



# Asthma in Missouri

Highlands Community Asthma Care & Education

## Abstract

- ❖ Asthma is a chronic condition affecting children and adults in Missouri and nationwide. Nationwide, it is estimated that more than 25 million children and adults currently have asthma. The Highlands Community Asthma Care & Education (CACE) Hub area of Missouri, comprised of nine counties (Crawford, Dent, Franklin, Iron, Jefferson, Phelps, Reynolds, St. Francois, and Washington), is no exception with a substantial population of children with asthma.
- ❖ According to the Behavioral Risk Factor Surveillance System, the estimated prevalence of current asthma among children in the Highlands CACE Hub varies by region of assignment of the county, such as 8.8% for counties in the St. Louis Metropolitan region, which is close to the state prevalence (8.7%), to 3.3% for counties in the BRFSS Southeast region.
- ❖ In Missouri, approximately one-half million people currently have asthma with more than 100,000 being children. The prevalence of current asthma among adults in Missouri is 12.2% higher compared to U.S. adults (10.1% v. 9.0%, respectively). Children with asthma, aged 0 to 17 years, residing in the Highlands CACE Hub 9-county area have had consistently lower asthma emergency department (ED) visit and hospitalization rates than the state. However, reviewing the data at the county-level revealed that children with asthma residing in a few counties (Jefferson, St. Francois, and Franklin) in the Highlands Hub represented the majority (~78%) of the acute care visits.
- ❖ To inform and guide geographic distribution of interventions, analysis of Medicaid administrative claims data indicated areas in the Highlands CACE Hub where children are experiencing persistent asthma and indicated a substantial proportion (33%) have uncontrolled asthma.
- ❖ Seasonality asthma hospitalization data for children and teens in Missouri combining 2011-2015 indicate two peak periods: 1) April and 2) August through October. For the Highlands CACE Hub 9-county area, the inpatient hospital admission rate for children and teens increased from January to February, March to April, and August to September, with a slight decline September to October followed by a continuous decline.
- ❖ In Missouri, among children and teens aged 0 to 17 with asthma as the primary diagnosis, hospital charges totaled \$20.8 million, and children / teens from the Highlands 9-county area accounted for about 4.7% (\$971 thousand) of these charges (2015). Medicaid accounted for the largest pay source cited.
- ❖ The Highlands Hub 9-county area has 47 public school districts. Combined, this area has more than 76,000 total students representing approximately 5.5% of the enrollment in public schools in Missouri (2019-2020). The most populous school districts in the 9-county area were Fox C-6 (11,025 students, Jefferson County), followed by Northwest R-1 (6,119 students, Jefferson County) and Rolla 31 (4,111 students, Phelps County).
- ❖ Interventions directed in the Highlands CACE Hub have included Teaming Up for Asthma Control, Asthma Ready® part 1 and 2 trainings for clinics, hospitals, and clinicians, the Childhood Asthma Linkages in Missouri (CALM), and courses such as Becoming an Asthma Educator and Care Manager, Acting on Behalf of My Child (ABC) and Asthma Control Everyday (ACE)
- ❖ The health care system in the Highlands CACE Hub includes primary care providers, hospitals, clinics, urgent care, community health centers, public health, mental health services, schools, Medicaid and care management services, and community partners. There are many community resources also available.

### Asthma Ready® Communities

University of Missouri

Columbia

June 2022



# Table of Contents

Abstract.....	i
Highlands Hub Counties.....	1
Asthma.....	2
• Prevalence	
• Control	
• Emergency Room Visits	
• Hospitalizations	
• Seasonality	
Programs.....	8
Community Agencies.....	11
Health Systems.....	12
Schools.....	14
Churches.....	15
Acknowledgement.....	15
References.....	16

## Tables

1. Characteristics and select indicators for the Highlands Community Asthma Care and Education (CACE) Hub Counties and Missouri, 2021
2. Asthma emergency department and hospitalization rates and select indicators among children aged 0 to 17 years, Highlands CACE Hub Counties, Missouri
3. Number of Zip Codes, Most Populous and Percent of County Population covered by Most Populous Zip Code, Highlands CACE Hub Missouri
4. Key interventions to reduce pediatric asthma risk and improve control, Highland Hub area, Missouri, October 2006 - March 2022
5. Highlands CACE Hub School Districts by Number of Students, Missouri

## Figures

1. Highlands Community Asthma Care and Education (CACE) Hub counties, Missouri, 2021
2. Prevalence of current asthma among children aged 0 to 17 years, Missouri, 2019
3. Asthma Emergency Visit rates among children aged 0-17 years, Highland CACE Hub and Missouri, 2011 - 2015
4. Asthma Hospitalization rates among children aged 0-17 years, Highland CACE Hub and Missouri, 2011 - 2015
5. Asthma Inpatient Hospitalizations by quartiles under age 18, Missouri, 2016 – 2019
6. Asthma inpatient hospital admission rates for children aged 0 to 19 years by month, Highlands CACE Hub and Missouri, 2011-2015
7. Missouri County Zip Codes, 2022
8. Asthma Risk Panel Report, Highlands CACE Hub Dashboard, 2019
9. Children with Medicaid coverage and persistent asthma by county, Missouri, 2014-2015
10. Hospitals, Federally Qualified Health Centers, and Rural Clinics, Highlands CACE Hub counties, Missouri
11. Primary Care Health Homes, Missouri
12. Highlands CACE Hub School Districts and County, Missouri





Funding for this report was provided in part by the Missouri Foundation for Health and the US Centers for Disease Control and Prevention cooperative agreement number N01CE001393. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the Centers for Disease Control and Prevention or the Department of Health and Human Services.

Cover photo: Sandy Creek Covered Bridge State Historic Site  
Jefferson County, Missouri

Courtesy of: Kbh3rd, Creative Commons, Wikimedia original, no modifications

[https://en.wikipedia.org/wiki/Sandy\\_Creek\\_Covered\\_Bridge\\_State\\_Historic\\_Site](https://en.wikipedia.org/wiki/Sandy_Creek_Covered_Bridge_State_Historic_Site)

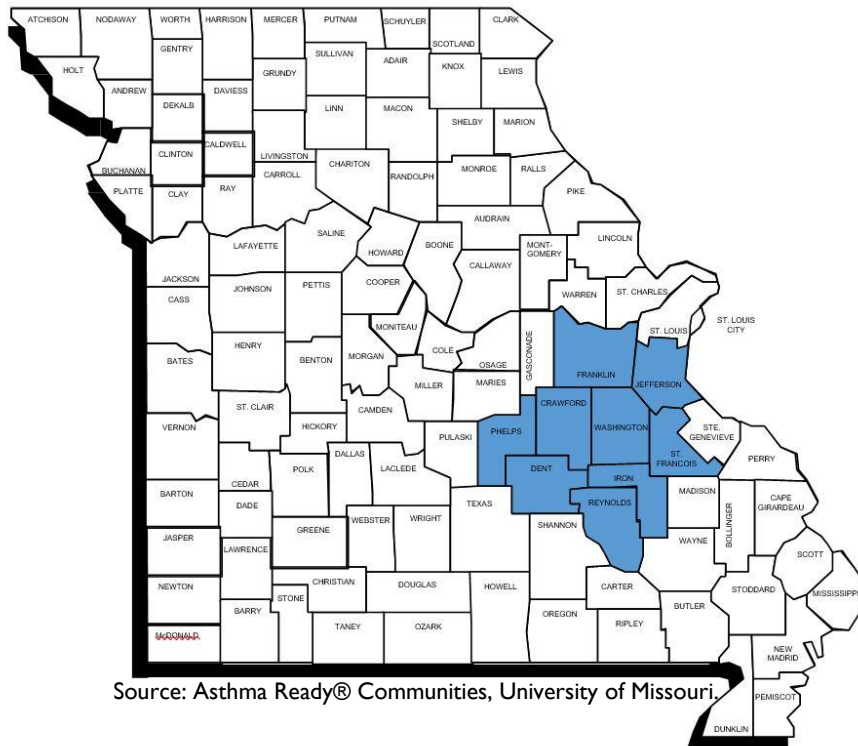
Wikimedia Commons: [https://commons.wikimedia.org/wiki/File:Sandy\\_creek\\_covered\\_bridge\\_02.jpg](https://commons.wikimedia.org/wiki/File:Sandy_creek_covered_bridge_02.jpg)



# Highlands Hub

Childhood asthma is one of the most prevalent conditions faced by families, schools, and health clinicians. Nationwide, more than 25.3 million people are living with asthma of which 4.2 million are younger than age 18 (2020).<sup>1</sup> Children and teens with asthma are especially vulnerable to persistent symptoms or uncontrolled asthma affecting learning, wellness, and overall quality of life.<sup>2, 3</sup> Community Asthma Care and Education (CACE) Hubs are designated, contiguous multi-county regions identified through Medicaid claims data having disparate rates of uncontrolled pediatric asthma (i.e., high acute care utilization and medications). These Hubs establish partnerships and implement interventions to improve pediatric asthma control. The Highlands CACE Hub includes 9-counties (Figure 1).

**Figure 1.**  
Highlands Community Asthma Care and Education (CACE) Hub counties, Missouri, 2022



Source: Asthma Ready® Communities, University of Missouri.

Jefferson County is the most populous county in the Highlands CACE Hub region followed by Franklin and St. Francois (Table 1).<sup>4</sup> Children aged 0 to 17 years account for approximately 1 in 5 people in each county. African-Americans comprise a small proportion in each county with St. Francois county having the largest proportion (4.6%). Phelps, Crawford, and Jefferson have the largest Hispanic/Latino populations. Among persons younger than age 65 without health insurance ranges from a low in Jefferson County (11.2%) to Dent County (16.6%). Three counties (Iron, Reynolds, and Washington) have approximately one in five persons (> 19%) living in poverty. Many households in the Highlands Hub area, highest in Iron followed by Crawford, and Washington counties, do not have a computer.



## Community Asthma Care & Education

- Improve asthma control
- Reduce emergent visits
- Partnerships
- Collaborative learning
- Collective Impact

**Table 1.**

Characteristics and select indicators for the Highlands Community Asthma Care and Education (CACE) Hub Counties and Missouri, 2021

County	Population	Age			Race <sup>a</sup> / Ethnicity			No Health Insurance	Persons in Poverty	Households without computer <sup>b</sup>
		0-17 Percent	18-64 Percent	≥ 65 Percent	White Percent	Black Percent	Hispanic Percent	Age ≤ 65 years Percent	Percent	Percent
<b>Crawford</b>	22,807	22.5	57.4	20.1	96.8	0.5	2.1	15.8	16.3	18.7
<b>Dent</b>	14,432	22.2	55.5	22.3	95.5	0.7	1.9	16.6	15.1	15.5
<b>Franklin</b>	105,231	22.7	59.3	18.0	96.5	1.0	1.9	11.8	9.1	8.2
<b>Iron</b>	9,408	20.8	57.3	21.9	95.7	1.5	1.9	13.9	19.5	20.7
<b>Jefferson</b>	227,771	22.9	61.6	15.5	96.0	1.2	2.1	11.2	8.9	6.5
<b>Phelps</b>	44,937	20.9	62.1	17.0	90.7	2.2	2.8	15.6	17.5	7.8
<b>Reynolds</b>	6,087	20.1	56.2	23.7	94.6	1.2	1.7	16.0	19.4	14.0
<b>St. Francois</b>	67,541	21.0	62.4	16.6	92.9	4.6	1.7	12.5	16.2	12.9
<b>Washington</b>	23,502	22.6	60.2	17.2	95.2	2.5	1.5	15.0	19.4	17.2
<b>Missouri</b>	<b>6,168,187</b>	<b>22.3</b>	<b>60.4</b>	<b>17.3</b>	<b>82.9</b>	<b>11.8</b>	<b>4.4</b>	<b>12.0</b>	<b>12.1</b>	<b>9.3</b>

Source: U.S. Census Bureau.

<sup>a</sup> Others not shown.

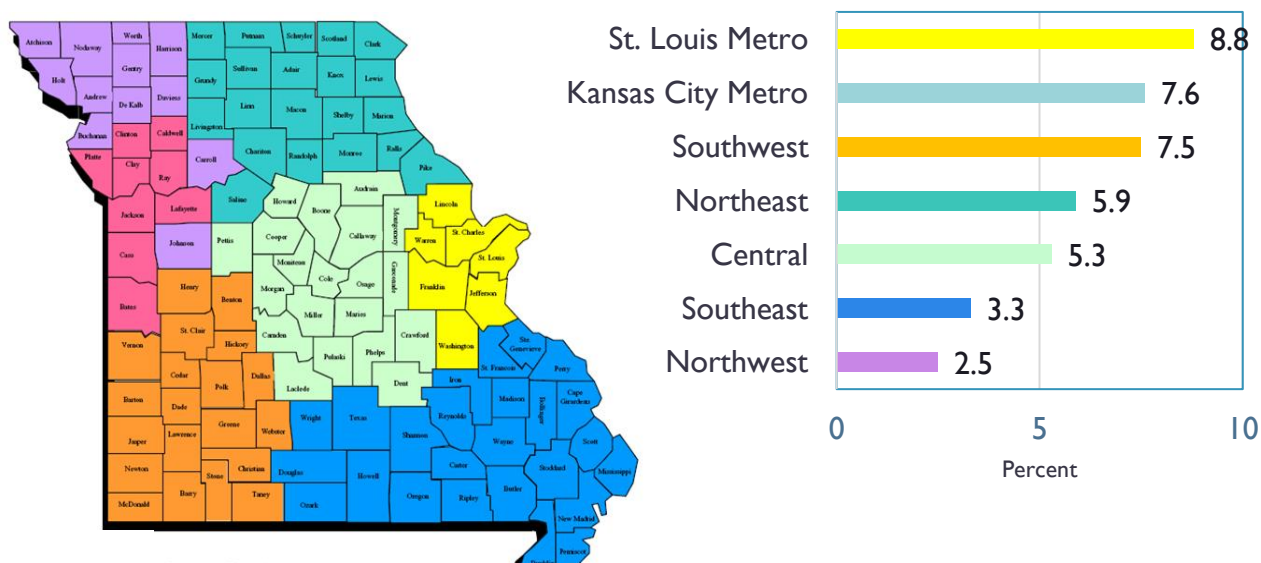
<sup>b</sup> 2016-2020

## Asthma

### Prevalence

The Behavioral Risk Factor Surveillance System (BRFSS) collects asthma prevalence information for children and adults.<sup>5</sup> According to the 2019 data, adults living with current asthma in Missouri is 12.2% higher compared to the U.S. (10.1% v. 9.0%, respectively).<sup>6</sup> For children, the prevalence of current asthma in Missouri (7.0%) is similar to the U.S. (7.4%) in 2019. The Highlands CACE Hub counties are dispersed in three Missouri BRFSS regions: 1. St. Louis (Crawford, Franklin, and Jefferson); 2. Central (Dent, Phelps, and Washington); and 3. Southeast (Iron, Reynolds, and St. Francois) (Figure 2). Compared to the other Missouri BRFSS regions, St. Louis Metropolitan Region has the highest prevalence of current asthma among children (8.8%).

**Figure 2.** Prevalence of current asthma among children aged 0 to 17 years, Missouri, 2019





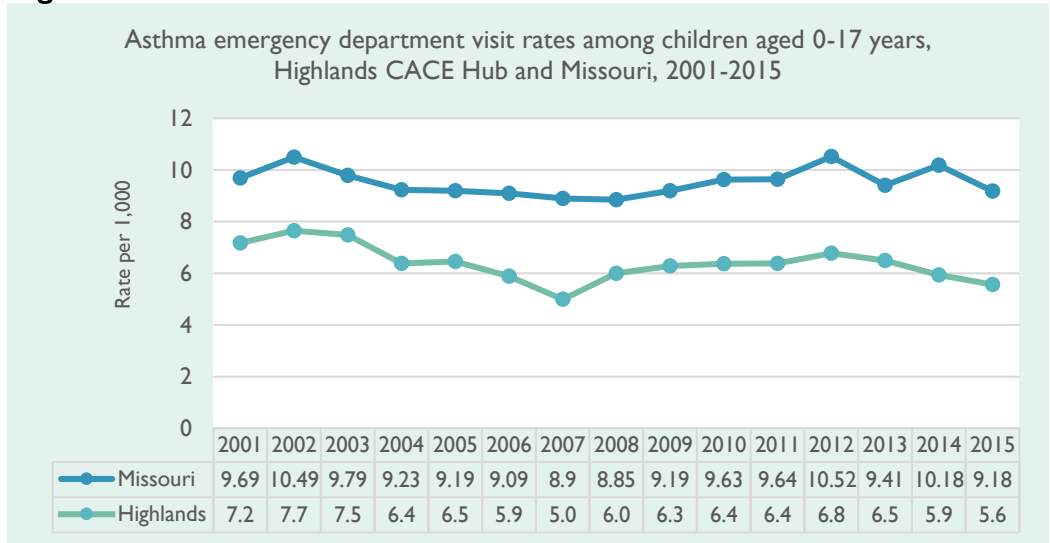
## Control

In Missouri, approximately one-half million people currently have asthma with more than 100,000 being children.<sup>6</sup> While asthma occurs among all population groups, it is particularly a health issue among children and teens and is more common among African-Americans and in households with lower incomes and education. While asthma cannot be cured, the goal is optimal control. Well controlled asthma results in increased productivity and low morbidity and overall health costs. Approximately 55.5% of children with asthma in Missouri are uncontrolled.<sup>2</sup> This leads to frequent symptoms and urgent asthma attacks resulting in impairment (e.g., interference with sleep and normal activity), absenteeism from school, and a disproportionate share of emergency department (ED) visits and hospitalizations.

## Emergency Department Visits and Hospitalizations

The emergency visit rates for children with a primary diagnosis of asthma in the Highlands CACE Hub 9-county area has consistently been lower than the state rates (Figure 3).

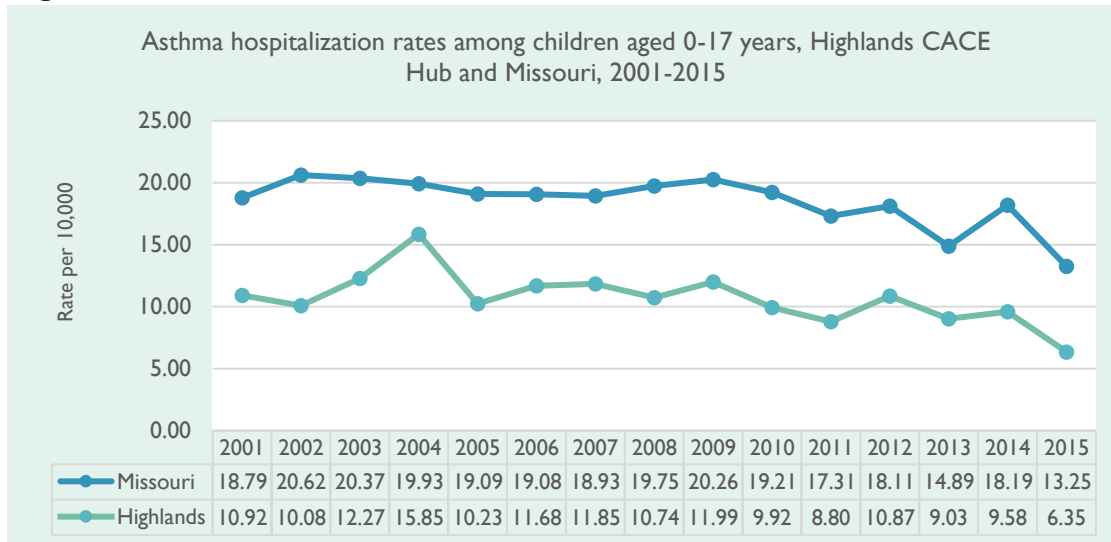
**Figure 3.**



Source: Missouri Department of Health and Senior Services. Missouri Public Health Information Management System (MOPHIMS), Inpatient Hospitalizations, Missouri Information for Community Assessment (MICA).

Similar to ED visits, asthma hospitalizations for children living in the Highlands CACE Hub have been consistently lower than the state rates also (Figure 4). While the asthma hospitalization rates for children in the Highlands Hub show an initial increasing trend (2002 – 2004), there was a 47.0% decline comparing 2009 and 2015. The Missouri asthma hospitalization rates for children also showed a decline of 34.6% comparing the same years.

**Figure 4.**



To further explore asthma emergency visits and hospitalizations for children in the Highlands CACE Hub, 5-years of data were combined for each county (Table 2). Children residing in three counties (Jefferson, St. Francois, and Franklin) within the Highlands CACE Hub accounted for 77.8% of the asthma ED visits and 78.7% of the asthma hospitalizations. The Highlands CACE Hub counties have more than 3,900 children with asthma enrolled in MO HealthNet with the same three counties (Jefferson, Franklin, and St. Francois) having the majority of these children (70.7%). In addition, the Highlands CACE Hub counties, with the exception of Jefferson County, are designated as primary care health professional shortage areas). The Highlands Hub 9-county area also includes 47 school districts (see Schools).

**Table 2.**

Asthma emergency department and hospitalization rates and select indicators among children aged 0 to 17 years, Highlands CACE Counties, Missouri

County	Emergency Department Visits			Hospitalization			Asthma MO Health Net (age < 21yrs)	HRSA Primary Care Shortage Area	School Districts
	Number	Rate <sup>a</sup> (95% CI) 2011-2015	Sig.	Number	Rate <sup>b</sup> (95% CI) 2011-2015	Sig.	Number 2019	Designated 2021	Number 2020
Crawford	157	5.6 (4.8 – 6.6)	SL	23	7.8 (5.0 – 11.8)	SL	232	X	3
Dent	89	5.2 (4.2 - 6.4)	SL	12	6.7* (3.4 – 11.6)	SL	139	X	5
Franklin	571	4.9 (4.5 – 5.4)	SL	98	8.1 (6.5 – 9.8)	SL	749	X	10
Iron	60	5.5 (4.2 – 7.1)	SL	6	5.3* (1.9 – 11.5)	SL	83	X	1
Jefferson	1,622	6.4 (6.0 – 6.7)	SL	250	9.3 (8.2 – 10.5)	SL	1,398	--	11
Phelps	247	5.5 (4.8 – 6.2)	SL	38	7.9 (5.6 – 10.9)	SL	382	X	4
Reynolds	25	3.7 (2.4 – 5.5)	SL	8	11.4* (4.9 – 22.5)	NS	69	X	4
St. Francois	600	8.9 (8.2 – 9.6)	SL	77	10.8 (8.5 – 13.5)	SL	651	X	5
Washington	217	7.9 (6.8 -9.0)	SL	28	9.6 (6.4 – 13.9)	SL	253	X	4
<b>9 counties</b>	<b>3,588</b>	<b>6.3 (6.0 – 6.5)</b>	<b>SL</b>	<b>540</b>	<b>8.9 (8.2 – 9.7)</b>	<b>SL</b>	<b>3,956</b>	<b>--</b>	<b>47</b>
Missouri	66,705	10.1 (10.0 – 10.2)		11,450	16.4 (16.1 – 16.7)		53,019	--	518

Sources: Missouri Department of Health and Senior Services, Missouri Public Health Information Management System (MOPHIMS) emergency department and hospitalization data; Missouri Department of Social Services, Missouri Department of Social Services, MO HealthNet Division; HRSA: Health Resources & Services Administration, Primary Care HPSA: Health Professional Shortage Area; and Missouri Department of Elementary and Secondary Education.

<sup>a</sup> ED visit rate per 1,000 population

<sup>b</sup> Hospitalization rate per 10,000 population

\* Rate unstable numerator less than 20

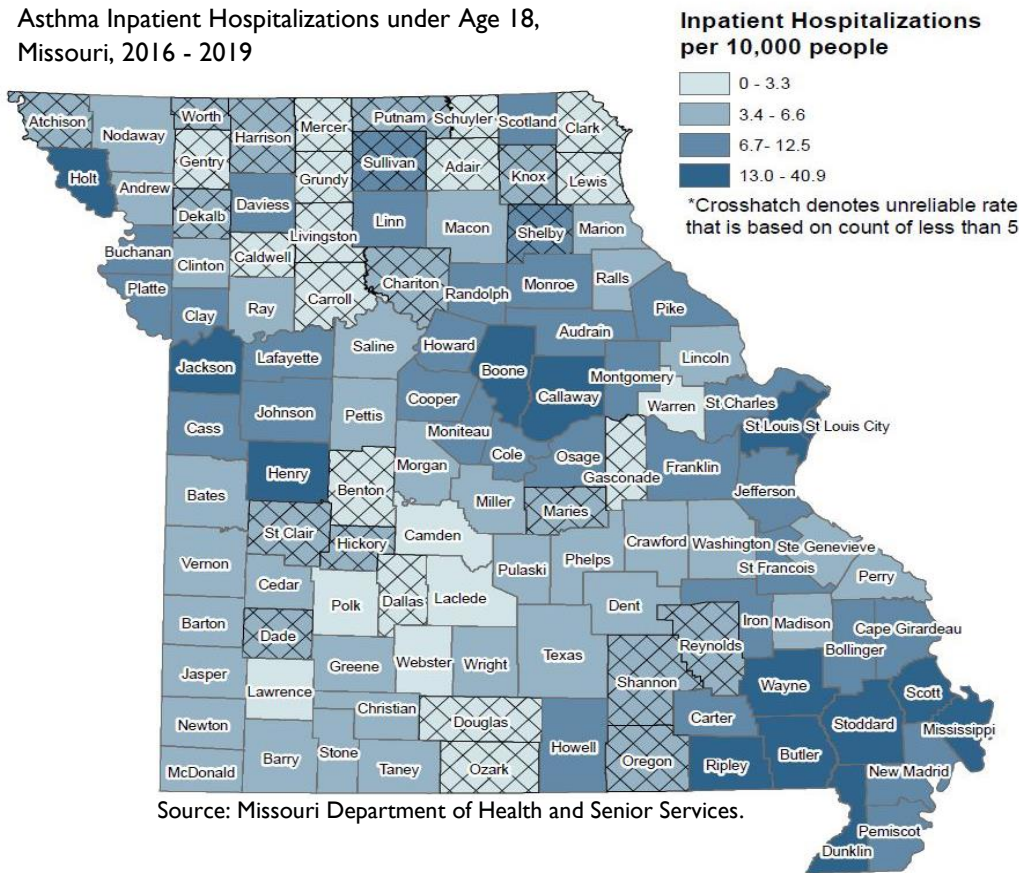
Significance: SL: significantly lower than State rate, Significantly higher than State rate; NS: No significant difference.



More recent hospitalization data show Franklin, Jefferson, St. Francois and Iron counties in the third quartile for asthma hospitalizations in the Highlands CACE Hub (Figure 5).

**Figure 5.**

Asthma Inpatient Hospitalizations under Age 18, Missouri, 2016 - 2019



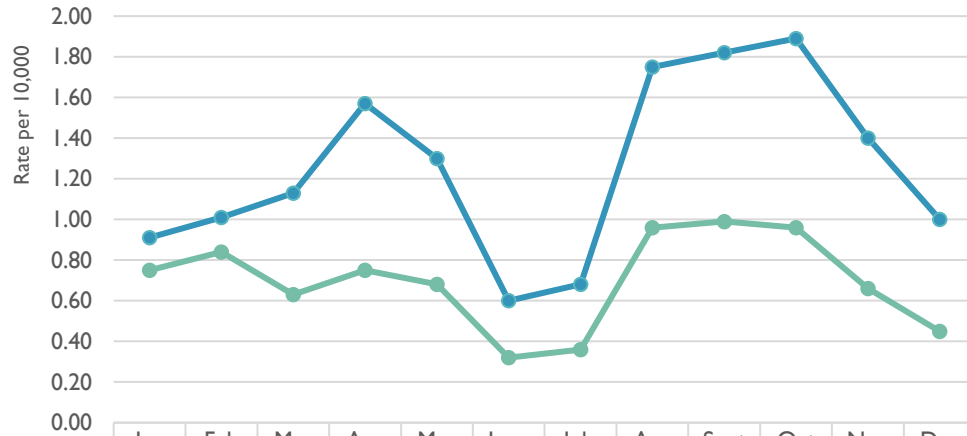
In Missouri, among children and teens aged 0 to 17 with asthma as the primary diagnosis, hospital charges totaled \$20.8 million and children / teens from the Highlands CACE Hub 9-county area accounted for about 4.7% (\$971 thousand) of these charges (2015).<sup>7</sup> Medicaid accounted for the largest source cited (60.2%) followed by commercial insurance (35.1%) for asthma hospital charges among children in the Highlands Hub area. Self-pay or no charges accounted for approximately 2.2% of the asthma hospitalization charges among children in the Highlands CACE Hub. As these data indicate, asthma continues to be a heavy financial weight on children and families enrolled in Medicaid.

## Seasonality

Asthma ED visits and hospitalizations have seasonal patterns. For children and teens aged 0 to 19, the asthma hospital admissions rates by month for Missouri show a bimodal distribution indicating two peak periods, April and August-October (Figure 6).<sup>5</sup> For the Highlands CACE Hub 9-county area, the inpatient hospital admission rate for children and teens increased from January to February, March to April, and August to September, with a slight decline September to October followed by a continuous decline. Both show substantial low rates in asthma hospital admissions for children and teens June-July.

**Figure 6.**

Asthma inpatient hospital admission rates for children aged 0 to 19 years by month, Highlands CACE Hub and Missouri, 2011-2015



	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Highlands Hub	0.75	0.84	0.63	0.75	0.68	0.32	0.36	0.96	0.99	0.96	0.66	0.45
Missouri	0.91	1.01	1.13	1.57	1.30	0.60	0.68	1.75	1.82	1.89	1.40	1.00

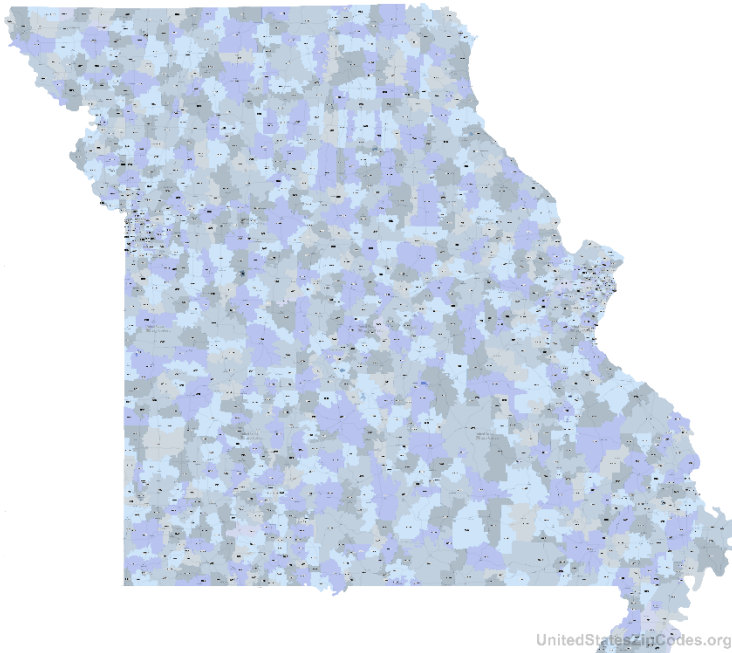
Source: Missouri Department of Health and Senior Services. Missouri Public Health Information Management System (MOPHIMS). Environmental Public Health Tracking





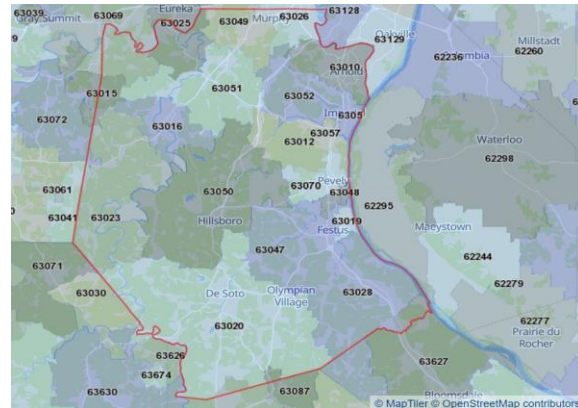
## Zip Codes

**Figure 7. Missouri County Zip Codes, 2022**

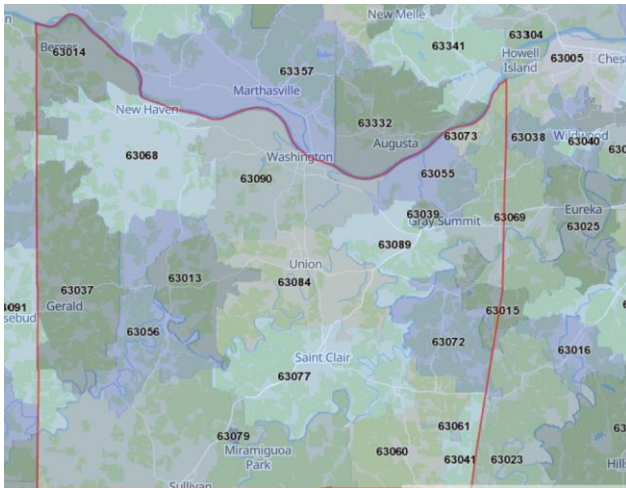


Source: United States Postal Service, US Census Bureau

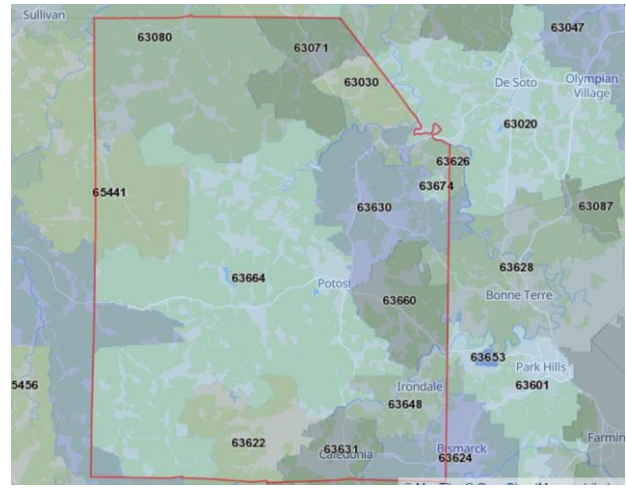
The Missouri Zip Codes Map (Figure 7), using the ZIP Code Tabulation Areas (ZCTAs) as specified by the United States Census Bureau, approximate the area covered by a ZIP code.<sup>8</sup> The Highlands 9-county area has about 133 ZIP codes. Most are residential (93.2%), but a small number (9 or 6.8%) are PO boxes with low or no residential populations (Table 3). Counties with large numbers of Zip codes are shown.



Jefferson County, MO



Franklin County, MO



Washington County, MO

County	Number of Residential Zip Codes	PO Boxes	Most Populous Zip Code	Percent of County Population %
Jefferson	22	3	63010	16
Franklin	20	2	63090	21
Washington	15	*	63664	35
Iron	14	*	63650	37
St. Francois	13	*	63640	38
Crawford	11	*	65453	34
Reynolds	11	*	63638	43
Phelps	10	*	65401	70
Dent	8	*	65560	88
<b>Total</b>	<b>124</b>	<b>9</b>	<b>--</b>	<b>--</b>

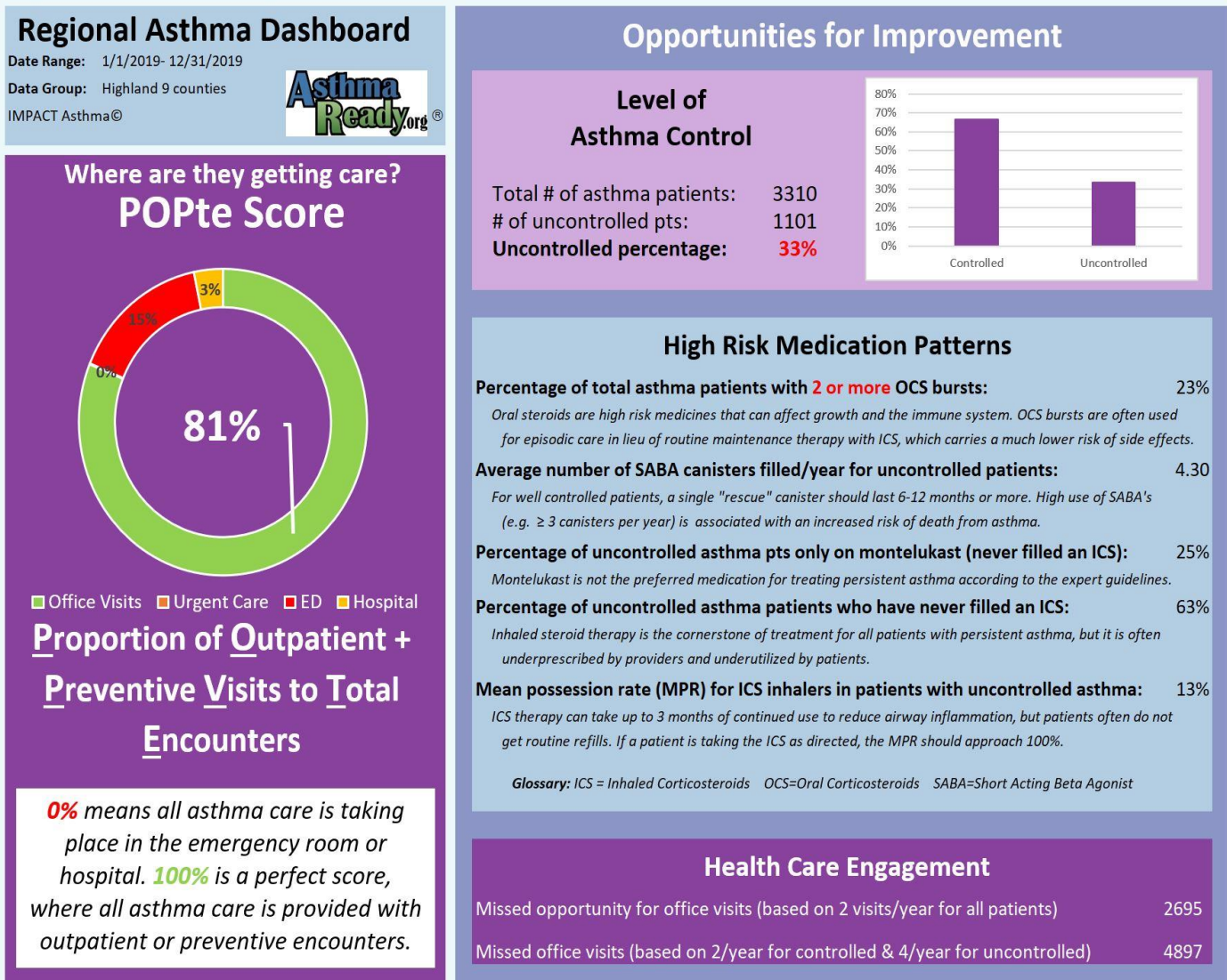
\*Less than 2; --not applicable.

**Table 3. Number of Zip Codes, Most Populous, and Percent of County Population for listed Zip Code, Highlands CACE Hub, Missouri**

# Programs

To focus programs in areas of greatest need, Medicaid administrative claims data are used to generate de-identified population-based asthma risk panel reports (ARPRs) and maps to identify children with uncontrolled asthma in Missouri. Risk indicators such as frequent asthma acute care visits (i.e., emergency visits and hospitalizations) and medication overuse (i.e., short acting beta agonists or systemic oral steroids) or underuse (low control medication use) are used. This information is translated for clinicians, school nurses, and care managers as an asthma risk population panel report. These reports inform care management and practices. The asthma risk panel report dashboard for children, teens and young adults (< 21 years) with asthma in the Highlands CACE Hub for 2019 indicates that one-third (33.0%) had uncontrolled asthma and a proportion sought care through the emergency room (15%) (Figure 8). Only 3% had been hospitalized for asthma. The proportion of outpatient and preventive visits to total care encounters (POPte) score of 81% indicates that 8 in 10 asthma care encounters are occurring in outpatient and preventive visits.

Figure 8.

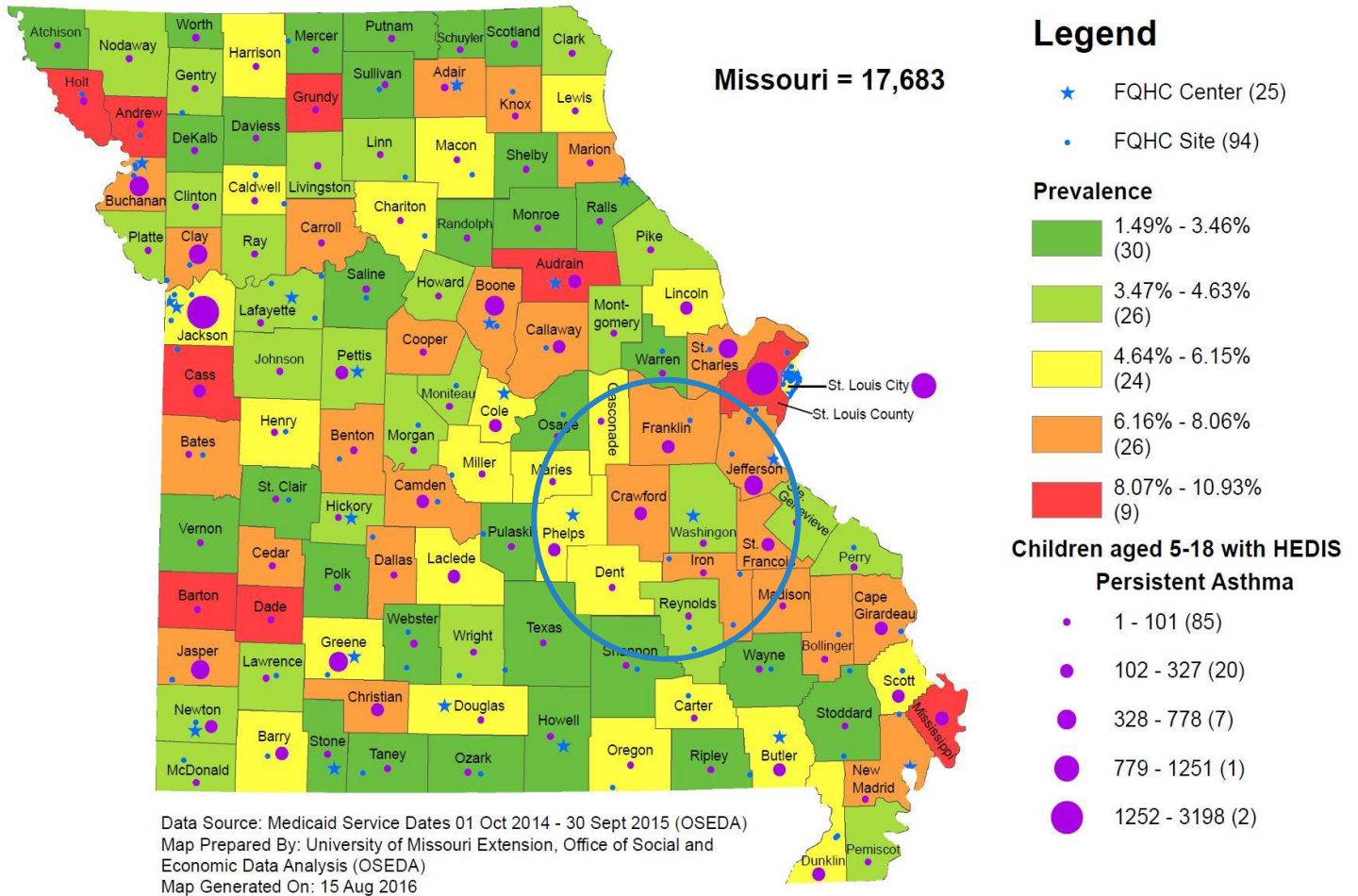




A map shows children throughout the Highlands CACE Hub with persistent asthma (Figure 9). Persistent asthma was defined by the legacy Healthcare Effectiveness Data and Information Set (HEDIS) criteria: One asthma inpatient admission; or ED visit, or four asthma medication dispensing events, or four outpatient asthma visits and at least 2 asthma medication dispensing events. This criterion was applied for children with a primary or second diagnosis of asthma.

**Figure 9.**

Children with Medicaid with persistent asthma by county, Missouri, 2014-2015



The Asthma Ready® Communities (ARC) data contained 94 activity records for the Highlands CACE Hub area (Table 4). Legacy interventions such as Teaming Up for Asthma Control (TUAC), Asthma Ready® trainings for clinics, hospitals, and clinicians, and the Childhood Asthma Linkages in Missouri (CALM) are leading interventions that have been implemented in the Highland CACE Hub counties. Other activities and interventions have included presentations, partnerships, and early childhood initiatives. Asthma care professional development combined with current interventions (e.g., collaborative learning combined with health system, primary care, and community initiatives, and expanded engagement of schools), are the focus for upcoming activities in the area. Other interventions and initiatives such as primary care health homes and home environmental assessments will further support and contribute to improving asthma outcomes and reducing costs.

**Table 4.**

Key interventions to reduce pediatric asthma risk and improve control, Highlands CACE Hub area, Missouri, October 2006 - March 2022

<i>Intervention</i>	<i>Activity Records Number</i>	<i>Participation records %</i>
<i>All</i>	<b>94</b>	<b>100</b>
<i>Teaming Up for Asthma Control and school activities</i>	<b>46</b>	<b>48.9</b>
<i>Asthma Ready Clinic Training (ARCT) and Hospitals, Physicians Asthma Care Education (PACE), and Counseling for Asthma Risk Reduction (CARR)</i>	<b>23</b>	<b>24.5</b>
<i>Childhood Asthma Linkages in Missouri (CALM), Becoming an Asthma Educator &amp; Care Manager (BAECM) and Community Outreach</i>	<b>12</b>	<b>12.8</b>
<i>Presentations / Professional Organizations / Partners</i>	<b>7</b>	<b>7.4</b>
<i>Courses – Acting on Behalf of My Child (ABC) and Asthma Control Everyday (ACE)</i>	<b>6</b>	<b>6.4</b>

Source: University of Missouri, Asthma Ready Communities (ARC). **Highlands CACE Hub** activity records.

## Community Agencies

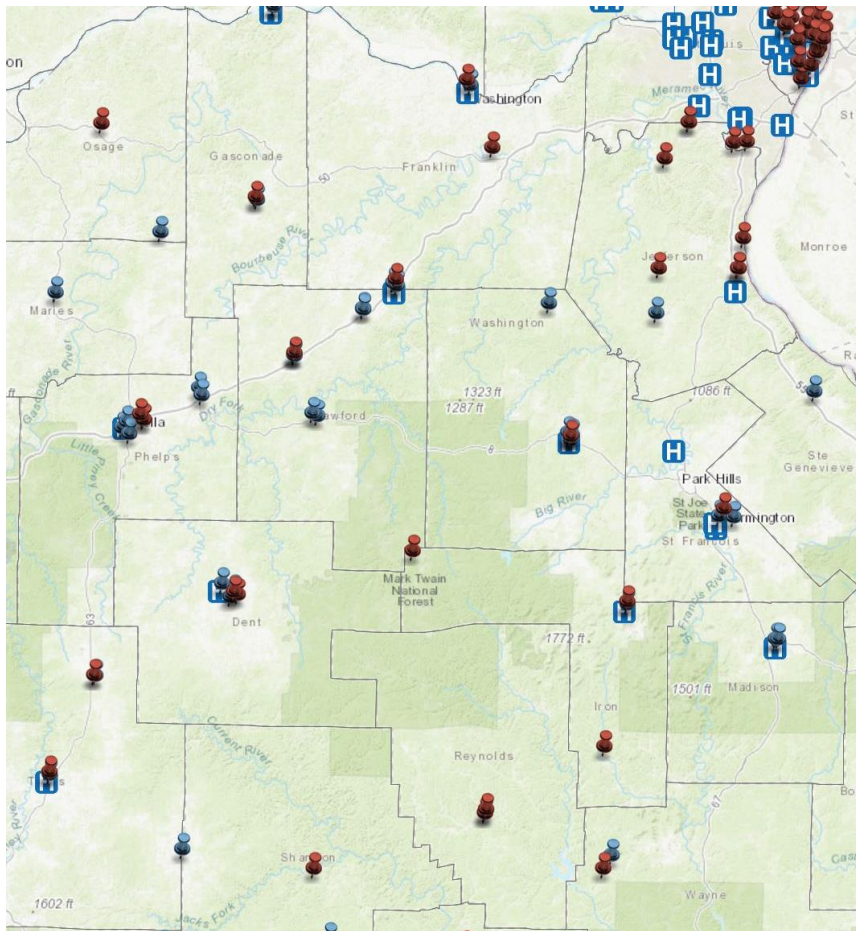
There are community resources available in the Highlands CACE Hub and neighboring areas to assist children with asthma and their families. Resources include public health systems, departments, and social services, assistance programs, planning commissions, and businesses. The following provides a sample of resources:

- Community Resource Guide – Crawford County, Children’s Mercy, provides telephone numbers for general, health, dental, hotlines, housing, utilities, childcare, and other services. <https://www.childrensmercy.org/contentassets/11ea3f3419c045bdb6b9b9f1d5544d6e/beam-comm-resources-crawford-county--ks-resource-guide.pdf>
- Franklin County Community Resource Board focuses on a system of care for children and families. <https://www.franklincountykids.org/>
- Jefferson County Community Resources Directory, Jefferson County Online Information Network (JOIN-N), provides a directory and links to community services, education, health and wellness, just for kids, churches, business, media, and others. <http://jeffersoncountyonline.org/communityservices/churches/churchhome.shtml>
- Jefferson Franklin Community Action Corporation address the causes and conditions of poverty in the counties. <https://www.jfcac.org/>
- The Community Partnership offers services and home visiting for families and young children. <https://www.thecommunitypartnership.org/>
- Iron County Resource Guide, East Missouri Action Agency, offers information regarding many community resources regarding education, employment services, personal food, clothing, and shelter, child support, health care, dental services, and mental health. <https://eastmoaction.files.wordpress.com/2012/06/iron.pdf>
- United Way 2-1-1 and East Missouri Action Agency, Inc. Iron County Outreach provides links to many services including utilities, rent assistance, home weatherization, heating and cooling, rehabilitation and education, and tax preparation assistance. <http://www.eastmoaa.org>
- Community Resources Guide, The Doe Run Company, provides information regarding local schools, historic attractions, parks, and events. [https://doerun.com/wp-content/uploads/2018/06/2018\\_June\\_Community-Resources-Guide-Final.pdf](https://doerun.com/wp-content/uploads/2018/06/2018_June_Community-Resources-Guide-Final.pdf)
- University of Missouri Extension offers consultation for community groups, disaster planning, public access computers, and environmental health services. <https://extension.missouri.edu/counties/iron/services>
- Social Services - Welcome to Salem, MO provides a wealth of resources including child care and support, housing, mental health, and senior services. [https://www.salemmo.com/city/community/social\\_services.php](https://www.salemmo.com/city/community/social_services.php)
- Dent County Resource List, Meramec Region Planning Commission, information includes substance and mental health treatment services, food and clothing, legal, medical and dental, and transportation. <https://www.meramecregion.org/wp-content/uploads/2020/04/Dent-County-Resource-List.pdf>
- Community Resource Guide, St. Francois County Community Partnership, includes all types of community resources such as food pantries, health, education, and many others. [http://sfccp.org/files/COMM\\_RESC\\_21-22\\_ONLINE\\_EDITION.pdf](http://sfccp.org/files/COMM_RESC_21-22_ONLINE_EDITION.pdf)
- The Washington County Guide offers contact information for a multitude of community groups and services. <https://washingtoncounty.guide/resources/>

# Health Systems

The health care system is comprised of primary care providers, hospitals, clinics, community health centers, public health, mental health services, school nurses, Medicaid and care management services, and community partners. Yet, most of the Highlands CACE Hub counties are designated as primary care professional shortage areas.<sup>9</sup> The Highlands CACE Hub area has several health care systems that participate in asthma interventions and activities including Mercy health system, Great Mines, Washington County Hospital, Comtrex, and Phelps County Medical Center. Locations of the Highlands hospitals, federally qualified health centers, and rural clinics are shown in Figure 10.

**Figure 10.**



Hospitals, Federally Qualified Health Centers, and Rural Clinics, Highlands CACE Hub counties, Missouri

Medical Facilities	
	Hospital Locations
	FQHC Locations
	Rural Clinic Locations

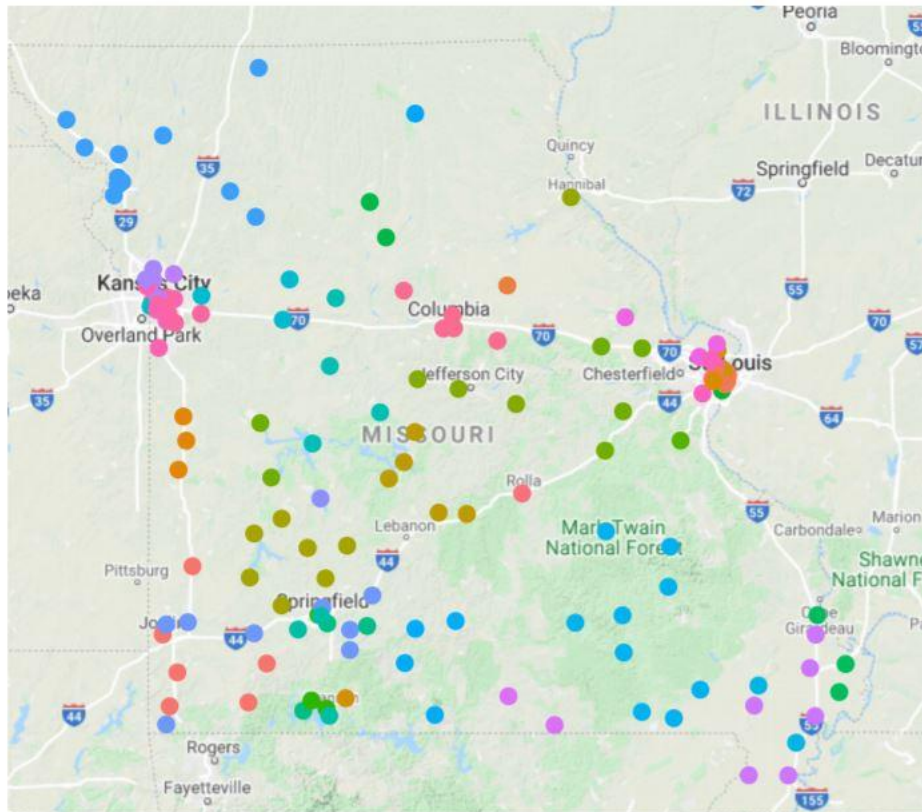
Source: Missouri Department of Health and Senior Services, Rural Health



There are Primary Care Health Home providers in the Highlands CACE Hub Area (Figure 11). Local Public Health Agencies are also located throughout the Highlands Hub.

Figure 11.

Primary Care Health Homes, Missouri



- |   |   |  |
|---|---|--|
| ● Access Family Care                          | ● Family Health Center of Boone County              | ● Ozarks Community Health Center               |
| ● Affinia Healthcare                          | ● Ferguson Medical Group St. Francis Medical Center | ● Priority Care Pediatrics LLC                 |
| ● Author Center                               | ● Fitzgibbon Hospital                               | ● Samuel U Rogers Health Center                |
| ● Bates County Memorial Hospital              | ● Fordland Clinic                                   | ● Southeast Missouri Health Network            |
| ● Betty Jean Kerr Peoples Health Centers      | ● Great Mines Health Center                         | ● Southern Missouri Community Health Center    |
| ● Bridges Medical Services                    | ● Jordan Valley Community Health Center             | ● SSM Cardinal Glennon Danis Pediatrics        |
| ● Care StL                                    | ● Katy Trail Community Health                       | ● SSM Cardinal Glennon Pediatrics              |
| ● Central Ozarks Medical Center               | ● KC Care Clinic                                    | ● SSM Internal Medicine                        |
| ● Childrens Mercy Hospital                    | ● Livewell Community Health                         | ● SSM Pediatrics                               |
| ● Citizens Memorial Healthcare                | ● Managed Care Inc.                                 | ● St. Louis County Department of Public Health |
| ● Clarity Healthcare Preferred Family Health  | ● Missouri Delta Medical Center                     | ● Swope Health Services                        |
| ● Community Health Center of Central Missouri | ● Missouri Highlands Health Care                    | ● Truman Medical Centers                       |
| ● Compass Health Wellness                     | ● Missouri Ozarks Community Health                  | ● University of Missouri Health System         |
| ● Contera Community Health                    | ● Northeast Missouri Health Council                 | ● Your Community Health Center                 |
| ● Cox Health                                  | ● Northwest Health Services                         |  |
| ● Family Care Health Centers                  | ● OCH Health System                                 |  |

Source: Missouri Primary Care Association, MO HealthNet, and Missouri Institute of Mental Health. Primary Care Health Home Progress Report 2018-2019.

## Schools

There are 47 school districts in the Highlands CACE Hub 9-county area (Figure 12).<sup>10</sup> These students are located in elementary, middle and high schools as well as preschools and technical, career, and special learning centers. Combined, the Highlands CACE Hub has more than 76,000 total students (Table 5), representing approximately 5.5% of the enrollment in public schools in Missouri.<sup>11</sup>

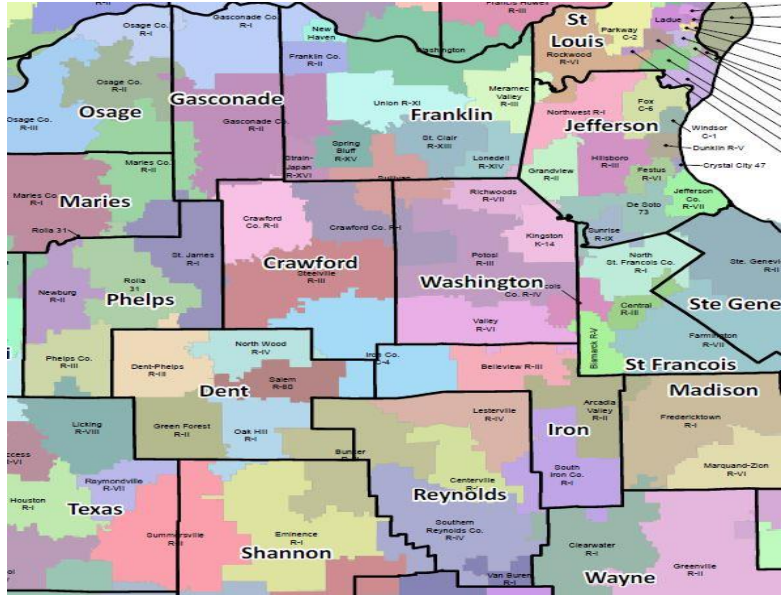


Figure 12. Highlands CACE Hub school districts, Missouri

Table 5. Highlands CACE Hub School Districts by Number of Students, Missouri

Districts		Number	Percent of Total
County	9-County Area	76,598	100.0
Jefferson	Fox C-6	11,025	14.4
Jefferson	Northwest R-1	6,119	8.0
Phelps	Rolla 31	4,111	5.4
St. Francois	Farmington R-VII	3,985	5.2
Franklin	Washington	3,849	5.0
Jefferson	Hillsboro R-III	3,291	4.3
Franklin	Union R-XI	3,216	4.2
Jefferson	Festus R-VI	3,113	4.1
Franklin	Meramec Valley R-III	3,026	4.0
Jefferson	Windsor C-I	2,994	3.9
St. Francois	North St. Francois Co. R-I	2,830	3.7
Jefferson	Desoto 73	2,604	3.4
Franklin	St. Clair R-XIII	2,232	2.9
Franklin	Sullivan	2,064	2.7
St. Francois	Central R-III	2,064	2.7
Washington	Potosi R-III	2,046	2.7
Phelps	St. James R-1	1,813	2.4
Jefferson	Dunklin R-V	1,697	2.2
Dent	Salem R-80	1,413	1.8
Crawford	Crawford Co. R-II	1,291	1.7
Jefferson	Jefferson Co. R-VII	1,047	1.4
Crawford	Steelville R-III	978	1.3
St. Francois	West St. Francois Co. R-IV	973	1.3
Franklin	Arcadia Valley R-II	953	1.2
Crawford	Crawford Co. R-1	906	1.2
Washington	Kingston K-14	873	1.1
	All Other Districts	6,085	7.9

Source: Missouri Department of Elementary and Secondary Education. School Directory April 22, 2022.

18 school districts have more than 80% of the total Highlands Hub public school student population

## Churches

There is an abundance of churches in the Highlands CACE Hub Area including Baptist, Catholic, Christian, Methodist, and many others. The location of many of the churches may be found through online search portals such as [Church Finder](#) and [Jefferson County Community Resources Directory](#). Faith-based asthma control initiatives and partnerships have the potential for a broad health impact, ranging from the individual to the community and have shown promise in improving asthma control.

The combined impact of simultaneously supporting clinicians, school nurses, and care managers while implementing effective interventions and linking with community resources (i.e., schools, churches, pharmacies, etc.) in areas with known asthma burden will likely have substantial impact and significantly improve population-level asthma control.

## Acknowledgment

This report was made possible through a collaboration of the University of Missouri – Department of Child Health and Center for Health Policy; Missouri Department of Social Services, MO HealthNet Division; Missouri Department of Health and Senior Services, Missouri Asthma Prevention and Control Program; and many partners. The following individuals made important contributions:

Sherri Homan, PhD, RN, FNP: Public Health Epidemiologist, Asthma Ready® Communities, University of Missouri: Principal, SuRE Writing LLC

Ben Francisco, PhD, PNP-BC, AE-C: Director Asthma Ready® Communities, Pediatric Nurse Practitioner, Certified Asthma Educator

Paul Foreman, PhD, MS, MA, Project Director, Asthma Ready® Communities

Tammy Rood, DNP, CPNP-PC, AE-C: Pediatric Nurse Practitioner, Certified Asthma Educator, Asthma Ready® Communities, University of Missouri

Rebecca Brown, MPA, AE-C, RRT:  
Community Asthma Coordinator, Asthma Ready® Communities, University of Missouri

Michelle Dickens, RN, FNP-C, AE-C, Family Nurse Practitioner and Certified Asthma Educator, Cox Health, Ferrell Duncan Allergy Clinic

Julie Patterson, BA, Asthma Ready Communities, University of Missouri

Eric S. Armbricht, PhD: Lead Evaluator, Missouri Asthma Prevention and Control Program; Principal, Open Health LLC

Peggy Gaddy, RRT, MBA: Missouri Asthma Prevention and Control Program Manager, Missouri Department of Health and Senior Services

## References

- <sup>1</sup> Centers for Disease Control and Prevention (CDC). Most Recent National Asthma Data. 2020 National Health Interview Survey (NHIS). Retrieved June 9, 2022 from [https://www.cdc.gov/asthma/most\\_recent\\_national\\_asthma\\_data.htm](https://www.cdc.gov/asthma/most_recent_national_asthma_data.htm)
- <sup>2</sup> CDC. Uncontrolled asthma among children, 2012-2014. Behavioral Risk Factor Surveillance System (BRFSS)—Child Asthma Call-back Survey Data, 2012-2014. Retrieved June 9, 2022, from [https://www.cdc.gov/asthma/asthma\\_stats/uncontrolled-asthma-children.htm](https://www.cdc.gov/asthma/asthma_stats/uncontrolled-asthma-children.htm)
- <sup>3</sup> Pate CA, Zahran HS, Qin X, Johnson C, Hummelman E, Malilay J. Asthma Surveillance – United States, 2006-2018. Morbidity and Mortality Weekly Report (MMWR). 2021;70(5): 1-32. [https://www.cdc.gov/mmwr/volumes/70/ss/ss7005a1.htm?s\\_cid=ss7005a1\\_w](https://www.cdc.gov/mmwr/volumes/70/ss/ss7005a1.htm?s_cid=ss7005a1_w)
- <sup>4</sup> US Census Bureau. Population and demographic estimates. Retrieved April 1, 2022, from <https://www.census.gov/data.html>
- <sup>5</sup> Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System. <https://www.cdc.gov/brfss/>
- <sup>6</sup> CDC. Behavioral Risk Factor Surveillance System, 2019. Retrieved June 10, 2022, from <https://www.cdc.gov/asthma/brfss/default.htm>
- <sup>7</sup> DHSS. Missouri Public Health Information Management System (MOPHIMS), Missouri Information for Community Assessment (MICA) - Inpatient Hospitalizations, and Environmental Public Health Tracking. Retrieved May 10, 2022, from <https://healthapps.dhss.mo.gov/MoPhims/MOPHIMSHome>
- <sup>8</sup> United States Zip Codes.org. Zip Code Maps by State. Retrieved May 30, 2022, from <https://www.unitedstateszipcodes.org/printable-zip-code-maps/>
- <sup>9</sup> Health Resources & Services Administration. Primary Care HPSA: Health Professional Shortage Area. Retrieved May 2, 2022, from <https://data.hrsa.gov/tools/shortage-area/hpsa-find>
- <sup>10</sup> Missouri Department of Elementary and Secondary Education. Missouri School Directory, 2022. Retrieved May 19, 2022 from <https://dese.mo.gov/directory>
- <sup>11</sup> Missouri Department of Elementary and Secondary Education. 2019-2020 Statistics of Missouri Public Schools. Retrieved May 28, 2022, from <https://dese.mo.gov/media/pdf/mo-school-statistics>

