



Emergency Department Utilization Among Montanans, 2019-2020

Key Findings

- Total number of ED visits declined 10.7 percent in 2020 as compared to 2019, with the most drastic proportional decline (32.8%) occurring after the State of Emergency declaration on March 12, 2020.
- Montana's youngest populations had the largest declines in ED utilization with infants less than one year old decreasing 32 percent during 2020.
- ED visits for acute or more emergent conditions declined in 2020 compared to 2019.
- Visits for exposure, encounters, screening or contact with infectious disease, mental health and substance use disorders demonstrated proportional increases compared to 2019.
- Significant declines of ED utilization were observed across all parts of the state, but the most rural Montanan's ED visits remained higher than residents of micropolitan or small metropolitan areas.

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Introduction

On March 12, 2020, Montana's Governor issued a State of Emergency related to coronavirus disease 2019, also known as, COVID-19. To slow the spread of COVID-19, the Centers for Disease Control and Prevention (CDC) issued guidance to the public and healthcare providers regarding the use of telehealth services. ¹ These recommendations included implementing or offering virtual or telehealth services to maintain social distancing policies to prevent patients from visiting the emergency room for non-urgent conditions. As such, several states and major cities witnessed steep declines of visits to the emergency department during 2020.^{2,3}

This report summarizes emergency department (ED) utilization among Montanans during 2020 compared to ED visits in 2019 in order to understand how the COVID-19 pandemic may have altered ED utilization in Montana across demographic and geographic indicators.

Methods

ED visit data came from the Montana Hospital Discharge System (MHDDS) for years 2019 and 2020, which contains annual datasets using hospital discharge data elements, based on the Uniform Billing 2004 form. MHDDS data are provided courtesy of participating Montana Hospital Association (MHA) members and represents approximately 85% of annual in-patient and out-patient discharges in Montana. Emergency Department data in this report represent unique ED visits and does not represent individual cases since the MHDDS does not contain personal identifiers, and therefore, cannot be deduplicated.

Records with unknown or missing sex or age and non-Montana residents were excluded from the analysis (n=13,246). A total of 298,324 ED visits in 2019 and 266,348 ED visits in 2020 were included for analysis. To assess the annual trend, weekly number of ED visits between January 1, 2020 through December 31, 2020, were analyzed and compared to the same time period in 2019. In addition, the demographic characteristics of patients were compared between 2019 and 2020 and percent change was calculated to determine differences of ED utilization by gender, urban-rural classification, and age group.

For diagnosis-specific analyses, the patient's primary diagnosis code was analyzed. ED records for this analysis were coded to the *International*

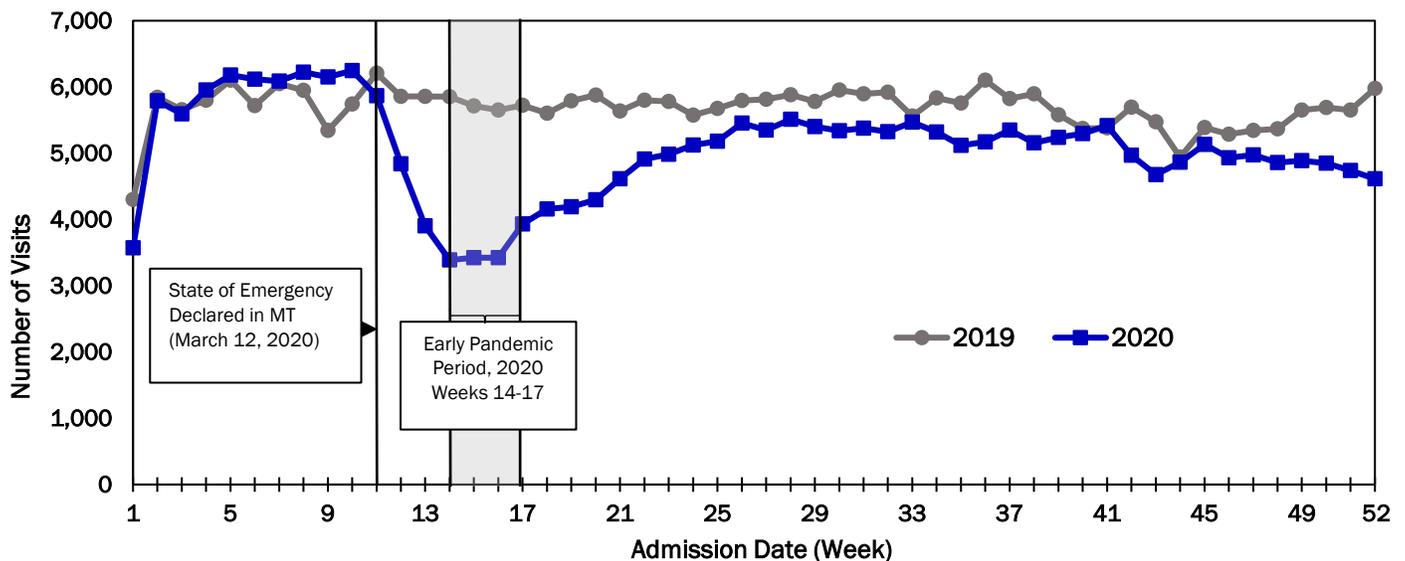
Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM). The unique ICD-10-CM codes were then categorized into clinically meaningful groups using the Clinical Classifications Software Refined Tool, available from the Healthcare Cost and Utilization Project.⁴

Numbers, percentages, and age-adjusted rates by demographic characteristics were calculated and reported. Patient’s county of residence was classified by the corresponding urban-rural designation using the 2013 National Center for Health Statistics (NCHS) Urban-Rural Classification Scheme for Counties: small metro (population 50,000 to 250,000), micropolitan (population 10,000 to 49,999), and noncore (population less than 10,000).⁵ Age-adjusted rates were calculated using a direct method, with NCHS 2020 bridged-race postcensal population estimates and age-adjustment weights based on the 2000 US standard population.^{6,7} Age-specific rates were calculated for ED visits by age category using the same method. Data were analyzed using SAS software, version 14.1 (SAS Institute Inc., Cary, NC).

Results

In 2020, there were a total of 266,348 ED visits throughout Montana, resulting in a nearly 11 percent overall decline when compared to the number of ED visits in 2019 (n=298,324). Figure 1 shows ED visits in the first quarter of 2020 (weeks 2-9) met or exceeded the number of visits in 2019; however, after the declaration of State of Emergency in Montana on March 12, 2020 (during week 11), visits to the ED declined more than 17 percent. Weeks 14 through 17 have been nationally defined as the “early pandemic period”² When comparing the number of ED visits in Montana from weeks 11, when the State of Emergency was declared, through 17 for 2019 to 2020, there was a 32.8 percent decrease. The most noticeable overall reduction of ED visits persisted through week 26 when the gap between began to narrow. Despite the narrowing, the number of ED visits in 2020 remained consistently lower than 2019 throughout the remainder of the year.

Figure 1. Emergency Department visits by week in Montana among Montana residents, 2019 and 2020.



Source: Montana Hospital Discharge Data System, 2019-2020.

Table 1 presents the ED utilization by patient demographic characteristics among Montana residents for data years 2019 and 2020. Historically, females in Montana utilize the ED at higher rates than their male counterparts; however, in 2020, females showed a more sizeable decrease in ED utilization compared to males, at 13.2 percent and 11.4 percent, respectively.

ED utilization between the two years varied considerably by the urban-rural composition of the patient’s county of residence. Montanans living in micropolitan and small metropolitan areas of the state reduced their ED visits in 2020 compared to 2019, with age-adjusted rates declining 13.7 and 12.5 percent, respectively (Table 1). Conversely, ED utilization among residents of more rural parts of the state, also referred to as “noncore,” declined less than 8 percent in 2020 as compared to 2019. The reductions of ED visits among all three urban-rural county compositions were statistically significantly different between 2019 and 2020.

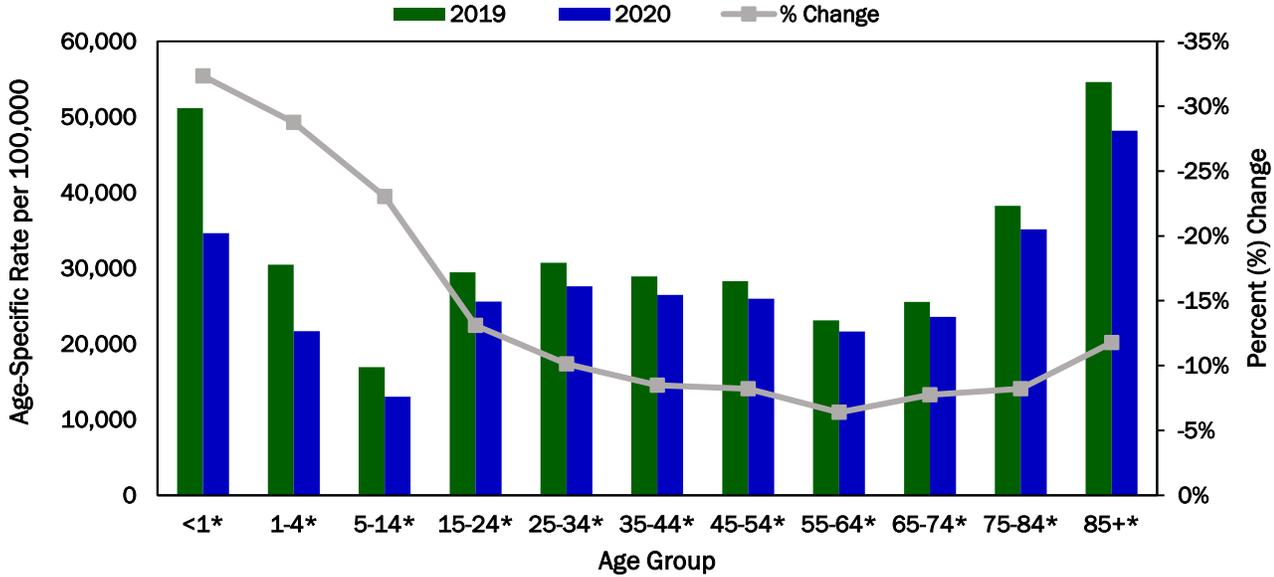
Table 1. Age-adjusted rate per 100,000 population of Emergency Department visits by demographic and geographic characteristics, Montana residents, 2019 and 2020.

	2019		2020		Annual Percent Change (+/-)	Statistically significant
	N	Age-Adjusted Rate (95% Confidence Intervals)	N	Age-Adjusted Rate (95% Confidence Intervals)		
Montana Residents	298,324	26,691.6 (26,587.6-26,765.7)	266,348	24,451.6 (24,355.4-24,547.9)	-8.4%	Yes
Sex						
Female	119,000	30,280.7 (30,126.2-30,435.3)	98,733	26,271.0 (26,128.0-26,414.0)	-13.2%	Yes
Male	106,486	25,709.1 (25,569.8-25,848.3)	90,217	22,787.5 (22,657.5-22,917.5)	-11.4%	Yes
County of residence (Urban-Rural classification)						
Small metro	179,175	27,582.2 (27,451.4-27,713.1)	159,929	24,134.3 (24,013.0-24,255.6)	-12.5%	Yes
Micropolitan	88,481	33,099.0 (32,869.1-33,328.9)	77,508	28,567.8 (28,355.1-28,780.5)	-13.7%	Yes
Noncore	30,668	19,877.0 (19,638.4-20,115.6)	28,911	18,378.8 (18,150.5-18,607.0)	-7.5%	Yes

ED Utilization by Age Groups

Age-specific rates of ED visits were calculated for each year and demonstrated statistically significant decreases across all age groups between 2019 and 2020 (Figure 2). Montana’s pediatric population (aged 0-14 years) experienced the largest proportional declines of ED visits among all age groups. ED visits among infants less than one year old declined 32.3 percent, followed by children ages one through four years (28.7 percent). Among adults, the largest proportional decline in ED visits were among Montanan’s aged 85 years and older (11.8 percent). Adults aged 35-44 years old experienced the smallest decrease in ED utilization, with an age-specific rate of 23,125.9 per 100,000 in 2019 and 21,648.7 per 100,000 in 2020, resulting in a less than a 7 percent decline between the two years.

Figure 2. Age-specific rates and percent change per 100,000 population of Emergency Department visits by age group, Montana residents, 2019 and 2020



Source: Montana Hospital Discharge Data System, 2019-2020.
 *Statistically significant at 95% confidence interval.

ED Visits by Major Diagnostic Categories

Prevalence ratios (PR) were calculated to compare the difference of ED visits by diagnostic category between 2019 and 2020 (Table 3). A PR greater or equal to one indicate a higher prevalence of the diagnosis in 2020 as compared to 2019. Alternatively, a PR less than one indicates a decline in prevalence in 2020 as compared to 2019. As displayed in Table 3, the diagnostic category with the greatest and statistically significant proportional increase of ED visits, was for “exposure, encounters, screening or contact with infectious disease” which demonstrated a 264 percent increase in

2020 as compared to 2019 (PR=3.64). The second highest increase of ED visits were for internal injuries (PR=1.33). Substance use and mental health disorders visits were higher in 2020 than 2019, including stimulant related disorders (PR=1.30), suicidal ideation/attempt/self-harm (PR=1.17), and alcohol-related disorders (PR=1.14). Additionally, ED visits for cerebral infarction (stroke), viral infection (PR=1.16), respiratory signs and symptoms (PR=1.15), fracture of the upper limb (PR=1.10), and essential hypertension (PR=1.08) were more prevalent in 2020 as compared to 2019.

Table 3. Frequency of ED visits by primary diagnosis, Clinical Classification Software Refined Tool (HCUP), 2019 compared to 2020

HIGHEST PREVALENCE RATIOS				
DIAGNOSTIC CATEGORY	TOTAL COUNT OF VISITS		ABSOLUTE CHANGE BETWEEN 2019 AND 2020 (+/-)	PREVALENCE RATIOS (PR) (95% CI)
	2019	2020		
<i>Exposure, encounters, screening or contact with infectious disease</i>	275	894	+619	3.64 (3.18 - 4.12)
<i>Internal organ injury, initial encounter</i>	178	211	+33	1.33 (1.09 - 1.62)
<i>Stimulant-related disorders</i>	606	702	+96	1.30 (1.16 - 1.45)
<i>Cerebral infarction</i>	502	560	+58	1.25 (1.11 - 1.41)
<i>Suicidal ideation/attempt/intentional self-harm</i>	2,277	2,387	+110	1.17 (1.11 - 1.24)
<i>Viral infection</i>	2,994	3,089	+95	1.16 (1.10 - 1.21)
<i>Respiratory signs and symptoms</i>	6,734	6,917	+183	1.15 (1.11 - 1.19)
<i>Alcohol-related disorders</i>	5,648	5,757	+109	1.14 (1.10 - 1.18)
<i>Fracture of the upper limb, initial encounter</i>	4,658	4,564	+94	1.10 (1.05 - 1.14)
<i>Essential hypertension</i>	1,409	1,357	+52	1.08 (1.00 - 1.16)
LOWEST PREVALENCE RATIOS				
DIAGNOSTIC CATEGORY	TOTAL COUNT OF VISITS		ABSOLUTE CHANGE BETWEEN 2019 AND 2020	PREVALENCE RATIOS (PR) (95% CI)
	2019	2020		
<i>Acute bronchitis</i>	3,227	1,844	-1,383	0.64 (0.61 - 0.68)
<i>Intestinal infection</i>	842	486	-356	0.65 (0.58 - 0.72)
<i>Sinusitis</i>	1,164	679	-485	0.65 (0.59 - 0.72)
<i>Otitis media</i>	2,891	1,705	-1,186	0.66 (0.62 - 0.70)
<i>Cornea and external disease</i>	1,428	932	-496	0.73 (0.67 - 0.79)
<i>External cause codes: bites; initial encounter</i>	655	435	-220	0.74 (0.66 - 0.84)
<i>Chronic obstructive pulmonary disease and bronchiectasis</i>	2,545	1,802	-743	0.79 (0.75 - 0.84)
<i>Upper Respiratory Infections</i>	9,416	6,811	-2,605	0.81 (0.79 - 0.84)
<i>Allergic reactions</i>	2,966	2,170	-796	0.82 (0.78 - 0.87)
<i>Headache: including migraine</i>	7,421	5,637	-1,784	0.85 (0.82 - 0.88)
Ratio calculated as the proportion of all ED visits in each diagnostic category in 2020, divided by the proportion of ED visits in the diagnostic category during 2019.				
Ratios > 1 indicate a higher proportion of visits in that category during 2020 than 2019; ratios <1 indicate a lower proportion during 2020 than 2019.				
Top 10 highest and lowest prevalence ratios displayed.				
ED visits were categorized using the Clinical Classifications Software Refined tool from the Healthcare Cost and Utilization Project, which combines International Classification of Disease, Tenth Revision, Clinical Modification codes into clinically meaningful groups. https://hcup-us.ahrq.gov/toolsoftware/ccsr/dxcsr.jsp				



ED visits for more common, yet acute conditions, demonstrated large declines in 2020. There were 1,383 fewer ED visits for acute bronchitis in 2020 resulting in a reduction of 36 percent from 2019. Acute, but generally less severe, conditions with typically high ED visit volume include upper respiratory infections, otitis media (ear infection), and headache, all demonstrated sizable reductions of visits to the ED 2020. Additionally, ED visits for intestinal infections (PR=0.65), sinusitis (PR=0.65), external diseases of the eye (PR=0.73), external injuries from bites (PR=0.74), chronic obstructive pulmonary disease and bronchiectasis (PR=0.79), and allergic reactions (PR=0.82) resulted in fewer ED visits during 2020 when compared to 2019. Non-specific chest pain was the second highest reason for ED visits in both 2019 and 2020 and visit volume remained nearly unchanged between the two years (PR=0.99). Similarly, ED visits for myocardial infarction show a slight but not statistically significant decline in 2020 as compared to 2019 (PR=0.97).

Among Montana's residents of noncore counties, visits for "exposure, encounters, screening or contact with infectious disease" increased 17.1 percent between 2019 and 2020; whereas ED visits among residents in Montanan's small metropolitan and micropolitan designated areas of the state only increased 2.8 and 2.3 percent, respectively.

Limitations

This report is subject to a few data limitations. First, the MHDDS cannot be deduplicated, which makes it impossible to understand individual-level ED utilization patterns across demographic and geographic indicators.

While the MHDDS offers a invaluable and high quality data source to analyze the health and health care delivery of the Montana population, published studies have questioned the reliability and consistency of ICD-10 codes that are collected primarily for billing purposes.^{11,13}

Patient's race and ethnicity has only been reported in the MHDDS since 2018. While this report analyzed gender, age, and geographic location as demographic indicators, race and ethnicity were purposefully omitted until a full analysis of MHDDS' collection and classification of race and ethnicity is completed.

Lastly, Federal healthcare facilities, such as Veteran's Affairs and Indian Health Services, do not report to the MHDDS; therefore, the populations receiving care from these facilities are not included in the report.

Conclusion

Montana witnessed a decrease of ED utilization in 2020 compared to 2019, with the greatest decline coinciding soon after the COVID-19 emergency declaration (week 11) and persisting through late April 2020. The nationally defined "early pandemic period" (March 29 - April 25), demonstrated the lowest rates of ED utilization in Montana, which was also witnessed nationally, with a 42 percent reduction of ED utilization across the U.S. While the number of ED visits in Montana increased during summer 2020, utilization remained continuously lower than 2019. These declines were greatest among children and young adolescents in Montana, who had 32 percent fewer ED visits in 2020 than in 2019; these findings are consistent with other states in the nation.^{2,3,8,12}

The reduction of ED visits for more acute conditions, such as bronchitis and upper respiratory conditions, is also consistent with



findings from across the United States.⁸ Furthermore, it is difficult to understand whether this reduction in visits was attributed to receipt of medical care outside of the ED, via telehealth, adherence to public health recommendations such as wearing face masks and social distancing, or whether Montanans decided to forgo care altogether. To prevent the latter, more tailored public health messaging could be developed to encourage the public to seek immediate healthcare in the event of an emergent or urgent medical issue.

Geographic differences in ED utilization during 2020 elucidated possible healthcare access obstacles for the most rural Montanans. According to the 2014 National Health Interview Survey, 15.8 percent of Montanans did not have a usual place to receive medical care.⁹ Rural Montanans face long travel times to health care facilities and therefore may opt to use the ED for more general care needs.

These findings can assist public health and health care professionals to better understand the impact the COVID-19 pandemic had on ED utilization during 2020 in Montana. Continued surveillance of ED utilization is needed throughout the pandemic phase, as well as when COVID-19 becomes endemic to understand patient behaviors. Communicating to the public the importance of seeking urgent or emergency health care for acute and severe health conditions is imperative for helping Montanans achieve healthier lives.

Recommendations

Expansion of Telephone Triage (Tele-triage) Services or Urgent Telehealth¹

Increase access to healthcare professionals who can assist patients over the phone to determine whether emergency care is necessary.

Increase Access to Telemedicine¹⁰

Expanded access to telemedicine can help alleviate the primary health care provider shortage and provide more equitable health access to rural Montanans.

Emphasize Seeking In-Person Care for Emergency Conditions

Continue to educate the public on the importance of appropriate ED utilization for emergency conditions to prevent potentially serious consequences of delayed medical care.

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