
Identifying cannabis-related health outcomes in Colorado

Assessment of hospital and emergency department data

January 2022



COLORADO

Department of Public
Health & Environment

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Introduction

Per House Bill 21-1317, the Colorado Department of Public Health and Environment was required by the Colorado General Assembly 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” by January 2022. 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 Coloradoan.

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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 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 our [CHA dashboard at www.marijuanahealthinfo.colorado.gov](http://www.marijuanahealthinfo.colorado.gov)

Predictive value: A performance term used to describe the ability to correctly identify a true positive 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, not-yet-published study has shown to have high predictive value¹:

1. cannabis poisoning code (T40.7)
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 low predictive values as demonstrated in a single, in-depth study¹.

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.
- Numbers and rates of total hospital and emergency department discharges may be different in 2020 due to changes in healthcare utilization because of the COVID-19 pandemic.
- 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.

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 ED discharges in 2020:

- 0.8% (n=12,392) had any cannabis code present (Figure 1).
- 0.6% (n=9,458) had a cannabis only code, compared to 7.0% (n=108,828) that had alcohol and/or drug code(s) and 0.2% (n=2,934) that had cannabis plus alcohol and/or drug codes.

Of ED discharges that contained any cannabis code in 2020:

- 76.3% (n=9,458) contained cannabis only code(s) compared to 23.7% (n=2,934) that contained cannabis plus alcohol and/or drug codes.
- The counties with the highest rates of ED discharges with cannabis only codes include; Gunnison (21.0 per 1,000 discharges), Rio Blanco (19.4 per 1,000 discharges), and Moffat (12.0 per 1,000 discharges) (Figure 3).

Of ED discharges that contained cannabis only code(s) in 2020:

- 15.6% (n=1,471) could be described as cannabis likely-attributed compared to 84.4% (n=7,987) that have the less reliable cannabis-mentioned codes. Cannabis likely-attributed discharges accounted for 0.09% of all ED discharges in 2020.

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

- Males (104.1 per 100,000 discharges; Table 3).
- Ages 13-17 years old (87.4 per 100,000 discharges; Table 2).
 - Rates were significantly higher among adolescents ages 13-17 years followed by young adults 18-20 and 21-25 years with no significant difference.
 - Of note, among children ages <6 years old, 99.0% of the codes were cannabis likely-attributed compared to the less reliable cannabis-mentioned codes.
- Unknown Race/ethnicity (167.5 per 100,000 discharges; Table 4).

Hospitalizations

Of all hospital discharges in 2020:

- 3.4% (n=15,311) had any cannabis code present (Figure 2).
- 2.0% (n=8,843) had a cannabis only code, compared to 12.6% (n=56,605) that had an alcohol and/or drug code(s) and 1.4% (n=6,468) that had cannabis plus alcohol and/or drug codes.

Of hospital discharges that contained any cannabis code in 2020:

- 57.8% (n=8,843) contained cannabis only code(s) compared to 42.2% (n=6,468) that contained cannabis plus alcohol and/or drug codes.

Of hospital discharges that contained cannabis only code(s) in 2020:

- 1.9% (n=165) could be described as cannabis likely-attributed compared to 98.1% (n=8,678) that have the less reliable cannabis-mentioned codes. Cannabis likely-attributed discharges accounted for 0.04% of all hospital discharges in 2020.

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

- Males (52.1 per 100,000 discharges; Table 6).
- Ages 13-17 and 21-25 years old for age (163.6 and 112.5 per 100,000 discharges; Table 5).
- Black race/ethnicity (96.3 per 100,000 discharges; Table 7).
- Crowley (41.7 per 1,000 discharges), Bent (39.6 per 1,000 discharges), and Otero (34.5 per 1,000 discharges) hospital facilities had the highest rate of discharges with cannabis only codes in 2020 (Figure 4).

Hospital to ED comparisons

In 2020, there were more cannabis codes present in hospital discharges than ED discharges.

- 3.4% of all hospital discharges had any cannabis code present compared to 0.8% of ED discharges.

In 2020, ED discharges had the higher percentage of cannabis only codes but the lower percentage of discharges with cannabis + alcohol and/or other drug codes compared to hospital discharges (Figures 1-2).

- 76.3% of ED discharges with any cannabis code were cannabis only compared to 57.8% of hospital discharges with any cannabis code.
- 23.7% of ED discharges with any cannabis code were cannabis plus alcohol and/or drug compared to 42.2% of hospital discharges.

In 2020, ED discharges had a higher percentage of cannabis likely-attributed codes (i.e. higher predictive value) compared to hospital discharges.

- 15.6% of ED discharges with cannabis only codes had cannabis likely-attributed codes compared to 1.9% of hospital discharges.

Discussion

Pursuant to C.R.S. 25-3-127, CDPHE used hospital and emergency room discharge data but 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 also specified “Emergency room intake data on marijuana use” should be used 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, we cannot provide a solid conclusion to the request in statute. In production of this report we reference studies¹⁻⁴ that aimed to 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 studies¹⁻⁴ 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 of cannabis on health care facilities. Overall, our 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 we 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 we 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 cannabis¹. Therefore, we note that our methodology most likely underestimated the true number of cases attributed to cannabis. This is also why more research is needed to determine why cannabis-mentioned codes do not perform as well, which cannabis codes have highest sensitivity, specificity and predictive values, plus whether predictability varies by other factors, such as demographics, year, or health care setting.

Our 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 stays compared to cannabis use alone.

The demographic group of most concern in our analysis was children under 6 years old. Nearly all pediatric cannabis only ED discharges had cannabis likely-attributed codes; meaning that per our 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 data⁵⁻⁷, 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, we are not able to identify specific cannabis-attributed diagnoses or conditions nor are we confident our findings correctly describe the true burden of cannabis-attributed hospital and ED visits. We 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.

- Increase collaboration with stakeholders to better understand goals and improve efforts to communicate and achieve these goals, including;
 - Clarify the intention and/or desires of this annual report and define in a problem statement(s).
 - Develop public health based research questions.
 - Determine feasible strategies best suited to answer research questions.
 - Revise statute as needed.
- 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, mental and 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, 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 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 2020. 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 + 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 study¹.

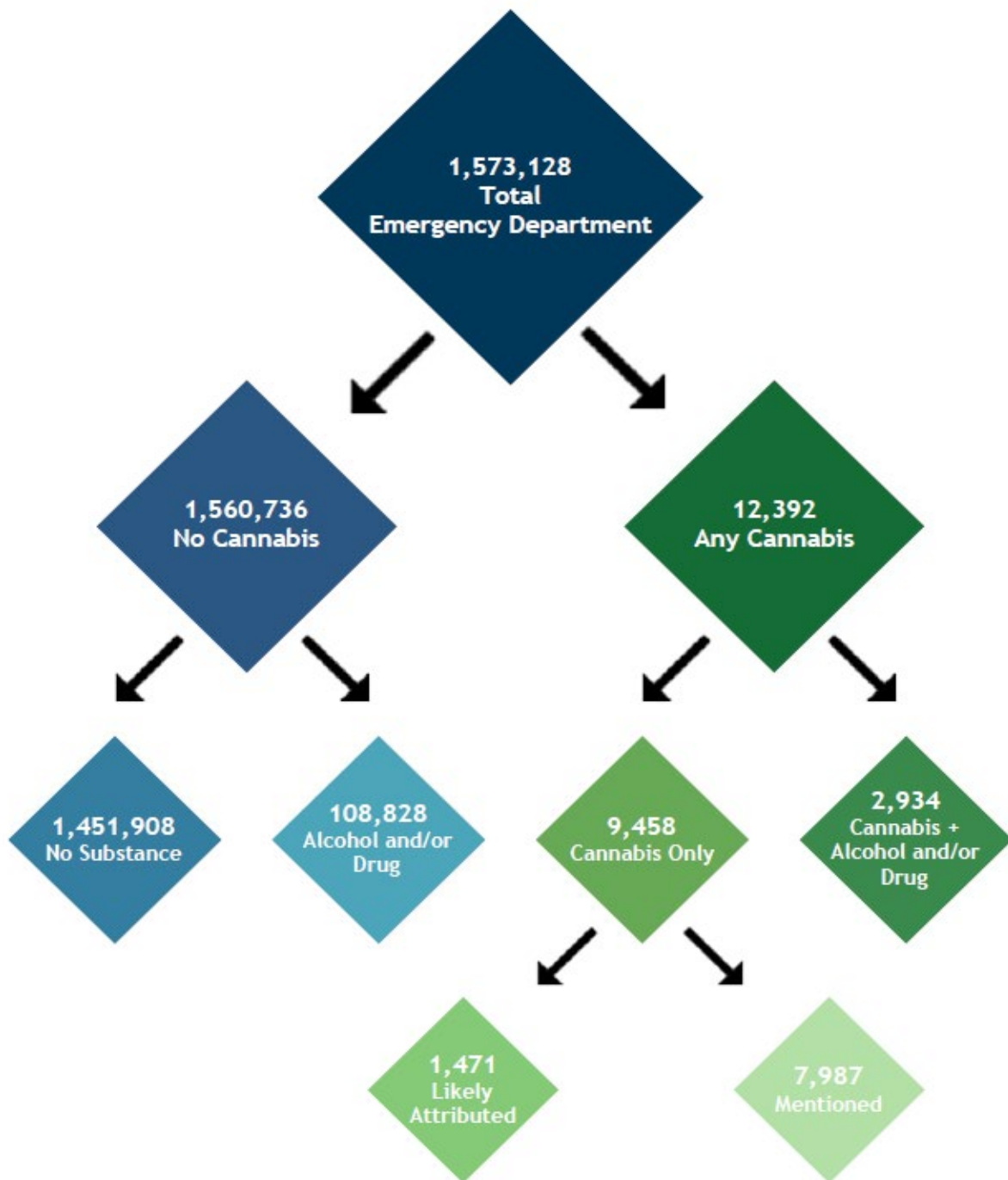
Discharge rates were calculated for cannabis only discharges by age, sex, race/ethnicity, and county. The numerator was stratified by the number of discharges that met the definition criteria for either cannabis likely-attributed or cannabis-mentioned and total discharges were stratified by demographic 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
	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

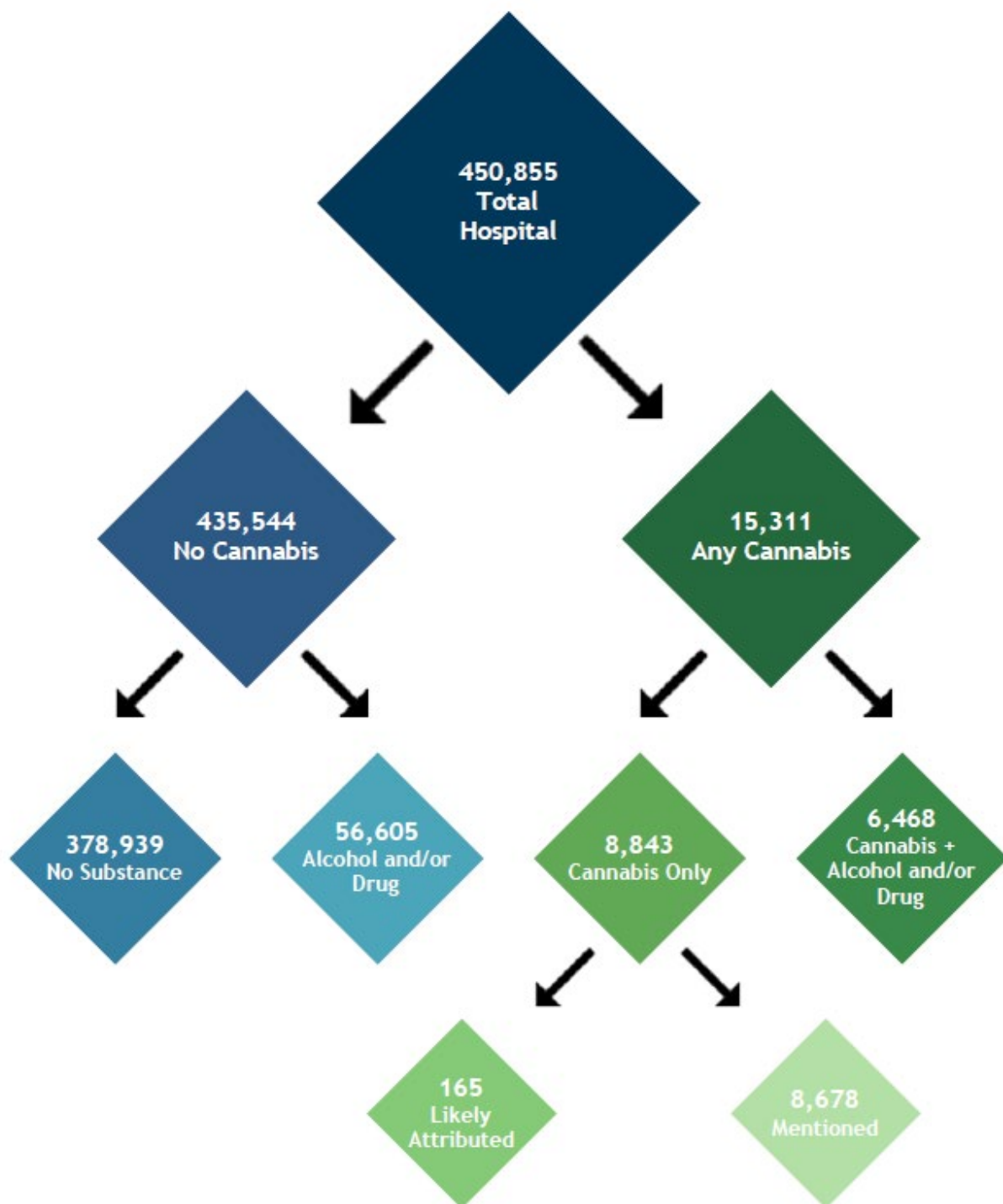
Logic models

Figure 1. Logic model of emergency department (ED) discharges with and without ICD-10-CM substance codes, Colorado 2020[‡]



[‡] Colorado Hospital Association, 2020 dataset

Figure 2. Logic model of hospital discharges with and without ICD-10-CM substance codes, Colorado 2020[‡]



[‡] Colorado Hospital Association, 2020 dataset

Demographics

Table 2. Rate of emergency department discharges with cannabis only ICD-10-CM codes per 100,000 discharges by age, Colorado 2020

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	117,851	103	87.4	71.3-106.0	-*		
6-12 years	77,042	25	32.4	21.0-47.9	26	33.7	22.0-49.4
13-17 years	76,086	220	289.1 [†]	252.2-329.9	848	1,114.5	1,041.1-1,191.7
18-20 years	70,736	147	207.8	175.6-244.2	923	1,304.9 [‡]	1,222.5-1,391.2
21-25 years	130,172	246	189.0	166.1-214.1	1,597	1,226.8 [§]	1,167.7-1,288.1
26-35 years	278,554	364	130.7	117.6-144.8	2,168	778.3	746.0-811.6
36-55 years	400,187	243	60.7	53.3-68.9	1,774	443.3	422.9-464.4
56-65 years	169,875	65	38.3	29.5-48.8	426	250.8	227.5-275.7
66+ years	252,613	58	23.0	17.4-29.7	224	88.7	77.4-101.1
Unknown	12	-*			-*		

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 2020

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	732,206	762	104.1†	96.8-111.7	4,539	619.9‡	602.1-638.2
Female	840,771	709	84.3	78.2-90.8	3,447	410.0	396.4-423.9
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 2020

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	14,983	-*			75	50.1	393.9-627.1
Asian/Pacific Islander	24,173	32	132.4§	90.6-186.8	56	23.2	175.0-300.7
Black	116,388	171	146.9§	125.7-170.6	922	79.2‡	742.0-844.8
Hispanic	294,013	315	107.1	95.6-119.6	1,421	48.3	458.6-509.0
White, non-Hispanic	974,359	741	76.0	70.7-81.7	4,671	47.9	465.8-493.3
Other	76,377	83	108.7	86.6-134.7	395	51.7	467.5-570.6
Unknown	72,835	122	167.5†	139.1-200.0	447	61.4	558.3-673.1

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

Map of Colorado showing the percentage of the population aged 65 and over by county. The map uses a blue color scale where darker shades represent higher percentages.

County	Percentage (%)
Adams	5.2
Alamosa	6.8
Archuleta	4.9
Arapahoe	5.2
Baca	3.1
Bent	6.3
Boulder	7.6
Broomfield	6.8
Chaffee	2.6
Clear Creek	4.4
Conejos	3.9
Costilla	7.7
Crowley	0.0
Custer	0.0
Delta	5.6
Denver	5.6
Douglas	3.3
Dolores	0.0
El Paso	7.1
Elbert	2.8
Garfield	6.5
Gunnison	21.0
Hinsdale	0.0
Huerfano	5.2
Jefferson	4.2
Kit Carson	7.6
Kiowa	0.0
Kearney	0.0
Larimer	6.6
Las Animas	8.7
La Plata	4.9
Lake	5.8
Lincoln	8.8
Logan	3.6
Manitou	0.0
Mineral	0.0
Montezuma	4.5
Montrose	3.3
Morgan	8.5
Mesa	4.6
Moffat	12.0
Ouray	0.0
Park	3.5
Pueblo	8.0
Prowers	3.3
Rio Blanco	19.4
Rio Grande	4.6
Routt	5.8
Saguache	6.7
San Juan	0.0
San Miguel	0.0
Sedgwick	0.0
Seminole	0.0
Summit	4.4
Teller	3.4
Washington	8.4
Weld	5.9
Yuma	10.4

Discharges missing residential information excluded

Table 5. Rate of hospital discharges with cannabis only ICD-10-CM codes by age, Colorado 2020

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	60,443	13	21.5	11.5-36.8	628	103.9	959.7-1,123.1
6-12 years	4,027	.*			.*		
13-17 years	7,947	13	163.6†	87.1-279.6	645	811.6‡	7,525.0-8,738.5
18-20 years	7,649	.*			575	751.7§	6,936.2-8,131.1
21-25 years	19,561	22	112.5§	70.5-170.2	1,197	611.9	5,787.4-6,464.3
26-35 years	61,312	30	48.9	33.0-69.8	1,941	316.6	3,028.6-3,307.4
36-55 years	81,587	44	53.9	39.2-72.4	1,893	232.0	2,218.0-2,425.8
56-65 years	62,991	16	25.4	14.5-41.2	1,037	164.6	1,548.3-1,748.7
66+ years	145,337	14	9.6	5.3-16.2	755	51.9	483.2-557.8
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 2020

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	201,361	105	52.1†	42.7-63.1	4,414	219.2‡	2,128.6-2,257.0
Female	249,350	60	24.1	18.4-31.0	4,259	170.8	1,657.5-1,759.7
Unknown	144	-*			-*		

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

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 2020

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	3,905	-*			81	2,074.3	1,650.6-2,571.6
Asian/Pacific Islander	8,798	-*			84	954.8	762.3-1,180.7
Black	23,888	23	96.3†	61.0-144.4	1,043	4,366.2‡	4,110.6-4,633.0
Hispanic	66,195	27	40.8	26.9-59.3	1,262	1,906.5	1,803.7-2,013.6
White, non-Hispanic	299,966	97	32.3	26.2-39.4	5,293	1,764.5	1,717.7-1,812.3
Other	17,152	-*			387	2,256.3	2,039.3-2,489.7
Unknown	30,951	-*			528	1,705.9	1,564.6-1,856.4

Footnotes:

-*Race/ethnicity groups with n<11 are suppressed

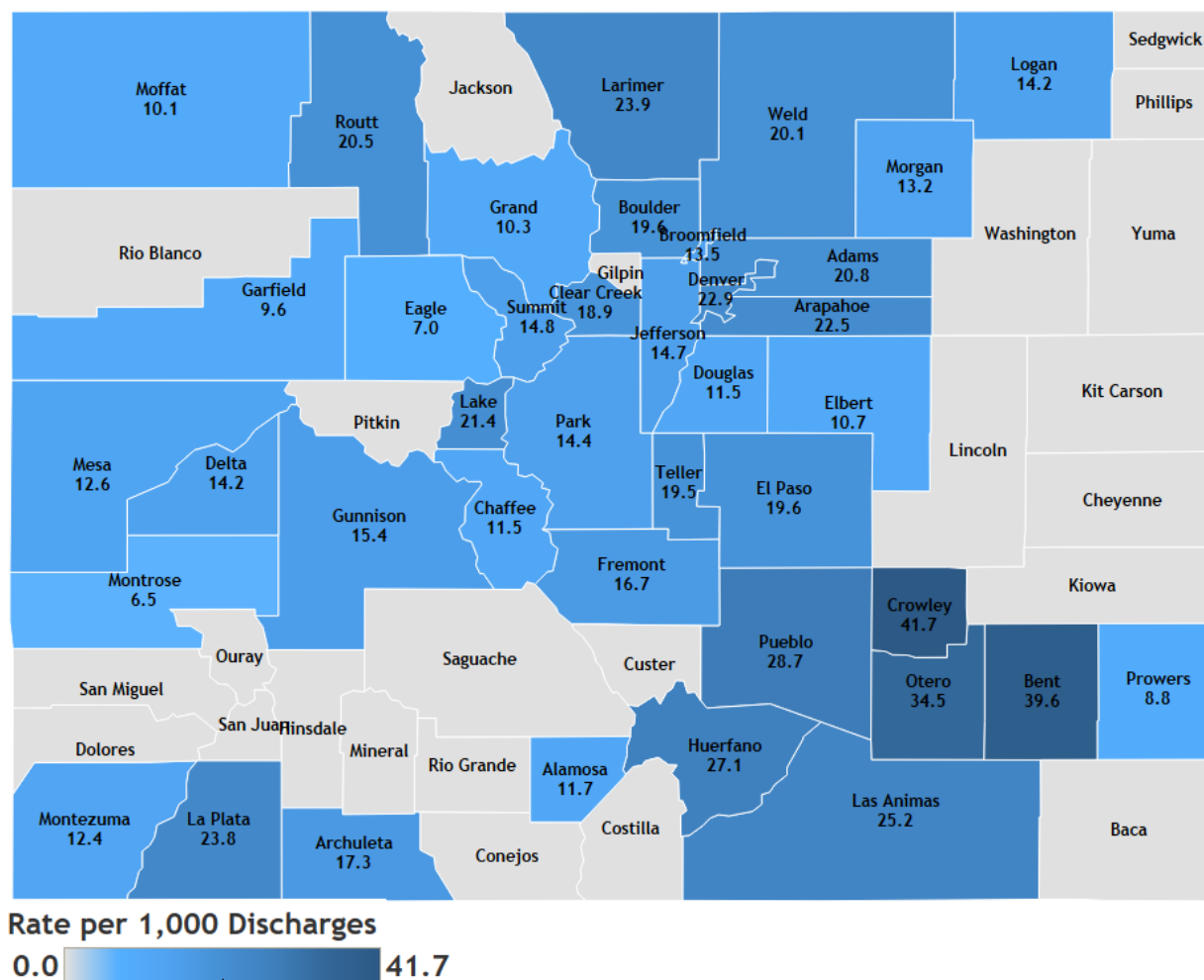
† Highest rate in demographic group among cannabis likely-attributed

‡ Highest rate in demographic group among cannabis-mentioned

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 2020



Footnotes:

- Counties with n<11 are suppressed and indicated in gray
- 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

References

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