

# Trends in Cannabis-Related Acute Psychosis Diagnoses in California-Based Emergency Departments

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## Abstract

**Background.** Research has suggested an upward trend in the number of cannabis-related adverse events in Colorado since legalization of recreational cannabis in 2014. This was supported by an increase in the number emergency department (ED) visits for acute cannabis intoxication, misuse, unintentional ingestion, dependence, and/or addiction. Because California legalized recreational cannabis in 2018, we aimed to examine the patterns of cannabis use, misuse, and dependence with psychiatric or anxiety disorder diagnoses in California from 2015 to 2018.

**Methods.** General population data and self-reported data on cannabis users in California from 2015 through 2018 were collected from US- and California-based databases. ED visits resulting in cannabis-related acute psychosis diagnoses were identified using ICD-9-CM and ICD-10-CM codes. A simple linear regression was performed to assess for trends.

**Results.** The number of self-reported cannabis users in California has increased each year since 2015, according to US-based data. Moreover, cannabis-related acute psychosis diagnoses have increased since 2015 in California specifically.

**Conclusions.** This exploratory analysis highlights the increase in psychiatric diagnoses associated with cannabis use, especially during an era of legalizing recreational cannabis. Given the increase in cannabis-related ED visits associated with acute psychosis, it would be fiscally and socially beneficial to develop specific therapies to reduce the time spent in EDs and to decrease the number of hospitalizations due to improper use.

**Key words:** Cannabis, cannabis legalization, acute psychosis, emergency department, California

Colorado was the first state to legalize recreational cannabis in the United States. In November 2012, the inaugural state passed Colorado Amendment 64,

which legalized the manufacturing, commercial sale, and use of recreational cannabis for adults aged 21 years or older.<sup>1</sup> The legislation was implemented 2 years

later on January 1, 2014. Research has suggested an upward trend in the number of cannabis-related adverse events in Colorado since legalization, possibly because of the increased availability and use of the drug.<sup>2</sup> This was further supported by an increase in the number of patients who presented to emergency departments (EDs) with acute cannabis intoxication, misuse, unintentional ingestion, dependence, and/or addiction.<sup>3</sup>

An increasing number of states have legalized cannabis use for both medical and recreational purposes. One of the most recent states is California, which legalized recreational cannabis on January 1, 2018. Legalization, however, coincides with a decrease in perceived harmfulness of the

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The authors report no relevant financial relationships.

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**Table.** ICD-10-CM Codes Included as “Cannabis-Related Acute Psychosis” Diagnoses

ICD-10-CM CODE	DIAGNOSIS DESCRIPTION
F12121	Cannabis misuse with intoxication delirium
F12122	Cannabis misuse with intoxication with perceptual disturbance
F12150	Cannabis misuse with psychotic disorder with delusions
F12151	Cannabis misuse with psychotic disorder with hallucinations
F12159	Cannabis misuse with psychotic disorder, unspecified
F12180	Cannabis misuse with cannabis-induced anxiety disorder
F12250	Cannabis dependence with psychotic disorder with delusions
F12251	Cannabis dependence with psychotic disorder with hallucinations
F12259	Cannabis dependence with psychotic disorder, unspecified
F12280	Cannabis dependence with cannabis-induced anxiety disorder
F12950	Cannabis use, unspecified with psychotic disorder with delusions
F12951	Cannabis use, unspecified with psychotic disorder with hallucinations
F12959	Cannabis use, unspecified with psychotic disorder, unspecified
F12980	Cannabis use, unspecified with anxiety disorder
T407X2A	Poisoning by cannabis (derivatives), intentional self-harm, initial encounter

drug and, therefore, has led to increased misuse.<sup>4</sup> In Colorado, when International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) codes were examined between 2012 and 2014, mental illness diagnoses in the ED had increased 5 times faster than mental illness presentations alone.<sup>5</sup> The largest increases were seen in persons who had received diagnoses of anxiety disorders, schizophrenia, suicide/intentional self-harm, and mood disorders.<sup>5</sup> Thus, in this exploratory analysis, we aimed to continue examining the patterns of cannabis use, misuse, and dependence with psychiatric or anxiety disorders in California. We aimed to initiate a discourse about the need for cannabis-related preparedness in EDs and to provide improved mental health care to this specific patient population that is increasing in size.

Methods

Descriptive data for the general population and self-reported data on cannabis users in California from 2015 through 2018

were collected from the US Census Bureau, US Department of Health & Human Services (HHS), and Substance Abuse and Mental Health Services Administration (SAMHSA).<sup>6</sup> Cannabis-related hospital ED visits in California from 2015 through 2018 were collected from the California Health and Human Services (CHHS) Hospital ED open database.<sup>7</sup> This includes cannabis-related primary diagnosis count data for all hospital EDs in the state of California.

ED visits resulting in cannabis-related acute psychosis diagnoses were identified using ICD-9-CM and ICD-10-CM codes. In our analysis, any case having an ICD-9-CM or ICD-10-CM code defined as or related to cannabis misuse, dependence, or use with psychotic disorders, hallucinations, delusions, self-harm, or induced anxiety disorders were counted as an ED cannabis-related acute psychosis diagnosis (Table).

Data were analyzed using SPSS version 23.<sup>8</sup> A simple linear regression was performed to assess any trends that the

dependent variable of our exploratory analysis—cannabis-related acute psychosis ED visits in California—might have had over time.

Results

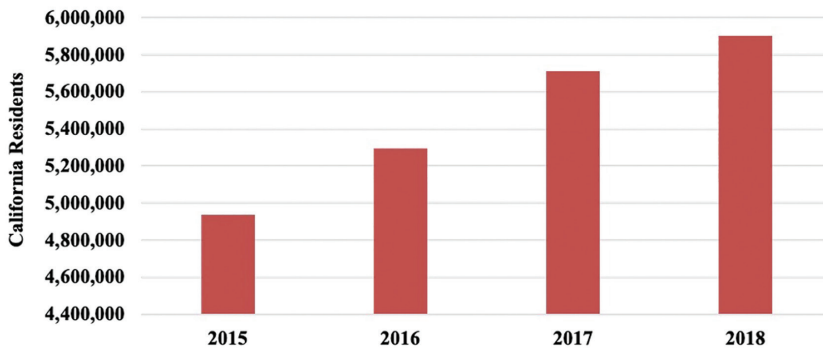
The US Census Bureau, HHS, and SAMHSA reported that the number of self-reported cannabis users in California has increased each year since 2015, with approximately 4.9 million users in 2015 to approximately 5.9 million users in 2019 (Figure 1).<sup>6</sup> According to the CHHS Hospital ED open database, cannabis-related acute psychosis diagnoses have continued to increase with an uphill, positive linear relationship ( $R = .95$ ) from 708 visits in 2015 to 1266 visits in 2018 (Figure 2).<sup>7</sup>

Discussion

This exploratory analysis highlights the increase in psychiatric diagnoses associated with cannabis use, especially during an era of legalizing recreational cannabis. After referring to the current literature, we hypothesized that cannabis-related acute psychosis diagnoses have been steadily increasing in California. Given the increase in cannabis-related ED visits associated with acute psychosis, it would be fiscally and socially beneficial to develop specific therapies to reduce the time spent in EDs and to decrease the number of hospitalizations due to improper use. Specific oral cannabinoid1 receptor antagonists have been shown to be highly favorable for one-time use as a reversal agent in acute cannabinoid overdose.<sup>9</sup> However, reformulation of a cannabinoid1 receptor antagonist for parenteral administration may offer better symptom reduction, easier delivery, and more rapid medication onset in an acute ED setting.<sup>10,11</sup>

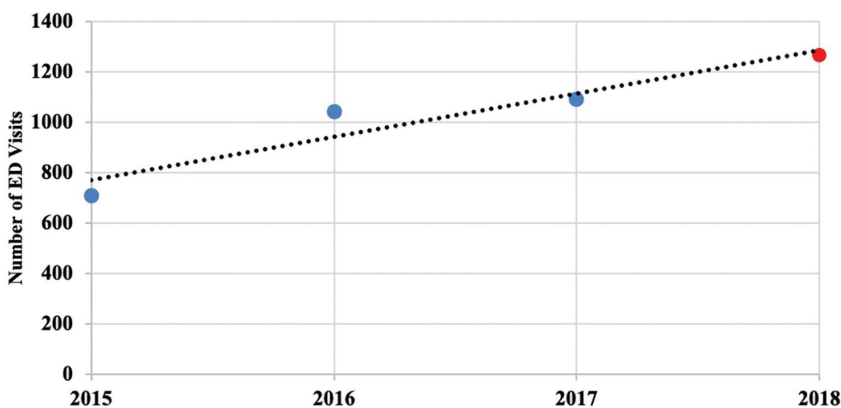
Because past and current federal restrictions have hindered research on cannabis, tetrahydrocannabinol (THC), and cannabidiol (CBD), no universal guidelines for safe use of these products exist in any context. Therefore, there are no standards to help guide health care

Cannabis Users in California (CA) from 2015-2018



**Figure 1.** Note: All reported users were aged 12 or older. Recreational cannabis use was legalized in California in 2018.<sup>4</sup>

Cannabis-Related Acute Psychosis Diagnoses in Emergency Departments (ED) in California (CA) from 2015-2018



**Figure 2.** Note:  $R = 0.95$ . Recreational cannabis use was legalized in California in 2018.<sup>4</sup>

professionals in diagnosing multiple comorbidities in this patient population. Many major complications related to cannabis use and ingestion have become more prevalent secondary to increased cannabis use. Some issues include acute mental illness (ie, acute psychosis, depression, anxiety, and suicidal ideation), cannabis toxicity, cannabinoid hyperemesis syndrome, and pulmonary and cardiovascular complications.<sup>12</sup> What remains unknown and of interest to many health care professionals is the medical management of cannabis-associated

psychotic and anxiety disorders that functions beyond symptom reduction.

### Study Limitations

The generalization of our findings is limited by the collection of cannabis-related acute psychosis diagnosis data from open databases. Because open databases do not disclose patient information, we were unable to account for any duplicated cases, patient demographics, dose of cannabis, general vulnerability to psychosis, pre-existing psychiatric conditions, and concurrent drug use. We

can only infer from the current literature that improper cannabis use or consumption may contribute to causing psychosis, increasing the intensity of psychosis, or producing the symptoms of acute psychosis. The commonality of which has been generally observed in California EDs from 2015 to 2018.

### Conclusions

Because questions about the role of cannabis use and the presentation of acute psychosis or acute psychosis-like symptoms remain, there is a great need to research different dimensions of cannabis-related disorders.<sup>13</sup> There is a significant need for more data collection regarding cannabis dosing, acute and chronic adverse effects, and treatment protocol in this increasingly more common ED patient population.

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