



BURDEN REPORT: AN OVERVIEW OF ASTHMA IN MONTANA

Contact:

Mary Duthie – Epidemiologist (406) 444-7304

Asthma Program Staff:

Jessie Fernandes—Section Supervisor

Jennifer Van Syckle—QI Coordinator BJ

Biskupiak—Program Manager

Ann Lanes—Data Analyst

Carolyn Linden—Administrative Assistant

Mary Duthie – Epidemiologist

Introduction

Asthma is a common chronic respiratory condition, which causes repeated episodes of wheezing, breathlessness, chest tightness, and nighttime or early morning coughing. Asthma affects over 100,000 people in Montana and caused over 2,000 emergency department (ED) visits and 459 hospital stays in 2018.^[1]

The Montana Asthma Control Program (MACP) is committed to addressing the public health concern of asthma. In 2007, the MACP was created with support and funding from the State of Montana, and since 2009, the MACP has been awarded five-year grants from the Centers for Disease Control and Prevention (CDC) to support asthma control efforts in Montana with additional funding from the Montana State Legislature. The MACP is responsible for Montana's asthma surveillance, as well as implementing evidence-based interventions to improve asthma control and prevention. The MACP's goals are created and acted upon through a collaborative process involving several asthma control partners from the Montana Asthma Advisory Groups (MAAG).

Montana has many unique characteristics that require diverse interventions to promote asthma control. These include:

- **Population Density:** The total population of Montana was estimated to be just over one million residents in 2019. This gives an estimated population density of 7.3 persons per square mile.^[2]
- **Metro/Micropolitan/Rural Counties:** In 2020, five of Montana's counties were defined as metropolitan (population: 50,000+), and five were micropolitan (population: 10,000 -- 50,000 inhabitants). The remaining 46 counties were considered rural (population: <10,000).^[3]
- **Reservations:** There are seven American Indian reservations and 12 tribes in Montana. Each reservation has a sovereign tribal government, and its own healthcare system. American Indian/Alaskan Natives comprise 6.7% of the population and are the second largest racial group in Montana.^[2]

Health Disparities Related to Asthma:

Race/Ethnicity: American Indian/Alaska Native children have higher prevalence of asthma compared to white, non-Hispanic children.^[4]

Household Income: Asthma prevalence is higher among Montanans with lower household income. In 2019, Montana's median household income was about \$57,000, which is more than 12% lower than the US median of \$65,000.^[5]

Overweight and Obese: Persons categorized as overweight or obese, according to their Body Mass Index (BMI), have a higher risk of developing asthma compared to those in the normal weight BMI category, as well as a greater risk of increased symptoms.^[6] About 65% of the adult population in Montana was categorized as overweight or obese in 2019.^[7]

Smoking: Tobacco smoke is a common trigger for asthma and can increase current symptoms.^[8] About 17% of adults in Montana were current smokers in 2019. There was also a large racial disparity observed. Among white, non-Hispanic adults, 15% reported currently smoking, compared to 41% of American Indian/Alaska Native adults.^[7]

Air Quality: There are significant associations between wildfire smoke and exacerbations of asthma.^[9] In 2019, Montana experienced 1,474 wildfires across the state.^[10] Additionally, ten of the thirteen U.S. Environmental Protection Agency's Air Quality Systems in Montana received an "F" grade for particle pollution by the American Lung Association (ALA).^[11]

This report describes the prevalence of current asthma among adults and children by demographic characteristics and by geographic regions, as well as the prevalence of common asthma symptoms and the prevalence of select healthcare outcomes among those with controlled and uncontrolled asthma. This report is the first of several reports which aim to comprehensively review of the current state of asthma in Montana. Follow-up reports will describe asthma-related mortality, asthma-related emergency department visits, and asthma triggers and self-management education.

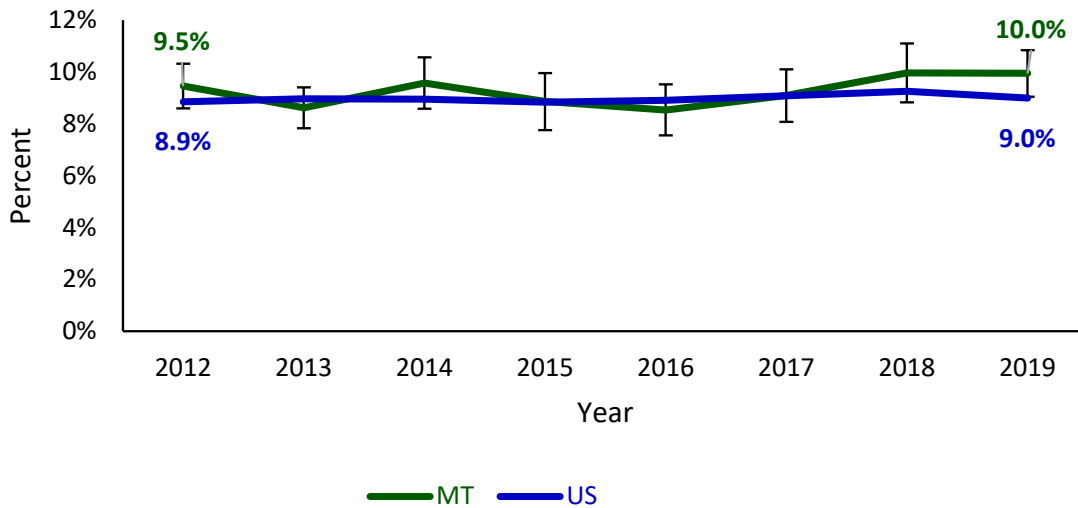
Methods

Data from the Montana Behavioral Risk Factor Surveillance System (BRFSS) for years 2012–2019 were analyzed to describe asthma prevalence overall and by demographic characteristics. The Asthma Callback Survey (ACBS) for years 2013–2017 was used to identify respondents with well-controlled and uncontrolled asthma and to describe select asthma health outcomes by level of control. The BRFSS and ACBS are telephone surveys of non-institutionalized adults aged 18 years and older. BRFSS respondents that report having current asthma are asked if they would like to participate in the ACBS. Current asthma was defined as a respondent reporting that a health care professional has ever told them they have asthma and then reporting that they still have asthma. Multiple Logistic Regression was used to calculate odds ratios (the probability of disease given an exposure to a specific factor in one group compared to another group). This was used to determine the odds of select risk factors for asthma as determined by literature.

Asthma among Montana Adults

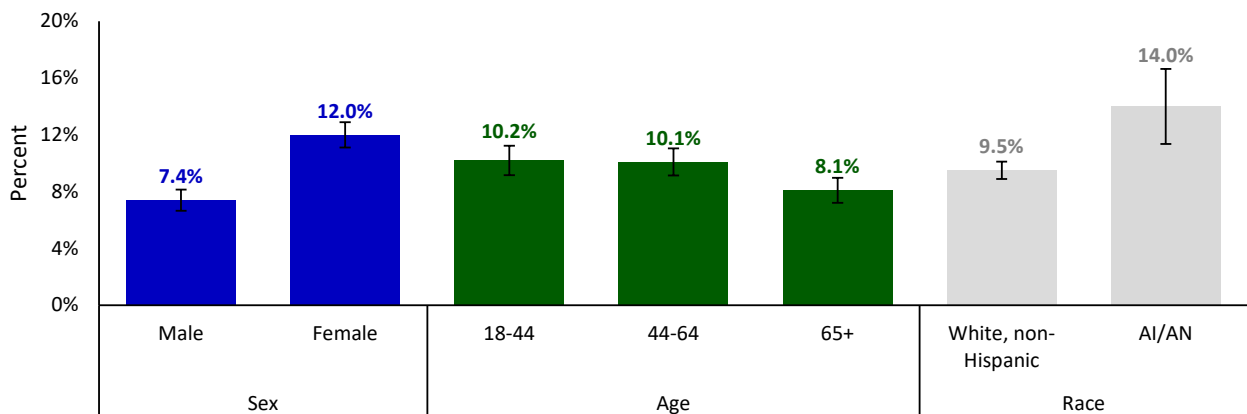
In 2019, approximately 10.0% of Montana adults reported having current asthma which was similar to the U.S. (9.0%) (Figure 1). The prevalence of asthma among Montana adults did not change significantly between 2012 and 2019 (Figure 1).

Figure 1. Percent of Adults with Current Asthma by Year, Montana & US, BRFSS, 2012-2019



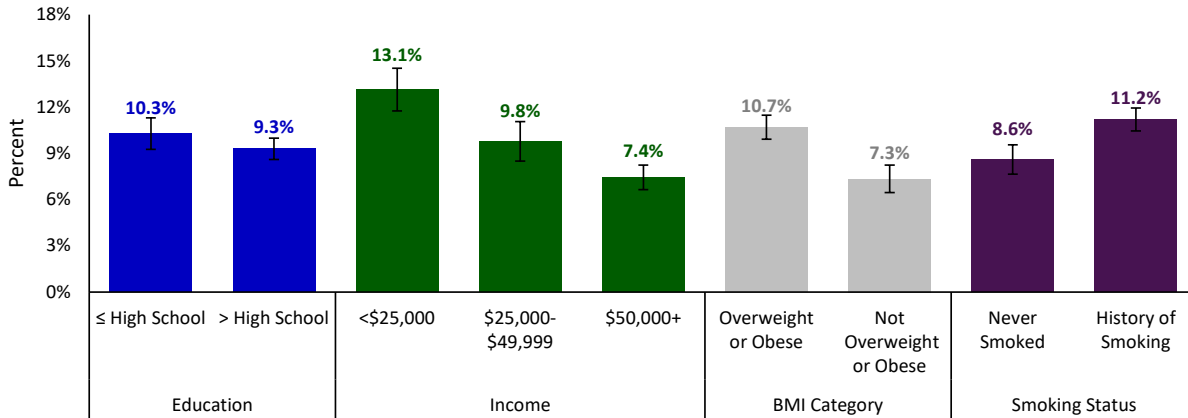
The prevalence of asthma was significantly higher among adult females compared to males and among younger adults (aged 18-44 years) compared to older adults (aged 65+). There was no significant difference among other age groups. Furthermore, American Indian or Alaska Native (AI/AN) adults had a significantly higher prevalence of asthma compared to white, non-Hispanic adults (Figure 2).

Figure 2. Percent of Adults with Current Asthma by Sex, Age, and Race, Montana, BRFSS, 2015-2019



Adults with lower household income, a BMI in the overweight or obese category, or a history of smoking experienced significantly higher prevalence of asthma than those of higher household income, a BMI not in the overweight or obese category, and no history of smoking, respectively (Figure 3).

Figure 3. Percent of Adults with Current Asthma by Education Attainment, Income, BMI, and Smoking History, Montana, BFRSS, 2015-2019



There are many established factors that can significantly influence the odds of currently having asthma, including sex, race, age, educational attainment, household income, BMI category, and a history of smoking (history of smoking defined as a respondent who reported being a current or previous smoker). After adjusting for these factors, the odds of current asthma were higher among females, American Indians/Alaska Natives, adults less than 65 years of age, adults with an annual household income of less than \$25,000, adults with an overweight or obese BMI, and adults with a history of smoking (Table 1).

Table 1. Factors Associated with Montana Adults Having Current Asthma, Montana, BRFSS, 2015-2019

	With Asthma n [unweighted] (%)	Without Asthma n [unweighted] (%)	Adjusted Odds Ratio	95% Confidence Interval
Sex				
Male	575 (7.4%)	7,697 (92.6%)	1.0 (reference)	
Female	1,072 (12.0%)	8,272 (88.0%)	1.70	1.48-1.95 [†]
Race				
White, non-Hispanic	1,349 (9.5%)	13,600 (90.5%)	1.0 (reference)	
American Indian/Alaska Native	232 (14.0%)	1,645 (86.0%)	1.56	1.24-1.96 [†]
Age				
Age 18-44 Years	490 (10.2%)	4,286 (89.8%)	1.29	1.10-1.52 [†]
Age 45-64 Years	626 (10.1%)	5,485 (89.9%)	1.26	1.07-1.48 [†]
Age ≥ 65 Years	531 (8.1%)	6,067 (91.9%)	1.0 (reference)	
Education				
High School Degree or Less	580 (10.3%)	5,400 (89.7%)	1.12	0.97-1.29
More than High School Degree	1,067 (9.3%)	10,438 (90.7%)	1.0 (reference)	
Annual Household Income				
Income <\$25,000	530 (13.1%)	3,495 (86.9%)	1.88	1.59-2.22 [†]

	With Asthma n [unweighted] (%)	Without Asthma n [unweighted] (%)	Adjusted Odds Ratio	95% Confidence Interval
Income \$25,000-\$49,999	365 (9.8%)	3,691 (90.2%)	1.35	1.12-1.62 [†]
Income ≥ \$50,000	478 (7.4%)	6,044 (92.6%)	1.0 (reference)	
BMI Category				
Not Overweight or Obese	401 (7.3%)	4,989 (92.7%)	1.0 (reference)	
Overweight or Obese	1,096 (10.7%)	9,773 (89.3%)	1.51	1.30-1.77 [†]
Smoking History				
History of Smoking	814 (11.2%)	6,892 (88.8%)	1.33	1.16-1.52 [†]
No History of Smoking	798 (8.6%)	8,550 (91.4%)	1.0 (reference)	

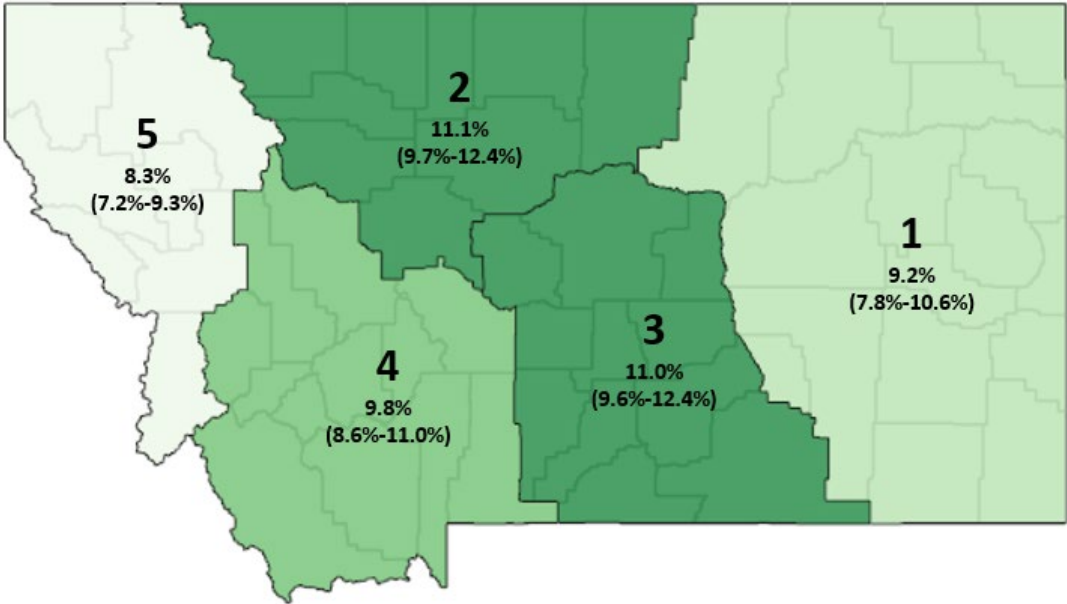
**Adjusted for other categories listed*

† Statistically different from reference category sex, race, age, educational attainment, household income, BMI category, and a history of smoking

Asthma by geographic region

The state of Montana is divided into five Health Planning Regions. Health Planning Region 5, in the northwest corner of Montana, had the lowest asthma prevalence and was significantly lower than Health Planning Regions 2 and 3. There were no other significant differences in adult asthma prevalence among health regions (Figure 4).

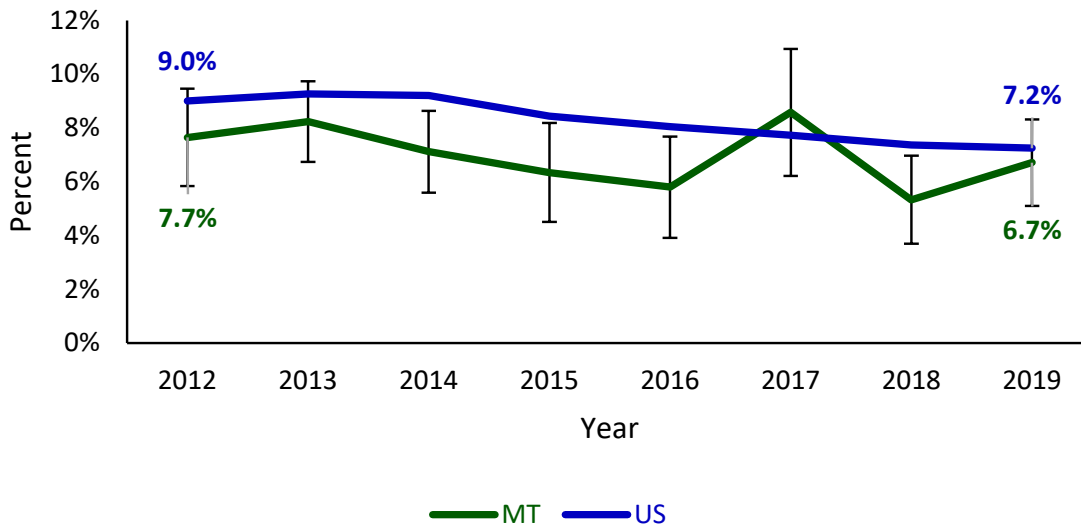
Figure 4. Asthma Prevalence by Health Planning Region, Montana, BRFSS, 2015-2019



Asthma among Montana Children

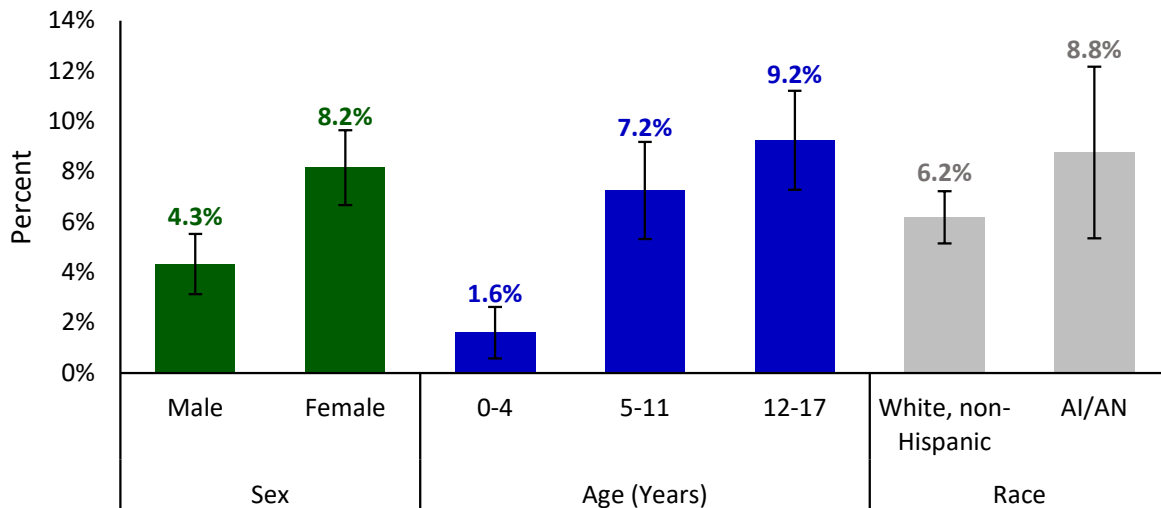
In 2019, 6.7% (approximately 15,000) of Montana children had current asthma. Much like the asthma prevalence among adults, the prevalence of asthma among children (those less than 18 years of age) remained unchanged between the years of 2012 and 2019. Montana’s childhood asthma prevalence was significantly lower than that of the US from 2014 – 2016, and again in 2018 (Figure 5).

Figure 5. Percent of Children Who Have Current Asthma, by Year, Montana & US, BRFSS, 2012-2019



In Montana, female children have a significantly higher prevalence of asthma than male children. Additionally, children have a significantly lower prevalence of asthma between birth and four years of age, possibly due to most children not receiving a diagnosis of asthma until they reach the age of five. Unlike adults, there was no significant difference in asthma prevalence for children by race/ethnicity in Montana (Figure 6).

Figure 6. Percent of Children with Current Asthma by Sex, Age, and Race, Montana, BRFSS, 2015-2019

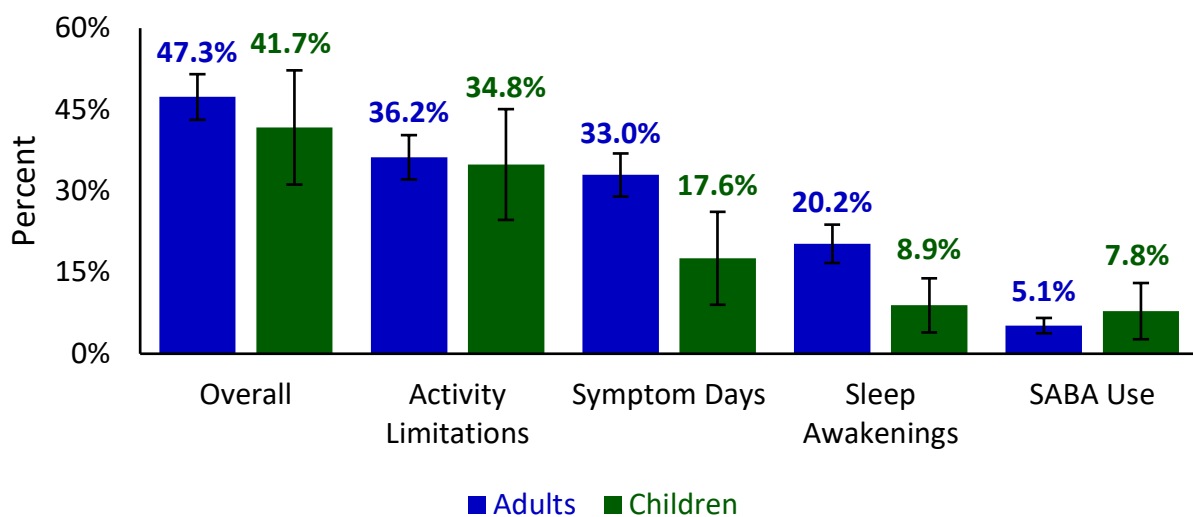


Asthma Control and Symptoms

Asthma control levels (well controlled, not well controlled, or poorly controlled) are defined as how well symptoms of asthma are mitigated by various interventions.^[12] The CDC definition of well-controlled asthma, used in this report, is based on several indicators: less than two days of symptoms per week, less than two times of waking up due to asthma in the last month, no limited activities due to asthma in the last month, and limited use of Short-Acting Beta Agonist (SABA) medication—aside from pre-exercise.

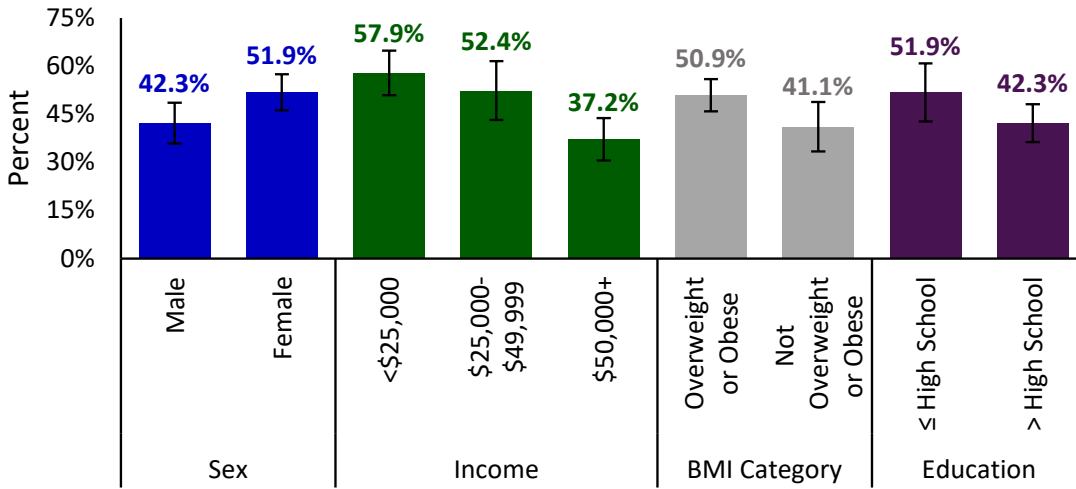
Figure 7 shows the percent of Montana adults and children with uncontrolled asthma. Uncontrolled asthma is either not well or very poorly controlled, which includes those with greater than two days of symptoms per week, at least two sleep awakenings due to asthma in the last month, limited activities due to asthma in the last month, and use of SABA medication. “Overall” was defined as having uncontrolled asthma for one or more symptom(s). Nearly half of adults (47.3%) and two in five children (41.7%) with asthma reported experiencing overall, uncontrolled asthma. Activity limitations and the number of days with symptoms were the most reported symptoms among adults and children with uncontrolled asthma.

Figure 7. Percent of **Adults** and **Children** with Uncontrolled Asthma, by Symptom and Overall, Montana, ACBS, 2013-2017



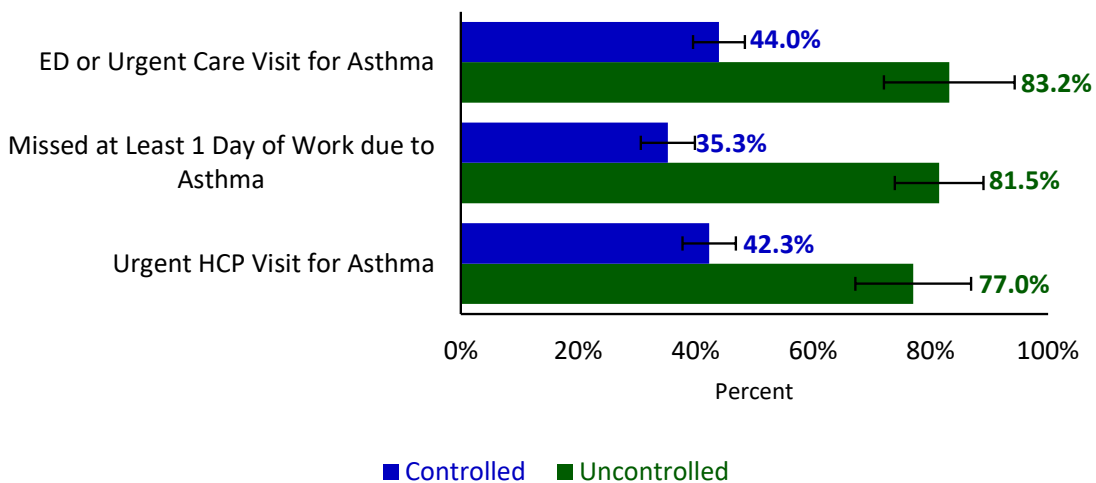
Adults with an annual household income less than \$25,000 reported a significantly higher prevalence of uncontrolled asthma than those with an annual household income of greater than \$50,000 (57.9% and 37.2%, respectively; Figure 8). There were no significant differences in the prevalence of uncontrolled asthma by sex, BMI category, or education.

Figure 8. Percent of Adults with Uncontrolled Asthma by Sex, Income, BMI, and Educational Attainment, Montana, ACBS, 2013-2017



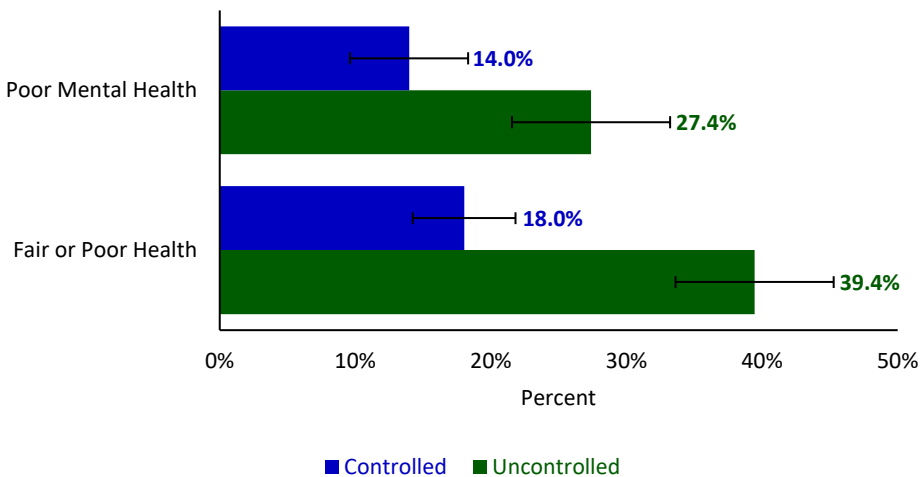
Adults with uncontrolled asthma reported a higher prevalence of urgent visits to a healthcare provider (HCP) for their asthma, missing at least one day of work in the last 12 months due to asthma, and having ED or urgent care visits for asthma in the last 12 months compared to those with well-controlled asthma (Figure 9).

Figure 9. Prevalence of Select Health Outcomes in the Last 12 Months among Adults with Current Asthma, by Asthma Control Status, Montana, ACBS, 2013-2017



Nearly four in ten adults (39.7%) with uncontrolled asthma reported poor physical health and over one-quarter (27.4%) reported poor mental health (Figure 10). The prevalence of poor mental health (such as stress, depression, and problems with emotions) and physical health (physical illness and injury) was significantly higher for Montana adults with uncontrolled asthma than for those with controlled asthma.

Figure 10. Prevalence of Poor Mental and Physical Health among Adults with Current Asthma, by Asthma Control Status, Montana, ACBS, 2013-2017



Conclusion

The prevalence of current asthma remains consistent for both adults and children within the past eight years. There are several demographic categories which have a documented greater asthma prevalence in Montana, such as females, American Indian/Alaskan Natives, younger age groups (less than 65 years of age), those in a lower income bracket (<\$25,000), those who fall into the overweight/obese BMI category, and those with a history of smoking. Additionally, activity limitation is the most common symptom of uncontrolled asthma among those with current asthma, and uncontrolled asthma is significantly higher in those with a low household income. Finally, those with uncontrolled asthma have a significantly higher prevalence of healthcare visits, poor mental health, and poor physical health.

Recommendations for Providers

- Target patient education efforts around groups with higher asthma prevalence to ensure they know about their disease and are empowered to manage it
- Provide patient self-management education at multiple points of care
- Discuss and develop an asthma action plan with your pediatric asthmatic patients
- Encourage patients to keep up on their vaccinations and health screenings to optimize their overall health

- Utilize resources provided by the MACP such as:
 - [The Montana Asthma Home Visiting Program](#) for patients with uncontrolled asthma
 - [Continuing education credits for healthcare professionals](#)
 - [Other asthma resources](#)

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