Cannabis-Related Emergency Department Visits Among Rhode Island Residents Under the Age of 25, 2019–2023

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INTRODUCTION

As of November 1, 2024, cannabis is legal for adult use in 28 U.S. states and territories and legal for medical use in 42 U.S. states and territories. In Rhode Island (RI), the Medical Marijuana Program began in 2006, and in December 2022, sales began for adult use cannabis. While cannabis is legal for purchase over the age of 21, cannabis can have negative health effects if used while the brain is still developing. As brain development can continue until age 25, youth and young adults are at elevated risk of negative health outcomes from cannabis use.[1] Youth who use cannabis frequently are at higher risk for mental health complications such as schizophrenia, psychosis, and suicidal ideation. Given the risks of cannabis use to youth and young adults, this analysis focuses on emergency department (ED) visits among patients under 25-years-old who present for cannabis-related reasons. To date, this is the first time cannabis-related ED visits among individuals under the age of 25 in RI have been described.

METHODS

We obtained data from the RI Hospital Discharge Dataset (HDD) which collects hospital reports from 10 acute care and two psychiatric care hospitals in RI. We identified cannabis-related ED visits among RI residents under the age of 25 that occurred between January 1, 2019 and December 31, 2023. We defined a "cannabis-related ED visit" as any ED visit that had at least one of the following 10th Clinical Modification of the International Classification of Diseases (ICD-10) codes as a primary or subsequent diagnosis: F12.1-F12.9 (Cannabis abuse, dependence, or use) or T40.7 (Cannabis poisoning).[2] While HDD requires a primary diagnosis, subsequent diagnoses codes are optional and up to 11 additional diagnoses can be entered. Demographic information collected included sex, age, race/ethnicity, and insurance type. Race/ethnicity was defined as: Non-Hispanic White, Non-Hispanic Black, Hispanic, Non-Hispanic Other (Asian, American Indian/Alaska Native, Native Hawaiian/Other Pacific Islander, and Other), and Unknown. Insurance type was categorized into Private, Public (Medicaid or Medicare), and Other (Self-Pay, Workers Compensation, Other). Clinical characteristics collected include cannabis-related ICD-10 codes, hospital of admission, and discharge status.

All analyses were performed in SAS [Version 9.4].

RESULTS

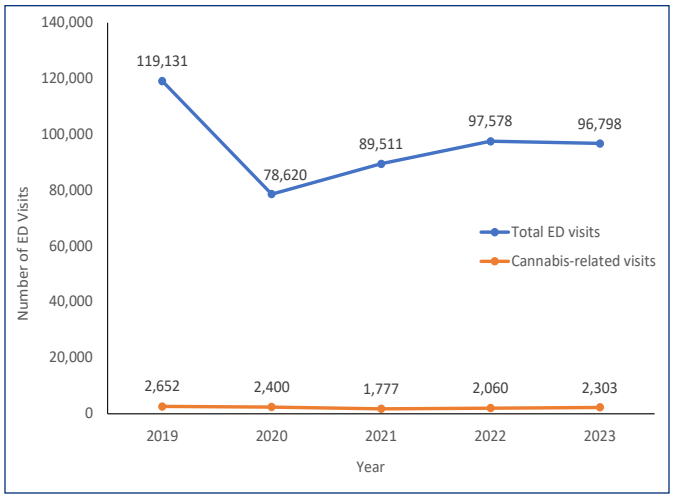
From January 1, 2019 to December 31, 2023, there was a total of 481,638 ED visits to RI hospitals among RI residents under the age of 25 (**Figure 1**), of which, 11,192 (2.3%) ED visits included any cannabis-related ICD-10 code. The total number of ED visits and ICD-10 coded cannabis-related ED visits by under-25-year-old patients both increased from 2021 to 2023 but remained below 2019 counts.

For all ICD-10 coded cannabis-related ED visits, the mean age was 20 years, and most patients were 18–24 years (75.7%), followed by 15–17 years (19.1%; **Table 1**). Overall, 50.1% of cannabis-related ED visits occurred among males. Most patients identified as Non-Hispanic White (55.1%), followed by Hispanic (23.7%), and non-Hispanic Black (14.8%). Public health insurance was most common (61.1%), followed by private (30.0%). Rhode Island Hospital (36.1%) and Landmark Medical Center (20.8%) saw the most ED visits by under 25-year-old patients for cannabis-related reasons (**Table 2**).

For trends within demographic groups, visits by 10- to 14-year-olds increased by 26% from 2019 to 2023. The proportion of visits by female patients increased from 2019 to 2023 (47.1% to 53.8%), and ED visits by Hispanic individuals increased by 15% over the study period.

Only 1,218 (10.9%) of cannabis-related ED visits had a cannabis-related primary ICD-10 code, with the most common

Figure 1. Emergency Department visits for Rhode Island residents under 25-years-old, Rhode Island, 2019–2023



primary diagnosis being F12.9: Cannabis use, unspecified (62.0%; **Table 3**). Most of the ICD-10 codes referred to cannabis use, abuse, and dependence (F12.1–12.9), while fewer visits included ICD-10 codes for cannabis poisoning (T40.7). The most frequent subsequent diagnosis code was F12.9: Cannabis use, unspecified (71.7%). For clinical outcomes among people with a primary cannabis-related ICD-10 code, 96.6% of patients were routinely discharged home from the ED. This outcome was the same across all age and race/ethnicity groups.

Table 1. Demographics of under 25-year-old Rhode Island residents with cannabis-related visits presenting to Emergency Department, Rhode Island, 2019–2023.

Demographic Characteristics	Overall n(%)	2019 n(%)	2020 n(%)	2021 n(%)	2022 n(%)	2023 n(%)
Total	11,192	2,652	2,400	1,777	2,060	2,303
Sex						
Male	5,603 (50.1%)	1,401 (52.8%)	1,255 (52.3%)	865 (48.7%)	1,024 (49.7%)	1,058 (45.9%)
Female	5,562 (49.7%)	1,249 (47.1%)	1,137 (47.4%)	905 (50.9%)	1,031 (50.1%)	1,240 (53.8%)
Other/Unknown/Missing	27 (0.2%)	<5*	8 (0.3%)	7 (0.4%)	5 (0.2%)	5 (0.2%)
Age						
0–4	47 (0.4%)	<5*	9 (0.4%)	10 (0.6%)	11 (0.5%)	14 (0.6%)
5–9	26 (0.2%)	5 (0.2%)	5 (0.2%)	<5*	6 (0.3%)	6 (0.3%)
10–14	514 (4.6%)	120 (4.5%)	73 (3.0%)	78 (4.4%)	92 (4.5%)	151 (6.5%)
15–17	2,133 (19.1%)	573 (21.6%)	448 (18.7%)	302 (16.9%)	376 (18.3%)	434 (18.8%)
18–24	8,472 (75.7%)	1,951 (73.6%)	1,865 (77.7%)	1,383 (77.8%)	1,575 (76.5%)	1,698 (73.7%)
Race/Ethnicity						
Non-Hispanic White	6,168 (55.1%)	1,565 (59.0%)	1,351 (56.3%)	974 (54.8%)	1,088 (52.8%)	1,190 (51.7%)
Non-Hispanic Black	1,651 (14.8%)	382 (14.4%)	370 (15.4%)	241 (13.6%)	319 (15.5%)	339 (14.7%)
Non-Hispanic Other	526 (4.7%)	126 (4.8%)	104 (4.3%)	79 (4.5%)	93 (4.5%)	124 (5.4%)
Hispanic	2,657 (23.7%)	527 (19.9%)	530 (22.1%)	467 (26.6%)	527 (25.6%)	606 (26.3%)
Unknown	190 (1.7%)	52 (2.0%)	45 (1.9%)	16 (0.9%)	33 (1.6%)	44 (1.9%)
Insurance Type						
Private	3,352 (30.0%)	854 (32.2%)	678 (28.3%)	575 (32.4%)	595 (28.9%)	650 (28.2%)
Public (Medicaid, Medicare)	6,835 (61.1%)	1,437 (54.2%)	1,443 (60.1%)	1,085 (61.1%)	1,341 (65.1%)	1,529 (66.4%)
Other (Self-Pay, Workers Comp, other)	1,005 (9.0%)	361 (13.6%)	279 (11.6%)	117 (6.6%)	124 (6.0%)	124 (5.4%)

*Counts less than five are suppressed. Please use caution when interpreting rates. Note: Percentages may add to more than 100% due to rounding.

Table 2. Hospital of admission for under 25-year-old Rhode Island residents with cannabis-related visits presenting to Emergency Department, Rhode Island, 2019–2023.

Hospital	Overall n(%)	2019 n(%)	2020 n(%)	2021 n(%)	2022 n(%)	2023 n(%)
Newport Hospital	647 (5.8%)	168 (6.3%)	132 (5.5%)	73 (4.1%)	128 (6.2%)	146 (6.3%)
Our Lady of Fatima Hospital	445 (4.0%)	102 (3.9%)	76 (3.2%)	77 (4.3%)	92 (4.5%)	98 (4.3%)
The Miriam Hospital	1,306 (11.7%)	477 (18.0%)	190 (7.9%)	176 (9.9%)	222 (10.8%)	241 (10.5%)
Rhode Island Hospital	4,040 (36.1%)	853 (32.2%)	769 (32.0%)	671 (37.8%)	803 (39.0%)	944 (41.0%)
Roger Williams Medical Center	551 (4.9%)	74 (2.8%)	117 (4.9%)	142 (8.0%)	112 (5.4%)	106 (4.6%)
South County Health	298 (2.7%)	42 (1.6%)	54 (2.3%)	75 (4.2%)	63 (3.1%)	64 (2.8%)
Kent Hospital	1,109 (9.9%)	539 (20.3%)	144 (6.0%)	150 (8.4%)	143 (6.9%)	133 (5.8%)
Westerly Hospital	171 (1.5%)	57 (2.2%)	29 (1.2%)	26 (1.5%)	34 (1.7%)	25 (1.1%)
Landmark Medical Center	2,330 (20.8%)	268 (10.1%)	848 (35.3%)	351 (19.8%)	411 (20.0%)	452 (19.6%)
Women & Infants Hospital	182 (1.6%)	69 (2.6%)	35 (1.5%)	29 (1.6%)	23 (1.1%)	26 (1.1%)
Butler Hospital	113 (1.0%)	<5*	6 (0.3%)	7 (0.4%)	29 (1.4%)	68 (3.0%)

*Counts less than five are suppressed. Please use caution when interpreting rates. Note: Percentages may add to more than 100% due to rounding.

Table 3. Cannabis-related ICD-10 Codes for primary diagnosis in under-25-year-old patients presenting to Emergency Department, Rhode Island, 2019–2023.

	Primary Cannabis-Related ICD-10 Code	Subsequent Non-Primary Cannabis-Related ICD-10 Code*
F12.1: Cannabis abuse (F12.10, F12.12, F12.120, F12.121, F12.122, F12.129, F12.15, F12.151, F12.159, F12.18, F12.180, F12.188, F12.19)	246 (20.2%)	1,442 (12.9%)
F12.2: Cannabis dependence (F12.2, F12.20, F12.22, F12.220, F12.221, F12.222, F12.229, F12.25, F12.250, F12.251, F12.259, F12.28, F12.280, F12.288)	40 (3.3%)	709 (6.3%)
F12.9: Cannabis use, unspecified (F12.9, F12.90, F12.92, F12.920, F12.921, F12.922, F12.929, F12.95, 12.950, F12.951, F12.959, F12.98, F12.980, F12.988, F12.99)	755 (62.0%)	8,022 (71.7%)
T40.7: Cannabis poisoning (T40.7 × 1, T40.7X1A, T40.7X1D, T40.7X1S, T40.7 × 2, T40.7X2A, T40.7X2D, T40.7X2S, T40.7 × 3, T40.7X3A, T40.7X3D, T40.7X3S, T40.7 × 4, T40.7X4A, T40.7X4D, T40.7X4S, T40.7 × 5, T40.7X5A, T40.7X5D, T40.7X5S)	177 (14.5%)	107 (1.0%)

*Records can have up to 10 subsequent ICD-10 code so counts will not add up to total. Note: Percentages may add to more than 100% due to rounding.

DISCUSSION

From January 1, 2019, to December 31, 2023, a cannabis-related ICD-10 code was included in 2.3% of all ED visits by RI residents under the age of 25, and among these visits, was listed as the primary diagnosis for only 10.9% of visits. Although this is a small percent of all visits for this population, it is important to note that one in four cannabis-related ED visits occurs in this population in RI and nationally.[3] While RI has seen an increase in cannabis-related ED visits in patients under the age of 25 since 2021, there has been an 18.6% decrease from 2019 to 2023. Reasons for these trends are unknown. The neighboring state of Massachusetts saw increases in ED visits after sales for recreational cannabis began in 2018.[8] While legalizing adult use cannabis in December 2022 does not seem to have had an immediate impact on the number of cannabis-related ED visits in RI, the Rhode Island Department of Health (RIDOH) will continue to monitor these trends.

Within demographic groups, RI saw increases in the proportion of cannabis-related ED visits in females and Hispanic patients. RI survey data also show an increase in self-reported cannabis use among female high school students, and nationally rates of ED visits for females under 25 have increased more than males.[3,4] While self-reported current cannabis use among RI Hispanic high school students increased from 2021 to 2023, it was similar to increases observed among all other race/ethnicity groups during this time period.[5] Exact reasons for these trends are unknown and may include using cannabis to self-medicate, increased access from legalization, and decreased perception of risk.[6,7] RIDOH will continue to monitor cannabis-related ED visits to create tailored and culturally sensitive messaging about the risks of cannabis use to demographic groups experiencing increases or disproportionate burdens in ED visits, such as female and Hispanic youth.

Although patients younger than 10 made up less than 1% of cannabis-related ED visits in RI, children should still be an important focus of outreach and education efforts, as national data have shown a significant increase in pediatric exposures to edible cannabis products.[9] These products often look like products that appeal to children, such as candy or snacks.[10,11] To prevent accidental exposures, caretakers of children should use safe storage practices, including using lock bags to securely store all drugs, medications, and cannabis products to ensure children cannot access them.[12] Caretakers should also have their local poison control center number readily available (for RI: 1-800-222-1222) and be prepared to call if a child in their care has ingested cannabis.[11] RIDOH is working with the RI Cannabis Control Commission to create packaging requirements to ensure cannabis products do not appeal to children.

From 2019 to 2023, in the under-25-year age group, around 25% of ICD-10 coded cannabis-related ED visits were among middle- or high school-aged children (10–17 years old). RI saw a slight increase in 10- to 14-year-old patients from 2021 to 2023, which was similar to national trends in the 11- to 14-year-old population.[3] While ED data do not provide information on intentionality of cannabis use, the RI Youth Risk Behavior Survey (YRBS) asks middle and high school students about cannabis use. In 2023, the first year of the survey since RI legalized adult use cannabis, 5% of middle school students had ever tried cannabis and 20% of high school students reported current cannabis use, both of which increased from 2021.[4] Middle school students also saw a significant increase in current cannabis use in the 2024 RI Student Survey.[13] Since RI is two years post-legalization, it is important to monitor cannabis-related ED visits and self-reported cannabis use trends in this age group to determine if legalization impacted intentional use among youth. Both in RI and nationally, trends have shown decreases in self-reported cannabis use by youth yet increases in cannabis-related ED visits for this

population.[3,4,14,15] RIDOH should partner with prevention coalitions and other state agencies to educate youth on the risks of using cannabis and increase protective factors that can mitigate the use of harmful coping mechanisms.

Our analysis showed the highest percent of ED visits (75.7%) were in those ages 18–24, with 47.4% among ages 21–24. While cannabis is legal to purchase by those 21 and older at RI dispensaries, research recommends waiting until age 25 or later to use cannabis due to the critical period of brain development.[1] Further analyses into this age demographic will be conducted and used to inform educational campaigns on lower-risk use guidelines for those legally able to purchase cannabis.[16]

Analysis of primary diagnosis ICD-10 codes showed inconsistent use and almost 90% of cannabis-related ED visits did not report a cannabis-related ICD-10 code as the primary diagnosis. Future work will evaluate how accurately ICD-10 codes capture cannabis-related ED visits and examine the co-occurrence of cannabis-related ICD-10 codes with other co-morbidities to further define the role of cannabis in ED visits.

Like other states where cannabis was legalized, RIDOH recently developed a public health surveillance program for cannabis use. Findings from this analysis provide direction for our future surveillance, education, and outreach efforts and highlight limitations in relying on ICD-10 codes for surveillance. We will continue to monitor the population utilizing ED care for cannabis for negative health outcomes, especially for the high-risk population under 25 as cannabis becomes more widely available in RI.

LIMITATIONS

Cannabis legalization may have changed willingness to report cannabis involvement in ED visits. Additionally, we cannot determine if the patient is a medical marijuana patient, reason for use of the cannabis product, if the cannabis product was purchased through a regulated source, or if the exposure was intentional or accidental.

The lack of standardization of ICD-10 codes within hospitals and between clinicians may underestimate the burden of cannabis exposure in this population. We cannot infer the effect cannabis exposure had on the patient's clinical presentation or medical severity. We also cannot determine any long-term medical conditions, such as cannabinoid hyperemesis syndrome or cannabis use disorder, that may result from frequent chronic cannabis use and are more accurately diagnosed in other healthcare settings.

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