Identifying cannabis-attributed health outcomes in Colorado

Assessment of hospital and emergency department data

January 2023

COLORADO
Department of Public Health & Environment

Marijuanahealthinfo.colorado.gov/reports-and-summaries

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Introduction

Per House Bill 21-1317, the Colorado General Assembly requires the Colorado Department of Public Health and Environment (CDPHE) to "produce a report on hospital and emergency room discharge data of patients, including demographic information, presenting with conditions or a diagnosis that reflect marijuana use" annually by January 2. Information requested on these patients includes age, race, ethnicity, gender, geographic location, presenting with conditions or a diagnosis that reflect marijuana use, including and identifying if marijuana use was in conjunction with alcohol or other drugs. Informed by these data findings or the lack thereof, this report concludes with recommendations to better educate, inform, and protect Coloradoans.

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Definitions

These definitions were developed specifically for this report and are preliminary. They have not been used, validated or standardized by any other organization.

ICD-10-CM code: The International Classification of Diseases, 10th Revision, Clinical Modification (ICD-10-CM) provides an established set of codes to document diagnoses for billing purposes. A discharge can have up to 30 diagnosis codes listed on a single discharge billing record.

No cannabis: A discharge that does not have a cannabis ICD-10-CM code.

Any cannabis: A discharge with at least one cannabis ICD-10-CM code.

No substance: A discharge with no cannabis, alcohol, cocaine, opioid, or stimulant ICD-10-CM code.

Alcohol and/or drug: A no cannabis discharge with at least one alcohol, cocaine, opioid, or stimulant ICD-10-CM code.

Cannabis-only: A discharge with at least one cannabis ICD-10-CM code and no alcohol, cocaine, opioid, or stimulant ICD-10-CM code.

Cannabis + alcohol and/or drug: A discharge with at least one cannabis ICD-10-CM code plus at least one alcohol, cocaine, opioid, or stimulant ICD-10-CM code. Further examination of each individual substance can be found on CDPHE's Colorado Hospital Association (CHA) dashboard.

Predictive value: A performance term used to describe the ability to correctly identify a true result; Positive Predictive Value (PPV) or a true negative result (Negative Predictive Value (NPV)). In this report, we use this term in reference to the ability of cannabis ICD-10-CM codes to correctly identify a hospital or emergency department discharge attributed to cannabis.

Primary diagnosis: The ICD-10-CM code that establishes the main diagnosis for discharge.

Cannabis likely-attributed: A cannabis-only discharge with at least one of the following inclusion criteria that a single, unpublished study has shown to have high predictive value[1]:

1. Cannabis poisoning code (T40.7 from Jan. 1, 2021 – Sept. 30, 2021 or T40.71 from Oct. 1, 2021 - Dec. 31, 2021).
2. Cannabis abuse, dependence, or use with an intoxication code (F12.12, F12.22, F12.92).

3. The primary diagnosis ICD-10-CM code contained any cannabis code.

Cannabis-mentioned: A cannabis-only discharge that does not meet the criteria for the cannabis likely-attributed definition (above) due to unfavorable predictive values as demonstrated in a single, in-depth study[1].

Limitations

There are considerable restraints in how the information contained in this report may be interpreted due to the following reasons:

- Nationally, no formal definitions exist for identifying cannabis-related diagnoses or conditions in hospital or ED data.
    - There are no standardized codes or sets of codes that have been validated (i.e., scientifically proven to correctly and accurately identify) diagnoses or conditions caused by cannabis.
- Our definitions are novel and interpretation of these data are conservative. Analyses may underestimate the true burden of cannabis-attributed diagnoses or conditions.
- Discharge data do not contain detailed information about patient cannabis use, such as type of product used, amount used, THC content of product (% THC), frequency of use, and temporality of use in relation to the health event.
- Findings gained from this dataset cannot infer causation between cannabis use and medical outcomes, including reason for visiting the hospital/ED, diagnoses, or conditions.
- Data reported to the Colorado Hospital Association (CHA) are from participating member hospitals or healthcare systems only and most are located in urban areas.
- The primary purpose of these data are for billing and patient medical records. Codes are subject to interpretation by those assigning them.

Due to these limitations, the findings of this report must be interpreted with caution.

Findings

The findings of this report must be interpreted with caution due to the major limitations listed in the previous section.

Emergency department

Of all emergency department (ED) discharges in 2021:

- 0.7% (n=12,248) had any cannabis code present (Figure 1).
- 0.5% (n=9,504) had a cannabis-only code, compared to 6.1% (n=111,809) that had alcohol and/or drug code(s), and 0.2% (n=2,744) that had cannabis plus alcohol and/or drug codes.

Of ED discharges that contained any cannabis code in 2021:

- 77.6% (n=9,504) contained cannabis-only code(s) compared to 22.4% (n=2,744) that contained cannabis plus alcohol and/or drug codes.
- The counties with the highest rates of ED discharges with cannabis-only codes include; Gunnison (12.2 per 1,000 discharges), Crowley (11.8 per 1,000 discharges), and Phillips (10.6 per 1,000 discharges) (Figure 3).

Of ED discharges that contained cannabis-only code(s) in 2021:

- 14.1% (n=1,343) could be described as cannabis likely-attributed compared to 85.9% (n=8,161) that have the less reliable cannabis-mentioned codes. Cannabis likely-attributed discharges accounted for 0.09% of all ED discharges in 2021.

The demographics with the highest rate of cannabis likely-attributed ED discharges were among:

- Males (85.4 per 100,000 discharges; Table 3).
- Ages 13-17 years old (232.0 per 100,000 discharges; Table 2).
    - Of note, among children younger than 6 years old discharged with a cannabis code, 100.0% of the codes were cannabis likely-attributed.
- All race/ethnicities groups except Hispanic and White, non-Hispanic (Table 4).

- There were no significant differences among the groups Unknown race/ethnicity, Asian/Pacific Islander, Black, Other race/ethnicity and American Indian/Alaskan Native.

Hospitalizations

Of all hospital discharges in 2021:

- 3.3% (n=15,420) had any cannabis code present (Figure 2).
- 1.9% (n=8,995) had a cannabis-only code, compared to 12.3% (n=58,147) that had an alcohol and/or drug code(s), and 1.4% (n=6,425) that had cannabis plus alcohol and/or drug codes.

Of hospital discharges that contained any cannabis code in 2021:

- 58.3% (n=8,995) contained cannabis-only code(s) compared to 41.7% (n=6,425) that contained cannabis plus alcohol and/or drug codes.

Of hospital discharges that contained cannabis-only code(s) in 2021:

- 1.4% (n=123) could be described as cannabis likely-attributed compared to 98.6% (n=8,872) that have the less reliable cannabis-mentioned codes. Cannabis likely-attributed discharges accounted for 0.06% of all hospital discharges in 2021.

The demographics with the highest rate of cannabis likely-attributed hospital discharges were among:

- Ages 13-17 years and 21-25 years (172.5 and 154.8 per 100,000 discharges; Table 5).
- Black race/ethnicity (43.8 per 100,000 discharges; Table 7), but was not significantly different from Hispanic (30.0 per 100,000 discharges), or White, non-Hispanic (23.0 per 100,000 discharges).
- Otero (31.7 per 1,000 discharges), Park (30.0 per 1,000 discharges), and Pueblo (28.8 per 1,000 discharges) hospital facilities had the highest rate of discharges with cannabis-only codes in 2021 (Figure 4).
- In 2021, there was no significant difference in the rate of discharges between males and females.

Hospital to ED comparisons

In 2021, there were more cannabis codes present in hospital discharges than ED discharges.

- 3.3% of all hospital discharges had any cannabis code present compared to 0.7% of ED discharges.

In 2021, ED discharges had the higher percentage of cannabis-only codes but the lower percentage of discharges with cannabis plus alcohol and/or other drug codes compared to hospital discharges (Figures 1-2).

- 77.6% of ED discharges with any cannabis code were cannabis-only compared to 58.3% of hospital discharges with any cannabis code.
- 22.4% of ED discharges with any cannabis code were cannabis plus alcohol and/or drug compared to 41.6% of hospital discharges.

In 2021, hospital discharges had a lower percentage of cannabis likely-attributed codes compared to ED discharges.

    - 14.1% of ED discharges with cannabis-only codes had cannabis likely-attributed codes compared to only 1.4% of hospital discharges. We hypothesize the reason for the lower percentage in hospital discharges is due to the rarity in occurrence of which patients are admitted to the hospital due to cannabis exposure.

Discussion

Pursuant to C.R.S. 25-3-127, CDPHE used hospital and emergency room discharge data, but it has concerns regarding how informative this dataset is for the purposes of this report. The International Classification of Diseases (ICD) system has not established codes that specifically identify health events caused by cannabis. As a result, the information gained from this data is insufficient to directly evaluate cannabis-attributed discharges as we cannot infer causation between cannabis use and medical outcomes.

C.R.S. 25-3-127 discusses the use of emergency room intake data on marijuana use and discharge data for this report, but CHA data reflects discharge data only. Intake data from hospitals or emergency departments is not currently collected by CHA and can vary from facility to facility, so it would not provide consistent data even if it were collected.

Intentions behind Colorado House Bill 21-1317 were specific to regulating marijuana concentrates, a form of marijuana product consisting of high percentage THC content. However, the CHA dataset does not include information on cannabis products or patterns of use, such as; type of product used, amount used, percent THC of product, frequency of use, and temporality of use in relation to the health event in question. At this time, hospitals and emergency departments simply do not collect this information.

Without validating the methodology used in this report, CDPHE cannot provide a solid conclusion to the request in statute. In the production of this report CDPHE reference studies[1-4] that examine the accuracy of cannabis-related ICD-10-CM codes in the CHA data and how well they correctly identified health events caused by cannabis. All of these studies required review of individual medical records in order to confirm cannabis was at least partially-attributable, a resource-intensive task. Regardless of immense effort put forth in these studies, none were successful in identifying all cases involving cannabis use.

Methodology used for this report includes novel definitions of what constitutes a cannabis-related case. These definitions were informed by the studies[1-4] mentioned throughout this report and input from subject matter experts, including CDPHE's Retail Marijuana Public Health Advisory Committee. In general, public health follows guidelines provided by national partners on how to define cases. Unfortunately, no formal, standardized definitions of cannabis-attributed cases exist. Very little research has been conducted on ICD-10-CM codes being used in this manner and none have been

proven to correctly, accurately, and completely identify diagnoses or conditions caused by cannabis in hospital or emergency department billing records.

Limitations aside, cannabis codes in their current state can still provide some valuable information, such as insight on the overall burden on health care facilities. Overall, the analyses showed very small percentages of Colorado's ED and hospital discharges had cannabis codes present. The number of discharges decreased with each level of specificity resulting in suppression of some demographic groups and decreasing statistical method reliability.

Discharges that were identified as cannabis likely-attributed had higher predictive value compared to those identified as cannabis-mentioned which had lower predictive values. The cannabis likely-attributed definition used in this report was shown in a single study to have a high PPV of >80%, but it only captured 13.5% of ED visits determined to be attributable to cannabis[1]. Therefore, CDPHE notes that the methodology most likely underestimated the true number of cases attributed to cannabis. This is also why more research is needed to determine the following: 1) why cannabis-mentioned codes do not perform as well, 2) which cannabis codes have highest sensitivity, specificity and predictive values, and 3) whether predictability varies by other factors, such as demographics, year, or health care setting.

The analysis also found cannabis codes perform better in ED visits compared to hospitalizations. This may be a reflection of more acute health outcomes resulting from immediate, or short-term, effects produced by cannabis use. Additionally, hospitalizations had a higher percentage of cannabis plus alcohol and/or drug codes, which may suggest that polysubstance use might require more inpatient hospital stays compared to cannabis use alone.

The demographic group of most concern in the analysis was children younger than 6 years old. In 2021, all pediatric cannabis-only ED discharges had cannabis likely-attributed codes; meaning that per the methodology, there is a high likelihood these visits were due in part to cannabis exposure. This finding is supported by pediatric cases being more likely to require medical attention due to unintentional cannabis exposure or ingestion. This is a growing problem among this age group, documented in both the literature and data[5-7], and remains a significant public health concern.

Key takeaway

Given the limitations of CHA hospital and ED data, plus the lack of standardized and validated methods and definitions, CDPHE is not able to identify specific cannabis-attributed diagnoses or conditions nor is the Department confident that the findings correctly describe the true burden of

cannabis-attributed hospital and ED visits. Based on studies reviewed, the Department can only conclude the hospital and ED discharge data are not suitable to identify diagnoses or conditions caused by cannabis use at this time.

Recommendations

The following recommendations are actionable items based on the limitations, findings, and discussion presented in this report.

- Continue to increase collaboration with stakeholders to better understand their concerns and goals and improve communication to achieve these goals, including;
    - Clarify the intention and/or desires of this annual report and define it in a problem statement(s).
    - Develop public health based research questions.
    - Determine feasible strategies best suited to answer research questions.
    - Revise statute as needed.
- Continue to explore additional and/or new sources of data that may improve results or directly answer research questions.
- Fund public health research on a continuous basis to:
    - Further assess the ability of CHA hospital and emergency department discharge data to identify cannabis-related cases in emergency department or hospital visits.
        - Assess performance of cannabis ICD-10-CM codes used in combination with other codes of health outcomes supported by the literature to be related to cannabis consumption, such as; cardiovascular events, pulmonary disease, injury, and mental or behavioral health events.
        - Assess performance of cannabis poisoning and/or intoxication codes to measure acute health events in ED/hospital data.
        - Assess performance of cannabis abuse, use, and dependence codes to measure chronic events in ED/hospital data.

    - Conduct medical record reviews to confirm predictive values of cannabis codes to correctly identify cannabis-attributed health events.

- Collaborate with state and national organizations to:
    - Develop and validate methodology and case definitions that maximize the sensitivity and specificity for identifying hospital and ED visits attributable to cannabis.
    - Educate health care providers on the existing definition of cannabinoid hyperemesis syndrome.
    - Establish clinical definition(s) for health care encounters due to cannabis.

Methods

Statistical analyses

The Colorado Hospital Association (CHA) manages administrative data on hospitalization and emergency department (ED) discharges from participating member health care facilities in Colorado. The majority of acute care hospitals and emergency departments in Colorado are included in this data source. Both hospital and ED discharges are mutually exclusive. All discharges are included regardless of residential status unless otherwise noted.

Logic models were developed to examine frequency of cannabis, multiple substances, and predictive value of ICD-10-CM codes. Each level of the models creates mutually exclusive definitions using ICD-10-CM substance codes (Table 1). The top levels consist of the total counts of ED or hospital discharges in Colorado during 2021. The second level of the model examines overall cannabis presence in discharges by separating the frequency of discharges that contain any cannabis codes from those with no cannabis codes. The next level branches from cannabis presence to examine overall substance presence. Any cannabis discharges are separated based on discharges that met the cannabis-only definition and those that met the cannabis plus alcohol and/or drug definition. Discharges that met the no cannabis definition are further separated based on discharges that met the no substance definition and those that met the alcohol and/or drug definition. The final and lowest level evaluates the cannabis-only discharges and branches those that met the definition for cannabis likely-attributed and cannabis-mentioned into separate categories. The definitions of these two categories are based on the predictive value performance of cannabis codes as demonstrated in a single study[1].

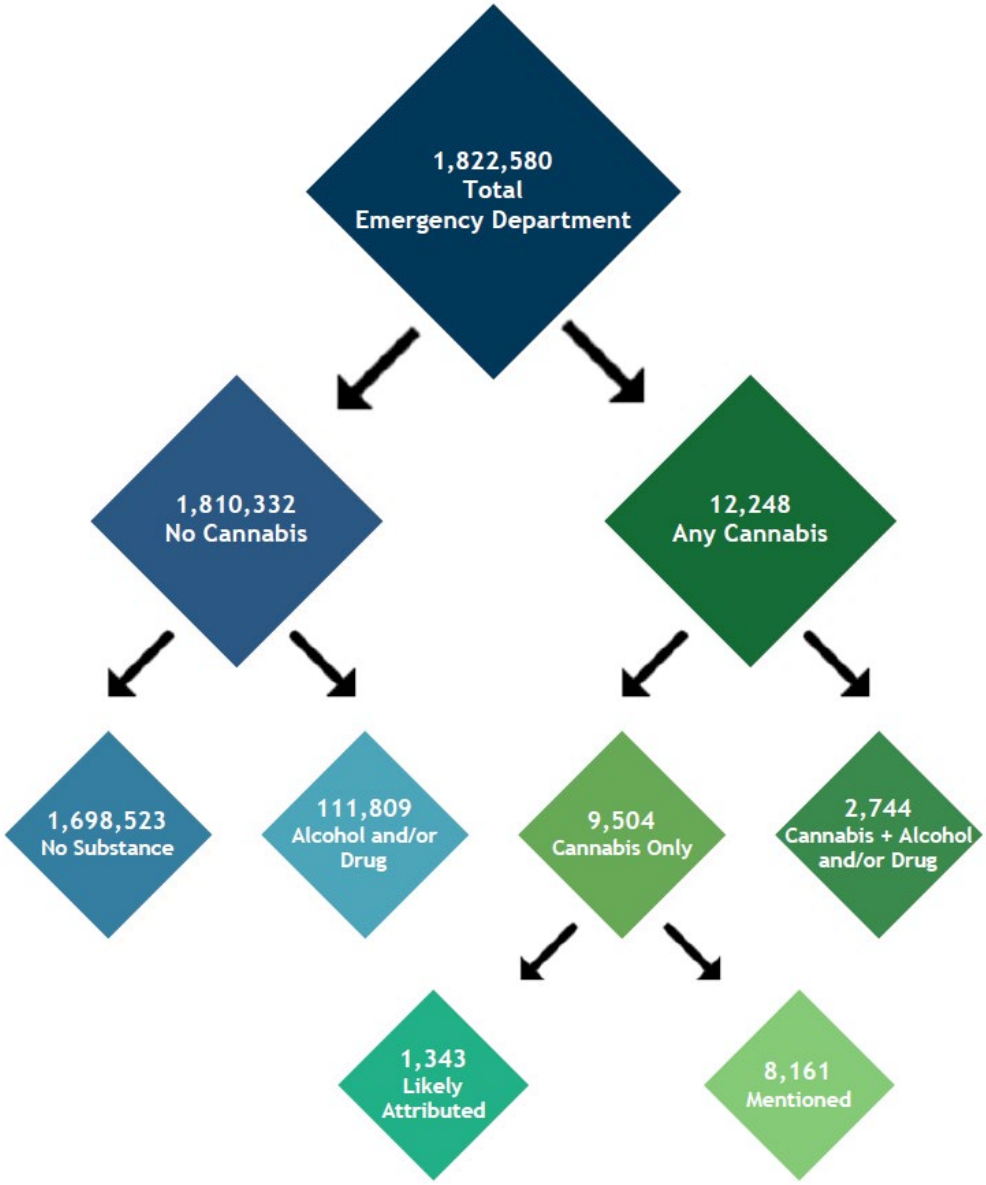
Discharge rates were calculated for cannabis-only discharges by age, sex, race/ethnicity, and county. The numerator was stratified by the number of discharges that met the definition criteria for either cannabis likely-attributed or cannabis-mentioned and total discharges were stratified by demographic for the denominator. The proportion was multiplied by 100,000 (1,000 for county level) to obtain the discharge rate. The highest rate for each group was compared to other demographic stratifications using non-overlapping 95% confidence intervals to determine significance.

Table 1. ICD-10-CM substance codes

Substance category	Description	ICD-10-CM Codes
Cannabis	Cannabis abuse, dependence, or use	F12
	Cannabis poisoning	T40.7 from Jan. 1, 2021 – Sept. 30, 2021 T407.1 from Oct. 1, 2021 – Dec. 31, 2021
	Newborn affected by maternal cannabis use	P04.81
Alcohol and/or drug	Alcohol	E24.4, F10, G31.2, G62.1, G72.1, I42.6, K29.2, K70, K85.2, K86.0, O35.4, O99.31, P04.3, Q86.0, T51.0, Y90.[4-8]
	Cocaine	F14, T40.5, R78.2
	Opioid	F11, T40.[0-4], T40.6, Z79.981
	Stimulant	F15, T43.6

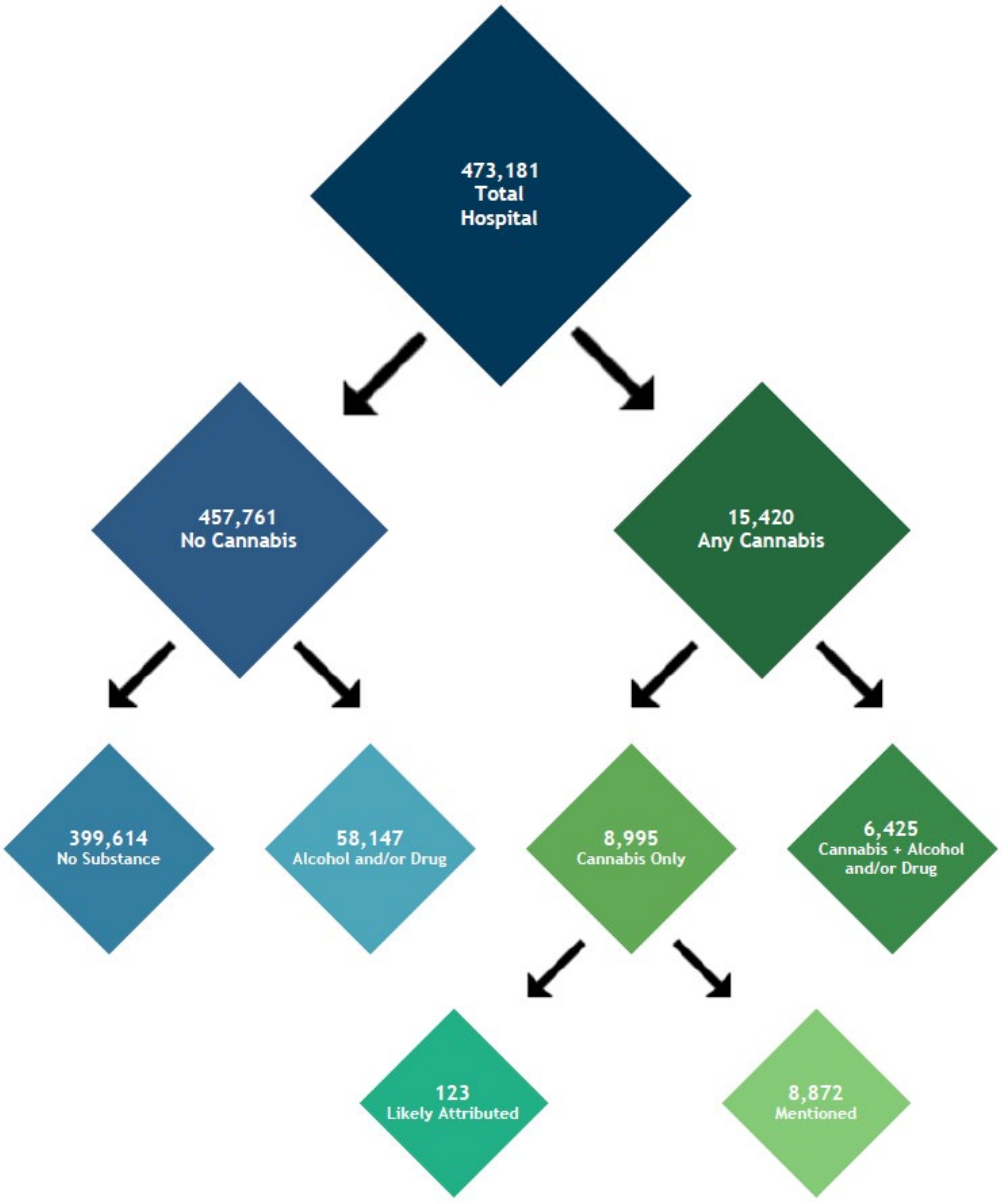
Logic models

Figure 1. Logic model of emergency department (ED) discharges with and without ICD-10-CM substance codes, Colorado 2021[‡]



[‡] Colorado Hospital Association, 2021 dataset

Figure 2. Logic model of hospital discharges with and without ICD-10-CM substance codes, Colorado 2021‡



‡ Colorado Hospital Association, 2021 dataset

Demographics

Table 2. Rate of emergency department discharges with cannabis-only ICD-10-CM codes per 100,000 discharges by age, Colorado 2021

Demographic	Total ED	Cannabis likely-attributed			Cannabis-mentioned		
		N	Rate per 100,000	95% Confidence intervals	N	Rate per 100,000	95% Confidence intervals
<6 years	158,198	140	88.5	74.5-104.4	0	0.0	0.0-0.2
6-12 years	92,325	43	46.6	33.7-62.7	30	32.5	21.9-46.4
13-17 years	93,949	218	232.0†	202.3-264.9	847	901.6	842.1-964.1
18-20 years	82,630	128	154.9	129.3-184.2	972	1,176.3‡	1,103.9-1,252.2
21-25 years	147,829	199	134.6	116.6-154.7	1,670	1,129.7¥	1,076.4-1,184.9
26-35 years	309,744	241	77.8	68.3-88.3	2,200	710.3	681.0-740.5
36-55 years	442,797	230	51.9	45.4-59.1	1,695	382.8	364.8-401.4
56-65 years	192,071	75	39.0	30.7-48.9	472	245.7	224.1-268.9
66+ years	303,032	69	22.8	17.7-28.8	275	90.7	80.3-102.1
Unknown	-*	-*			-*		

Footnotes:
-*Age groups with n<11 are suppressed.
† Highest rate in demographic group among cannabis likely-attributed.
‡ Highest rate in demographic group among cannabis-mentioned.
¥ No significant difference compared to highest rate due to overlapping confidence intervals.
Discharge rate calculated with total discharges in age group per 100,000 ED discharges.
Hospital and ED discharges are mutually exclusive.

Table 3. Rate of emergency department discharges with cannabis-only ICD-10-CM codes by sex, Colorado 2021

Demographic	Total ED	Cannabis likely-attributed			Cannabis-mentioned		
		N	Rate per 100,000	95% Confidence intervals	N	Rate per 100,000	95% Confidence intervals
Male	840,739	718	85.4†	79.3-91.9	4,603	547.5‡	531.8-563.5
Female	981,547	625	63.7	58.8-68.9	3,555	362.2	350.4-374.3
Unknown	151	-*			-*		

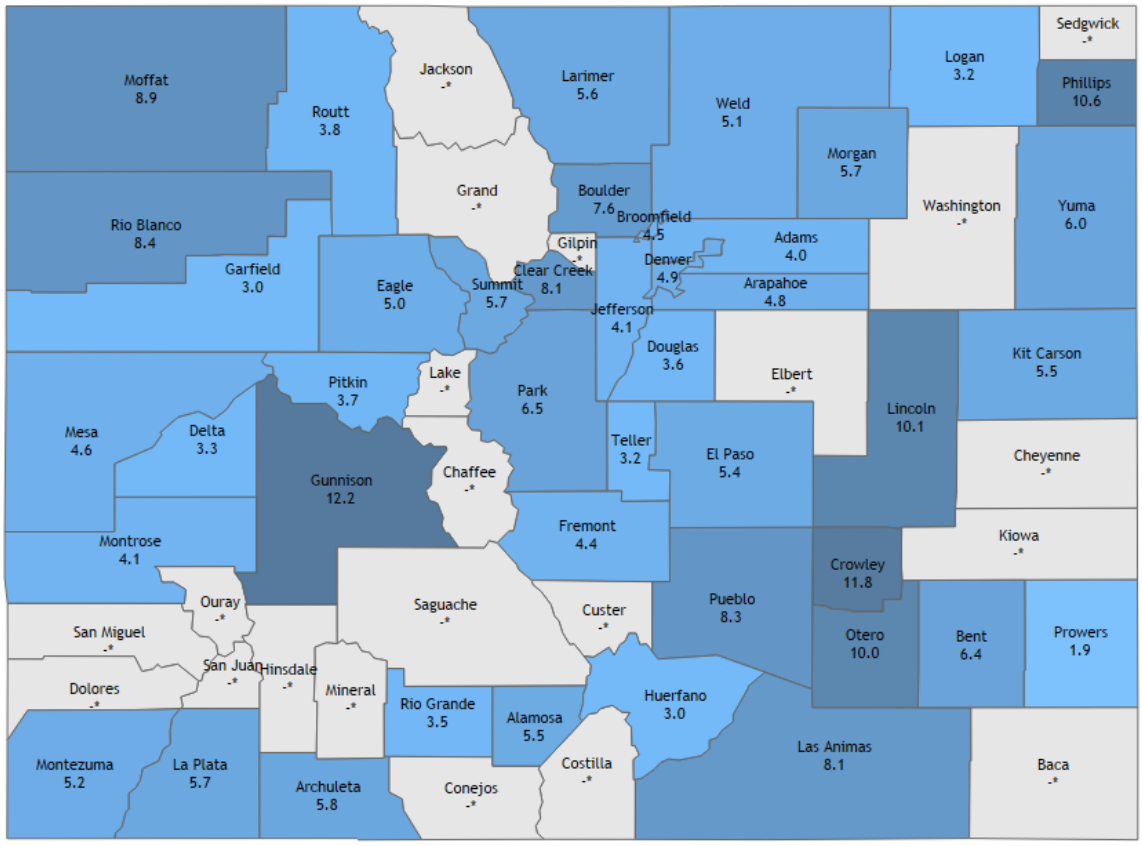
Footnotes:
-*Sex groups with n<11 are suppressed.
† Highest rate in demographic group among cannabis likely-attributed.
‡ Highest rate in demographic group among cannabis-mentioned.
¥ No significant difference compared to highest rate due to overlapping confidence intervals.
Discharge rate calculated with total discharges in sex group per 100,000 ED discharges.
Hospital and ED discharges are mutually exclusive.

Table 4. Rate of emergency department discharges with cannabis-only ICD-10-CM codes by race and ethnicity, Colorado 2021

Demographic	Total ED	Cannabis likely-attributed			Cannabis-mentioned		
		N	Rate per 100,000	95% Confidence intervals	N	Rate per 100,000	95% Confidence intervals
American Indian/Alaskan Native	17,381	11	63.3¥	31.6-113.2	82	471.8	375.4-585.3
Asian/Pacific Islander	29,839	33	110.6¥	76.1-155.3	105	351.9	287.9-425.8
Black	135,037	145	107.4¥	90.6-126.3	940	696.1‡	652.5-741.9
Hispanic	340,967	251	73.6	64.8-83.3	1,416	415.3	394.0-437.4
White, non-Hispanic	1,109,989	692	62.3	57.8-67.2	4,610	415.3	403.4-427.5
Other	92,105	90	97.7¥	78.6-120.1	407	441.9	400.1-486.9
Unknown	97,262	121	124.4†	103.2-148.6	601	617.9¥	569.6-669.2

Footnotes:
-*Race/ethnicity groups with n<11 are suppressed.
† Highest rate in demographic group among cannabis likely-attributed.
‡ Highest rate in demographic group among cannabis-mentioned.
¥ No significant difference compared to highest rate due to overlapping confidence intervals.
Discharge rate calculated with total discharges in race/ethnicity group per 100,000 ED discharges.
Hospital and ED discharges are mutually exclusive.

Figure 3. County level heat map of emergency department discharges with cannabis-only ICD-10-CM codes per 1,000 discharges, Colorado 2021



Footnotes:
-*Counties with n<11 or total discharges <50 are suppressed.
Discharge rate calculated with total discharges in county per 1,000 ED discharges.
Hospital and ED discharges are mutually exclusive.
Discharges missing residential information excluded.

Table 5. Rate of hospital discharges with cannabis-only ICD-10-CM codes by age, Colorado 2021

Demographic	Total hospital	Cannabis likely-attributed			Cannabis-mentioned		
		N	Rate per 100,000	95% Confidence intervals	N	Rate per 100,000	95% Confidence intervals
<6 years	70,792	16	22.6	12.9-36.7	729	1,029.8	956.7-1,106.9
6-12 years	4,266	-*			21	492.3	305.0-751.5
13-17 years	8,696	15	172.5†	96.6-284.3	598	6,876.7¥	6,353.6-7,428.9
18-20 years	7,753	12	154.8¥	80.0-270.2	604	7,790.5‡	7,203.4-8,409.6
21-25 years	19,687	13	66.0¥	35.2-112.9	1,128	5,729.7	5,409.0-6,063.4
26-35 years	63,246	16	25.3	14.5-41.1	1,943	3,072.1	2,939.0-3,209.6
36-55 years	83,924	21	25.0	15.5-38.2	1,986	2,366.4	2,264.6-2,471.5
56-65 years	63,562	12	18.9	9.8-33.0	1,021	1,606.3	1,510.0-1,707.1
66+ years	151,255	12	7.9	4.1-13.9	842	556.7	519.8-595.5
Unknown	-*	-*			-*		

Footnotes:
-*Age groups with n<11 are suppressed.
† Highest rate in demographic group among cannabis likely-attributed.
‡ Highest rate in demographic group among cannabis-mentioned.
¥ No significant difference compared to highest rate due to overlapping confidence intervals.
Discharge rate calculated with total discharges in age group per 100,000 hospital discharges.
Hospital and ED discharges are mutually exclusive.

Table 6. Rate of hospital discharges with cannabis-only ICD-10-CM codes by sex, Colorado 2021

Demographic	Total hospital	Cannabis likely-attributed			Cannabis-mentioned		
		N	Rate per 100,000	95% Confidence intervals	N	Rate per 100,000	95% Confidence intervals
Male	211,740	64	30.2†	23.3-38.6	4,547	2,147.4‡	2,086.1-2,210.1
Female	261,269	59	22.6¥	17.2-29.1	4,323	1,654.6	1,606.0-1,704.3
Unknown	172	-*			-*		

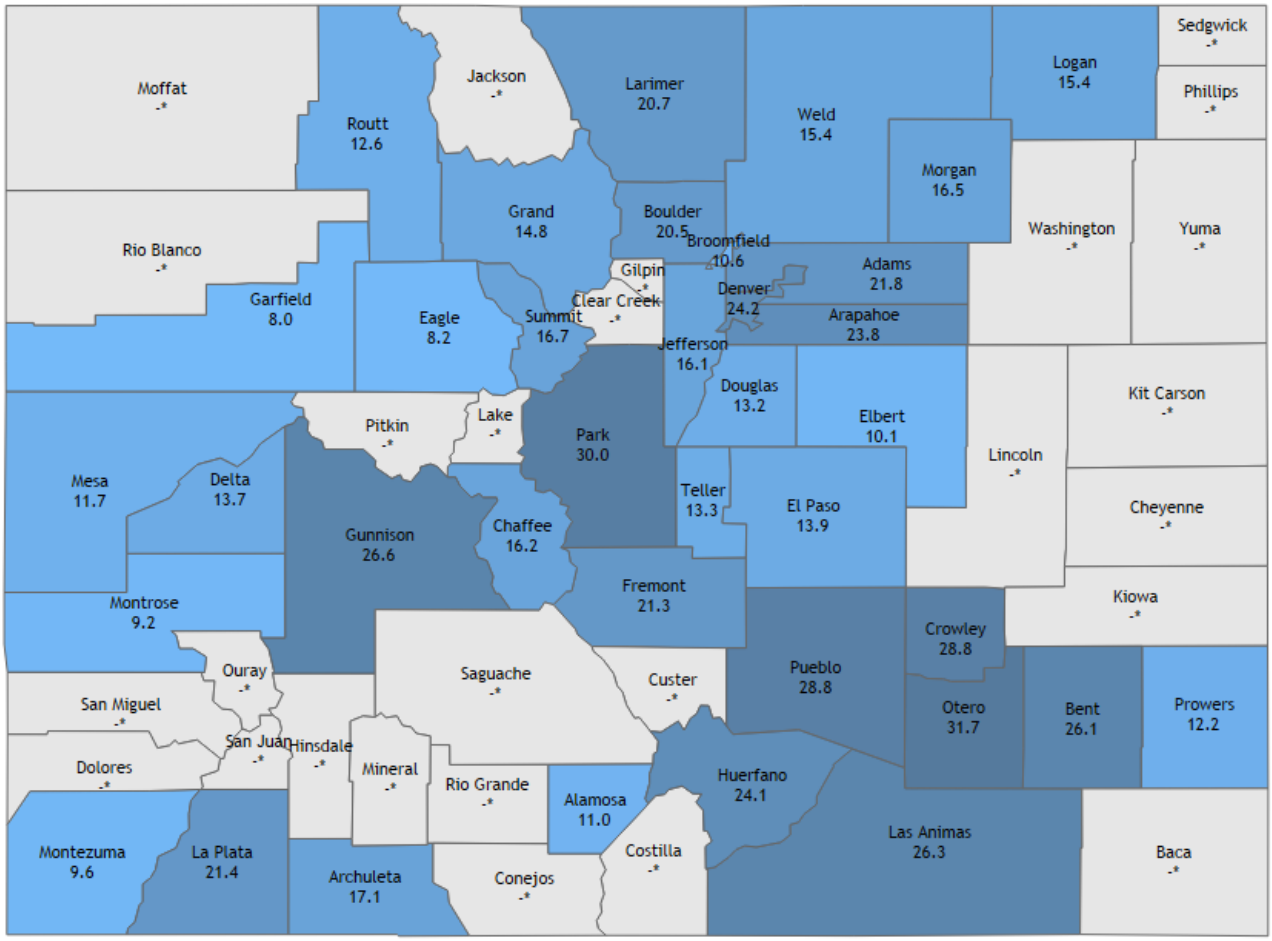
Footnotes:
-*Sex groups with n<11 are suppressed.
† Highest rate in demographic group among cannabis likely-attributed.
‡ Highest rate in demographic group among cannabis-mentioned.
¥ No significant difference compared to highest rate due to overlapping confidence intervals.
Discharge rate calculated with total discharges in sex group per 100,000 hospital discharges.
Hospital and ED discharges are mutually exclusive.

Table 7. Rate of hospital discharges with cannabis-only ICD-10-CM codes by race and ethnicity, Colorado 2021

Demographic	Total hospital	Cannabis likely-attributed			Cannabis-mentioned		
		N	Rate per 100,000	95% Confidence intervals	N	Rate per 100,000	95% Confidence intervals
American Indian/Alaskan Native	4,170	-*			72	1,726.6	1,353.4-2,169.5
Asian/Pacific Islander	9,412	-*			64	680.0	524.1-867.5
Black	25,129	11	43.8†	21.9-78.3	1,060	4,218.2‡	3,973.0-4,474.1
Hispanic	69,943	21	30.0¥	18.6-45.9	1,310	1,873.0	1,773.8-1,976.2
White, non-Hispanic	308,807	71	23.0¥	18.0-29.0	5,308	1,718.9	1,673.3-1,765.3
Other	18,236	-*			420	2,303.1	2,090.3-2,531.3
Unknown	37,484	-*			638	1,702.1	1,573.5-1,838.1

Footnotes:
-*Race/ethnicity groups with n<11 are suppressed.
† Highest rate in demographic group among cannabis likely-attributed (multiple rates footnoted indicates no significant difference among those rates).
‡ Highest rate in demographic group among cannabis-mentioned.
¥ No significant difference compared to highest rate due to overlapping confidence intervals.
Discharge rate calculated with total discharges in race/ethnicity group per 100,000 hospital discharges.
Hospital and ED discharges are mutually exclusive.

Figure 4. County level heat map of hospital discharges with cannabis-only ICD-10-CM codes per 1,000 discharges, Colorado 2021



Footnotes:
-*Counties with n<11 or total discharges <50 are suppressed.
Discharge rate calculated with total discharges in county per 1,000 hospital discharges.
Hospital and ED discharges are mutually exclusive.
Discharges missing residential information excluded.

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