



Report Highlights

- There were **9,857 emergency department visits** and **1,259 hospital admissions** related to asthma from 2016–2020.
- From 2016–2020, the average charge of an **asthma-related hospital stay** has increased from **\$10,384** to **\$15,989**.
- The month of **September** has the **highest emergency department and hospitalization burden** for asthma (**11% for each**).
- **Children aged 0–11** carry the **biggest burden** with the **highest age-specific rate of hospital admissions** (6.6 per 10,000) as well as the **second highest rate of ED visits** (24.7 per 10,000).
- **Medicaid** is the most common payer type of both **emergency department visits (43%)** and **hospital admissions (41%)**.

Montana Hospital and Emergency Department Visits for Asthma-Related Causes, 2016–2020

Asthma causes swelling in the airways, which when uncontrolled can lead to asthma attacks. Symptoms of asthma attacks are coughing, wheezing, shortness of breath, rapid breathing, and chest tightness.¹

Severe asthma attacks that result in emergency department visits share many symptoms in common with a moderate attack. Symptoms of a severe attack include: intense shortness of breath; very rapid breathing; straining chest muscles; blueish color in face, lips, or nails; gasping; confusion or exhaustion; and fainting or collapsing. However, the key difference is a severe asthma attack doesn't improve after taking rescue medication.² In 2018, asthma accounted for 178,530 admissions to the hospital and 1.6 million emergency department visits in the United States.³

While an emergency department visit for asthma can be discharged on the same day, if the symptoms remain after several hours, oxygen levels are low, or air is in the chest, hospital admission may be required.⁴ Treatment in an emergency department or hospital typically involves short-acting beta-agonists, corticosteroids, bronchodilators, or a breathing tube or oxygen in life-threatening situations.⁵

Between 2016 and 2020, 39 Montana hospitals admitted patients for asthma and 45 saw asthma patients in their emergency departments.

This report looks at the asthma-related hospitalizations and emergency department visits in Montana from 2016–2020.

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Methods

This report utilizes inpatient hospitalization and Emergency Department (ED) data for 2016-2020 from the Montana Hospital Discharge Data System (MHDDS). Records indicating asthma as the primary discharge diagnosis (by ICD-10 codes J45.0—J45.998) were included in the analysis. After filtering for patients whose primary residence was in the state of Montana, the final sample included 1,259 asthma-related inpatient records and 9,857 asthma emergency department records.

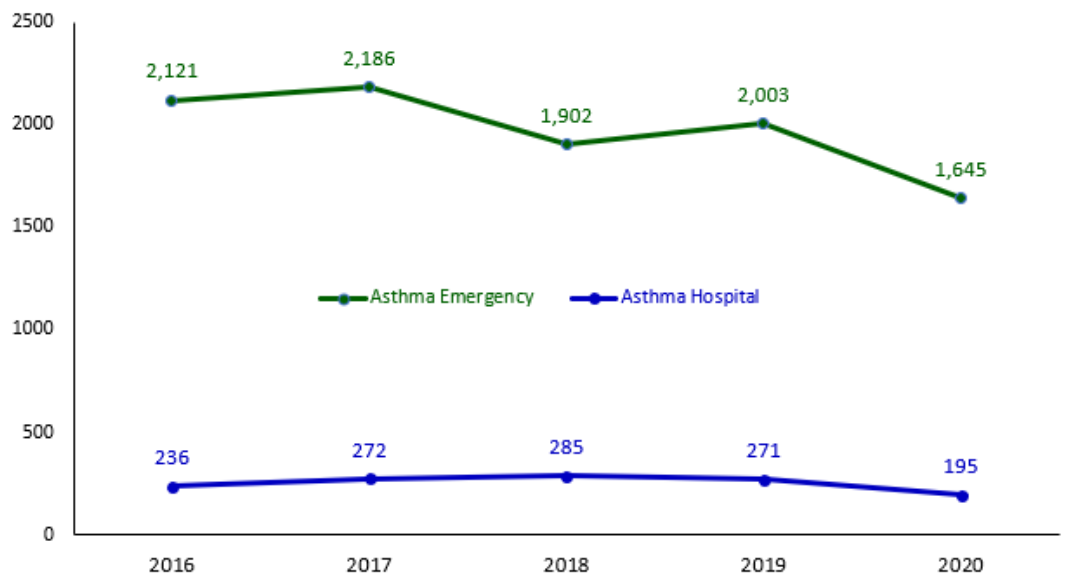
Data were classified by the date of discharge. Emergency department visits and hospital admissions were also analyzed by payer, age group, and region of residence. Age-specific rates were determined using 2019 population data alone, due to 2020 Census data not being available at the time of analysis. Counties were grouped into regions according to the 14 Chronic Disease Contracting Regions of Montana.

All analyses were performed in SAS 9.4.

Results

- On average, there were **1,971 emergency department visits** and **252 hospital admissions** related to asthma each year between 2016 and 2020 (Figure 1).
- 2020** had the **lowest** number of **both** emergency department visits and hospital admissions, at **1,645** and **195**, respectively (Figure 1).
- Hospital admissions** were **relatively consistent** except for the **strong decline in 2020**, which may be due to the influence of the COVID-19 pandemic. The number of ED visits in 2020 was 1,645 and the number of hospital admissions was 195, compared to the 2016—2019 average of 2,053 and 266, respectively. This was a **20% decrease in ED visits** and a **25% decrease in hospital admissions**. (Figure 1).

Figure 1. Number of Asthma-Related **Emergency Department Visits** and **Hospital Stays** by Year, Montana, 2016 -2020, MHDDS



Results

Table 1. Average Charge of Hospital Stay and Length of Stay, MHDDS, 2016 –2020

Year	Average Charge of Hospital Stay	Length of Stay (Days)
2016	\$10,384.00	2.31
2017	\$12,377.00	2.52
2018	\$13,034.00	2.46
2019	\$13,897.00	2.36
2020	\$15,989.00	2.50
Average	\$13,136.20	2.43

- The **average charge** of an asthma-related **hospital stay** has consistently **increased** over the past five years, for an **average charge of \$13,136** (Table 1).

Table 2. Average Charge of Emergency Department Visit, MHDDS, 2016 –2020

Year	Average Charge of Emergency Room Visit
2016	\$1,564.00
2017	\$1,685.00
2018	\$1,821.00
2019	\$2,023.00
2020	\$1,912.00
Average	\$1,801.00

- The **length of stay** has remained **between 2.31 days and 2.52 days**, with an average of 2.43 days, despite the cost increasing (Table 1).

- The **average charge** of an asthma-related **emergency department visit** also **increased** from 2016 to 2019. Then, decreased in 2020, with an **average of charge of \$1,801** (Table 2).

- September was the peak month for both asthma-related **emergency department visits** and **hospital admissions** from 2016 to 2020. Both had **11%** of the total asthma-related visits for this time period (Figures 2 and 3).
- For asthma-related **emergency department visits**, the admission burden was lowest in **July**, having only **6%** of the visits in 2016—2020 (Figure 3).
- Emergency department visits** also remained high in **October**, having another **10%** of the total visits (Figure 3).
- These trends remained consistent when analyzed by year, except for **hospital admissions** in **2020**, which had a peak instead in **August and November**, while having a dip in **April, May, and June** (MHDDS, data not shown).

Figure 2. Percent of Asthma Hospital Stays by Discharge Month, Montana, 2016 - 2020, MHDDS

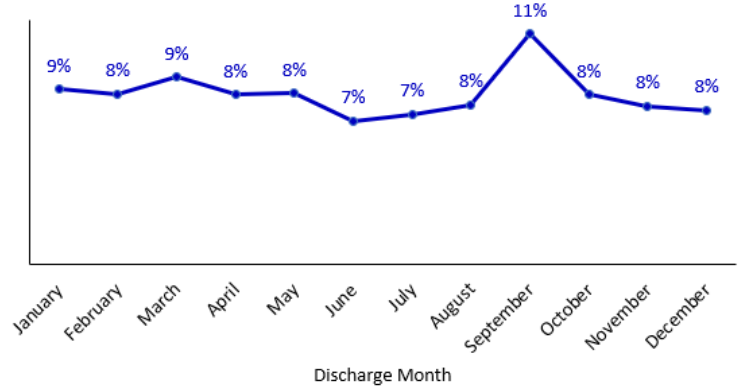


Figure 3. Percent of Asthma Emergency Department Visits by Discharge Month, Montana, 2016 - 2020, MHDDS

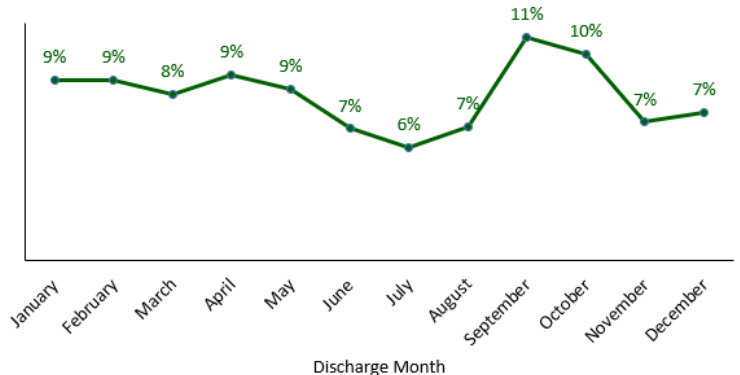
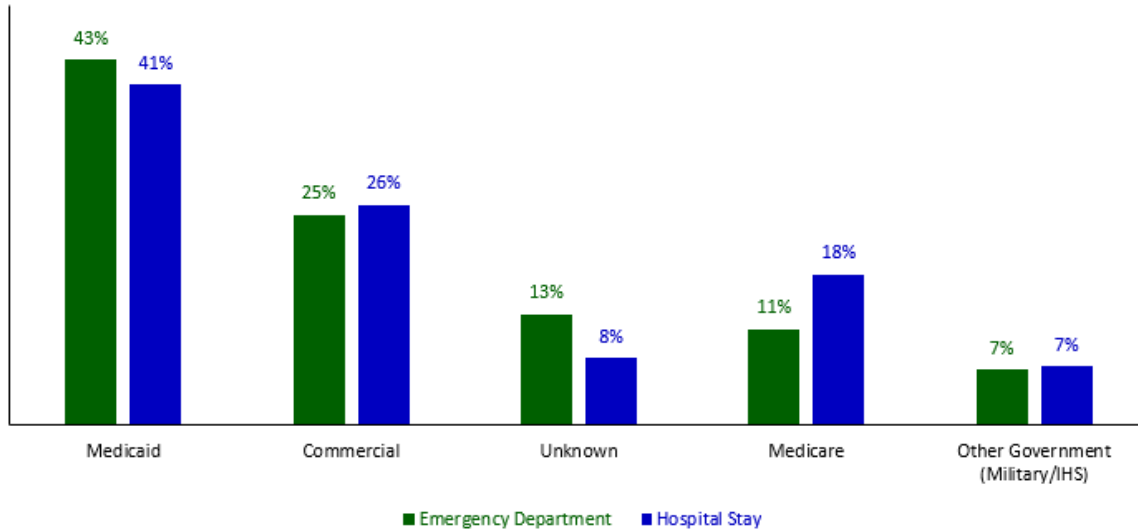




Figure 4. Asthma Emergency Department Visits and Hospital Stays by Payment Type, Montana, 2016 - 2020, MHDDS



- **Medicaid** was the **most common payer** for both **emergency department visits and hospital admissions**, at **43%** and **41%**, respectively (Figure 4).
- **Military or IHS coverage** were the least used forms of payment, at **7%** for both (Figure 3). However, this dataset does not include Veteran's Association or Indian Health Service hospitals, which creates a bias against those forms of payment.
- Other forms of payment too small to display include worker's comp, charity, or uninsured COVID cases.

Table 3. Percent of Hospital Admissions by Age Group and Rate per 10,000 , MHDDS, 2019

Age Group (Years)	N	% of Total Visits	Age-Specific Rate per 10,000
0-11	100	36.9%	6.6
12-24	30	11.1%	1.7
25-44	62	22.9%	2.3
45-64	47	17.3%	1.8
65+	32	11.8%	1.6

- Children aged **0-11 years** had the **highest rate of hospital admissions** at **6.6 visits per 10,000** in the population and the **second highest rate of emergency department visits**.

Table 4. Percent of ED Visits by Age Group and Rate per 10,000 , MHDDS, 2019

Age Group (Years)	N	% of Total Visits	Age-Specific Rate per 10,000
0-11	374	18.6%	24.7
12-24	506	25.1%	28.9
25-44	629	31.3%	23.5
45-64	349	17.3%	13.0
65+	154	7.7%	7.5

- The age group **12-24** had the **highest rate of emergency department visits** at **28.9 visits per**

10,000 in the population, but the **second lowest hospital admissions rate** of any age group.

Figure 5: Asthma-Related Emergency Department Visits per 10,000 Population by Health Region, MHDDS, 2019

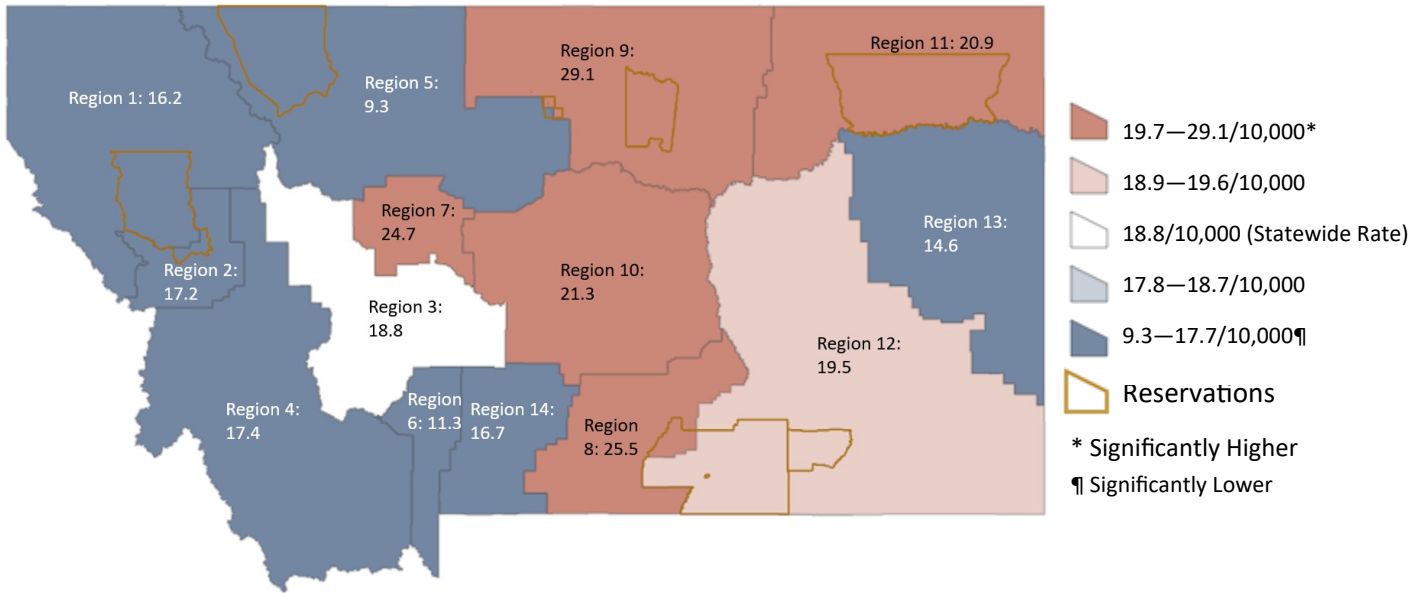
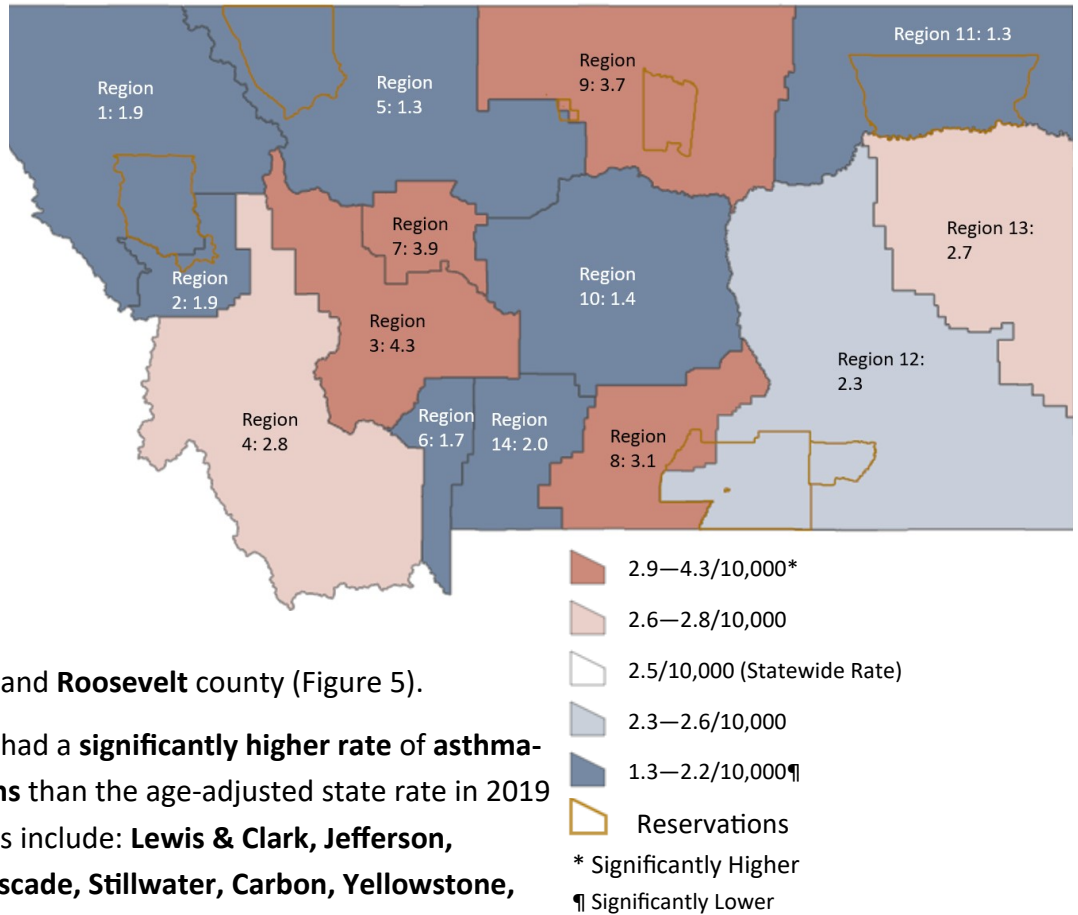


Figure 6: Asthma-Related Hospital Admissions per 10,000 Population by Health Region, MHDDS, 2019

- Regions 7, 8, 9, 10, and 11 had a significantly higher rate of asthma-related emergency department visits than the age-adjusted state rate in 2019 (18.8/10,000). These regions include: Cascade, Stillwater, Carbon, Yellowstone, Hill, Blaine, Phillips, Judith Basin, Fergus, Petroleum, Wheatland, Golden Valley, Musselshell, Valley, Daniels, Sheridan, and Roosevelt county (Figure 5).



- Regions 3, 7, 8, and 9 had had a significantly higher rate of asthma-related hospital admissions than the age-adjusted state rate in 2019 (2.5/10,000). These regions include: Lewis & Clark, Jefferson, Broadwater, Meagher, Cascade, Stillwater, Carbon, Yellowstone, Hill, Blaine, and Phillips county (Figure 6).



Discussion

- Despite the fact that the length of stay has remained relatively consistent from 2016 to 2020 (ranged from 2.3 days to 2.5 days), the average charge of an asthma-related hospital stay has increased from \$10,384 to \$15,989, which is a 54% increase.
- Consistent with previous asthma studies, the number of both asthma-related emergency department visits and hospital admissions spike in September (11% of total visits for both). However, the number of emergency department visits stay strong even in October, having another 10% of the total visits.
- Medicaid is the most common payer type of both emergency department visits (43%) and hospital admissions (41%), which is higher than the percentage of the total population that are Medicaid members in Montana, at 20.8%.⁶
- The age group 12-24 had the highest rate of emergency department visits at 28.9 visits per 10,000 in the population, but the second lowest hospital admissions rate of any age group, which may indicate the severity of asthma exacerbations which lead to an ED visit could be lower, as they do not turn into admissions.
- Similar regions had a significantly higher rate of asthma-related hospitalizations and emergency department visits (7, 8, and 9), which may indicate a greater prevalence of a lack of asthma control in those regions.

Limitations

- The MHDDS dataset contains records from hospitals and emergency departments across Montana; however, it does not contain Veteran's Administration (VA) hospitals, military hospitals, psychiatric/mental health hospitals, or Indian Health Service (IHS) hospitals; therefore, this sample likely underrepresents the populations served by those facilities.
- This dataset could not be de-duplicated, so it does not represent individuals.
- Additionally, in 2020 the admissions data may be different than other years due to the 2020 Public Health Emergency and Stay at Home directive, which was in effect from March 28th 2020 to April 25th 2020.



Clinical Recommendations

- Well-controlled asthma is the best preventative measure against asthma-related emergency department visits or hospital admissions. Appropriate rescue and controller medication, knowledge of triggers, and going to regular asthma checkups are all steps to well-controlled asthma.
- Recall patients every six months for an asthma checkup to prevent emergency department visits or hospital admissions.
- Assess patients' asthma control before September starts and review any asthma triggers common in autumn, such as allergies, an increase in germs that cause colds and flus, or exposure to wildfire smoke.
- Providers may have an opportunity for offering patients telehealth for preventative care, including asthma control. Telehealth has many benefits, including reduction of travel time, less risk of contracting or spreading COVID and other infectious diseases, and the convenience of healthcare from inside the home.

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Citations

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