sex, 2013-2016

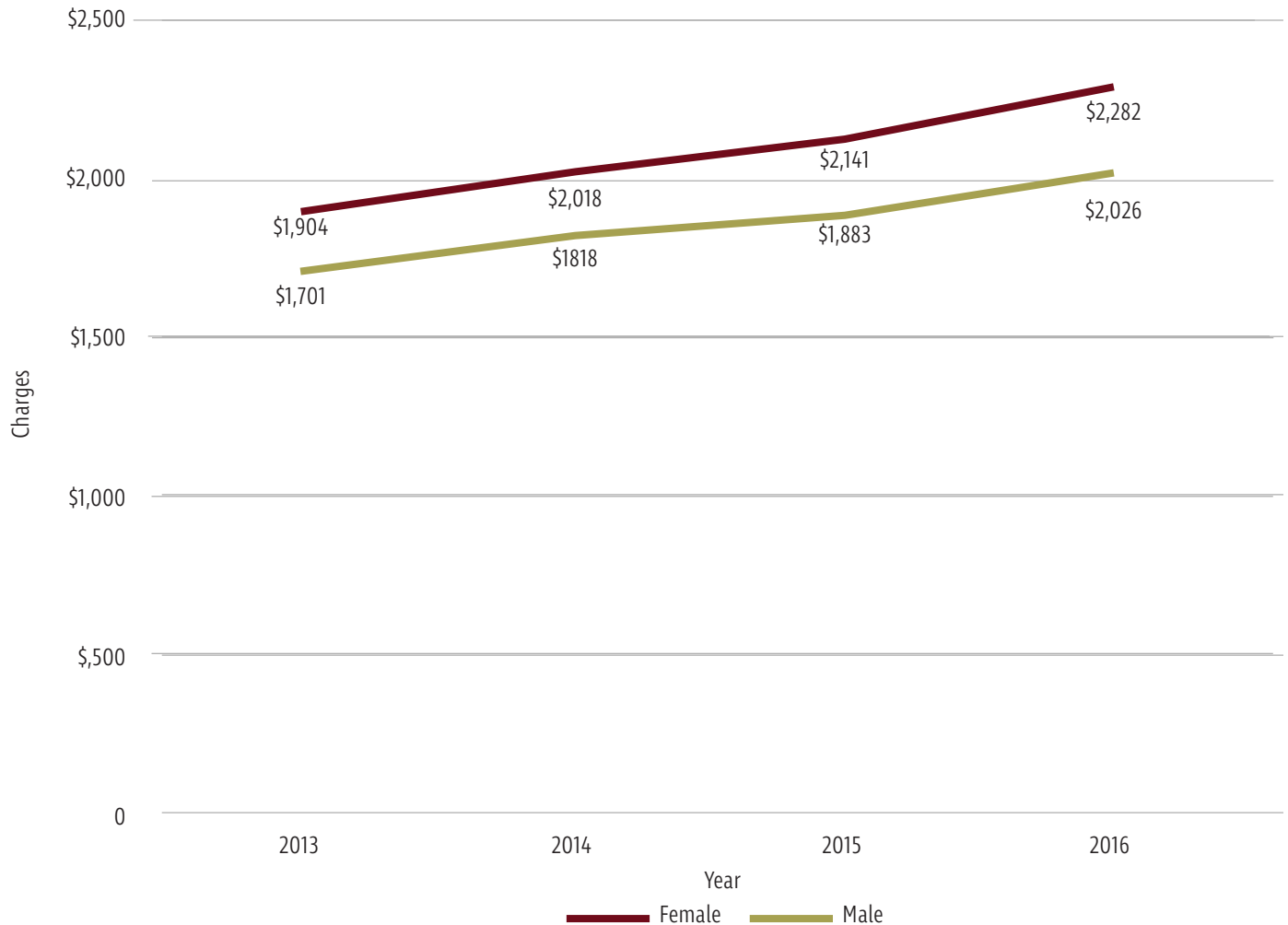


Figure 15

Source: Ohio Hospital Association Clinical-Financial Database, Years 2013-2016.

Charges for emergency department visits for females were about 10 percent higher than males in 2016, \$2,282 compared to \$2,026.



Insurance Payors of Emergency Department Visits for Patients with a Primary Diagnosis of Asthma, Children, 2016

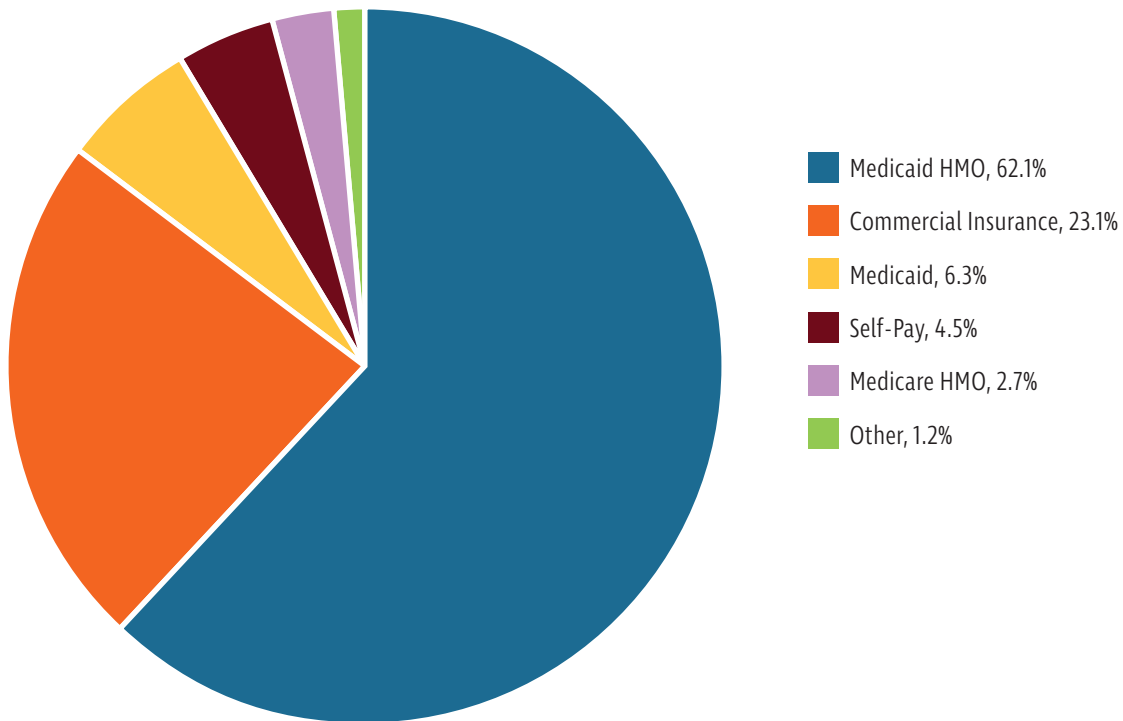


Figure 16

Source: Ohio Hospital Association Clinical-Financial Database, Year 2016.

In 2016, over two-thirds of all asthma ED visits for children were covered by Medicaid — 62.1 percent were covered by a Medicaid HMO, and 6.3 percent by fee for service Medicaid. Another large portion was covered by commercial insurance (23.1 percent).



Insurance Payors of Emergency Department Visits for Patients with a Primary Diagnosis of Asthma, Adults, 2016

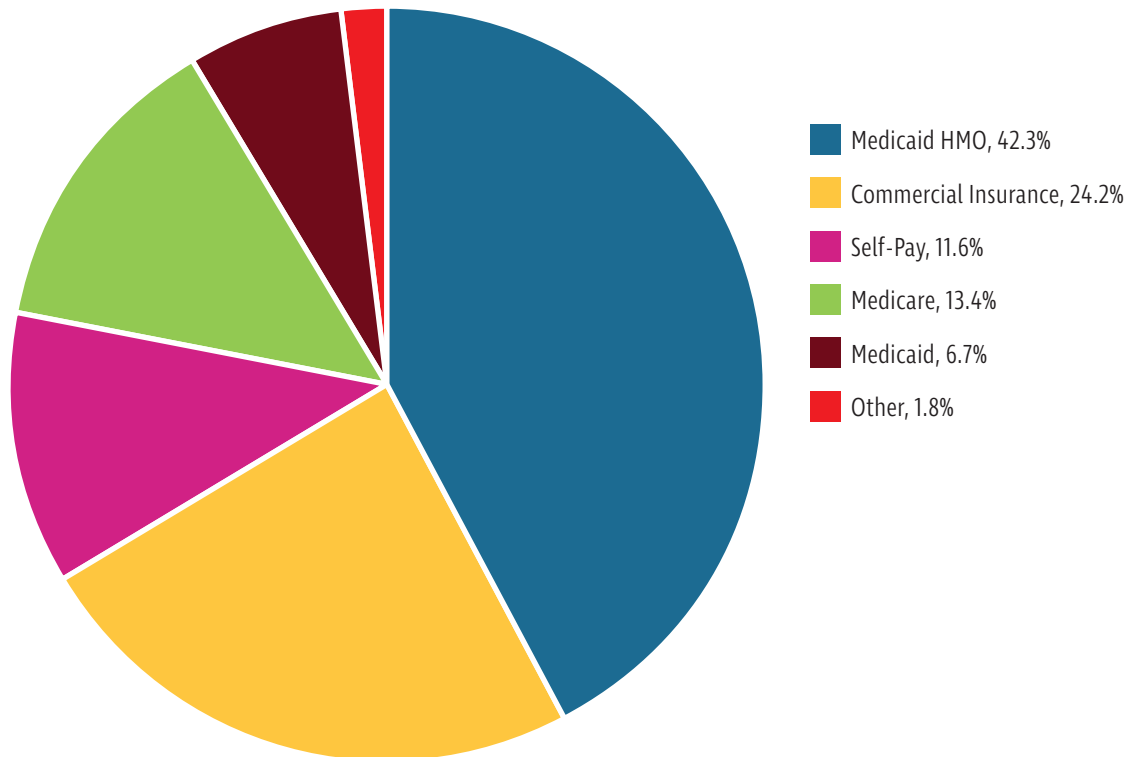


Figure 17

Source: Ohio Hospital Association Clinical-Financial Database, Year 2016.

For adults in 2016, close to half of all asthma ED visits were covered by Medicaid- 42.3 percent were covered by a Medicaid HMO and 24.2 percent were enrolled in fee for service Medicaid. Other large portions were covered by private insurance (24.2 percent), self-pay (11.6 percent) and Medicare (13.4 percent).



Inpatient

Asthma inpatient hospitalizations, like ED visits, are often preventable by appropriate asthma management, including: avoidance of triggers, increased patient and family education, use of asthma action plans, use of appropriate controller medications, with routine and follow-up care. An inpatient hospital visit for asthma is both very serious and very costly. However, this data on asthma hospitalizations can be used to identify disparate groups of people for targeted services.

Asthma Inpatient Hospitalizations

In 2016, there were almost 7,000 asthma hospitalizations in Ohio. This translates to a rate of 5.8 hospitalizations per 10,000 residents. The rates for inpatient hospital visits in 2016 were below the recommended Healthy People 2020 targets for all age groups, except for children under age five, which exceeds the target rate of 18.2, at 20 per 10,000 residents. However, the target rates for Healthy People 2020 were calculated based on ICD-9 coding, and may no longer be a valid measure of burden (Office of Disease Prevention and Health Promotion, 2016). Inpatient visits for asthma represent a gross treatment failure, and the majority are preventable with long-term, appropriate medications and symptom monitoring.

Disparities in Inpatient Hospital Visits

There are outstanding disparities in asthma hospitalization rates by race, sex, age and region. As mentioned previously, in the Behavioral Risk Surveillance System 2016, the prevalence of current asthma was significantly higher for residents aged 45-54 years, women, people with low levels of education and people with low income. However, race was not significant. Children under five years of age are also less likely to have an asthma diagnosis compared to children aged 10-17 (BRFSS, 2016). Disparities in inpatient hospital visits also do not necessarily mirror disparities in prevalence.

Sex

Boys make close to one third more inpatient visits than girls (1,844 compared to 1,187 respectively), with a rate that is a third higher than girls. The opposite is true in adulthood, and adult women make over 2.5 times more visits the hospital for asthma than men (2,691 and 969, respectively), with a rate that approaches three times that of men.

Age

While physicians may be reluctant to diagnose asthma in children under age five, inpatient visit rates are more than twice as high for preschool children than any other age group, with a rate of 20.0 visits per 10,000 residents in 2016. Rates remain far lower for older adults, at 4.6 visits per 10,000 residents for 35-64 year olds, and 4.0 visits per 10,000 residents for adults over 65 years old.



Race

Inpatient visits for asthma show the same pattern as ED visits for black and white residents. Inpatient visit rates for black children in this age category is close to four times higher than white children. Inpatient hospital data shows that close to half of inpatient visits for preschool children are made by children who are black, even though they make up less than 20 percent of the child population of Ohio. Similar to rates for ED visits, black residents have a much higher asthma inpatient hospitalization rate – 11.7 per 10,000 residents in 2016. This is more than four times higher than the rate among whites. For school-aged children aged five to fourteen years, the majority of inpatient visits for asthma are made by black children (54.7 percent).

Among adults, black residents are also overrepresented in inpatient hospital visits, where they have rates that are two to four times higher for inpatient visits as white residents. Inpatient hospital rates for black males and females are significantly higher when compared to the rates for white males. In 2016, rates for black males and females exceeded those of white males by over fourfold.

Region

Like emergency department visits, metropolitan counties were the most represented when it came to higher rates of inpatient hospital visits in 2016. Among children, inpatient hospital visits were significantly higher in urban areas that were home to large cities such as Dayton, Cincinnati, Columbus, Lorain, Cleveland and Toledo. Many counties with the highest adult rates were urban ones that encompass large metropolitan areas such as Toledo, Cincinnati, Cleveland, and Akron, but also suburban counties with small cities, such as Marion and Springfield.



Inpatient Hospital Rates per 10,000 Residents for Children with a Primary Diagnosis of Asthma, by Sex, 2013-2016

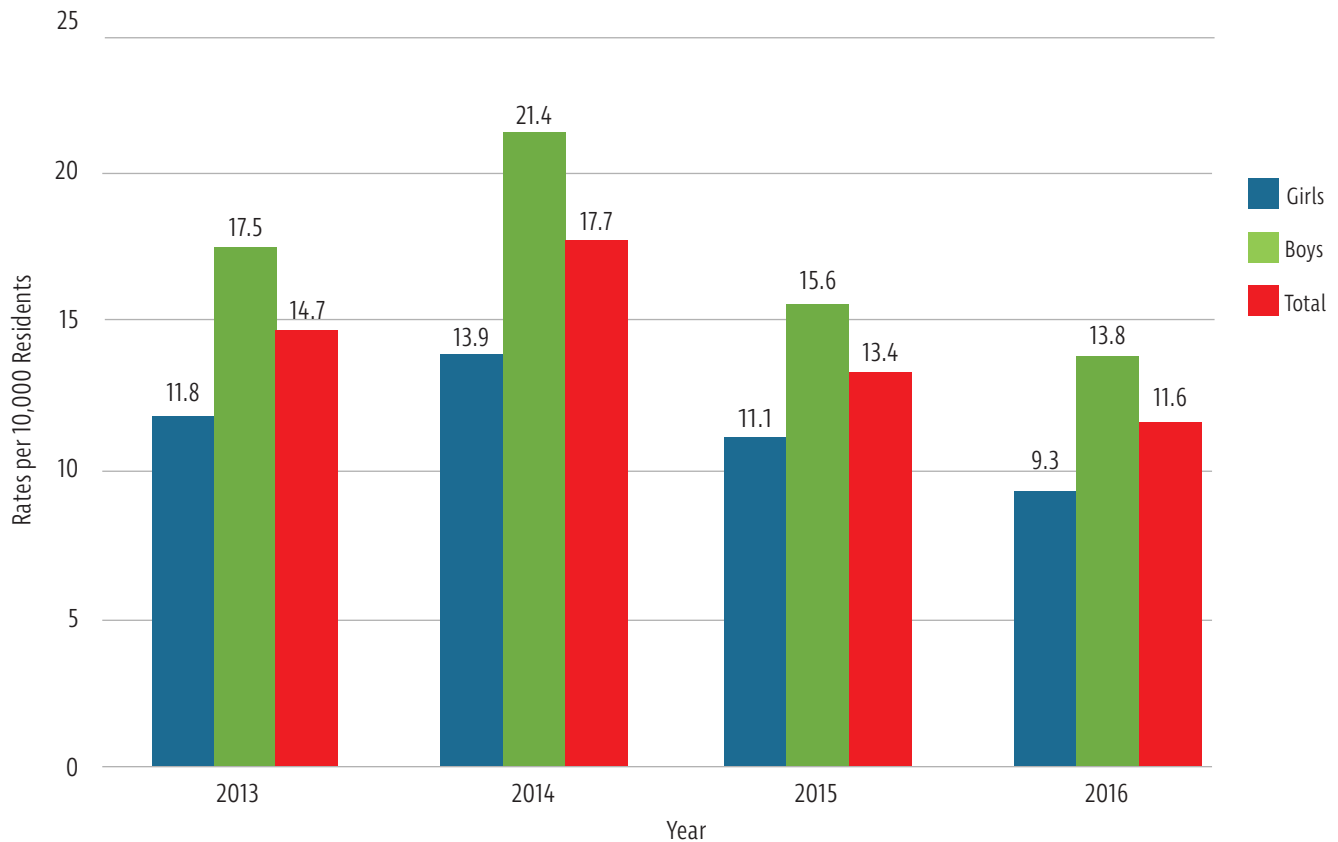


Figure 18

Sources: Ohio Hospital Association Clinical-Financial Database, Years 2013-2016; U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.

For children under age 18, asthma inpatient hospital visit rates for boys are consistently over one-third higher than for girls.



Inpatient Hospital Rates per 10,000 Residents for Adults with a Primary Diagnosis of Asthma, by Sex, 2013-2016

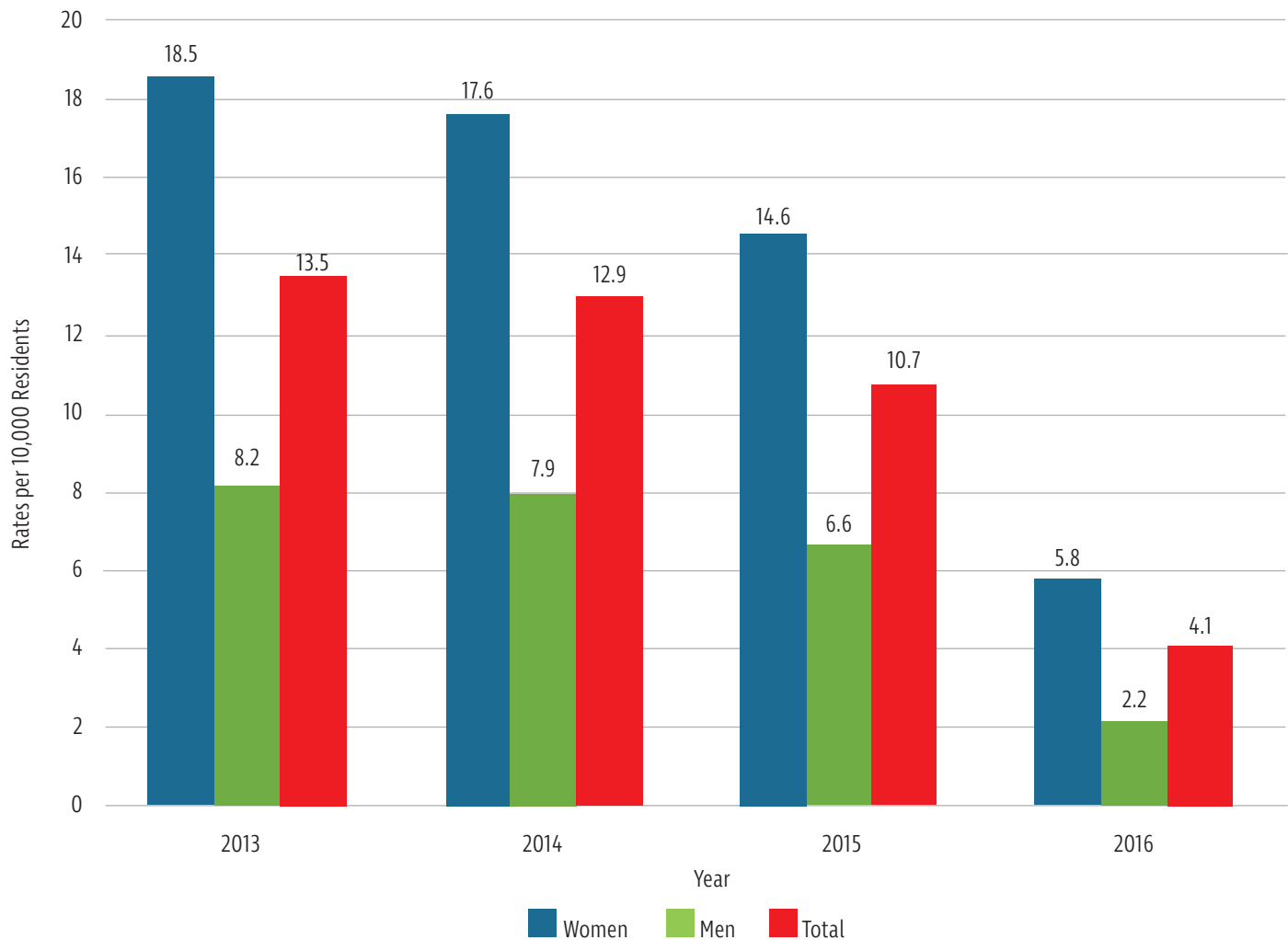


Figure 19

Sources: Ohio Hospital Association Clinical-Financial Database, Years 2013-2016; U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.

The disparity in sex for asthma inpatient hospital visits varies by age. Among adults, women have over twice the rate of inpatient hospitalization as men.



Inpatient Hospital Rates per 10,000 Residents for Preschool Children with a Primary Diagnosis of Asthma, by Sex, 2013-2016

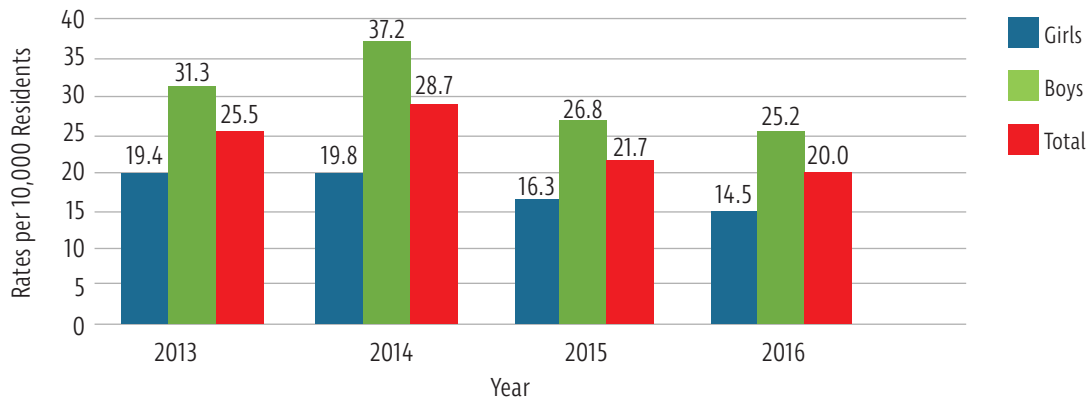


Figure 20

Sources: Ohio Hospital Association Clinical-Financial Database, Years 2013-2016; U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.

Inpatient Hospital Rates for Older Adults with a Primary Diagnosis of Asthma, by Sex, 2013-2016

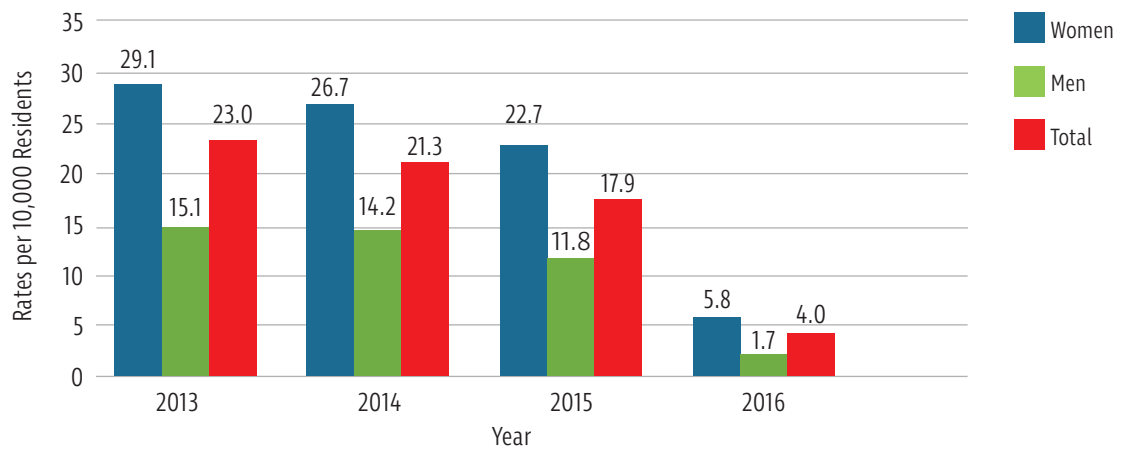


Figure 21

Sources: Ohio Hospital Association Clinical-Financial Database, Years 2013-2016; U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.

Among children under 5 years of age, the difference between boys and girls is particularly striking, with the boys' rate exceeding the girls by close to 75 percent. Among adults over 65 years of age, women have twice the rate of ED visits for asthma compared to men.



Inpatient Hospital Rate for Patients with a Primary Diagnosis of Asthma, by Age Group, 2016

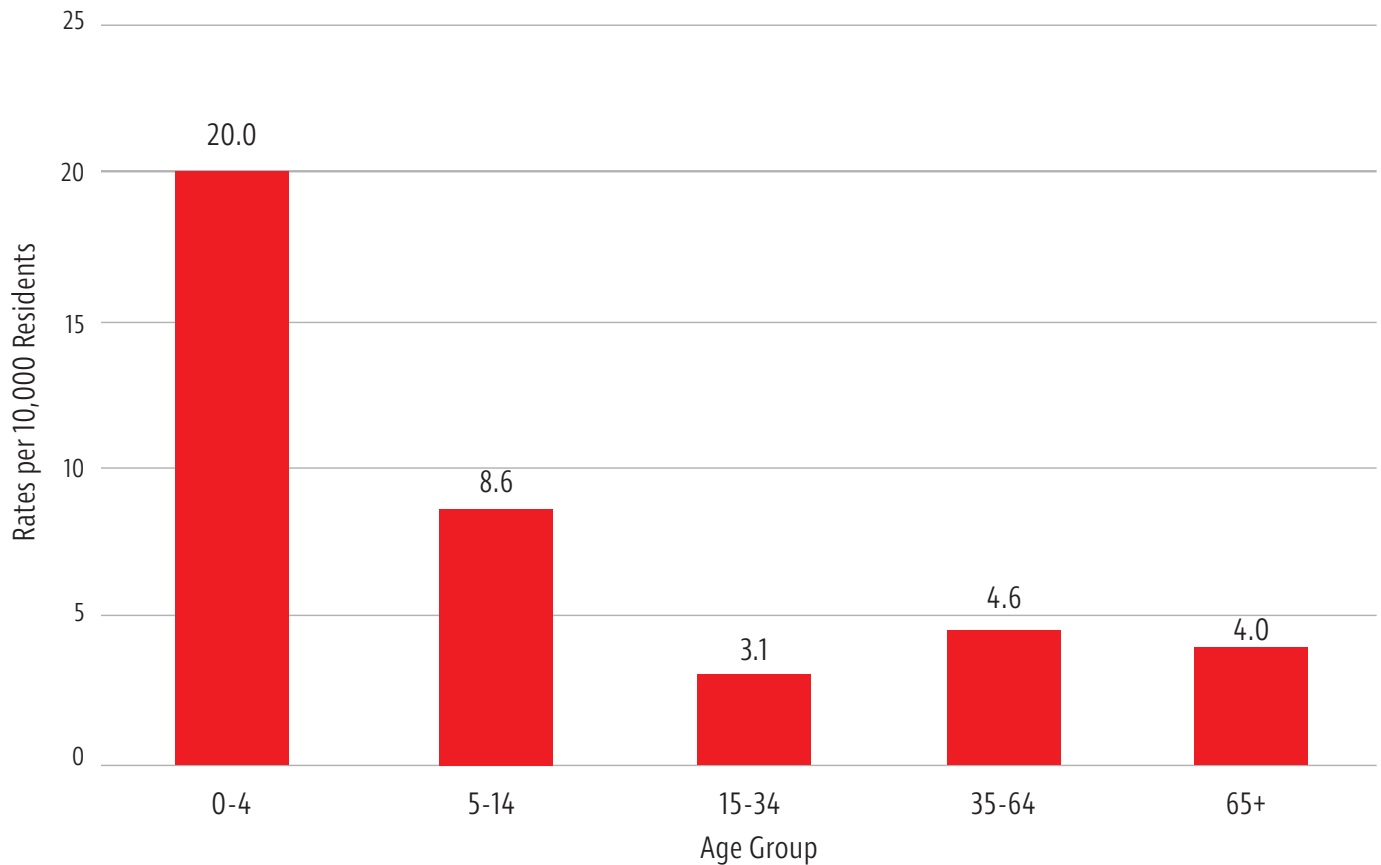


Figure 22

Sources: Ohio Hospital Association Clinical-Financial Database, Year 2016; U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.

Asthma inpatient hospital visit rates have been consistently highest in children under the age of five — over twice as high as any other age group.



Race Among Children Aged Five to Fourteen Years, Ohio, 2016

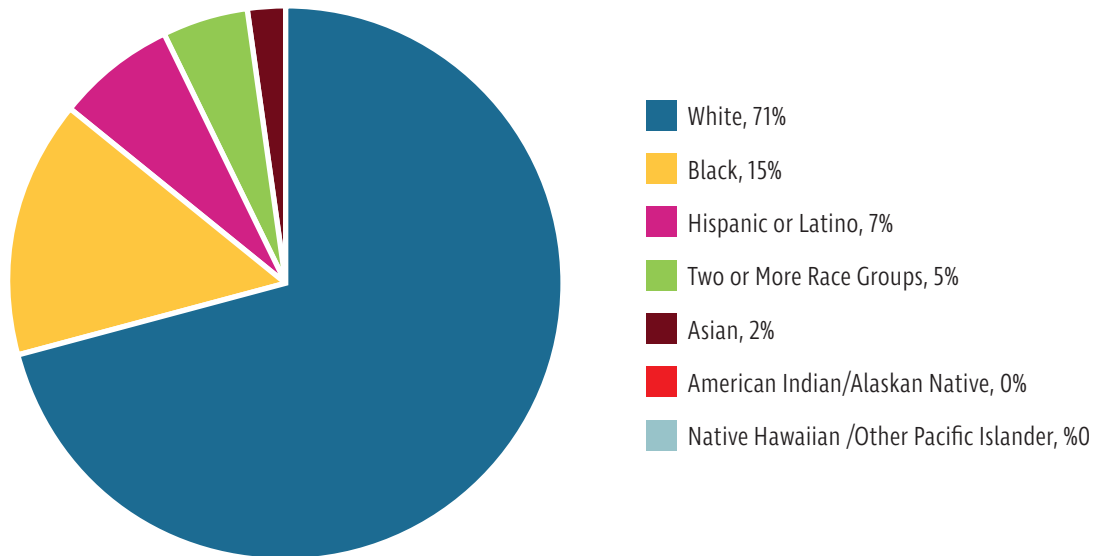


Figure 23

Source: U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.

Race of Patients Aged Five to Fourteen Years, Inpatient Hospital Visits for Asthma, 2016

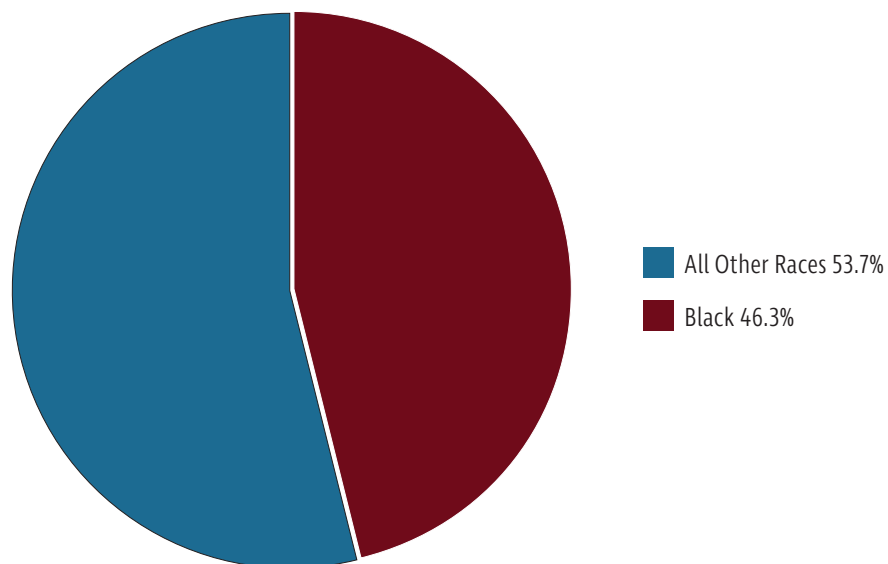


Figure 24

Source: Ohio Hospital Association Clinical-Financial Database, Year 2016

Among the population of children age five to fourteen years in Ohio, close to one in seven (15 percent) is black. However, black children account for over half (53.7 percent) of the inpatient visits.



Inpatient Hospital Rates per 10,000 Residents for Children with a Primary Diagnosis of Asthma, by Races, 2013-2016

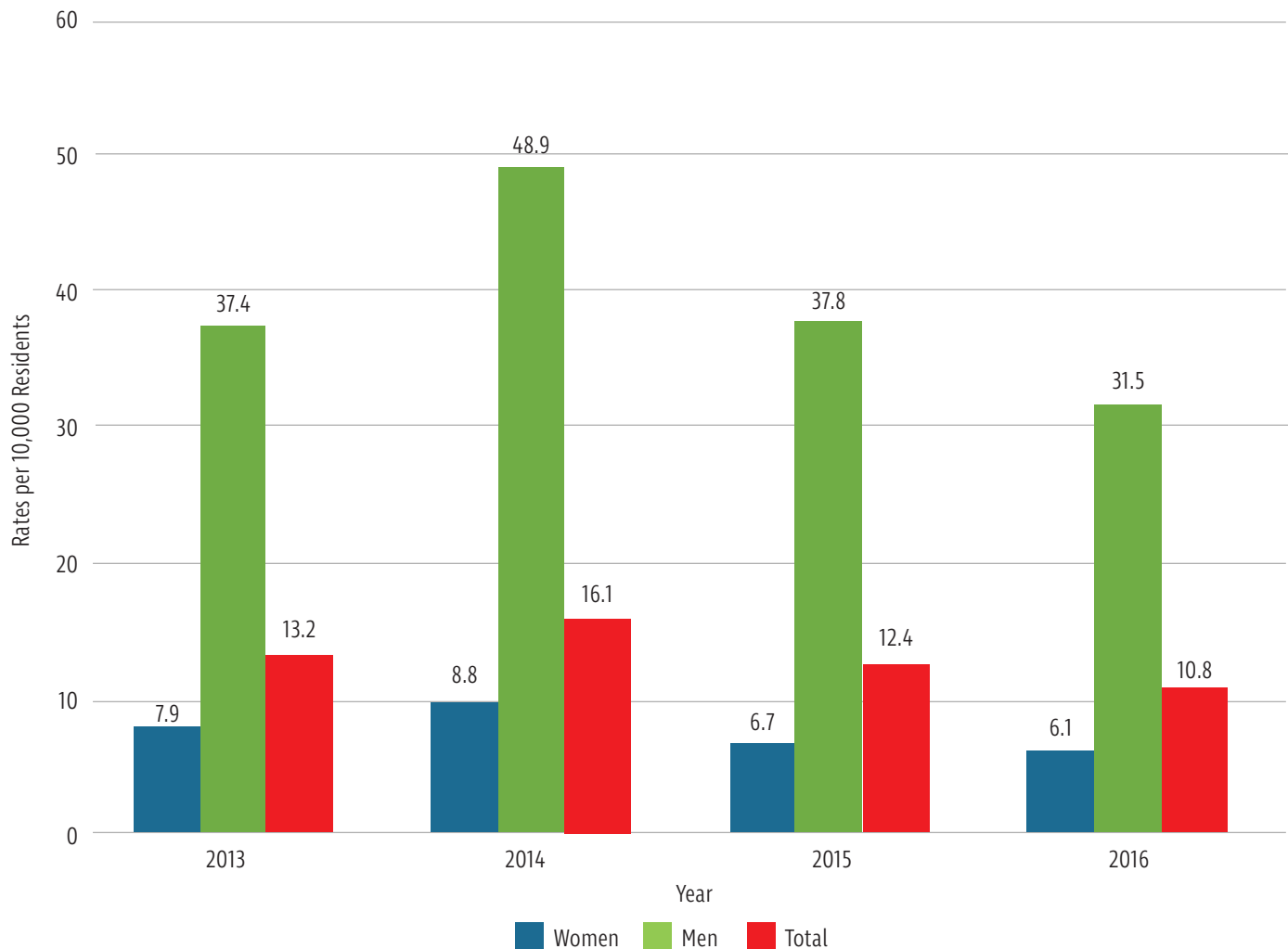


Figure 25

Sources: Ohio Hospital Association Clinical-Financial Database, Years 2013-2016; U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.

Black children have a higher inpatient hospital visit rate — 31.5 per 10,000 residents in 2016. This rate is over five times higher than white children (6.1 per 10,000 residents).



Inpatient Hospital Rates per 10,000 Residents for Adults with a Primary Diagnosis of Asthma, by Races, 2013-2016

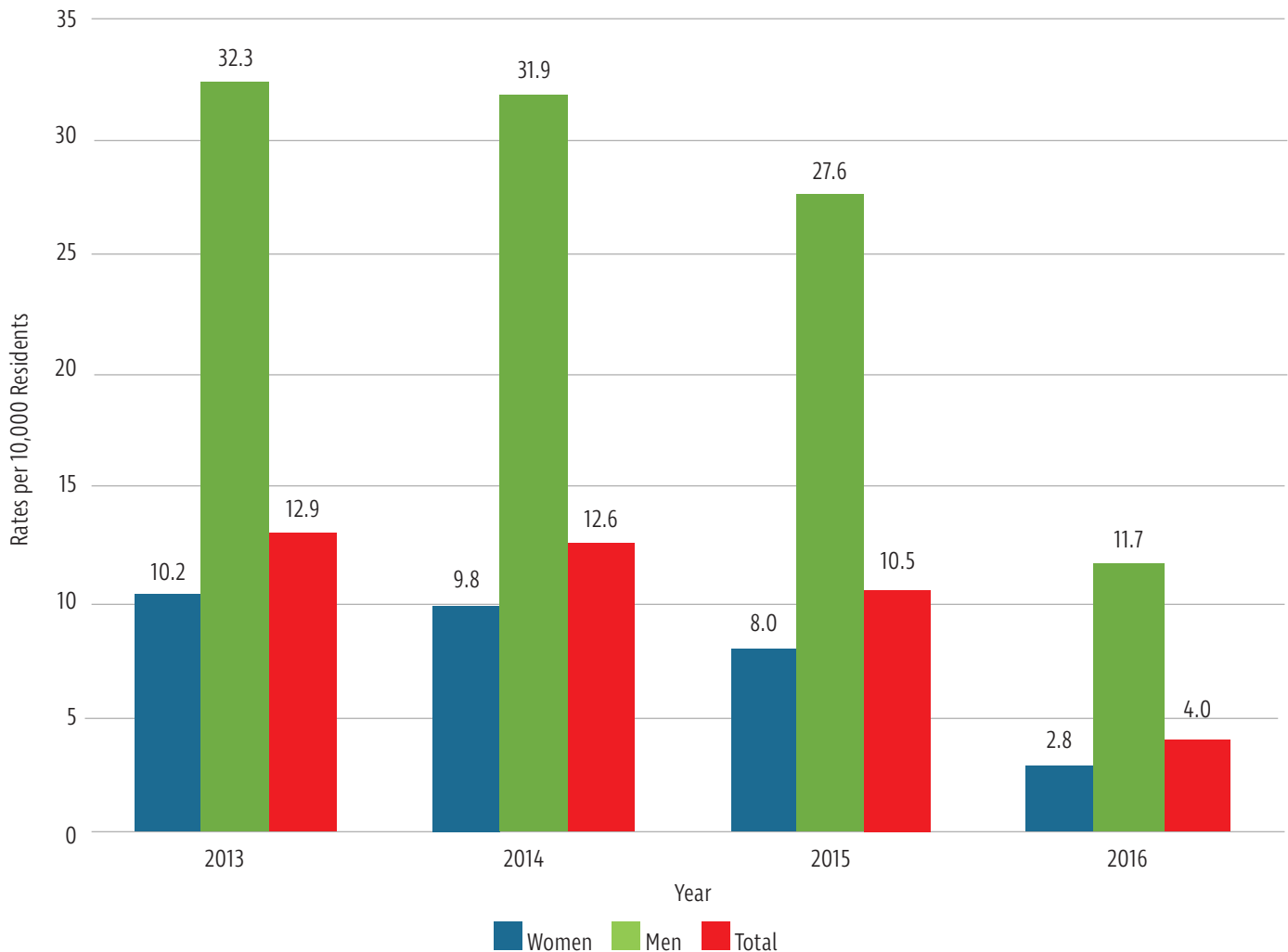


Figure 26

Sources: Ohio Hospital Association Clinical-Financial Database, Years 2013-2016; U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.

Black adults have a higher inpatient hospital visit rate — 11.7 per 10,000 residents in 2016. This is over four times higher than the rate among white adults (2.8 per 10,000 residents).

The disparity between black children and white adults deserved to be noted – the two groups with high and low asthma inpatient rates. Black children have a rate of inpatient hospitalization, a situation that is in most cases preventable, that exceeds the rate of white adults by more than tenfold (31.5 versus 2.8 per 10,000 residents, respectively.)



Emergency Department for Patients with a Primary Diagnosis of Asthma, by Age Group and Month of Admission, 2013-2016

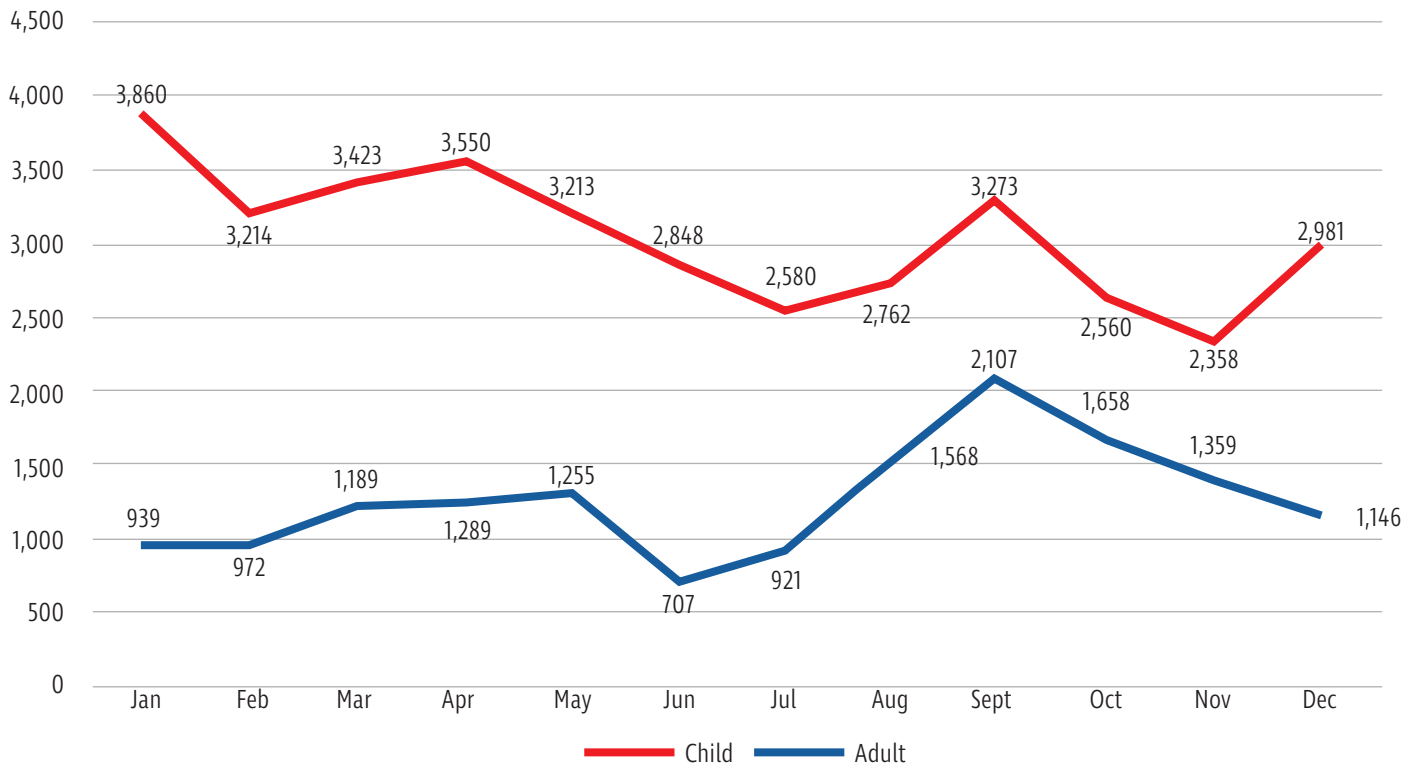


Figure 27

Source: Ohio Hospital Association Clinical-Financial Database, Years 2013-2016

Asthma hospitalizations vary by season. The number increases in the fall and winter, during influenza season, with children peaking in September when many return to school. Adults have the most visits during the winter months.



Counties with Significantly Higher Child Inpatient Hospital Rates per 10,000 Residents for Patients with a Primary Diagnosis of Asthma, 2016

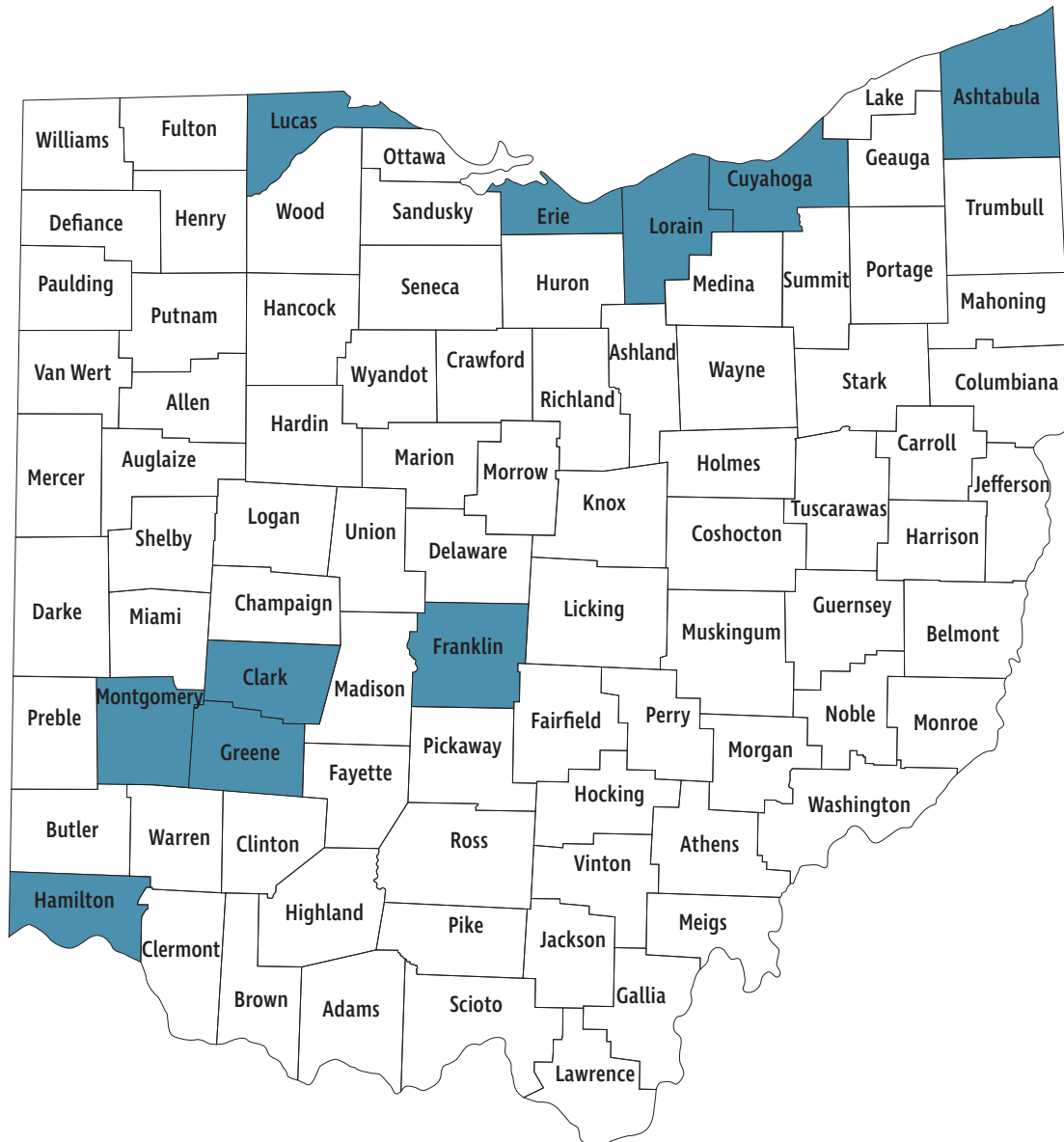


Figure 28

Sources: Ohio Hospital Association Clinical-Financial Database, Year 2016; U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates; Ohio Department of Development, 2018.

Counties with significantly higher rates for adults are mostly urban, and contain the cities of Cincinnati, Toledo, Dayton, Columbus, Cleveland.



Counties with Significantly Higher Adult Emergency Department Rates per 10,000 Residents for Patients with a Primary Diagnosis of Asthma, 2016



Figure 29

Sources: Ohio Hospital Association Clinical-Financial Database, Year 2016; U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates; Ohio Department of Development, 2018.

Half of the counties with inpatient hospital rates higher than the state average are urban, and include the counties with the cities of Toledo, Cincinnati, Cleveland, Akron and Youngstown. Three others have small cities, such as Marion, Springfield and Warren.



Charges for Asthma Hospitalization, 2013-2016

(Note: With the change in hospital coding in 2015, inpatient visits for chronic obstructive asthma are no longer included. This could contribute to the actual decrease of the average charges for an inpatient visit for asthma from 2013 to 2016.)

In 2016, there were over \$129 million in total charges for asthma inpatient hospitalizations in Ohio. The average charge for an asthma hospitalization was \$19,311, compared to \$19,401 in 2013. Even after adjusting for inflation, charges the group with the strongest history of chronic obstructive asthma, patients aged 65 years older, decreased for inpatient hospital visits. Data from future years will indicate whether decreased charges for elderly patients are a trend, or a result of the ICD-10 coding scheme.

The majority of asthma hospitalizations are paid for through public programs such as Medicare and Medicaid. (Note: Charges are not necessarily equivalent to the payment received by the hospital or the total costs incurred.)

Average Charges for Inpatient Hospital Visits for Patients with a Primary Diagnosis of Asthma, by Age Group, 2013-2016

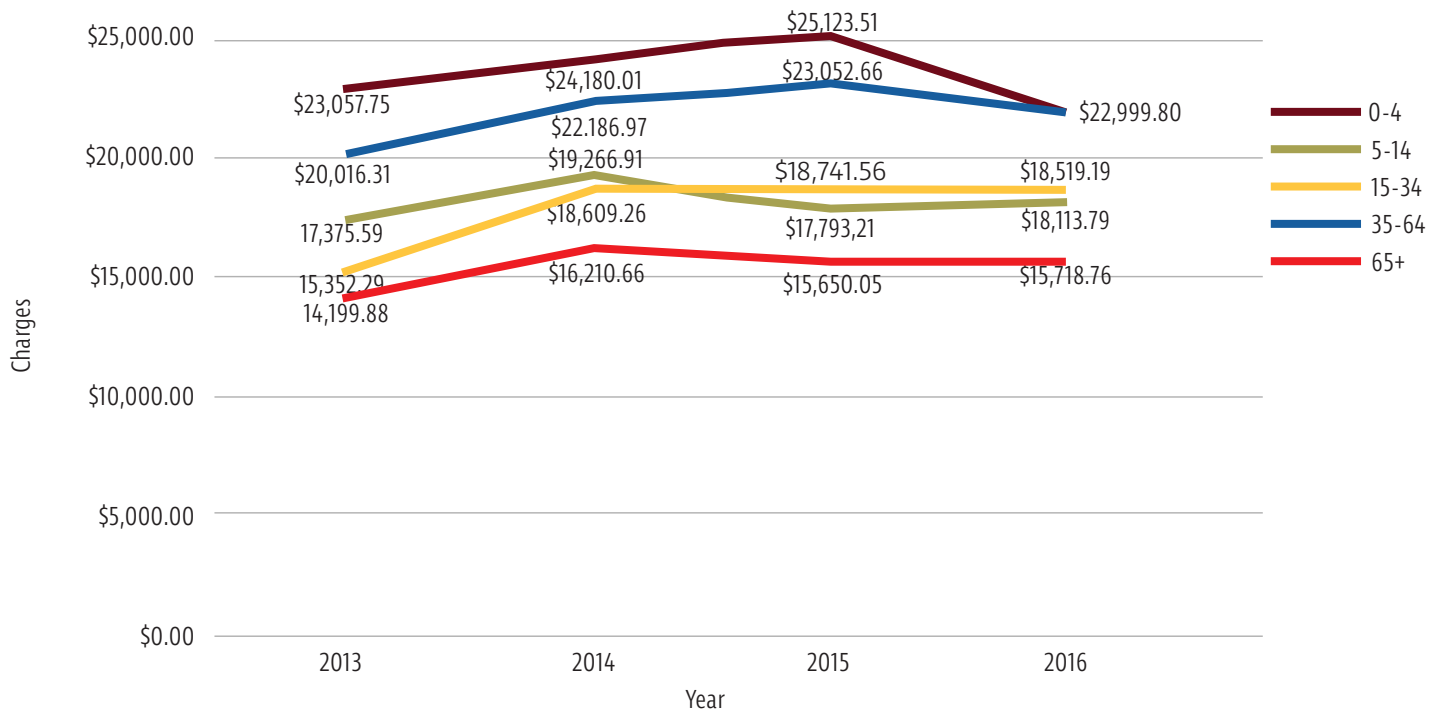


Figure 30

Source: Ohio Hospital Association Clinical-Financial Database, Years 2013-2016.

Charges for asthma hospitalizations increase with age. The average charges for people age 65 and over were about 50 percent higher than for children under age five in 2016.



Average Charges for Patients with a Primary Diagnosis of Asthma, by Sex, 2013-2016

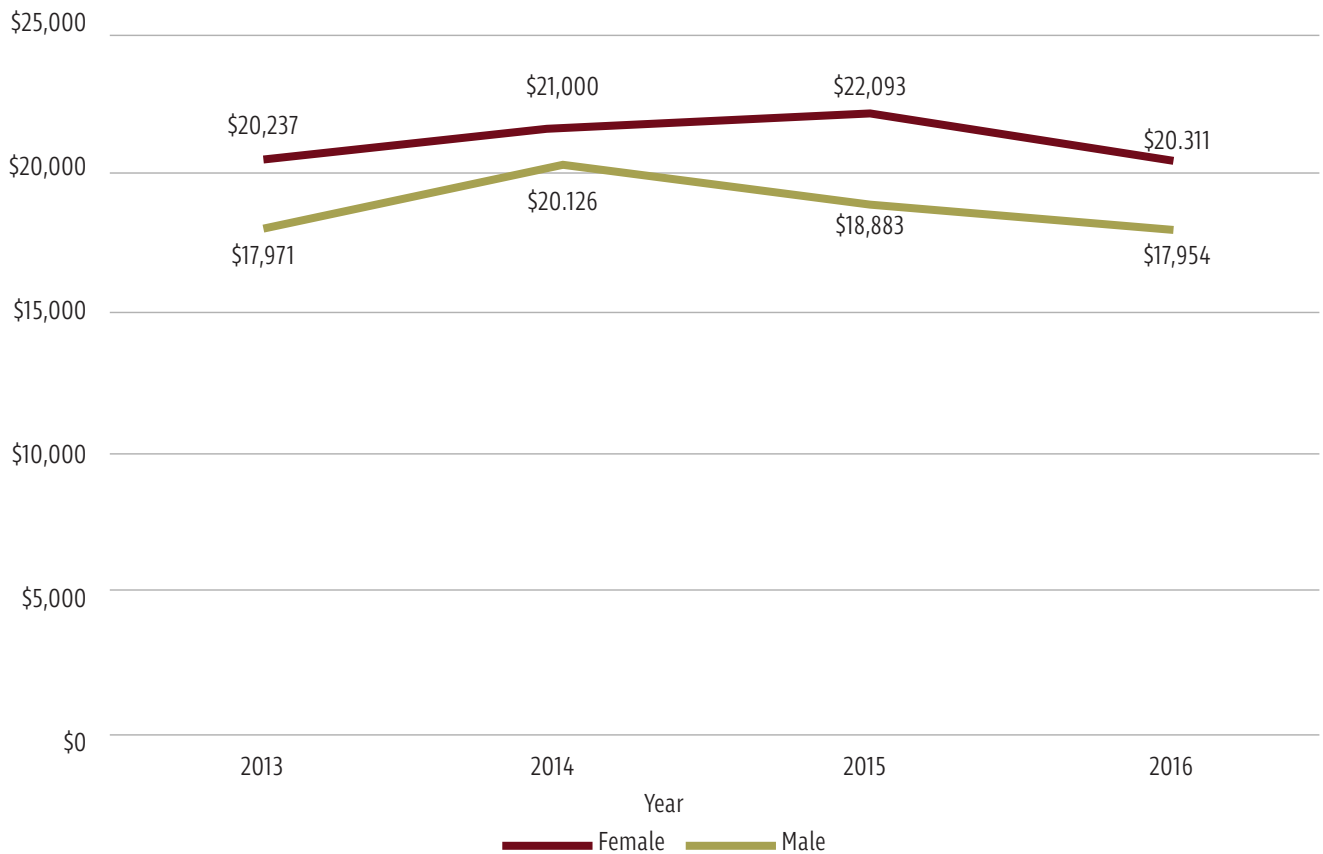


Figure 31

Source: Ohio Hospital Association Clinical-Financial Database, Years 2013-2016

Charges for asthma hospitalizations are consistently higher for females than males. The average charge for females was about 12 percent higher than for males in 2016.



Insurance Payors of Inpatient Hospital Visits for Patients with a Primary Diagnosis of Asthma, Children, 2013-2016

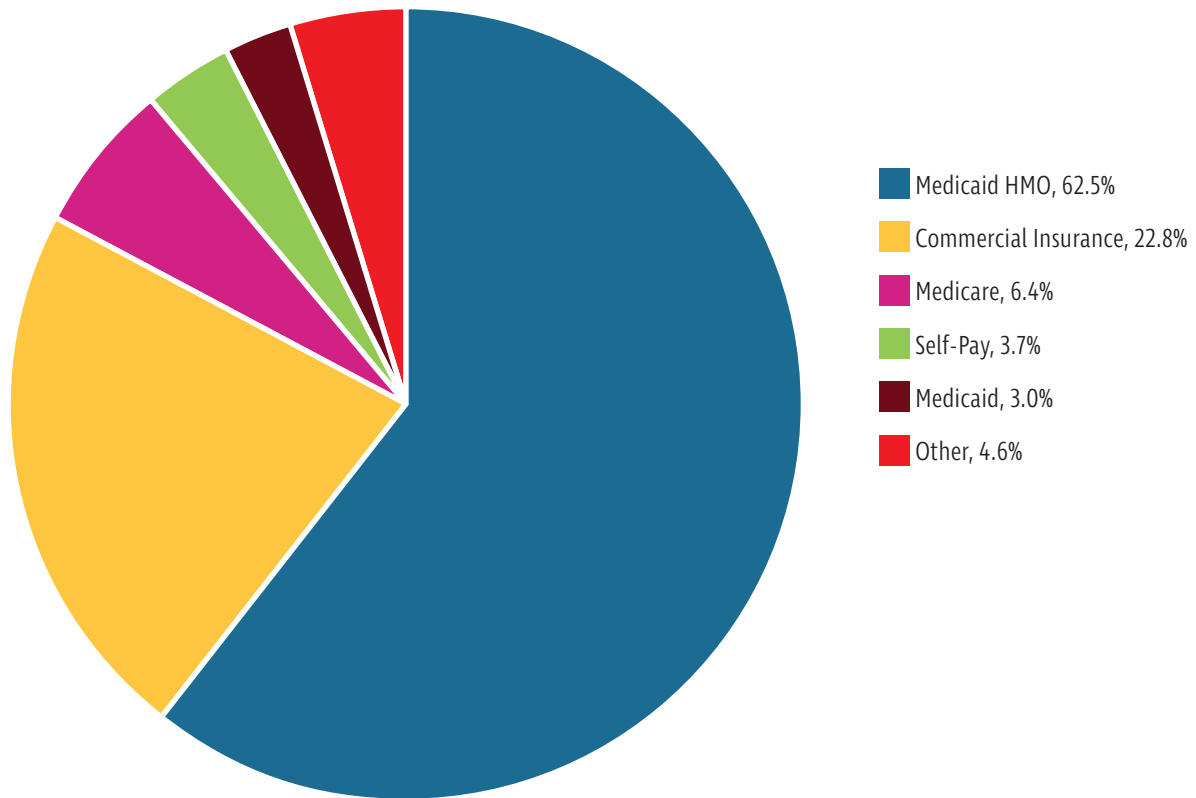


Figure 32

Source: Ohio Hospital Association Clinical-Financial Database, Years 2013-2016.

During 2013-2016, the clear majority of asthma inpatient hospital visits for children were covered by Medicaid— over two thirds (68.5 percent) were covered by Medicaid. Close to one quarter of visits (22.8 percent) were paid for by commercial insurance.



Insurance Payors of Inpatient Hospital Visits for Patients with a Primary Diagnosis of Asthma, Adults, 2013-2016

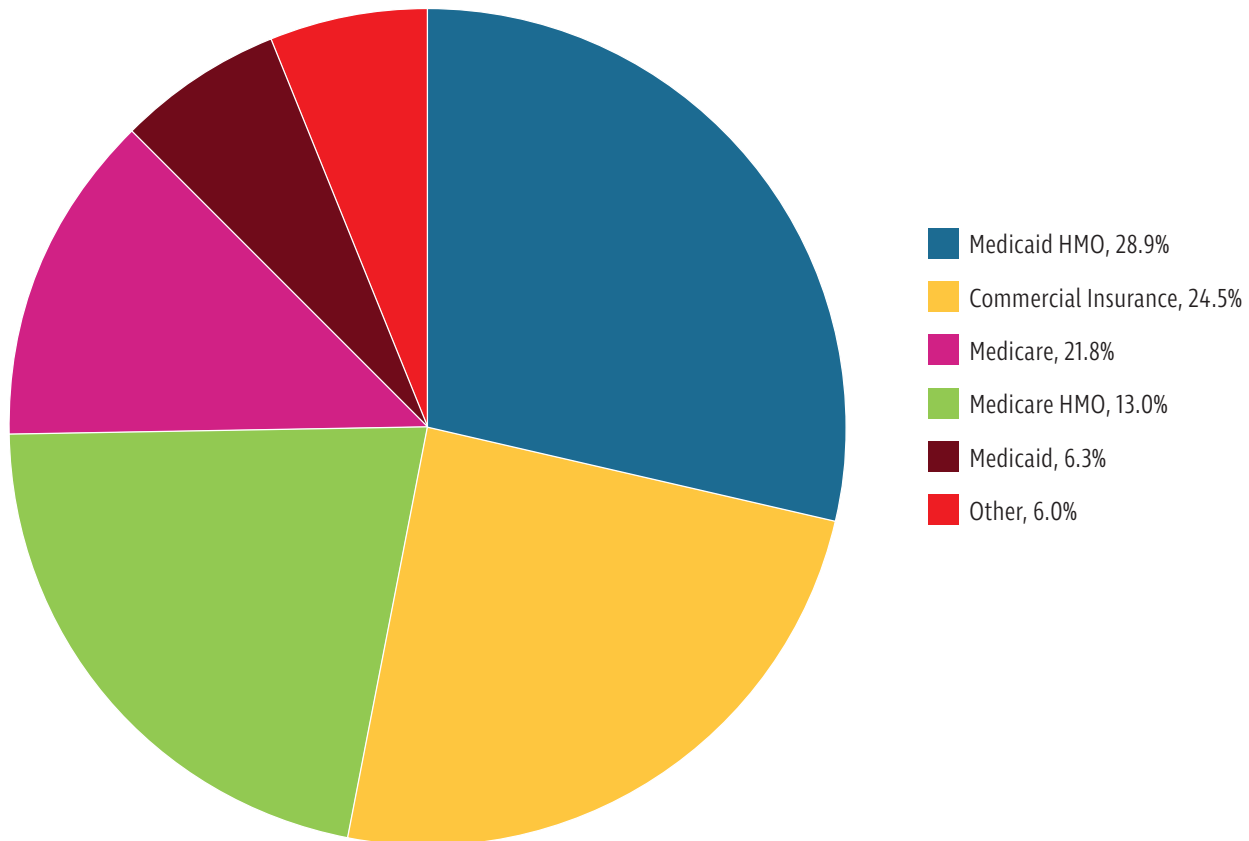


Figure 32

Source: Ohio Hospital Association Clinical-Financial Database, Years 2013-2016.

During 2013-2016, the clear majority of asthma inpatient hospital visits for children were covered by Medicaid — over two thirds (68.5 percent) were covered by Medicaid. Close to one quarter of visits (22.8 percent) were paid for by commercial insurance.



Notes

Changes from ICD-9 to ICD-10

The International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10) is a morbidity classification published by the United States for classifying diagnoses and reason for visits in all health care settings. This document is the statistical classification of disease published by the World Health Organization (WHO). Deaths have been coded using these asthma diagnostic codes (ICD-10 Codes: J45, J46) as the underlying causes of death since 1999. However, a clinical modification of the classification for morbidity purposes has been developed by the National Center for Health Statistics (NCHS), the federal agency responsible for use of the International Statistical Classification of Diseases and Related Health Problems, 10th revision (ICD-10) in the United States (National Center for Health Statistics, 2017).

General Changes

The ICD-10 code sets have updated medical terminology and disease classifications, and as a consequence, ICD-9 and ICD-10 are very different. There are nearly 5 times as many diagnosis codes in ICD-10 than in ICD-9. The clinical modification represents significant changes from ICD-9 to ICD-10 which include:

- the addition of information relevant to ambulatory encounters
- expanded injury codes
- the creation of combination diagnosis/symptom codes to reduce the number of codes needed to fully describe a condition
- the addition of sixth and seventh characters
- incorporation of common 4th and 5th digit sub-classifications
- improved specificity in code assignment

This new structure allows further expansion than was possible with ICD-9. The ICD-9 to ICD-10 conversion will have a significant impact on public health surveillance systems and health care utilization data, particularly asthma-related hospital discharge and emergency department visits (National Center for Health Statistics, 2016).

Coding Changes

- The ICD codes for asthma have changed from 493.00 – 493.99 in ICD-9 to J45.0 – J45.998 in ICD-10
- Asthma codes under ICD-9 were stratified by extrinsic (493.00 – 493.02) and intrinsic (493.10 – 493.20)
- ICD-10 codes are stratified by severity
 1. mild intermittent asthma (J45.20 – J45.22)
 2. mild persistent asthma (J45.30 – J45.32)
 3. moderate persistent asthma (J45.40 – J45.42)
 4. and severe persistent asthma (J45.50 – J45.52)



- Some codes covered under the ICD-9 asthma codes 493.00-493.99 are not covered under asthma's J45 codes in ICD-10. Under ICD-10, co-morbidities are typically coded separately.
- In ICD-9, asthma with chronic obstructive pulmonary disease is coded as chronic obstructive asthma, unspecified (493.20), chronic obstructive asthma with status asthmaticus (493.21), and chronic obstructive asthma with (acute) exacerbation (493.22).
- Under ICD-10, these asthma conditions are coded separately and are included under the codes for chronic obstructive pulmonary disease (J44.0 – J44.9), specifically J44.1 and J44.9. These codes are not specific to asthma, and include chronic airway obstruction, obstructive bronchitis without acute exacerbation and obstructive bronchitis with acute exacerbation.
- Very few ED and hospital visits for children have been coded as 493.2X in past years. The asthma rates for children are not expected to change substantially.

Impact on Analysis

The coding and rule changes between ICD-10 and ICD-9 have resulted in discontinuities in the measurement of asthma-related morbidity and healthcare utilization outcomes. The transition from ICD-9 to ICD-10 occurred on October 1, 2015. In 2015, asthma hospitalization and emergency department visits data for the first three quarters of the year were coded as ICD-9- (493.0-493.9) and the fourth quarter was coded as ICD-10 (J45.0-J45.998). In the future, this coding change will be noted in trend analysis.

By 2016, the transition was complete, and all related data was coded using ICD-10 codes J45.0-J45.998.

The change in definition using ICD-9 versus ICD-10 appear to have resulted in a decrease in emergency department visits by approximately 15 percent, and asthma hospitalizations by approximately 60 percent. The number of ED visits from 2014-2016 decreased from 62,281 to 52,955 and the rate decreased from 53.6 to 45.6 visits per 10,000 residents. The number of inpatient visits decreased from 16,219 to 6,691, resulting in a rate that decreased from 14 to 5.7 visits per 10,000 residents.

It is important to note that from 2014 to 2016, asthma prevalence did not change substantially for Ohio adults or children. For these years, approximately one in ten Ohio adults have current asthma, and one in eight children have been told they have asthma (BRFSS, 2014; BRFSS, 2015; BRFSS, 2016).

The transition from ICD-9 to ICD-10 has the potential to impact public health surveillance activities, particularly those regarding asthma morbidity and health care utilization. Until there are more years of ICD-10 data collection, it will be difficult to analyze trends in asthma health care utilization.



Features of the Ohio Hospital Association Clinical Financial Data Set

It is important to note that this report, and the Ohio Hospital Association Clinical Financial Data Set do not cover all visits made to Ohio hospitals. Emergency department (ED) visits resulting in subsequent hospitalization are not included, but rather, are counted once as inpatient hospital visits.

Federally-funded hospitals such as military and Veteran's Administration (VA) hospitals, normally exempt from state reporting requirements, are still included in these data.

Data are suppressed for counties with fewer than five visits to protect confidentiality. Please note that counts alone are a poor way to consider ED or hospital visits, because they do not allow for accurate comparison between counties. Counties with higher populations will have more ED visits because they have more people. A rate per 10,000 residents is a better measure for true comparison between counties.

The rates presented in this document are crude rates. The crude rate is the number of ED or inpatient hospital visits divided by the total number of people in the area of interest (for example, a county or age group). Population of interest is derived from census data. This is expressed as a number per unit population such as "per 10,000 residents." Crude rates do not take into account the differences in age distributions across counties and may be subject to bias.

All inpatient hospital visits and ED visits are excluded for out-of-state residents, or if the state of residence is unknown. This may result in an underestimate of the burden of asthma in counties which share a border with a populous county in another state.





Table X

ICD coding for Asthma

ICD-9 codes for Asthma (493.00 – 493.99)	ICD-10 codes for Asthma (J45.0 – J45.998)
493 asthma	J45 asthma
493.0 Extrinsic asthma <ul style="list-style-type: none"> • 493.00 Extrinsic asthma, unspecified • 493.01 Extrinsic asthma, status asthmaticus • 493.02 Extrinsic asthma, (acute) exacerbation 	J45.2 Mild intermittent asthma <ul style="list-style-type: none"> • J45.20 Mild intermittent asthma, uncomplicated • J45.21 Mild intermit. Asthma, acute exacerbation • J45.22 Mild intermit. asthma, status asthmaticus
493.1 Intrinsic asthma <ul style="list-style-type: none"> • 493.10 Intrinsic asthma, unspecified • 493.11 Intrinsic asthma, status asthmaticus • 493.12 Intrinsic asthma, (acute) exacerbation 	J45.3 Mild persistent asthma <ul style="list-style-type: none"> • J45.30 Mild persistent asthma, uncomplicated • J45.31 Mild persistent asthma, (acute) exacerbation • J45.32 Mild persistent asthma, status asthmaticus
493.2 Obstructive asthma <ul style="list-style-type: none"> • 493.20 Obstructive asthma, unspecified • 493.21 Obstructive asthma, status asthmaticus • 493.22 Obstructive asthma, (acute) exacerbation 	J45.4 Moderate persistent asthma <ul style="list-style-type: none"> • J45.40 Moderate persistent asthma, uncomplicated • J45.41 Mod. persistent asthma, (acute) exacerbation • J45.42 Mod. persistent asthma, status asthmaticus
493.8 Other forms of asthma <ul style="list-style-type: none"> • 493.81 Exercise-induced bronchospasm • 493.82 Cough variant asthma 	J45.5 Severe persistent asthma <ul style="list-style-type: none"> • J45.50 Severe persistent asthma, uncomplicated • J45.51 Severe persistent asthma, (acute) exacerbation • J45.52 Severe persistent asthma, status asthmaticus
493.9 Asthma, unspecified <ul style="list-style-type: none"> • 493.90 Asthma, unspecified type, unspecified • 493.91 Asthma, unspecified, status asthmaticus • 493.92 Asthma, unspecified, (acute) exacerbation 	J45.9 Other and unspecified asthma <ul style="list-style-type: none"> • J45.90 Unspecified asthma • J45.901 Unspecified asthma, (acute) exacerbation • J45.902 Unspecified asthma, status asthmaticus • J45.909 Unspecified asthma, uncomplicated
	J45.99 Other asthma <ul style="list-style-type: none"> • J45.990 Exercise-induced bronchospasm • J45.991 Cough variant asthma • J45.998 Other asthma

(Sources: ICD9Data.com, 2018; icd10Data.com, 2018)



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Recommendations

Most emergency department visits and inpatient hospitalizations due to asthma are preventable through proper asthma management and education. Effective management includes controlling exposure to triggers of asthma episodes, taking appropriate long-term asthma medications, monitoring the disease through routine office visits, and applying basic self-management care. Asthma can be controlled in an outpatient setting for most cases, reducing the need for inpatient emergency department visits or inpatient hospitalizations. Specific recommendations for treatment can be obtained through Guidelines from the National Asthma Education and Prevention Program Expert Panel Report 3 (National Heart, Lung, and Blood Institute, 2007).

Asthma is recognized as an important public health issue in Ohio and has been identified as a high priority in Ohio's state plans for health. The state of Ohio conducted a State Health Assessment (SHA) in 2016, the results of which inform identification of priorities in the State Health Improvement Plan (SHIP). The SHIP provides state agency leaders, local health departments, hospitals and other state and local partners with a strategic menu of priorities, objectives and evidence-based strategies. In the SHIP, child asthma was recognized as one of the priority topics for chronic disease. The desired outcome identified for child asthma is reducing child asthma morbidity, as measured by reducing ED visits for children under age 18 years.

At this time, it is uncertain that the rate of hospitalizations for asthma has decreased from 2013 to 2016, with the change from ICD9 to ICD10 hospital codes. The following recommendations can still be made to further reduce ED and inpatient hospital visits. Each recommendation is accompanied by initiatives already underway at the Ohio Department of Health Asthma Program.

- [Maintain and enhance the current asthma surveillance system in Ohio.](#)

The Ohio Surveillance System for Asthma (OSSA) informs stakeholders about the current state of asthma burden in Ohio. In order to accomplish this, the OSSA is addressing data gaps by expanding current data services, developing new data sources, and making new partnerships with organizations that collect data. Attention is being paid to areas with the most significant data gaps, including doctor's office visits, school days missed, triggers, actual costs, adherence to medication and reliable local data for many measures.

- [Use surveillance data to inform policy and to help plan, implement, and evaluate interventions, with attention to disparate populations.](#)

The OSSA is developing a key stakeholder survey for asthma (to identify gaps in care, establish associated metrics, recognize successes in the delivery of asthma care, and to gain a greater overall understanding of asthma care throughout Ohio).

ODHAP has convened a Strategic Evaluation Plan (SEP) Team, and hosts quarterly SEP meetings for strategic evaluation and planning. The primary goals of the ongoing quarterly team meetings are to (1) increase the capacity of people in the state to conduct evaluation, and (2) assist in the design of grant evaluation plans. Secondary goals of the SEP Team are (1) dissemination of evaluation results, and (2) act as a resource group for ideas for grant activities.



Asthma stakeholders are kept informed by the OSSA in many ways, including annual and occasional publications, in the monthly ODHAP newsletter, at quarterly SEP meetings and at biannual meetings of the Asthma Quality Improvement Collaborative (AQIC).

- Continue to work on quality improvement for diagnosis, treatment, and management throughout Ohio's health care system.

Asthma care and control are important components in preventing inpatient hospital and ED visits. One route to reduce existing disparities is improving self-management of asthma for disparate population groups in Ohio.

The ODHAP partnered with the Children's Hospital Association to convene a Children's Hospital Asthma Collaborative (CHAC) in 2015, now expanded to include adult patients as well as AQIC. AQIC is comprised of interdisciplinary asthma care team members who share their current work on QI projects and glean ideas for improvement from others.

ODHAP continues to develop webinars/independent study opportunities for healthcare professionals. The library of free courses in the series Asthma Care for Health Professionals is continuing to be built as monthly webinars are created and transitioned to online independent study opportunities. These courses are free of charge, provide continuing education credits and are housed on OhioTRAIN. Webinars have included topics such as Community Health Workers, Asthma Home Assessment, Social Determinants of Health, Athletes and Asthma, Asthma Case Management, School Management of Asthma, Health Literacy and Asthma, Asthma Comorbidities, CLAS Standards and Asthma in the Elderly.

- Expand access to care and facilitate reimbursement for comprehensive asthma management and home visits.

ODHAP has long considered the home visit initiative to be a priority. Home visits have the potential to provide data about environmental and social factors present in the home that can affect the effectiveness of asthma treatment, as well as decrease acute care costs. ODHAP has worked with Ohio Department of Medicaid (ODM) to describe the components of an "Asthma Home Visit," through working with mutual strategic partners. Currently, ODHAP is defining the outcomes of a home visit and identifying potential funding sources for their implementation.

Other initiatives being developed by ODHAP include providing free training to our grantees to improve asthma self-management education for children aged 8-11 years old and facilitating a health care payer work group to relay provider concerns and work collaboratively to improve asthma care.

- Establish comprehensive and coordinated policies and procedures in schools, higher education and public areas in order to ensure the health and well-being of people with asthma.

Improving the environment is another way to reduce asthma symptoms and improve self-management. In July 2012, the Ohio Board of Regents voted unanimously to recommend that each board of trustees of the University System of Ohio consider adopting a smoke-free policy. Across the state, public and private higher education institutions are adopting smoke-free and tobacco-free policies with the encouragement of ODH and their provision of model policies.

ODHAP is currently developing model asthma policies for schools, in addition to advocating for policies and procedures promoting tobacco-free spaces, educating the public and providers about asthma management and self-care, and increasing asthma knowledge of parents, caregivers and school personnel.



- Improve cultural competence of asthma care across settings.

Ensuring cultural competency at every step of asthma care is an important part of reducing disparities (Lieu, 2004). Pediatric patients on Medicaid who used clinics and hospitals with the highest cultural competency scores were less likely to underuse preventive asthma medications, and their parents were more likely to report higher satisfaction with care.

Research has also indicated that available asthma educational materials could be improved when it comes to cultural competency. Better communication with disparate populations could improve asthma self-management for members of these groups. This is also consistent with findings that suggest acculturation (such as language proficiency) and education level are strong predictors of asthma self-efficacy (Brotanek, 2007).

Plans for ODHAP's future work in assuring cultural competence in asthma care include hosting affinity focus groups with African American working professionals, as well as representatives from Appalachian counties to better understand these groups' needs, and improve the effectiveness of their asthma care.

- Support the development of public health-health care linkages to provide comprehensive asthma control services.

ODHAP has required linkages between care providers and home visitors for any entities that contract with it, such as FQHCs and children's hospitals. The contracts with children's hospital also require linkages between the healthcare providers and local schools. In work with the AQIC, SEP Team and other stakeholder groups, ODHAP staff always emphasize the importance of smooth transitions of care and effective linkages among all who touch children with asthma and their families.

ODHAP is also developing a statewide asthma health care providers directory, to inform patients as well as other healthcare providers about asthma services available in their community and the state. ODHAP is also developing a needs assessment that will help to focus efforts in high needs areas for the purposes of developing linkages, quality improvement and providing self-management education on asthma.



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Table 1
Emergency Department Visits and Rates per 10,000 Residents for Patients
with a Primary Diagnosis of Asthma, by Sex, Age and Year, 2013-2016

	Year			
	2013	2014	2015	2016
Child				
Girls	64.8	68.5	61.6	59.2
Boys	95.8	99.5	88.3	84.8
Total	80.6	84.3	75.2	72.3
Adult				
Women	54	54.2	50.9	45.3
Men	34.7	34.5	33.3	29.9
Total	44.7	44.7	42.4	37.8
Total				
Female	56.4	57.3	53.2	48.3
Male	49.3	50	46.3	42.8
Total	52.9	53.7	49.8	45.6

Sources: Ohio Hospital Association Clinical-Financial Database, Years 2013-2016; U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.



Table 2
Inpatient Hospital Visits and Rates per 10,000 Residents for Patients with a Primary
Diagnosis of Asthma by Sex, Age Group and Year, 2013-2016

Year	2013			2014		
	Frequency	Population	Rate per 10,000 Residents	Frequency	Population	Rate per 10,000 Residents
0-4	1,775	695,657	25.5	2,000	696,733	28.7
5-14	2,132	1,957,028	10.9	2,684	1,944,254	13.8
15-34	1,358	2,565,384	5.3	1,300	2,575,958	5
35-64	6,647	4,601,063	14.4	6,405	4,578,531	14
65+	4,035	1,750,890	23	3,830	1,798,932	21.3
Total	15,947	11,570,022	13.8	16,219	11,594,408	14

Year	2015			2016		
	Frequency	Population	Rate per 10,000 Residents	Frequency	Population	Rate per 10,000 Residents
0-4	1,511	696,816	21.7	1,394	697,923	20
5-14	2,009	1,930,482	10.4	1,637	1,914,249	8.6
15-34	1,068	2,575,863	4.1	803	2,582,395	3.1
35-64	5,265	4,558,795	11.5	2,096	4,533,177	4.6
65+	3,307	1,843,134	17.9	761	1,886,629	4
Total	13,160	11,605,090	11.3	6,691	11,614,373	5.8

Sources: Ohio Hospital Association Clinical-Financial Database, Years 2013-2016; U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.



Table 3
Emergency Department Visits and Rates per 10,000 Residents for Patients with a Primary Diagnosis of Asthma, by Sex, Age Group and Year, 2013-2016

Age Group		Year			
		2013	2014	2015	2016
0-4	Girls	74.4	75.4	67.4	63.4
	Boys	129.9	133.5	119.6	114.4
	Total	102.8	105.1	94.1	89.6
65+	Women	18.5	18.9	18	11.8
	Men	10.6	11.2	9.7	6.6
	Total	15.1	15.5	14.4	9.5
Total	Female	56.4	57.3	53.2	48.3
	Male	49.3	50	46.3	42.8
	Total	52.9	53.7	49.8	45.6

Sources: Ohio Hospital Association Clinical-Financial Database, Years 2013-2016; U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.

Table 4
Emergency Department Visits and Rates per 10,000 Residents for Patients with a Primary Diagnosis of Asthma, by Race and Year, 2013-2016

	Year			
	2013	2014	2015	2016
Child				
White	48.1	48.9	42.4	40.9
Black	172.7	186.3	184.7	175.9
Total	70.5	73.9	68.5	65.9
Adult				
White	30.1	29.8	27.7	24.1
Black	131.3	134.7	131.6	121.7
Total	42.8	43	41	36.7
Total				
White	34	33.9	30.9	124.3
Black	143.7	150.1	147.3	28.9
Total	49.1	50	47.2	50

Sources: Ohio Hospital Association Clinical-Financial Database, Years 2013-2016; U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.



Table 5
Emergency Department Visits and Rates per 10,000 Residents for Patients with
a Primary Diagnosis of Asthma by Age Group, Race and Year, 2013-2016

Race	Year											
	2013			2014			2015			2016		
	Frequency	Population	Rate per 10,000 Residents	Frequency	Population	Rate per 10,000 Residents	Frequency	Population	Rate per 10,000 Residents	Frequency	Population	Rate per 10,000 Residents
0-4 Age Group												
White	3,205	542,542	59.1	3,166	541,326	58.5	2,745	540,765	50.8	2,650	541,923	48.9
Black	2,811	132,761	211.7	3,053	133,899	228	2,939	133,760	219.7	2,765	132,450	209
Total	6,016	675,303	89.1	6,219	675,225	92.1	5,684	674,525	84.3	5,416	674,373	80.3
5-14 Age Group												
White	6,980	1,573,546	44.4	7,100	1,557,347	45.6	6,077	1,540,251	39.5	5,799	1,521,745	38.1
Black	5,194	330,883	157	5,638	332,518	169.6	5,705	334,263	170.7	5,459	335,101	163
Total	12,174	1,904,429	63.9	12,738	1,889,865	67.4	11,782	1,874,514	62.9	11,267	1,856,846	60.7
15-34 Age Group												
White	9,919	2,086,971	47.5	9,624	2,088,426	46.1	8,889	2,080,699	42.7	8,369	2,077,280	40.3
Black	7,039	392,883	179.2	7,262	398,040	182.4	7,211	402,316	179.2	6,941	408,306	170
Total	16,958	2,479,854	68.4	16,887	2,486,466	67.9	16,102	2,483,015	64.8	15,312	2,485,586	61.6
35-64 Age Group												
White	11,105	3,953,889	28.1	11,081	3,924,919	28.2	10,400	3,898,306	26.7	8,773	3,867,640	22.7
Black	6,639	539,900	123	6,914	542,089	127.5	6,799	544,859	124.8	6,324	545,939	116
Total	17,744	4,493,789	39.5	17,995	4,467,008	40.3	17,200	4,443,165	38.7	15,097	4,413,579	34.2
65+ Age Group												
White	1,918	1,575,672	12.2	2,013	1,616,308	12.5	1,886	1,652,789	11.4	1,278	1,688,518	7.6
Black	583	152,993	38.1	619	158,597	39	618	164,455	37.6	417	170,440	24.5
Total	2,501	1,728,665	14.5	2,632	1,774,905	14.8	2,504	1,817,244	13.8	1,695	1,858,958	9.1
Total												
White	33,127	9,732,620	34	32,984	9,728,326	33.9	29,997	9,712,810	30.9	26,869	9,697,106	27.7
Black	22,266	1,549,420	143.7	23,486	1,565,143	150.1	23,272	1,579,653	147.3	21,906	1,592,236	138
Total	55,393	11,282,040	49.1	56,471	11,293,469	50	53,272	11,292,463	47.2	48,787	11,289,342	43.2

Sources: Ohio Hospital Association Clinical-Financial Database, Years 2013-2016; U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.



Table 6
Emergency Department Visits and Rates per 10,000 Residents for Patients
with a Primary Diagnosis of Asthma, by Race, Sex and Year, 2013-2016

		Year			
Race	Race/Sex	2013	2014	2015	2016
White	White Female	39.6	39.8	36.2	32.1
	White Male	29.6	29.1	26.5	24
Black	Black Female	151.6	160.1	157.5	148.4
	Black Male	165.4	174.2	173.9	163.6

Sources: Ohio Hospital Association Clinical-Financial Database, Years 2013-2016; U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates



Table 7
Emergency Visit Rates and Inpatient Hospital Rates for Patients with
a Primary Diagnosis of Asthma, by County, 2016

County	ED			Inpatient		
	Child Rate	Adult Rate	Total Rate	Child Rate	Adult Rate	Total Rate
Adams	58.1	41.5	45.5	2.9	3.3	3.2
Allen	59.2	41.0	45.3	9.4	5.1	6.1
Ashland	42.6	33.6	35.7	0.8	2.7	2.3
Ashtabula	71.5	44.3	50.5	13.8	3.8	6.0
Athens	54.9	13.6	19.9	7.0	0.9	1.8
Auglaize	25.1	17.0	19.0	5.4	2.9	3.5
Belmont	24.2	15.2	16.9	0.8	3.0	2.6
Brown	42.7	26.9	30.6	4.8	4.4	4.5
Butler	57.6	31.7	38.0	8.9	3.9	5.1
Carroll	35.2	16.7	20.7	3.4	2.7	2.8
Champaign	46.0	32.6	35.7	6.6	5.3	5.6
Clark	85.6	38.4	49.2	17.0	3.5	6.6
Clermont	39.9	28.8	31.5	6.2	3.2	3.9
Clinton	49.8	46.2	47.1	6.0	2.8	3.6
Columbiana	99.6	26.2	41.5	7.3	3.6	4.4
Coshocton	74.8	32.2	42.3	5.8	4.3	4.6
Crawford	54.1	27.2	33.2	1.1	1.2	1.2
Cuyahoga	108.0	54.3	65.9	20.2	7.6	10.3
Darke	64.9	35.2	42.4	12.7	2.3	4.8
Defiance	49.5	38.4	41.1	3.3	5.8	5.2
Delaware	21.4	14.4	16.3	4.6	1.7	2.5
Erie	111.1	75.9	83.2	17.0	5.0	7.5
Fairfield	48.1	18.0	25.4	7.3	1.8	3.1
Fayette	61.2	34.8	41.1	13.1	1.8	4.5
Franklin	70.3	39.5	46.8	16.2	3.5	6.5
Fulton	29.7	25.3	26.4	4.8	2.8	3.3
Gallia	39.1	17.7	22.7	4.2	1.7	2.3
Geauga	22.9	10.8	13.7	5.7	2.9	3.6
Greene	81.0	34.2	43.9	19.9	2.1	5.8
Guernsey	34.1	20.1	23.3	2.2	2.3	2.3
Hamilton	74.6	56.0	60.3	16.2	6.4	8.7
Hancock	44.2	31.5	34.4	5.2	3.8	4.1



Table 7

County	ED			Inpatient		
	Child Rate	Adult Rate	Total Rate	Child Rate	Adult Rate	Total Rate
Hardin	44.9	15.2	22.1	8.2	0.8	2.5
Harrison	58.0	53.9	54.8	0.0	3.3	2.6
Henry	39.2	32.0	33.7	7.5	2.4	3.6
Highland	49.8	35.8	39.2	4.8	2.1	2.8
Hocking	54.3	23.6	30.7	7.5	0.5	2.1
Holmes	13.2	16.1	15.1	0.7	0.3	0.5
Huron	47.0	29.0	33.5	6.1	2.0	3.1
Jackson	29.0	18.1	20.8	1.3	0.8	0.9
Jefferson	55.4	32.9	37.3	3.0	4.6	4.3
Knox	36.3	22.2	25.5	9.2	1.7	3.5
Lake	51.3	22.3	28.4	7.5	3.9	4.6
Lawrence	0.0	0.4	0.3	0.0	0.2	0.2
Licking	33.4	19.2	22.6	9.2	1.4	3.2
Logan	44.8	32.8	35.7	3.7	2.6	2.9
Lorain	92.9	53.8	62.7	15.1	4.0	6.5
Lucas	115.9	54.0	68.4	16.7	6.1	8.5
Madison	82.0	29.7	40.8	4.3	2.3	2.8
Mahoning	179.4	53.5	79.3	9.2	7.2	7.6
Marion	67.9	32.2	39.7	5.1	5.6	5.5
Medina	33.2	25.5	27.3	3.4	2.4	2.6
Meigs	7.8	7.1	7.3	0.0	0.0	0.0
Mercer	22.0	11.8	14.4	3.8	1.3	2.0
Miami	53.8	29.0	34.7	12.5	2.5	4.8
Monroe	26.5	17.5	19.4	0.0	1.8	1.4
Montgomery	121.1	52.8	68.1	36.9	4.6	11.9
Morgan	24.5	14.7	16.8	0.0	3.5	2.7
Morrow	49.5	50.1	50.0	3.5	1.5	2.0
Muskingum	40.6	25.6	29.1	5.0	4.5	4.7
Noble	7.5	6.0	6.2	0.0	0.0	0.0
Ottawa	50.1	43.0	44.4	5.0	4.5	4.6
Paulding	50.5	37.9	40.9	0.0	2.8	2.1
Perry	37.6	18.7	23.3	6.8	5.1	5.6
Pickaway	62.6	27.6	35.4	8.7	1.4	3.0
Pike	42.5	19.1	24.8	11.7	1.4	3.9
Portage	65.3	19.1	28.1	4.5	2.8	3.1



Table 7

County	ED			Inpatient		
	Child Rate	Adult Rate	Total Rate	Child Rate	Adult Rate	Total Rate
Preble	48.7	22.2	28.4	7.3	1.6	2.9
Putnam	28.5	18.1	20.8	6.8	0.4	2.1
Richland	59.6	26.1	33.4	3.0	3.4	3.3
Ross	49.5	21.7	27.8	5.4	1.5	2.3
Sandusky	76.6	43.5	51.2	4.3	3.5	3.7
Scioto	30.1	12.4	16.3	3.5	3.0	3.1
Seneca	47.9	38.9	40.9	5.6	3.2	3.8
Shelby	30.6	33.1	32.5	7.1	1.1	2.7
Stark	62.3	43.6	47.7	2.4	4.5	4.0
Summit	115.5	39.9	56.3	5.4	3.4	3.9
Trumbull	62.0	36.0	41.5	3.9	5.3	5.0
Tuscarawas	54.7	38.9	42.5	1.4	2.0	1.8
Union	26.3	16.7	19.1	2.9	1.5	1.9
Van Wert	23.7	17.0	18.6	5.9	2.3	3.2
Vinton	56.3	21.8	29.7	3.3	3.0	3.0
Warren	32.7	23.7	26.0	3.1	1.6	2.0
Washington	36.2	21.8	24.7	4.1	0.8	1.5
Wayne	43.2	30.7	33.8	3.5	3.1	3.2
Williams	44.5	41.8	42.4	5.9	3.8	4.3
Wood	37.0	14.4	19.1	5.2	2.8	3.3
Wyandot	51.2	31.6	36.2	1.9	2.3	2.2
Ohio	71.5	38.1	45.7	11.5	4.1	5.8

Sources: Ohio Hospital Association Clinical-Financial Database, Year 2016; U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates; Ohio Department of Development, 2018.



Table 8
ED Visits for Patients with a Primary Diagnosis of Asthma, by Age Group
and Month of Admission, 2013-2016

Month	Year	Child	Adult	Total
January	2013	1,469	3,443	4,912
February	2013	1,376	2,753	4,129
March	2013	1,743	3,253	4,996
April	2013	1,803	3,127	4,930
May	2013	2,500	3,949	6,449
June	2013	1,243	3,212	4,455
July	2013	1,098	3,034	4,132
August	2013	1,352	2,965	4,317
September	2013	2,278	3,919	6,197
October	2013	2,504	3,585	6,089
November	2013	2,157	3,349	5,506
December	2013	1,868	3,254	5,122
January	2014	1,175	3,009	4,184
February	2014	1,034	2,439	3,473
March	2014	1,559	2,908	4,467
April	2014	1,780	3,206	4,986
May	2014	2,035	3,729	5,764
June	2014	1,174	3,120	4,294
July	2014	1,442	2,947	4,389
August	2014	2,427	3,462	5,889
September	2014	3,428	4,392	7,820
October	2014	2,267	3,801	6,068
November	2014	1,905	3,243	5,148
December	2014	2,037	3,763	5,800

Month	Year	Child	Adult	Total
January	2015	1,334	2,834	4,168
February	2015	1,416	2,500	3,916
March	2015	1,717	3,242	4,959
April	2015	1,730	3,471	5,201
May	2015	1,999	3,742	5,741
June	2015	995	3,153	4,148
July	2015	978	2,996	3,974
August	2015	1,319	3,126	4,445
September	2015	2,171	3,795	5,966
October	2015	2,156	3,371	5,527
November	2015	2,095	2,984	5,079
December	2015	1,859	2,834	4,693
January	2016	1,443	2,653	4,096
February	2016	1,548	2,602	4,150
March	2016	1,839	3,054	4,893
April	2016	1,545	2,749	4,294
May	2016	1,843	3,176	5,019
June	2016	900	2,675	3,575
July	2016	836	2,451	3,287
August	2016	1,190	2,541	3,731
September	2016	1,794	3,256	5,050
October	2016	2,108	2,932	5,040
November	2016	2,129	3,032	5,161
December	2016	1,709	2,948	4,657

Sources: Ohio Hospital Association Clinical-Financial Database, Years 2013-2016



Table 9
Average Emergency Department Charges for Patients with a Primary Diagnosis of Asthma (unadjusted), by Age Group and Year, 2013-2016

	Age Group				
Year	0-4	5-14	15-34	35-64	65+
2013	\$1,428	\$1,367	\$1,785	\$2,204	\$2,623
2014	\$1,555	\$1,484	\$1,883	\$2,337	\$2,760
2015	\$1,561	\$1,515	\$1,983	\$2,458	\$2,972
2016	\$1,721	\$1,635	\$2,180	\$2,643	\$3,019

Sources: Ohio Hospital Association Clinical-Financial Database, Years 2013-2016; U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.

Table 10
Average Emergency Department Charges for Patients with a Primary Diagnosis of Asthma (unadjusted), by Sex and Year, 2013-2016

	Year				
Sex	2013	2014	2015	2016	65+
Female	\$1,904	\$2,018	\$2,141	\$2,282	\$2,623
Male	\$1,701	\$1,818	\$1,883	\$2,026	\$2,760

Sources: Ohio Hospital Association Clinical-Financial Database, Years 2013-2016; U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.



Table 11
Insurance Payors of ED Visits for Patients with a Primary Diagnosis of Asthma, 2013-2016

ED	Year							
	2013		2014		2015		2016	
Payer	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Self-Pay	11,662	19.0	6,632	10.7	4,775	8.3	4,820	9.1
Worker's Compensation	63	0.1	66	0.1	57	0.1	60	0.1
Medicare	4,098	6.7	4,119	6.6	3,259	5.6	2,540	4.8
Medicaid	4,333	7.1	5,790	9.3	4,988	8.6	3,472	6.6
Other Government	272	0.4	342	0.6	292	0.5	307	0.6
Commercial Insurance	14,840	24.2	15,232	24.5	13,354	23.1	12,606	23.8
Other Government	505	0.8	504	0.8	491	0.9	434	0.8
Medicaid HMO	23,035	37.6	27,427	44.0	28,087	48.6	26,152	49.4
Medicare HMO	1,711	2.8	1,959	3.2	2,401	4.2	2,518	4.8
Charity Uncompensated	701	1.1	203	0.3	112	0.2	43	0.1

Sources: Ohio Hospital Association Clinical-Financial Database, Years 2013-2016



Table 12
Insurance Payors of Inpatient Hospital Visits for Patients with a
Primary Diagnosis of Asthma, 2013-2016

Payer	Year							
	2013		2014		2015		2016	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Self-Pay	1,136	7.1	485	3.0	347	2.6	266	4.0
worker's Compensation	10	0.1	6	0.0	10	0.1	3	0.0
Medicare	3,972	24.9	3,736	23.0	2,671	20.3	796	11.9
Medicaid	1,163	7.3	1,227	7.6	941	7.2	426	6.4
Other Government	95	0.6	72	0.4	57	0.4	35	0.5
Commercial Insurance	3,330	20.9	3,158	19.5	2,433	18.5	1,588	23.7
Other Government	96	0.6	98	0.6	105	0.8	51	0.8
Medicaid HMO	4,215	26.4	5,556	34.3	4,658	35.4	2,952	44.1
Medicare HMO	1,763	11.1	1,844	11.4	1,903	14.5	558	8.3
Charity Uncompensated	167	1.1	37	0.2	34	0.3	16	0.2

Sources: Ohio Hospital Association Clinical-Financial Database, Years 2013-2016

Table 13
Inpatient Hospital Visits and Rates per 10,000 Residents for Patients with
a Primary Diagnosis of Asthma by Sex, Age and Year, 2013-2016

		Year			
		2013	2014	2015	2016
Child	Girls	11.8	13.9	11.1	9.3
	Boys	17.5	21.4	15.6	13.8
	Total	14.7	17.7	13.4	11.6
Adult	Women	18.5	17.6	14.6	5.8
	Men	8.2	7.9	6.6	2.2
	Total	13.5	12.9	10.7	4.1
Total	Female	17	16.8	13.8	6.5
	Male	10.4	11.1	8.7	4.9
	Total	13.8	14	11.3	5.8

Sources: Ohio Hospital Association Clinical-Financial Database, Years 2013-2016; U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.



Table 14
Inpatient Hospital Visits and Rates per 10,000 Residents for Patients with a Primary Diagnosis
of Asthma by Sex, Age Group and Year, 2013-2016

Sex	Year											
	2013			2014			2015			2016		
	Frequency	Population	Rate per 10,000 Residents	Frequency	Population	Rate per 10,000 Residents	Frequency	Population	Rate per 10,000 Residents	Frequency	Population	Rate per 10,000 Residents
0-4 Age Group												
Female	661	339,897	19.4	674	340,511	19.8	555	340,042	16.3	493	340,559	14.5
Male	1,114	355,760	31.3	1,326	356,222	37.2	956	356,774	26.8	901	357,364	25.2
Total	1,775	695,657	25.5	2,000	696,733	28.7	1,511	696,816	21.7	1,394	697,923	20
5-14 Age Group												
Female	875	957,049	9.1	1,122	950,911	11.8	872	944,795	9.2	694	936,243	7.4
Male	1,257	999,979	12.6	1,562	993,343	15.7	1,137	985,687	11.5	943	978,006	9.6
Total	2,132	1,957,028	10.9	2,684	1,944,254	13.8	2,009	1,930,482	10.4	1,637	1,914,249	8.6
15-34 Age Group												
Female	864	1,273,374	6.8	807	1,276,714	6.3	675	1,274,956	5.3	522	1,276,944	4.1
Male	494	1,292,010	3.8	493	1,299,244	3.8	393	1,300,907	3	281	1,305,451	2.2
Total	1,358	2,565,384	5.3	1,300	2,575,958	5	1,068	2,575,863	4.1	803	2,582,395	3.1
35-64 Age Group												
Female	4,767	2,342,691	20.3	4,600	2,330,487	19.7	3,726	2,320,049	16.1	1,550	2,306,274	6.7
Male	1,880	2,258,372	8.3	1,805	2,248,044	8	1,539	2,238,746	6.9	546	2,226,903	2.5
Total	6,647	4,601,063	14.4	6,405	4,578,531	14	5,265	4,558,795	11.5	2,096	4,533,177	4.6
65+ Age Group												
Female	2,895	996,080	29.1	2,726	1,019,609	26.7	2,360	1,041,341	22.7	619	1,062,659	5.8
Male	1,140	754,810	15.1	1,104	779,323	14.2	947	801,793	11.8	142	823,970	1.7
Total	4,035	1,750,890	23	3,830	1,798,932	21.3	3,307	1,843,134	17.9	761	1,886,629	4
Total												
Female	10,062	5,909,091	17	9,929	5,918,232	16.8	8,188	5,921,183	13.8	3,878	5,922,679	6.5
Male	5,885	5,660,931	10.4	6,290	5,676,176	11.1	4,972	5,683,907	8.7	2,813	5,691,694	4.9
Total	15,947	11,570,022	13.8	16,219	11,594,408	14	13,160	11,605,090	11.3	6,691	11,614,373	5.8

Sources: Ohio Hospital Association Clinical-Financial Database, Years 2013-2016; U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.



Table 15
Inpatient Hospital Visits and Rates per 10,000 Residents for Patients with a Primary Diagnosis of Asthma, by Age Group, Race and Year, 2013-2016

Race	Year											
	2013			2014			2015			2016		
	Frequency	Population	Rate per 10,000 Residents	Frequency	Population	Rate per 10,000 Residents	Frequency	Population	Rate per 10,000 Residents	Frequency	Population	Rate per 10,000 Residents
0-4 Age Group												
White	813	542,542	15	833	541,326	15.4	670	540,765	12.4	602	541,923	11.1
Black	730	132,761	55	922	133,899	68.9	662	133,760	49.5	627	132,450	47.3
Total	1,543	675,303	22.8	1,755	675,225	26	1,332	674,525	19.7	1,229	674,373	18.2
5-14 Age Group												
White	863	1,573,546	5.5	1,016	1,557,347	6.5	727	1,540,251	4.7	655	1,521,745	4.3
Black	1,004	330,883	30.3	1,357	332,518	40.8	1,107	334,263	33.1	848	335,101	25.3
Total	1,867	1,904,429	9.8	2,373	1,889,865	12.6	1,834	1,874,514	9.8	1,503	1,856,846	8.1
15-34 Age Group												
White	747	2,086,971	3.6	713	2,088,426	3.4	585	2,080,699	2.8	442	2,077,280	2.1
Black	515	392,883	13.1	525	398,040	13.2	428	402,316	10.6	321	408,306	7.9
Total	1,262	2,479,854	5.1	1,238	2,486,466	5	1,013	2,483,015	4.1	763	2,485,586	3.1
35-64 Age Group												
White	3,964	3,953,889	10	3,920	3,924,919	10	3,084	3,898,306	7.9	1,180	3,867,640	3.1
Black	2,189	539,900	40.5	2,204	542,089	40.7	1,902	544,859	34.9	827	545,939	15.1
Total	6,153	4,493,789	13.7	6,124	4,467,008	13.7	4,986	4,443,165	11.2	2,007	4,413,579	4.5
65+ Age Group												
White	3,024	1,575,672	19.2	2,863	1,616,308	17.7	2,414	1,652,789	14.6	543	1,688,518	3.2
Black	799	152,993	52.2	781	158,597	49.2	742	164,455	45.1	164	170,440	9.6
Total	3,823	1,728,665	22.1	3,645	1,774,905	20.5	3,156	1,817,244	17.4	707	1,858,958	3.8
Total												
White	9,411	9,732,620	9.7	9,345	9,728,326	9.6	7,480	9,712,810	7.7	3,422	9,697,106	3.5
Black	5,237	1,549,420	33.8	5,789	1,565,143	37	4,841	1,579,653	30.6	2,787	1,592,236	17.5
Total	14,648	11,282,040	13	15,135	11,293,469	13.4	12,321	11,292,463	10.9	6,209	11,289,342	5.5

Sources: Ohio Hospital Association Clinical-Financial Database, Years 2013-2016; U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.



Table 16
Inpatient Hospital Visits for Patients with a Primary Diagnosis of Asthma,
by Age Group and Month of Admission, 2013-2016

Month	Year	Child	Adult	Total
January	2013	224	1,285	1,509
February	2013	231	1,097	1,328
March	2013	355	1,072	1,427
April	2013	333	1,084	1,417
May	2013	434	1,072	1,506
June	2013	223	876	1,099
July	2013	167	801	968
August	2013	231	866	1,097
September	2013	401	964	1,365
October	2013	499	938	1,437
November	2013	458	905	1,363
December	2013	361	1,003	1,364
January	2014	182	1,121	1,303
February	2014	174	803	977
March	2014	280	964	1,244
April	2014	355	977	1,332
May	2014	342	969	1,311
June	2014	186	868	1,054
July	2014	413	762	1,175
August	2014	797	818	1,615
September	2014	884	1,095	1,979
October	2014	422	995	1,417
November	2014	352	861	1,213
December	2014	287	1,344	1,631

Month	Year	Child	Adult	Total
January	2015	251	1,073	1,324
February	2015	283	927	1,210
March	2015	308	1,062	1,370
April	2015	286	1,170	1,456
May	2015	344	947	1,291
June	2015	164	847	1,011
July	2015	141	799	940
August	2015	254	777	1,031
September	2015	428	937	1,365
October	2015	398	325	723
November	2015	359	300	659
December	2015	308	342	650
January	2016	212	342	554
February	2016	282	381	663
March	2016	284	387	671
April	2016	246	325	571
May	2016	315	319	634
June	2016	135	225	360
July	2016	134	257	391
August	2016	200	218	418
September	2016	286	301	587
October	2016	394	277	671
November	2016	339	302	641
December	2016	190	292	482

Sources: Ohio Hospital Association Clinical-Financial Database, Years 2013-2016; U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.



Table 17

Average Charges for Inpatient Hospital Visits for Patients with a Primary Diagnosis of Asthma (unadjusted), by Age Group, 2013-2016

	Year			
Age Group	2013	2014	2015	2016
0-4	\$14,199.88	\$16,210.66	\$15,650.03	\$15,718.76
5-14	\$17,375.59	\$19,266.91	\$17,793.24	\$18,113.79
15-34	\$15,352.29	\$18,609.26	\$18,741.56	\$18,519.19
35-64	\$20,046.31	\$22,186.97	\$23,052.66	\$21,959.80
65+	\$23,057.75	\$24,180.01	\$25,123.51	\$22,009.74

Sources: Ohio Hospital Association Clinical-Financial Database, Years 2013-2016; U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.

Table 18

Average Charges for Inpatient Hospital Visits for Patients with a Primary Diagnosis of Asthma (unadjusted), by Sex and Year, 2013-2016

	Year			
Sex	2013	2014	2015	2016
Female	\$20,237	\$21,800	\$22,093	\$20,311
Male	\$17,971	\$20,126	\$18,883	\$17,934

Sources: Ohio Hospital Association Clinical-Financial Database, Years 2013-2016



Notes



