

2019 Asthma Task Force Report



Bureau of Assessment, Statistics & Epidemiology

Allegheny County Health Department

542 4th Ave., Pittsburgh, PA 15219

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2019 Asthma Task Force Report

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Bureau of Assessment, Statistics, & Epidemiology

Report Authors

Lynda Jones, MPH

Josh Feldmiller, MPH

Kristin Selker, MPH

Please address all questions, comments, or suggestions to:

Bureau of Assessment, Statistics & Epidemiology
Allegheny County Health Department
542 4th Avenue
Pittsburgh, Pennsylvania 15219
(412) 578-8370

Executive Summary

Asthma is a disease that affects the lungs, and when triggered, causes wheezing, coughing, and difficulty breathing. There is no cure for asthma, but medication and reduction of environmental triggers can help control symptoms and reduce morbidity. An estimated 42.7 million people (or 13.3% of the total U.S. population) have been diagnosed with asthma in the United States, and 9.6 million of those diagnosed were children (age 0-17) in 2017.¹ Most recent prevalence data indicate childhood asthma greater locally, approximately 11% of Allegheny County children have asthma compared to 8% nationally. While asthma HP2020 goals have been met for Emergency Department (ED) visits and hospitalizations among children under 5, significant racial and geographic disparities exist for asthma exacerbations. For example, in 2017, the ED visit rate for white children under 5 was 21 per 10,000 compared to 153 per 10,000 among black children. Urban and river-adjacent zip codes have ED visit rates (among children 0-17) several times higher compared to the Allegheny County rate; similar trends are observed for hospitalizations. High local prevalence and utilization disparities for pediatric asthma highlight the need for asthma resources in Allegheny County.

The 2015 Plan for a Healthier Allegheny (PHA), ACHD's comprehensive health improvement plan with five priority areas resulting from community input and guidance from an Advisory Coalition of 70+ organizations, identified pediatric asthma as a key component of the Maternal and Child Health Priority Area. Specifically, the PHA aims to reduce asthma-related emergency room visits and hospitalizations among all children (age 0-17), with particular attention to the Medicaid population.² Beginning February 2018, an Asthma Task Force was created to bring focus to pediatric asthma outcomes with the approach of: (1) convening multi-sector partner organizations; (2) collecting census-tract level utilization data; and (3) use a quality improvement framework to understand root causes.

The Asthma Task Force comprised of health care providers, managed care organizations and health plans, academia, environmental advocates, and local government agencies. For over a year, ongoing initiatives, including research and clinical perspectives as well as community-based work, were presented; concurrently, the Task Force designed a data request to local participating health plans and managed care organizations to include census-tract level asthma prevalence, ED visits, and hospitalizations using administrative claims data for members ages 0-18 during the 2017 calendar year. While administrative data can have limitations, prevalence for many chronic conditions, including asthma, are not available at the census-tract level; this granularity allows for increased understanding of localized burden and opportunities for more targeted interventions.

Key Findings

The following are key findings from the Asthma Task Force claims data request:

¹ U.S. Department of Health and Human Services. Centers for Disease Control and Prevention. *National Health Interview Survey (NHIS) Data*. (2017). Retrieved from: <https://www.cdc.gov/asthma/nhis/default.htm>

² Allegheny County Health Department. *Plan for a Healthier Allegheny*. (2015). Retrieved from <https://www.alleghenycounty.us/Health-Department/Resources/Data-and-Reporting/Chronic-Disease-Epidemiology/Plan-for-a-Healthier-Allegheny.aspx>

1. Overall prevalence is lower among children 0-4 (compared to children 5-11 and 12-18), but service utilization is much higher among this age group:
 - 5% of members ages 0-4 have asthma, but 19% of members with asthma had at least 1 ED visit and 9% had at least 1 hospitalization in 2017, more than twice as high compared to all members 0-18
2. Although prevalence is similar by insurance type, service utilization is much higher among Medicaid members:
 - 8% of commercial members and 9% of Medicaid members 0-18 have asthma, yet 14% of Medicaid members with asthma had at least 1 ED visit in 2017 and 9% had at least 1 hospitalization, compared to 4% of commercial members had at least 1 ED visit and 1% had at least 1 hospitalization
3. Racial disparities exist among Medicaid members:
 - 11% of black Medicaid members 0-18 and 8% of white Medicaid members have asthma, yet black Medicaid children with asthma are more than twice as likely to have at least 1 ED visit or hospitalization
4. Select census tracts within Allegheny County are disproportionately affected by poor asthma outcomes:
 - Areas within the City of Pittsburgh (Troy Hill, Hill District, Garfield, Homewood), and Duquesne had the highest rates of ED visits; between 28% and 33% of children with asthma in these communities had at least 1 ED visit in 2017. Homewood has both the highest rates of ED visits as well as hospitalizations, 27% of children with asthma were hospitalized in 2017.

Root Cause Analysis

Following a presentation of claims data analysis focusing on the key findings above, Asthma Task Force members engaged in a root cause analysis exercise to understand why these results occurred. This exercise asked participants to work as a group and generate a list of factors contributing to disproportionate outcomes in asthma emergency and inpatient utilization. These factors were discussed and clustered into three causal groups: 1) Structural Inequity, Education, and Patient Advocacy, 2) Environmental Triggers, 3) Access. The results of the Root Cause Analysis are in Appendix A.

Recent Successes

1. Combined health claims data used in this report are available on the Western Pennsylvania Regional Data Center Website (WPRDC.org)

2. UPMC and University of Pittsburgh School of Public Health initiated development of pediatric asthma registry supported by the ACHD Clean Air Fund based on root cause analysis

Next Steps

Allegheny County Health Department will continue to monitor pediatric asthma ED visits and hospitalizations, as well as ongoing initiatives and interventions within Allegheny County

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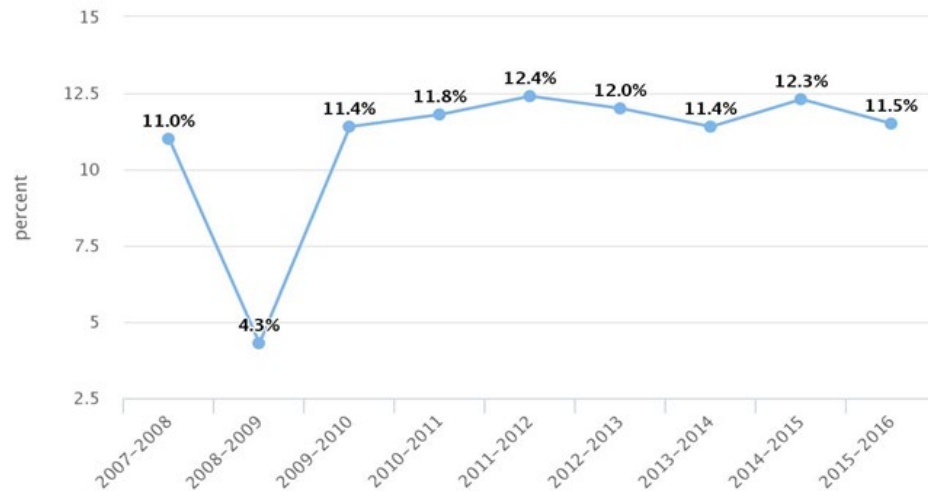
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Background

Prior to the formation of the Asthma Task Force, ACHD used 3 surveillance sources for pediatric asthma data (1) reports to school nurses (county-level); (2) hospitalizations (county and zip code level); and (3) syndromic ED visits (classified by chief complaint, county and zip code level). Each source can be used to understand the current state of pediatric asthma in Allegheny County.

Reports to school nurses are the primary source for asthma prevalence among Allegheny County children and show relatively stable rates over time (2008-2009 appears to be an anomaly, and may reflect a reporting issue), with approximately 12% of children having asthma in 2015-2016. **(Figure 1).**

Figure 1 - Asthma Reports to School Nurses (grades K-12) 2007 - 2016

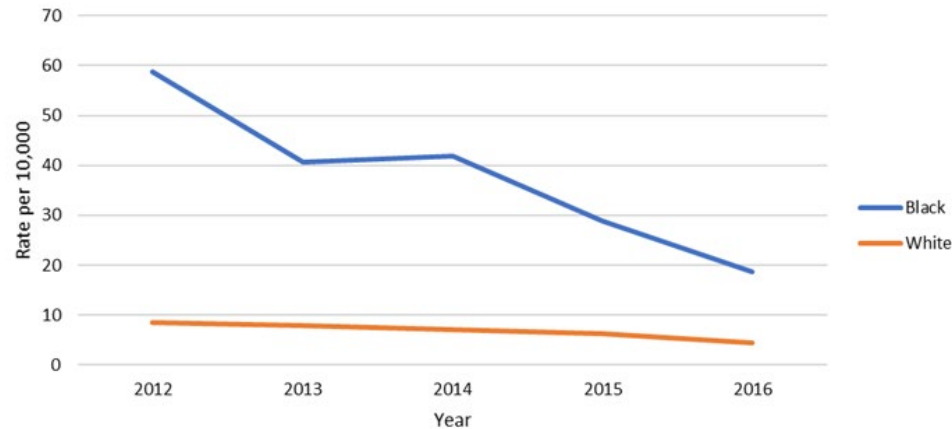


Hospital discharge and emergency room visits are data sources that reflect asthma exacerbations requiring urgent healthcare treatment. There has been a decreasing overall trend in asthma hospitalizations rates for all children (age 0 - 17) in Allegheny County. Over the five years reported, the rate of asthma hospitalizations among black children has decreased from 59 to 19 per 10,000, and the rate among white children decreased from 9 to 5 per 10,000 **(Figure 2)**, yet disparities persist, and benchmarks remain unmet; as of 2017 the hospitalization rate among

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black children under 5 was 29.1 per 10,000, over 4 times higher compared to white children and exceeding the Healthy People 2020 goal of 18.2 per 10,000.

Figure 2: Age-specific Asthma Hospitalization Rate by Race (Ages 0-17), 2012-2016



While the overall Healthy People 2020 goal of 18.2 per 10,000 asthma hospitalizations among children under 5 has been met (the Allegheny County rate was 11.5 per 10,000 in 2017), this age group has the highest rates of hospitalization (Figure 3); 1-year old children had the highest rate of 21 per 10,000 (**Figure 3**). Historically, males were more likely to be hospitalized compared to females, however recent data suggest minimal sex disparities (**Figure 4**).

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Figure 3: Age-specific Asthma Hospitalization Rate (Ages 0 - 17), 2015-2016 (Source: Pennsylvania Health Care Cost Containment Council)

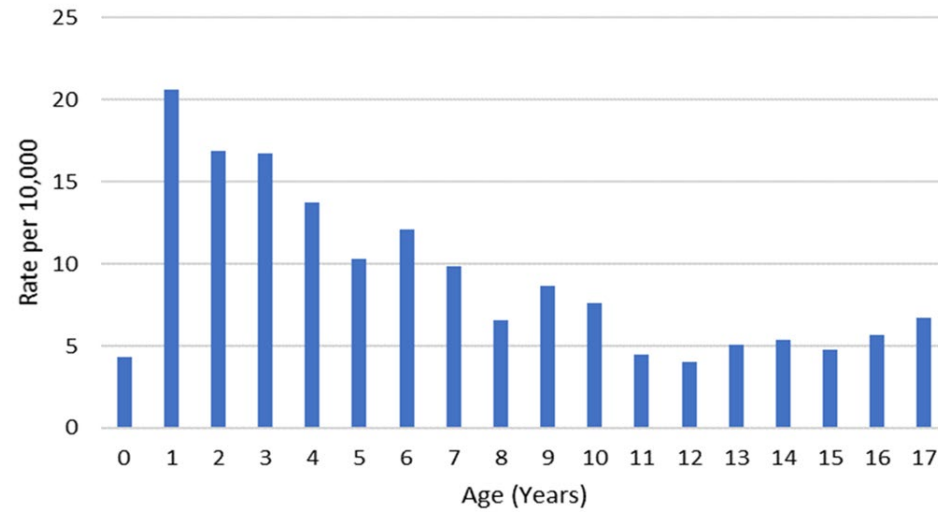
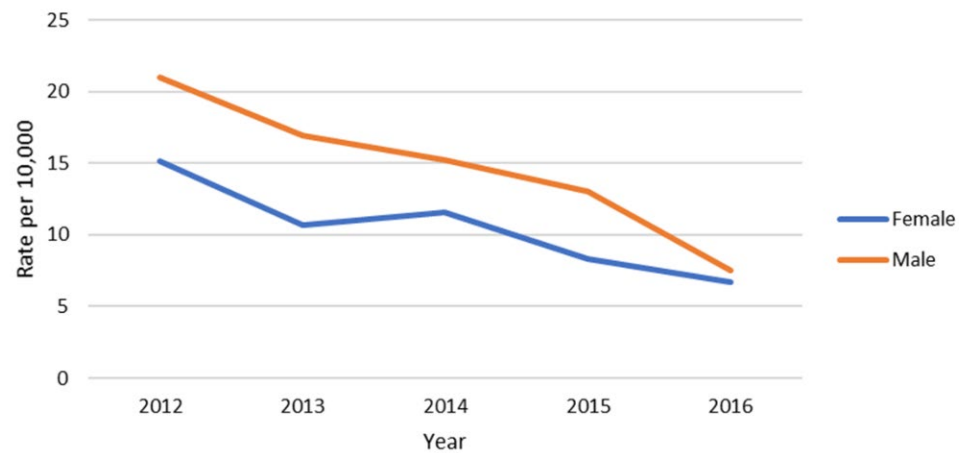


Figure 4: Age-specific Asthma Hospitalization Rate by Sex (Ages 0 - 17), 2012-2016 (Source: Pennsylvania Health Care Cost Containment Council)



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While children under 5 are disproportionately hospitalized and there are minimal male-female differences, Emergency department (ED) visits trend much differently; school age children have the highest proportion of ED visits, with children 9 years of age having almost 9% of asthma-associated chief complaint visits (Figure 5), and males having almost 60% of visits (Figure 6). Race data for ED visits were not available to ACHD at the time of analysis, so are not included.

Figure 5: Percentage of Asthma ED Visits by Age, 2017 (Source: EpiCenter, Health Monitoring Systems)

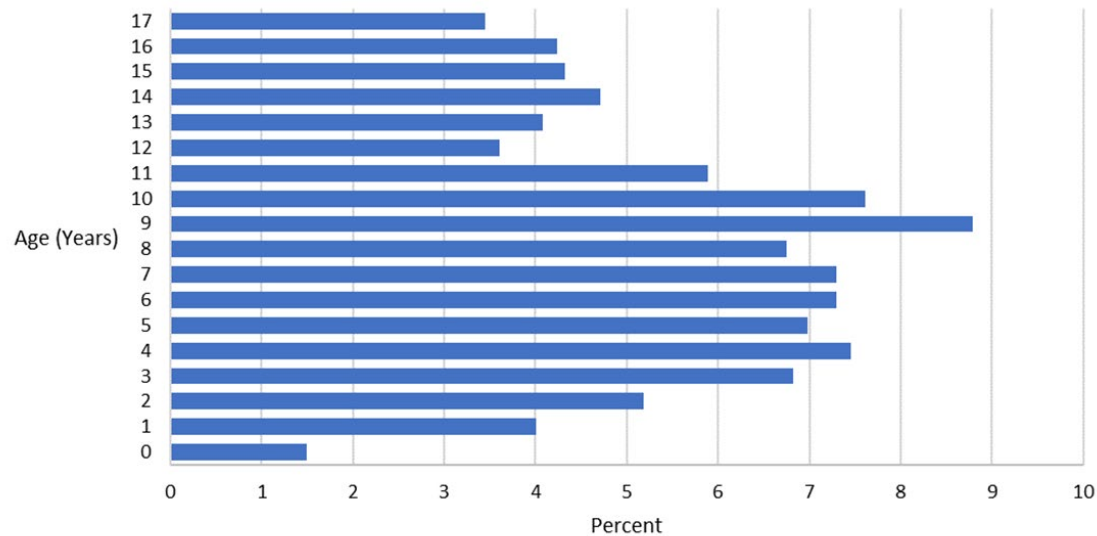
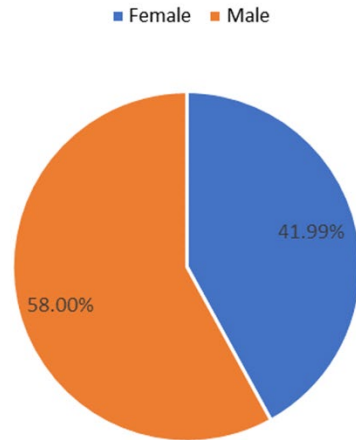


Figure 6: Percentage of ED Visits by Sex, 2017 (Source: EpiCenter, Health Monitoring Systems)



Drawing from the available data for asthma-associated ED and hospitalization utilization rates for children, the 2015 Plan for a Healthier Allegheny (PHA) identified pediatric asthma as a target for intervention, as outlined in Objective 4.1: *Reduce asthma-related emergency room visits and hospitalizations among all children (age 0-17), particularly targeting the Medicaid population.*³ Based on hospital emergency department (ED) data, the rate of respiratory ED visits among school-age children was 871 per 10,000, and the rate of respiratory ED visits among preschool-age children was 204 per 10,000, more than double the Healthy People 2020 Goal (Table 2).⁴ The 2015 PHA seeks a 10% decrease in the rates of ED visits for all children. The rate of asthma-related hospitalizations for children age 0-17 was 32.66 per 10,000 for black children and 6.69 per 10,000 for white children, indicating a racial disparity in outcomes. The 2015 PHA seeks a 15% decrease in the disparity between these populations. While the PHA focuses on the Medicaid population, ED visits are not available by payer, so insurance is unknown using available data sources. The Asthma Task Force (ATF), a collection of managed care organization representatives, health care providers, environmental advocates, and local government officials, was convened to identify and develop strategies to decrease asthma inpatient and

³Allegheny County Health Department. *2015 Plan for a Healthier Allegheny (PHA)*. Page 34. Available at: https://www.alleghenycounty.us/uploadedFiles/Allegheny_Home/Health_Department/Resources/Data_and_Reporting/Chronic_Disease_Epidemiology/Allegheny_County_PHA.pdf [Accessed 1 Aug. 2019].

⁴ U.S. Department of Health and Human Services, *Healthy People 2020 Objective: Respiratory Diseases*. Available at: <https://www.healthypeople.gov/2020/topics-objectives/topic/respiratory-diseases/objectives> [Accessed 1 Aug. 2019].

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emergency utilization in the county and impact the PHA measure. Additionally, the ATF collaborated to collect administrative claims data from UPMC, Highmark, and Gateway with a focus on information not traditionally available to ACHD for ED visits and hospitalizations, such as census tract, payer, and race.

Table 1: Outcome Indicators for 2015 PHA, Objective 4.1

Outcome Indicator	Baseline	PHA Impact	PHA Target	Healthy People 2020 Target	Data Source
rates of respiratory ED visits among school-age children	871 per 10,000	10% decrease	784 per 10,000	N/A	Hospital ED data
rates of respiratory ED visits among preschool-age children	204 per 10,000	10% decrease	184 per 10,000	95.7 ED visits per 10,000 children less than 5 years old	Hospital ED data
compare rates of asthma-related hospital admissions stratified by race for children aged 0-17	Black 32.66 White 6.69	decrease the disparity between populations by 15%	Black 27.8 White 6.69	N/A	MCOs, DHS (Medicaid)

Allegheny County Asthma Task Force: Formation and Process

The ATF initially convened in February 2018 to discuss the current state of asthma in Allegheny County and share available ACHD data and asthma-related objectives from the PHA. Partner organizations attending regular meetings represented a wide range of organizations: health care providers, managed care organizations and health plans, academia, environmental advocates, and local government agencies. Because many different backgrounds and areas of expertise were present, several meetings consisted of presentations by local asthma experts to understand why asthma exacerbations resulting in ED visits and hospitalizations occur, and current Allegheny County initiatives to reduce poor asthma outcomes in Allegheny County. Over the course of several months, ACHD and the ATF:

- Convened as stakeholders
- Listened to presentations from subject matter experts on asthma etiology, clinical pathways, exacerbations, environmental (indoor and outdoor) triggers, and programming to reduce exposure to asthma triggers
- Identified data gaps, outcomes of interest, and opportunities for additional data collection
- Identified metrics for administrative claims data collection and developed data collection templates
- Collected and combine data from UPMC, Gateway, and Highmark; present key findings
- Conducted root cause analysis and data discussion
- Developed collaborative solutions and plan to monitor progress for asthma outcomes in Allegheny County

New Insights from Health Plan Claims Data

Definitions and Limitations

ACHD ED and hospitalization data had several limitations prior to the formation of the ATF: (1) unavailable race data for ED visits; (2) zip code level data only; (3) no information on prevalence (rates are calculated from entire population rather than at-risk); (4) chief complaint rather than diagnostic codes for ED visits; and (5) no information on insurance type for ED visits. To address these limitations, claims data from partnering health plans were requested to supplement existing Health Department data. The Task Force spent several weeks determining the ideal asthma prevalence definition using health claims data. Aggregated health data were provided from three partnering health plans (University of Pittsburgh Medical Center [UPMC], Gateway Health Plan, and Highmark) based on the definitions in Table 2:

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Table 2: Administrative claims definition used to request asthma from UPMC, Gateway, and Highmark

Definition: All members ages 0-18 meeting numerator and denominator criteria for measurement year 2017; asthma is defined as any ICD-10 dx of J45.xxx	
Denominator (prevalence)	Members who are Allegheny County residents and were enrolled for at least 90 continuous days in 2017 and met at least one of the following criteria: <ul style="list-style-type: none"> • At least 1 ED visit with a dx 1-20 of asthma OR • At least 1 acute inpatient encounter with dx 1-10 of asthma OR • At least 1 outpatient visit or observational stay with dx 1-10 of asthma OR • At least 1 asthma controller medication dispensing event
Numerator (ED or hospitalization or Urgent Care visit)	Among members who meet denominator criteria, an ED visit or hospitalization with a primary dx of asthma

Using the above definitions, claims data were provided for 190,559 children (age 0 – 18) accounting for 74% of the total population of children in Allegheny County. While administrative data build upon knowledge from ACHD asthma analyses, these data also present certain limitations, mainly:

- Not all children in Allegheny County are captured
 - Excludes members who did not enter healthcare system or were enrolled in participating plans for < 90 days
 - Excludes children enrolled in plans other than Highmark, Gateway, and UPMC
 - Excludes uninsured children
- Only captures children who sought care in 2017
- Some children may be included more than once in combined dataset as they could have been enrolled in more than one health plan for 90 days throughout 2017
- Potential misclassification as administrative data are collected for billing purposes, not with intent to quantify disease prevalence

Asthma prevalence, ED utilization, hospitalizations, and urgent care utilization (defined by numerator and denominator definitions) were analyzed by age group, sex, race, product line and census tract within Allegheny County.

Results

Asthma Prevalence (Claims Data)

Key Finding #1: Overall prevalence is lower among children 0-4, but service utilization is much higher compared to other pediatric age groups.

While 5% of children 0-4 met the prevalence definition compared to 9% of children 5-11 and 12-18 years, approximately 1 out of 5 (19%) of children 0-4 with asthma had at least 1 ED visit in 2017, more than twice as high compared to all members 0-18. While utilization patterns for this age group appear high among children 0-4, similar trends are observed at the national level⁵. It can be difficult to test and diagnose children under 5 and differentiating between wheeze types (such as viral infection related wheeze) is more challenging in younger ages⁶, which may account for disproportionate trends observed by age.

Table 3: Total members, prevalence, ED and hospitalizations by age group (UPMC, Gateway, Highmark claims data), 2017

Age Group	Total Number of Members	Prevalence (n, %)	At least 1 ED Visit (n, %)	At least 1 Hospitalization (n, %)
0-4	48,323	2,285, 5%	429, 19%	214, 9%
5-11	70,788	6,723, 9%	538, 8%	288, 4%
12-18	71,448	6,542, 9%	338, 5%	148, 2%
Total	190,559	15,550, 8%	1,305, 8%	650, 4%

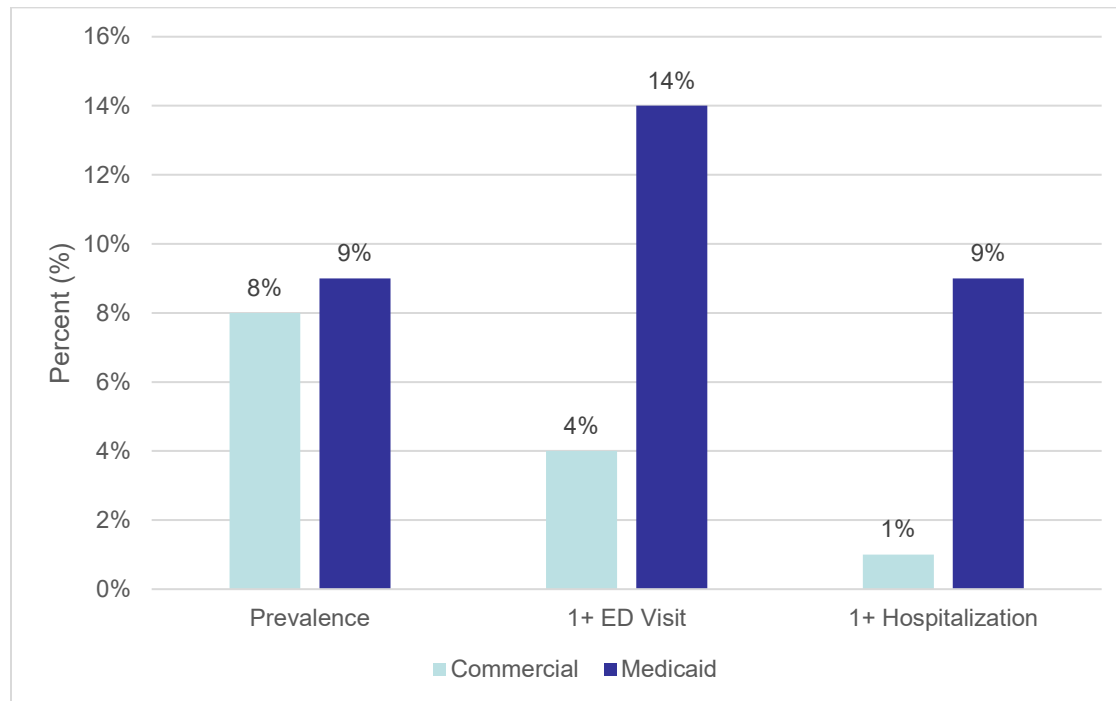
⁵ Zahran HS, Bailey CM, Damon SA, Garbe PL, Breyse PN. *Vital Signs: Asthma in Children — United States, 2001–2016*. MMWR Morb Mortal Wkly Rep 2018;67:149–155. DOI: <http://dx.doi.org/10.15585/mmwr.mm6705e1>

⁶ Brand PL, Baraldi E, Bisgaard H, et al. Definition, assessment and treatment of wheezing disorders in preschool children: an evidence-based approach. *Eur Respir J*. 2008;32(4):1096-1110. doi:10.1183/09031936.00002108

Key Finding #2: Although prevalence is similar by insurance type, service utilization is much higher among Medicaid members.

While 8% of commercial members and 9% of Medicaid members 0-18 have asthma, yet 14% of Medicaid members with asthma had at least 1 ED visit in 2017 and 9% had at least 1 hospitalization, compared to 4% of commercial members with at least 1 ED visit and 1% having at least 1 hospitalization.

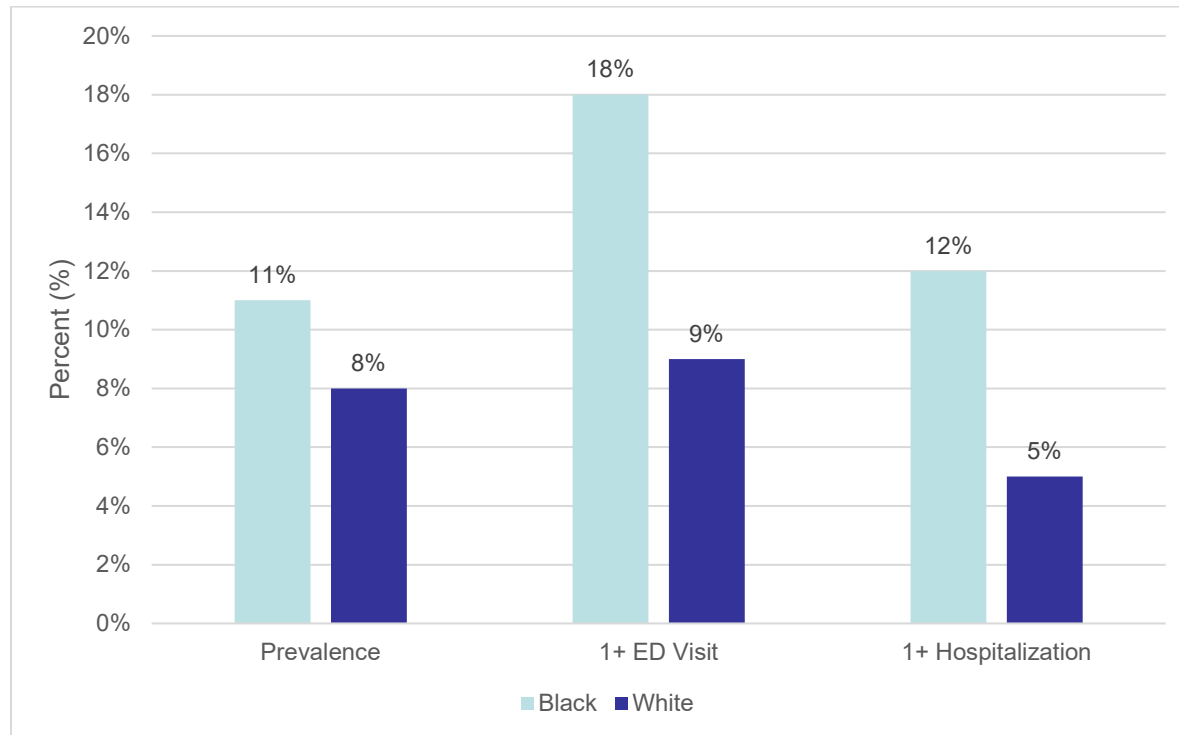
Figure 7: Pediatric Asthma Prevalence and Service Utilization Among Members (UPMC, Gateway, Highmark) Ages 0-18 by Insurance Type, 2017



Key Finding #3: Racial disparities exist among Medicaid members.

While 11% of black Medicaid members ages 0-18 and 8% of white Medicaid members have asthma, black Medicaid children with asthma are more than twice as likely to have at least 1 ED visit or hospitalization. Race data for commercial members was not available, so disparities could not be assessed.

Figure 8: Pediatric Asthma Prevalence and Service Utilization Among Members (UPMC, Gateway, Highmark) Ages 0-18 by Race for Medicaid members, 2017

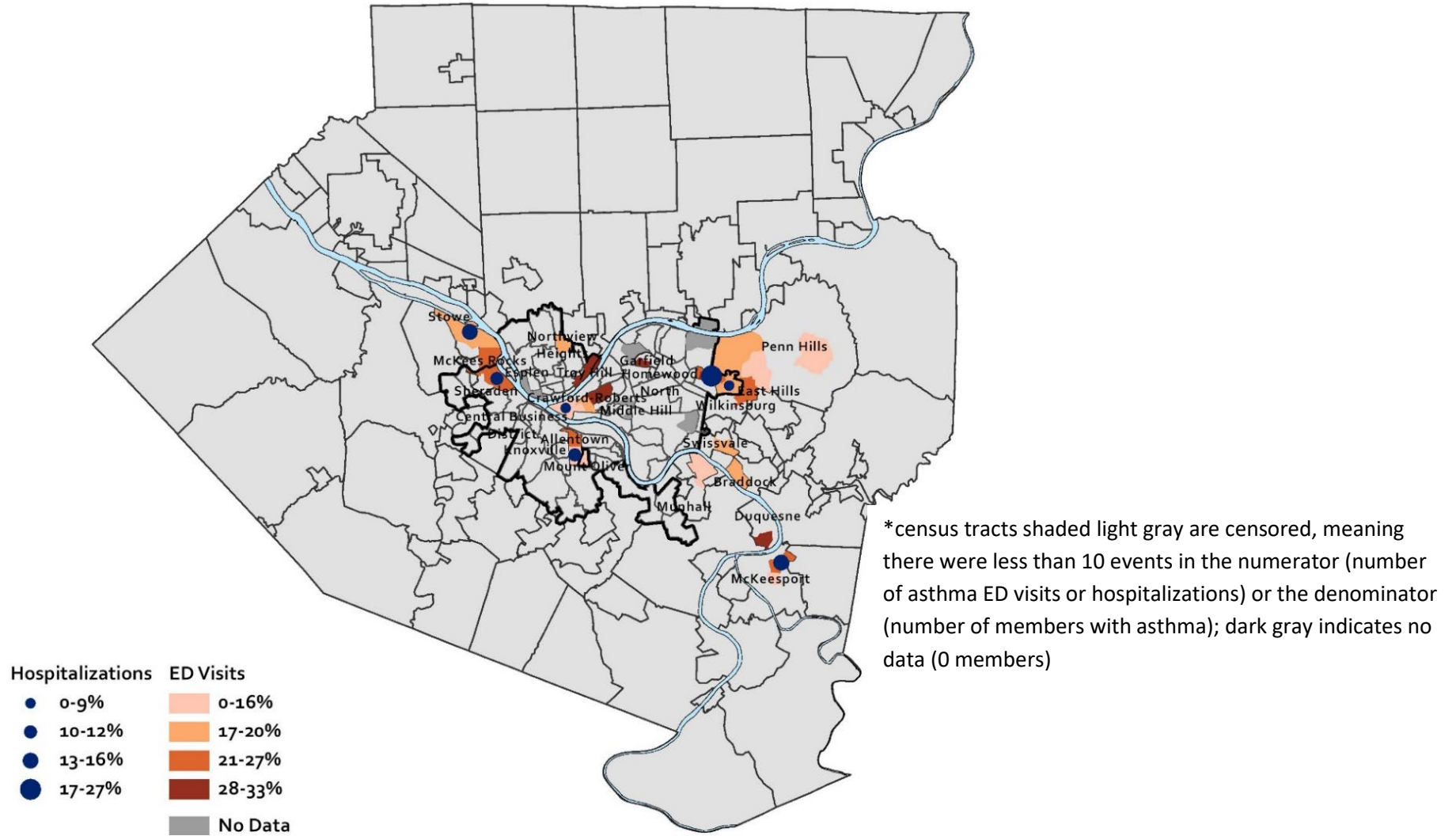


Key Finding #4: Asthma morbidity is concentrated within census tracts of many communities/municipalities.

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The greatest percentage of members with asthma having at least 1 ED visit occurred in Duquesne and Pittsburgh neighborhoods of the Hill District, Troy Hill, Garfield, and Homewood. Within these areas, between 28-33% of children with asthma went to the ED in 2017. Homewood was also the only community in the highest quartile of hospitalizations, with 27% of children with asthma being hospitalized in 2017.

Figure 9. Percent of Members (UPMC, Gateway, Highmark) with Asthma and at Least 1 ED visit or Hospitalization in 2017 by Census Tract *



ACHD and Partner Organization Initiatives

ACHD Programs

As the underlying cause of asthma varies by individual, local efforts to reduce the burden of asthma in Allegheny County are presently supported by a variety of ongoing programs. *Live Well Allegheny (LWA)* is a campaign managed by the Allegheny County Health Department (ACHD) Chronic Disease Program within the Bureau of Community Health Promotion and Disease Prevention that encourages schools, businesses, and communities to adopt policies that combat physical inactivity, poor nutrition, and tobacco use. To improve indoor air quality and reduce asthma triggers, the LWA promotes the adoption of smoke-free policies in partner organizations and communities. Laws governing outdoor air quality established by the Clean Air Act are enforced by the ACHD Air Quality Program. Industrial sources of pollution (which can trigger asthma attacks) are actively monitored for exceedances. In addition to observing industrial sources, ACHD Air Quality Program has directed initiatives seeking changes to open burning regulations, encouraging diesel retrofit programs and lawn mower switch-out programs.

ACHD Safe and Healthy Homes Program (SHHP) provides free, in-home health and safety assessments to reduce hospitalizations, injuries, illnesses, and deaths from preventable home health or safety hazards. Potential asthma triggers are identified during the assessment process and environmental support items like mattress and pillow covers, vacuums, and cleaning supplies are provided to qualified participants. When necessary, the SHHP provides additional educational materials, follow-up medical care, and referrals to community organizations for further support. Currently, a pilot project is underway exploring the potential for referral to SHHP and reimbursement for inspections related to asthma for children with an asthma hospitalization.

Partner Organization-Community Initiatives

While several ACHD programs improve environmental factors related to asthma outcomes, substantial work is occurring outside of ACHD through clinical, academic, healthcare, and other non-profit organizations within Allegheny County. While many organizations are working to impact asthma outcomes directly and indirectly, two community initiatives were highlighted through the Task Force: (1) University of Pittsburgh Asthma Institute at UPMC Asthma Institute Registry (AIR) for adults with asthma, collects demographic, health, and environmental information to use for community based participatory research; and (2) Children's Community Health Collaborative – Children's Hospital of UPMC developing community partnerships and engaging residents to reduce asthma morbidity in hot-spot neighborhoods.

Root Cause Analysis

Following a review of preliminary and supplementary data on asthma-associated health care utilization, the ATF completed a Root Cause Analysis. Root Cause diagramming is a collaborative effort where participants generate a comprehensive list of contributing factors to an identified issue. These factors are then grouped together into domains to focus interventions and identify need. The final draft of the ATF's Root Cause Analysis is found in **Appendix A**.

The ATF identified three major domains that negatively contribute to asthma inpatient and emergency utilization.

- 1) Structural Inequity, Education, and Patient Advocacy.** Factors affecting adequate treatment within this domain include financial limitations, employment issues, lack of available medications, and a lack of knowledge on the part of the individual, medical professionals, and the healthcare industry.
- 2) Environmental Triggers.** Factors affecting adequate treatment within this domain include viral infections, poor outdoor air quality, and poor indoor air quality.
- 3) Access.** Factors affecting adequate treatment within this domain include a complete lack of primary care services for an individual, and limited access to primary care due to issues with adequate transportation, ease of access, and physician availability.

Recent Successes and Next Steps

The combined 2017 dataset from UPMC, Gateway, and Highmark used to guide ATF work and root cause analysis was posted publicly to the Western Pennsylvania Data Center (WPRDC.org) during summer 2019, so that any individual or organization can continue using census tract level data to improve community-level asthma outcomes. Additionally, it was observed that there is a dearth of asthma-related longitudinal data at the individual level for the pediatric population. While there is currently an asthma registry for adults in the Pittsburgh region, there is no registry for children. Through the ATF, UPMC and University of Pittsburgh School of Public Health initiated the development of a pediatric asthma registry using ACHD Clean Air funds to follow children affected by asthma over time and understand strategies to improve pediatric asthma outcomes in Allegheny County.

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The Allegheny County Health Department will continue working with community partners to address local health issues, including asthma. Recent updates to surveillance sources allow ACHD to assess ED visits over time by race and using ICD code definitions. While claims data are beneficial as a unique data source to understand localized burden, recent ACHD efforts have observed limitations using claims data for surveillance purposes; ACHD continues to seek out quality data to understand temporal trends at the most granular geographic level possible.

Appendix A

