

Cannabis Use Disorder in the Era of Legalization: Implications for Addiction Treatment Systems

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Introduction: Cannabis legalization has expanded rapidly across high-income jurisdictions, altering patterns of cannabis use, product potency, and commercial markets. Although surveillance systems increasingly quantify cannabis exposure, clinically meaningful harm is more difficult to detect. Cannabis use disorder (CUD) represents a key construct linking exposure to sustained impairment, yet its epidemiologic visibility depends heavily on diagnostic frameworks and measurement design.

Aim: This review examines how contemporary surveillance systems detect cannabis-related harm and evaluates the implications of diagnostic classification, epidemiologic measurement, and treatment capacity for understanding and responding to CUD in the post-legalization era.

Methods: We conducted a narrative review synthesizing literature on cannabis legalization, psychiatric epidemiology, and treatment of CUD. Evidence was identified from biomedical databases, epidemiologic surveys, systematic reviews, randomized trials, and policy analyses. Sources were examined across three domains: (1) post-legalization surveillance of cannabis exposure and harm, (2) diagnostic evolution and measurement of CUD in population surveys, and (3) current evidence for treatment interventions and treatment system responses.

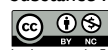
Results: Population surveillance systems measure cannabis exposure with increasing precision but show limited sensitivity for persistent or clinically meaningful harm. Transitions from DSM-IV's hierarchical abuse-dependence framework to the dimensional DSM-5 model expanded detection of mild and moderate disorder and altered prevalence estimates across epidemiologic surveys. International studies using DSM-5-aligned instruments generally report past-year CUD prevalence of approximately 2–3% in the general population, with substantially higher conditional risk among frequent users. However, surveillance systems relying on legacy diagnostic modules or restrictive assessment logic may underestimate disorder prevalence despite rising cannabis exposure and increasing acute health-care encounters. Evidence for CUD treatment indicates modest but consistent benefits from psychosocial interventions—including motivational, cognitive-behavioral, and contingency-based approaches—while no pharmacotherapies are currently approved, and treatment engagement remains low relative to estimated prevalence.

Conclusion: Apparent uncertainty in post-legalization health outcomes often reflects limitations in measurement rather than absence of harm. Aligning surveillance systems with contemporary diagnostic frameworks and strengthening treatment pathways are essential for translating exposure monitoring into effective public health response. As legalization continues to expand, CUD provides an important test of whether addiction treatment systems can adapt to legalized substances whose harms are diffuse, chronic, and frequently under-recognized.

Keywords: cannabis use disorder, cannabis legalization, psychiatric epidemiology, public health surveillance, addiction treatment systems, DSM-5, narrative review

Introduction

The global shift toward cannabis legalization represents one of the most consequential contemporary experiments in drug policy.¹ Across North America, Europe, Latin America, and Oceania, jurisdictions have moved from criminal prohibition to regulated legal markets, often justified on public health grounds.² Legalization has been framed as a corrective to the failures



of prohibition—reducing criminal justice harms, displacing illicit markets, and allowing regulatory control over product safety, potency, and access.^{3,4} Yet legalization also creates a governance obligation: if cannabis is regulated in the name of public health, governments must be able to detect, interpret, and respond to cannabis-related harm in a credible and timely manner.⁵ This requirement exposes a structural asymmetry that extends beyond any single country. Cannabis exposure—who uses, how often, and in what forms—is measured frequently and at scale in most high-income jurisdictions.^{6,7} In contrast, persistent or clinically meaningful cannabis-related harm is more difficult to detect and attribute.^{8–10} As outcomes become more clinically complex—psychiatric destabilization, cumulative functional decline, or disorder—surveillance sensitivity declines. Apparent ambiguity in post-legalization evidence often reflects measurement architecture rather than true epidemiologic uncertainty.⁶

Canada provides a useful case study of these dynamics. As the first G20 nation to implement nationwide legalization of non-medical cannabis in 2018 through the Cannabis Act,^{11,12} Canada embedded surveillance and legislative review directly within its regulatory framework.¹² Legalization was framed as an adaptive, evidence-informed public health intervention, with explicit acknowledgment of evidence gaps and a commitment to ongoing monitoring.³ Federal authority over criminal law, licensing, product standards, and promotion was paired with provincial control over retail models, pricing, age limits, and public consumption rules, generating regulatory heterogeneity within a unified national structure.^{13,14} This design mirrors international experience: legalization functions as a constellation of regulatory choices—commercialization intensity, retail density, marketing restrictions, and potency limits—each shaping exposure and risk.^{2,15,16} While these challenges are observable across jurisdictions, Canada's surveillance infrastructure provides a particularly well-documented case study. Despite substantial investment in exposure surveillance, the capacity of current systems to detect clinically meaningful cannabis-related harm remains uneven. Population surveys and administrative data sources capture prevalence, product types, and market behavior with considerable precision. Translating patterns of cannabis exposure into clinically meaningful outcomes, particularly cannabis use disorder (CUD), requires diagnostic frameworks and epidemiologic designs capable of detecting impairment rather than use alone.

The present narrative review examines cannabis use disorder as a critical bridge between cannabis exposure and clinically meaningful harm in the context of expanding legalization. Specifically, this review aims to:

1. Examine how contemporary surveillance systems measure cannabis exposure and harm following legalization;
2. Situate cannabis use disorder within evolving psychiatric diagnostic frameworks and epidemiologic measurement architectures; and
3. Review the current evidence base and system challenges related to the treatment of CUD.

Methods

Review Design

This article was conducted as a narrative review examining the relationship between cannabis legalization, surveillance systems, cannabis use disorder (CUD), and addiction treatment responses. A narrative review approach was selected because the objective was conceptual integration across multiple domains—including drug policy, psychiatric epidemiology, and clinical addiction treatment—rather than quantitative synthesis of a single outcome.

Literature Identification

Relevant literature was identified through targeted searches of major biomedical databases, including PubMed/MEDLINE and PsycINFO, as well as through reference lists of key review articles, epidemiologic studies, and policy reports. Search terms included combinations of keywords related to *cannabis*, *cannabis use disorder*, *marijuana legalization*, *drug policy*, *surveillance*, *epidemiology*, and *treatment*. Government reports and national surveillance publications from jurisdictions with legalized cannabis, particularly Canada and the United States, were also reviewed to contextualize policy and surveillance frameworks.

Evidence Selection and Synthesis

Sources were selected based on relevance to three thematic domains addressed in this review: (1) measurement of cannabis exposure and harm within post-legalization surveillance systems; (2) psychiatric diagnostic frameworks and epidemiologic measurement of cannabis use disorder; and (3) evidence regarding treatment interventions and treatment system responses for CUD. Priority was given to population-based epidemiologic surveys, diagnostic research, systematic reviews, randomized clinical trials of treatment interventions, and policy analyses. Evidence was synthesized narratively to examine conceptual relationships between surveillance design, diagnostic classification, and treatment system capacity.

Post-Legalization Cannabis Surveillance and Measurement of Harm Exposure Surveillance

In Canada, legalization was accompanied by substantial investment in national surveillance infrastructure oriented primarily toward exposure and market behavior.¹⁷ Health Canada and Statistics Canada operate multiple population surveys that track prevalence, frequency, product types, modes of administration, purchasing behaviors, and risk perceptions.^{18,19} These instruments—such as the Canadian Cannabis Survey (CCS), the Canadian Substance Use Survey (CSUS), and the Canadian Community Health Survey (CCHS)—serve distinct analytic purposes and produce heterogeneous but internally coherent estimates. This architecture is optimized for descriptive epidemiology, capturing shifts in prevalence, frequency distributions, and product diversification with considerable granularity. Post-legalization data document modest increases in adult use, stable but high adolescent prevalence, substantial growth in edible and vaping products, and a right-skewed distribution in which a minority of daily or near-daily users account for a disproportionate share of consumption.^{18,20} Similar patterns have been observed in U.S. states and Uruguay, where adult use has increased following legalization, while youth trends remain heterogeneous.^{9,21–23} Importantly, differences in survey framing, recruitment strategies, and question design produce divergent prevalence estimates across instruments and jurisdictions.²⁴ These differences do not necessarily represent methodological errors; they reflect trade-offs between disclosure, continuity, and representativeness. A cannabis-focused survey may yield higher estimates than a general health survey due to framing and participation effects. Extreme between-survey heterogeneity—observed in pooled analyses of Canadian data—is characteristic of substance-use surveillance internationally and underscores that exposure is measurable but context-sensitive. Public health guidance within these systems often centers on exposure modification. Canada's Lower-Risk Cannabis Use Guidelines (LRCUG), for example, recommend delayed initiation, avoidance of high-potency products, moderation of frequency, and safer modes of administration.^{25,26} Similar harm-reduction frameworks exist internationally. However, these guidelines are exposure-focused and derived from a synthesis of risk factors rather than evaluated as population-level interventions. Their integration into surveillance systems remains limited, and commercialization pressures—declining prices, higher THC concentrations, product innovation—complicate their uptake.^{27,28}

Acute Harms and Market Effects

Across legalized jurisdictions, including Canada, the most robust post-legalization signals involve acute and codable harms detectable in administrative systems. In Canada, increases in cannabis-attributable emergency department visits, poison control calls, hospitalizations, and unintentional pediatric exposures have been observed, particularly following commercialization phases and the introduction of edible products.^{9,29,30} Similar findings have been reported in U.S. states with commercial retail markets.^{31–34} At the same time, legalization has produced clear reductions in criminal justice harms. Cannabis-related possession charges declined sharply in Canada following 2018, consistent with findings from U.S. jurisdictions. Legal market participation increased, illicit market share declined, and product diversity expanded. These outcomes reflect the regulatory objectives of legalization and are often cited as policy successes.^{23,35–37} However, chronic and psychiatric outcomes show heterogeneous and often inconsistent patterns. Survey evidence suggests that a substantial minority of people who use cannabis report adverse experiences annually, but the prevalence of self-reported adverse events has remained relatively stable even as emergency department utilization patterns shift.³⁸

Internationally, associations between legalization and long-term mental health outcomes vary by study design, exposure definition, and population subgroup.^{24,39–41} This divergence between acute signals and ambiguous chronic outcomes reflects differences in measurement properties rather than contradiction.

Measurement Limitations in Cannabis Harm Surveillance

Cannabis exposure is relatively straightforward to measure as a discrete behavior—whether use occurred, how often, and in what form. Cannabis-related harm is conceptually diffuse and methodologically demanding.⁴² Harms may be acute or chronic, episodic or cumulative, and often require clinical interpretation. Attribution poses a central challenge: many outcomes are cannabis-involved without being cannabis-attributable, particularly in the presence of polysubstance use, psychiatric comorbidity, or social vulnerability. Population surveys prioritize feasibility and minimize respondent burden, limiting their ability to capture impairment, persistence, or functional decline. Administrative health data capture encounters, rather than conditions, are sensitive to coding practices, diagnostic thresholds, and health-seeking behavior. As clinical complexity increases, surveillance sensitivity declines. Systems optimized for counting users are structurally ill-suited to detecting clinically meaningful disorders. These limitations are not unique to Canada. Across jurisdictions, quasi-experimental designs exploit variation in legalization timing and regulatory intensity to estimate exposure effects. Yet interpretation remains constrained by unvalidated case definitions, exposure misclassification, short follow-up windows, and reliance on administrative proxies for disorder. Acute harms are detected reliably because they are proximate and codable. Persistent impairment is less visible.

Legalization as a Natural Experiment

Legalization is frequently described as a natural experiment. Cross-jurisdictional variation in pricing, retail access, marketing restrictions, and potency limits offers opportunities for quasi-experimental analysis.⁴³ These designs clarify how regulatory choices shape exposure and acute harms. However, their interpretability is fundamentally constrained by surveillance systems that measure exposure with far greater precision than harm. Stable or modest changes in prevalence do not imply stable harm. Conversely, null findings for chronic outcomes do not imply the absence of impairment. Frequency of use, product type, and mode of administration do not map cleanly onto clinically meaningful outcomes. The absence of health system contact does not imply the absence of distress or functional consequence. The core limitation is therefore not the absence of surveillance, but the absence of measurement constructs capable of bridging exposure and clinically meaningful harm. Measurement architecture functions as a form of governance: what is counted shapes what is interpreted as success or failure. As legalization spreads internationally, jurisdictions face a common challenge. Exposure is visible. Harm is only partially observable. Without validated constructs that translate use into disorder and impairment into measurable burden, policy evaluation will remain structurally asymmetric.

Cannabis Use Disorder: Diagnosis and Epidemiology

The preceding section established a central asymmetry in post-legalization surveillance: cannabis exposure is measured with precision, while harm is only partially observable. A critical reason for this gap is the tendency, in both public discourse and some epidemiologic analyses, to treat exposure metrics as implicit proxies for pathology.⁴⁴ Frequency of use, potency, retail density, and market growth are often interpreted as signals of disorder. Yet use is a behavior; cannabis use disorder (CUD) is a psychiatric diagnosis. Conflating the two collapses a clinically essential distinction and risks distorting inference. CUD is defined not by consumption alone but by impaired control, withdrawal, craving, persistence despite harm, and functional impairment.⁴⁵ It is the construct that links cannabis exposure to sustained disability. However, disorder prevalence is inseparable from the diagnostic and measurement systems used to operationalize it. Diagnostic criteria, structured interview design, skip patterns, symptom thresholds, and sampling frames do not merely observe pathology—they shape its epidemiologic visibility.⁴⁶ Apparent stability or fluctuation in CUD prevalence may therefore reflect properties of measurement architecture rather than true epidemiologic change. This section situates CUD within contemporary psychiatric nosology and epidemiology and examines how surveillance design can attenuate disorder detection—even in environments of rising exposure.

Diagnostic Evolution of CUD

Modern substance use disorder diagnosis emerged from dissatisfaction with moralistic and consequence-based models of excessive use.^{47,48} The dependence syndrome reframed addiction as a constellation of impaired control, salience, tolerance, withdrawal, and relapse—explicitly dimensional rather than categorical. However, DSM-III and DSM-IV formalized a hierarchical distinction between substance abuse and substance dependence.^{49–52} Abuse emphasized recurrent adverse consequences; dependence emphasized neuroadaptation and compulsive use. Dependence preempted abuse, embedding an assumed severity ordering. Psychometric analyses later demonstrated that abuse and dependence criteria loaded onto a single latent severity dimension rather than representing distinct syndromes.^{53,54} Cannabis illustrated this misalignment clearly. Individuals endorsing one or two dependence criteria—so-called “diagnostic orphans”—were excluded from diagnosis despite meaningful impairment and elevated progression risk.^{55,56} Several abuse criteria, including legal problems, operated at higher severity thresholds than some dependence criteria, contradicting the presumed hierarchy.⁵⁷ DSM-5 eliminated the abuse–dependence distinction and introduced a unified substance use disorder defined by 11 criteria, with severity graded as mild, moderate, or severe.⁵⁸ The major diagnostic differences between DSM-IV and DSM-5 substance use disorder frameworks are summarized in Table 1. Legal problems were removed; craving and cannabis withdrawal were added, the latter formally recognized as a distinct syndrome after extensive empirical validation.^{59,60} These revisions primarily increased identification of mild and moderate cases while

Table 1 Comparison of DSM-IV Cannabis Abuse and Dependence Criteria with DSM-5 Cannabis Use Disorder Criteria

Diagnostic Domain	DSM-IV Cannabis Abuse	DSM-IV Cannabis Dependence	DSM-5 Cannabis Use Disorder
Diagnostic framework	Abuse and dependence defined as separate disorders	Dependence considered more severe and hierarchical over abuse	Unified substance use disorder with dimensional severity
Impaired control	—	Substance taken in larger amounts or for longer than intended	Larger amounts or longer use than intended
	—	Persistent desire or unsuccessful efforts to cut down	Persistent desire or unsuccessful attempts to cut down
	—	Great deal of time spent obtaining, using, or recovering	Significant time spent obtaining, using, or recovering
	—	—	Craving or strong desire to use cannabis
Social impairment	Recurrent use leading to failure to fulfill role obligations	—	Failure to fulfill major role obligations
	Continued use despite social or interpersonal problems	—	Continued use despite social or interpersonal problems
	—	Important activities reduced or given up	Important activities reduced or given up
Risky use	Recurrent use in physically hazardous situations	—	Recurrent use in hazardous situations
	Continued use despite physical or psychological problems	—	Continued use despite physical or psychological problems
Pharmacologic criteria	—	Tolerance	Tolerance
	—	Withdrawal	Withdrawal (recognized as a diagnostic syndrome for cannabis)

(Continued)

Table 1 (Continued).

Diagnostic Domain	DSM-IV Cannabis Abuse	DSM-IV Cannabis Dependence	DSM-5 Cannabis Use Disorder
Additional DSM-IV abuse criterion removed in DSM-5	Recurrent substance-related legal problems	—	Criterion removed
Diagnostic threshold	≥1 abuse criterion within 12 months	≥3 dependence criteria within 12 months	≥2 criteria within 12 months
Severity specification	None	None	Mild (2–3 criteria), Moderate (4–5), Severe (≥6)

Notes: DSM-IV distinguished between substance abuse and substance dependence as separate diagnostic entities, with dependence considered hierarchically more severe. DSM-5 replaced this structure with a single substance use disorder diagnosis defined by 11 criteria and graded severity levels. The DSM-5 framework eliminated the legal-problems criterion and introduced craving as a diagnostic criterion. Cannabis withdrawal was formally recognized as a diagnostic syndrome in DSM-5 following empirical validation studies. Diagnostic thresholds were also revised: DSM-IV required one abuse criterion or three dependence criteria, whereas DSM-5 requires at least two criteria within a 12-month period, with severity specified based on the total number of criteria endorsed. **Sources:** Diagnostic criteria adapted from the *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition,^{51,52} and Fifth Edition.^{45,58}

Abbreviations: DSM-IV, *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition; DSM-5, *Diagnostic and Statistical Manual of Mental Disorders*, Fifth Edition.

leaving severe prevalence relatively unchanged.^{61,62} The implication for surveillance is direct: the prevalence of disorder depends on the classification framework. Diagnostic revision does not merely refine description—it alters who qualifies for diagnosis and which portions of the severity continuum become visible.

Psychiatric Epidemiology and Measurement Architecture

Psychiatric epidemiology does not observe disorder directly; it translates diagnostic criteria into structured instruments administered in defined populations.⁶³ The transition from clinician-administered interviews to fully structured lay-administered tools—such as the Diagnostic Interview Schedule (DIS) and the Composite International Diagnostic Interview (CIDI)—enabled large-scale community surveys but embedded diagnostic logic within algorithmic scoring.^{64,65} The WHO World Mental Health Surveys extended this architecture globally, providing standardized DSM-IV prevalence estimates across diverse jurisdictions.⁶⁶ For substance use disorders, the Alcohol Use Disorder and Associated Disabilities Interview Schedule (AUDADIS), implemented in the U.S. National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), generated detailed population-level estimates under DSM-IV and later DSM-5 frameworks.^{62,67} In contrast, the U.S. National Survey on Drug Use and Health (NSDUH) uses briefer modules with distinct skip logic optimized for annual monitoring.^{68,69} Divergence between NESARC and NSDUH estimates within the same country illustrates how instrument depth and gating rules independently influence observed prevalence. Three analytically distinct layers mediate between disorder and its epidemiologic representation. First, diagnostic criteria define which symptoms count and how they aggregate. Second, instruments operationalize criteria through question wording, recall periods, and symptom probes. Third, instrument logic—skip patterns, frequency gates, and aggregation thresholds—determines who is assessed and who can qualify for diagnosis. Sampling frames further constrain ascertainment; household surveys systematically exclude incarcerated, institutionalized, and homeless populations, groups with elevated substance use disorder prevalence.⁷⁰ Prevalence estimates are therefore outputs of measurement architecture. Stability under fixed criteria reflects the stability of classification rules as much as it does the stability of morbidity. Interpretation requires explicit attention to design.

International Prevalence Benchmarks

Across high-income countries applying DSM-5-aligned criteria, the general population’s past-year CUD prevalence typically ranges from 2% to 3%, with lifetime prevalence between 7% and 10% depending on exposure rates (Table 2). Table 2 also illustrates the distinction between general population prevalence and conditional prevalence among cannabis users, the latter of which is substantially higher in pooled epidemiologic estimates. Conditional risk among weekly or daily users is substantially higher, often exceeding 20–25%.^{71,74,75} Under DSM-IV, lifetime cannabis dependence rarely exceeded 2% in general population surveys; DSM-5 increased overall prevalence modestly by capturing lower-severity

Table 2 Population Prevalence Estimates of Cannabis Use Disorder (CUD) in Major Epidemiologic Meta-Analyses

Survey	Country	Survey Year(s)	Population Sample	Diagnostic Measure	Cannabis Exposure	Cannabis Use Disorder (%)
National Epidemiologic Survey on Alcohol and Related Conditions (NESARC I)	United States	2001–2002	Nationally representative adult household sample	DSM-IV cannabis abuse/dependence (AUDADIS-IV)	~4–5% past-year cannabis use	~1.5% past-year CUD in the general population
National Epidemiologic Survey on Alcohol and Related Conditions (NESARC III)	United States	2012–2013	Nationally representative adult household sample	DSM-5 cannabis use disorder (AUDADIS-5)	~4% past-year cannabis use	~2.5–3% past-year CUD in the general population
National Survey on Drug Use and Health (NSDUH)	United States	2015–2017	National household survey of individuals aged 12 years and older	DSM-IV cannabis abuse/dependence modules	~9–10% past-year cannabis use	~1.5–2% past-year CUD in the general population
World Mental Health Surveys (WMH)	Multinational	2001–2015	Cross-national household psychiatric surveys	DSM-IV substance use disorder modules (CIDI)	Variable across countries	~2–3% past-year CUD in the general population
National Survey of Mental Health and Wellbeing (NSMHWB)	Australia	2007	National adult household psychiatric survey	DSM-IV cannabis dependence (CIDI)	~10% lifetime cannabis use	~1–2% lifetime cannabis dependence in the general population
Epidemiological Survey of Substance Abuse (ESA)	Germany	2012	National adult population survey	DSM-IV cannabis abuse/dependence	~5–7% past-year cannabis use	~1–2% past-year CUD in the general population
Canadian Community Health Survey – Mental Health (CCHS-MH)	Canada	2012	National household psychiatric epidemiology survey of Canadians aged 15 years and older	DSM-IV cannabis abuse/dependence assessed via WHO-CIDI	~10–12% past-year cannabis use	1.3% past-year CUD in the general population
Mental Health and Access to Care Survey (MHACS)	Canada	2022	National population survey of Canadians aged 15 years and older	DSM-IV substance use disorder modules via modified WHO-CIDI	~15–16% past-year cannabis use	1.4% past-year CUD in the general population
Epidemiologic surveys synthesized in Leung et al	Multiple countries	1990s–2010s	Individuals with lifetime or recent cannabis use	DSM-III-R/DSM-IV/DSM-5 or ICD-based diagnoses	Cannabis users	22% (18–26%) CUD among cannabis users
Epidemiologic surveys synthesized in Leung et al	Multiple countries	1990s–2010s	Weekly or daily cannabis users	DSM-IV cannabis dependence	Regular cannabis use	33% (22–44%) cannabis dependence among frequent users
Epidemiologic surveys synthesized in Leung et al	Multiple countries	1990s–2010s	Individuals reporting cannabis use	DSM-IV cannabis abuse criteria	Cannabis users	13% (8–18%) cannabis abuse among cannabis users
Epidemiologic surveys synthesized in Leung et al	Multiple countries	1990s–2010s	Individuals reporting cannabis use	DSM-IV cannabis dependence criteria	Cannabis users	13% (10–15%) cannabis dependence among cannabis users

(Continued)

Table 2 (Continued).

Survey	Country	Survey Year(s)	Population Sample	Diagnostic Measure	Cannabis Exposure	Cannabis Use Disorder (%)
Population surveys synthesized in Boness et al	High-income countries	2000s–2020s	General population surveys	DSM-5 cannabis use disorder criteria	Variable across surveys	~2–3% past-year CUD in the general population
Population surveys synthesized in Boness et al	High-income countries	2000s–2020s	Individuals reporting cannabis use	DSM-5 cannabis use disorder criteria	Cannabis users	~20–25% CUD among cannabis users
Population surveys synthesized in Boness et al	High-income countries	2000s–2020s	Frequent or daily cannabis users	DSM-5 cannabis use disorder criteria	Frequent cannabis use	Often >25% CUD among heavy users

Notes: Estimates in this table are presented for two different epidemiologic denominators and should not be interpreted as directly interchangeable. “CUD in the general population” refers to the proportion of all respondents in a given survey who met diagnostic criteria for cannabis use disorder or, in older surveys, cannabis abuse and/or dependence. “CUD among cannabis users” refers to conditional prevalence, that is, the proportion of respondents reporting cannabis use who met diagnostic criteria for cannabis use disorder. “Cannabis dependence among frequent users” refers to conditional estimates among respondents with higher-frequency cannabis exposure, such as weekly or daily use. Earlier surveys commonly used DSM-IV abuse/dependence categories, whereas more recent surveys and meta-analyses may use DSM-5 cannabis use disorder criteria; these frameworks are related but not identical. Canadian estimates from the 2012 Canadian Community Health Survey – Mental Health and the 2022 Mental Health and Access to Care Survey were derived using WHO-CIDI–based DSM-IV substance use disorder modules and indicate relatively stable 12-month cannabis use disorder prevalence in the general population despite rising exposure. Meta-analytic rows summarize pooled evidence rather than single surveys and are included to contextualize individual-survey estimates within broader international epidemiologic benchmarks. Estimates are approximate where reported in narrative or pooled form rather than extracted as single harmonized point estimates. **Sources:** Survey-specific estimates adapted from the major epidemiologic surveys summarized in meta-analyses by Leung et al 2020 and Boness et al 2025;^{71,72} Canadian 2012 and 2022 estimates adapted from Stephenson et al 2023.⁷³

Abbreviations: AUDADIS-IV, Alcohol Use Disorder and Associated Disabilities Interview Schedule–DSM-IV version; AUDADIS-5, Alcohol Use Disorder and Associated Disabilities Interview Schedule–5; CIDI, Composite International Diagnostic Interview; CUD, cannabis use disorder; DSM, Diagnostic and Statistical Manual of Mental Disorders; ICD, International Classification of Diseases; WHO-CIDI, World Health Organization Composite International Diagnostic Interview.

cases. These convergent findings establish a stable epidemiologic corridor across jurisdictions and diagnostic eras. When instruments comprehensively assess DSM-5 criteria without restrictive gating, CUD prevalence clusters predictably within this range.

Canada and the Surveillance Paradox

Canada provides a useful case study of how survey design shapes the visibility of cannabis use disorder. National psychiatric surveys, including the Canadian Community Health Survey mental health cycles and the Mental Health and Access to Care Survey, prioritize comparability across survey waves and rely largely on legacy DSM-IV–based substance use modules.^{76–78} Several features of this architecture likely attenuate CUD detection, including retention of abuse–dependence logic, incomplete incorporation of withdrawal and craving, restrictive skip patterns, and exclusion of high-risk institutionalized and marginalized populations. Since legalization, Canada has experienced rising adult cannabis use, expanding retail access, increasing product potency, and documented increases in cannabis-attributable emergency department visits and pediatric exposures.^{30,37,38} Yet past-year CUD prevalence in national psychiatric surveys has remained clustered near 1.3–1.4% (Table 2), lower than the 2–3% past-year prevalence typically observed in comparable jurisdictions using DSM-5–aligned frameworks. This divergence is more plausibly explained by measurement attenuation than by uniquely low underlying risk. This is the surveillance paradox: a system optimized for comparability under legacy diagnostic logic yields relatively stable disorder estimates during a period of substantial exposure transformation.

Treatment of Cannabis Use Disorder

If CUD is the construct that bridges exposure and clinically meaningful harm, then treatment systems must be capable of responding proportionately to its detection. Recognition of cannabis use disorder (CUD) as a clinically meaningful and measurable condition carries an implicit obligation: effective treatment must be available, scalable, and aligned with severity. Yet the treatment landscape for CUD differs materially from that of alcohol or opioid use disorders. No pharmacotherapies are currently approved specifically for CUD, psychosocial interventions remain first-line, and treatment engagement rates are low relative to estimated prevalence.^{79,80} As legalization expands exposure and normalizes use, the gap between disorder burden and treatment penetration becomes increasingly visible.

Psychosocial Interventions

Psychosocial therapies form the foundation of CUD treatment. The most robust evidence supports motivational enhancement therapy (MET), cognitive behavioral therapy (CBT), and contingency management (CM), either alone or in combination.^{79,80} These interventions target impaired control, maladaptive coping, cue reactivity, and relapse vulnerability rather than withdrawal alone. Brief motivational interventions have demonstrated efficacy for individuals with mild to moderate CUD, particularly when delivered in primary care or university settings. CBT provides structured skill-building to manage triggers, restructure cognitive distortions, and develop alternative reinforcement patterns. Contingency management, which reinforces abstinence or reduced use with tangible incentives, consistently improves short-term abstinence rates but faces implementation challenges related to cost and sustainability. Effect sizes across trials are generally modest. Abstinence rates decline over time, and relapse is common. However, reductions in frequency and quantity of use—rather than sustained abstinence—are often clinically meaningful, particularly for moderate disorder. Importantly, many randomized trials predate the current high-potency commercial market, raising questions about generalizability to contemporary exposure environments.⁸¹ Digital and remote delivery models have expanded access, particularly among younger populations. Internet-based CBT and app-supported motivational programs demonstrate small-to-moderate benefits, though engagement and adherence remain variable. These models may be especially relevant in jurisdictions where stigma or normalization reduces help-seeking through traditional specialty services.

Pharmacotherapy

Unlike opioid, alcohol, or nicotine use disorders, cannabis use disorder (CUD) currently lacks approved pharmacotherapies.^{82–84} Pharmacologic trials have largely targeted three domains: mitigation of withdrawal symptoms, reduction of craving and relapse risk, and modulation of neurobiological pathways implicated in reward and stress

regulation. Investigated agents include cannabinoid agonists (eg., dronabinol, nabiximols), glutamatergic modulators such as N-acetylcysteine, antidepressants and mood stabilizers, and other neuromodulatory compounds. Overall, results have been heterogeneous and often limited by small sample sizes, short follow-up periods, and variability in outcome definitions.

Cannabinoid agonist approaches have attracted interest as a substitution strategy analogous to nicotine replacement therapy or opioid agonist treatment. Laboratory and clinical studies suggest that oral tetrahydrocannabinol (THC) and related agents can attenuate withdrawal symptoms such as irritability, insomnia, and decreased appetite. However, while these agents may improve short-term withdrawal tolerance, randomized trials have not consistently demonstrated sustained abstinence or relapse-prevention benefits. Evidence therefore supports a role in symptomatic withdrawal management rather than long-term disorder modification.

Other pharmacologic approaches have targeted glutamatergic dysregulation and craving mechanisms. N-acetylcysteine showed initial promise in adolescent samples, where it was associated with increased odds of negative urine cannabinoid tests, but subsequent adult trials failed to replicate these findings. Trials of antidepressants, mood stabilizers, and anxiolytics have similarly yielded inconsistent or negative results. A range of additional agents—including atomoxetine, buspirone, lithium, and cannabinoid receptor antagonists—have been explored in laboratory or pilot studies, though none has demonstrated sufficient efficacy to justify clinical adoption.

Consequently, pharmacotherapy in CUD remains largely symptomatic and adjunctive. Medications may be used to address withdrawal-related insomnia, anxiety, or mood symptoms during early abstinence, but no agent has demonstrated disease-modifying effects comparable to medications used for alcohol or opioid use disorders. Psychosocial treatments therefore remain the foundation of evidence-based care. The absence of approved pharmacologic treatments may also influence treatment engagement and referral patterns. In healthcare systems where pharmacotherapy anchors treatment expectations for substance use disorders, clinicians may perceive cannabis problems as less medically treatable, potentially reducing referral rates and reinforcing therapeutic nihilism. This dynamic may contribute to the persistent gap between the population prevalence of CUD and the relatively low proportion of affected individuals receiving formal treatment.

Withdrawal and Acute Care

Cannabis withdrawal is now formally recognized as a clinically significant syndrome characterized by irritability, anxiety, insomnia, decreased appetite, restlessness, and dysphoria.^{45,58,59} While generally less medically dangerous than alcohol or benzodiazepine withdrawal, it can be sufficiently distressing to perpetuate relapse. Management is typically outpatient and supportive. Short-term pharmacologic strategies may address insomnia, anxiety, or gastrointestinal discomfort, though no standardized protocol exists. In high-potency or daily users, withdrawal may be more pronounced, and comorbid psychiatric instability can complicate management.^{85,86} Emergency department presentations related to cannabis often involve acute intoxication, panic reactions, psychotic symptoms, or pediatric exposures rather than withdrawal. These encounters rarely translate into structured follow-up for CUD unless systematic referral pathways are in place. Thus, acute care utilization frequently represents a missed intervention opportunity.

Comorbidity and Integrated Treatment

CUD commonly co-occurs with mood, anxiety, trauma-related, and psychotic-spectrum disorders.⁸⁷ Treatment outcomes are strongly influenced by comorbidity. Cannabis use may exacerbate affective instability, interfere with antidepressant response, or increase relapse risk in psychotic disorders. Conversely, untreated psychiatric symptoms may drive persistent cannabis use as maladaptive coping. Integrated treatment models—addressing substance use and psychiatric symptoms concurrently—demonstrate superior outcomes relative to parallel or sequential care. However, implementation remains inconsistent. In many systems, cannabis use is documented but not explicitly targeted within mental health services. Where addiction and psychiatry remain siloed, patients may receive fragmented care. Severity stratification is therefore essential. Mild and moderate CUD embedded within mood or anxiety disorders may be managed effectively within general psychiatric care using motivational and CBT-informed approaches. Severe CUD with marked impairment

may require specialized addiction services with structured relapse-prevention programming. In the absence of clear pathways, care remains episodic.

Treatment Utilization and Unmet Need

Internationally, treatment utilization for CUD lags behind estimated disorder prevalence.^{88,89} In the United States, only a minority of individuals meeting DSM-5 criteria report receiving substance use treatment, and perceived treatment need is low relative to diagnostic prevalence. Similar patterns are observed in Canada and Europe. Several factors contribute. Normalization of cannabis reduces perceived harm and self-recognition of disorder. Stigma operates paradoxically: while cannabis use is normalized, seeking addiction treatment may still carry social cost. A lack of pharmacotherapy may diminish clinicians' enthusiasm. In systems without routine screening, identification depends on crisis or self-referral. Commercialization adds complexity. Increased product potency and diversification may intensify withdrawal and impairment among heavy users while simultaneously reinforcing normalization narratives that frame cannabis as benign or therapeutic. Treatment systems must therefore navigate an environment in which exposure increases while help-seeking does not.

System Implications for Treatment Services

The evidence base supports the effectiveness of psychosocial interventions but indicates modest impact. No single modality is sufficient across the severity spectrum. Treatment effectiveness improves when aligned with disorder severity, comorbidity profile, and patient goals (abstinence versus reduction). A stepped-care framework is pragmatic. Brief interventions and digital supports may address mild disorders. Structured CBT and motivational programs are suitable for moderate cases. Severe or refractory CUD warrants specialty addiction services and integrated psychiatric care. Without severity-aligned pathways, systems oscillate between under-treatment and over-referral. Effective service planning depends on reliable detection and severity stratification. Without routine identification, treatment needs will appear artificially low, and resource allocation will lag behind epidemiology. CUD treatment occupies an intermediate position within addiction medicine: more prevalent than many illicit drug disorders, less acutely lethal than opioid use disorder, and lacking approved pharmacotherapy. Its burden is diffuse rather than catastrophic. This profile makes it particularly sensitive to system design. If exposure continues to expand in legalized markets, even modest conditional risk translates into substantial population-level morbidity. Treatment systems must therefore move beyond binary conceptions of abstinence versus non-treatment and toward severity-informed, integrated care models capable of addressing cannabis-related impairment across its spectrum.

Future Directions for Treatment Systems

The expanding legal cannabis market requires addiction treatment systems to adapt to a form of substance-related morbidity that is common, heterogeneous, and often clinically subtle. Unlike opioid or stimulant crises—where harms are immediately visible through overdose, infectious disease, or acute instability—cannabis-related morbidity typically accumulates through impaired control, withdrawal, functional decline, and psychiatric destabilization. These patterns are less likely to trigger crisis-driven care pathways, yet their population burden may be substantial. The central challenge for treatment systems is therefore not simply expanding services, but aligning system architecture with the epidemiology of cannabis use disorder (CUD).

A first priority is the routine identification of CUD across clinical settings. Cannabis use is commonly documented descriptively but less often assessed diagnostically. Structured assessment of impaired control, withdrawal, craving, and functional consequences within primary care, psychiatry, emergency services, and addiction treatment would make disorder detection systematic rather than episodic. Screening alone, however, is insufficient. Identification must be linked to defined clinical responses; otherwise, clinicians are left recognizing problems without clear intervention pathways. Embedding CUD assessment within standardized intake processes, electronic medical records, and referral criteria can help normalize disorder recognition within routine practice.

Effective response also requires care models that reflect the severity spectrum of CUD. A stepped-care approach is particularly well suited to this disorder profile. Mild and moderate cases—often characterized by impaired control or

emerging psychosocial consequences—may respond to brief motivational interventions, cognitive-behavioral approaches, or digital self-management tools integrated within general psychiatric or primary care settings. More severe presentations involving persistent daily use, withdrawal, or destabilizing psychiatric comorbidity may require specialized addiction services and structured relapse-prevention programming. Without severity stratification, systems tend to default to binary responses—either no intervention or referral to specialty care—limiting opportunities for early intervention and efficient resource allocation.

Integration between addiction and mental health services is equally important. CUD frequently co-occurs with mood, anxiety, trauma-related, and psychotic-spectrum disorders, and interactions between cannabis use and psychiatric symptoms are bidirectional. Fragmented service structures in which substance use and mental health are addressed separately can result in incomplete care. Integrated assessment, shared treatment planning, and coordinated referral pathways better reflect the clinical reality of comorbidity and allow cannabis use to be addressed within broader psychiatric treatment. Workforce capacity represents another structural consideration. Many clinicians receive limited training in diagnosing and managing CUD outside specialized addiction settings. Enhancing clinical education—through undergraduate curricula, residency training, and continuing professional development—can improve diagnostic confidence and familiarity with evidence-based psychosocial interventions. Training initiatives are most effective when paired with clearly defined care pathways that allow clinicians to translate knowledge into practice.

Finally, treatment systems must develop stronger feedback mechanisms linking clinical activity with population health monitoring. Routinely collected data on disorder detection, treatment engagement, and clinical outcomes can support learning-oriented service adaptation. Such data do not replace population surveys but complement them by capturing clinically meaningful outcomes that may not appear in surveillance systems designed primarily to measure exposure. In rapidly evolving policy environments characterized by increasing product potency and market diversification, dynamic feedback between epidemiology and service delivery is essential.

Cannabis therefore represents more than a single clinical problem. It illustrates the broader challenge of adapting addiction treatment systems to legalized substances whose harms are diffuse, chronic, and often under-recognized. Addressing CUD effectively will require systems capable of detecting impairment early, matching intervention intensity to severity, and integrating addiction treatment within broader mental health care.

Conclusion

The rapid expansion of cannabis legalization has transformed patterns of exposure while simultaneously exposing important limitations in the way cannabis-related harm is measured and addressed. Surveillance systems are well equipped to quantify cannabis use, product characteristics, and market activity. Detecting clinically meaningful harm, however, depends on diagnostic definitions, measurement instruments, and case-ascertainment strategies that vary across surveys and jurisdictions. Cannabis use disorder therefore occupies a critical conceptual space between exposure and sustained impairment.

This review highlights how changes in diagnostic classification and measurement design influence the epidemiologic visibility of CUD. The transition from DSM-IV abuse–dependence categories to the dimensional DSM-5 framework broadened the detectable spectrum of disorder, particularly at mild and moderate levels of severity. International surveys using DSM-5–aligned instruments consistently identify general population prevalence in the range of approximately 2–3%, with substantially higher conditional risk among frequent users. Where surveillance systems retain legacy criteria, restrictive gating logic, or abbreviated diagnostic modules, disorder prevalence may appear artificially stable despite substantial changes in exposure environments.

At the same time, treatment systems have been slower to adapt to the evolving epidemiology of cannabis use. Evidence supports the effectiveness of psychosocial interventions, but no pharmacotherapies are currently approved for CUD, and treatment engagement remains low relative to estimated prevalence. In many health systems, inconsistent detection, fragmented care pathways, and limited clinician training contribute to a gap between disorder burden and service response.

Addressing this gap requires alignment between surveillance, diagnostic frameworks, and clinical care. Measurement systems must accurately detect disorder across its severity spectrum, while treatment services must be capable of

responding proportionately once cases are identified. Routine identification of CUD, severity-stratified care pathways, integration with mental health services, and learning-oriented data systems represent key components of such alignment.

As legalization continues to expand internationally, cannabis provides an instructive test case for modern addiction systems. Substances that are legal, widely used, and commercially promoted generate patterns of harm that differ from those associated with historically illicit drugs. Effective governance therefore depends not only on regulating markets but also on ensuring that health systems can detect and respond to the disorders that arise within them. Bridging the gap between exposure and impairment—through coherent measurement, diagnosis, and treatment—will ultimately determine whether legalization functions as a public health intervention or merely a regulatory shift.

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