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Addressing Cannabis Hyperemesis Syndrome in Canada

Introduction

Cannabis is one of the most commonly used substances in Canada. In 2024, about one in four people (26%) people living in Canada said they had used cannabis within the past year, and 6% said they used it daily or almost daily (Health Canada, 2024a).

There is strong evidence that using cannabis often can lead to several health problems. These effects include mental health disorders, changes in brain function, problematic cannabis use and cannabis use disorder (CUD). The risks appear to be much higher for people who use products that contain large amounts of delta-9-tetrahydrocannabinol (Δ-9-THC), the main psychoactive component in cannabis (Colizzi et al., 2020; Freeman & Winstock, 2015; Murray & Hall, 2020).

Recent reports from the National Academies of Sciences, Engineering and Medicine (2024) and from Health Canada's review of the *Cannabis Act* (Health Canada, 2024b) highlight growing public health concerns about high-THC products. These products are becoming more available and more popular, raising the potential for increased cannabis-related harms.

A lesser-known health concern linked to long-term cannabis use, and possibly to high-THC products, is cannabis hyperemesis syndrome (CHS). CHS is marked by cycles of severe nausea, vomiting and stomach pain. As both the use and access to cannabis and high-THC products continue to rise, understanding and addressing CHS is increasingly important for public health and cannabis policy in Canada.

What exactly are "high-THC products"?

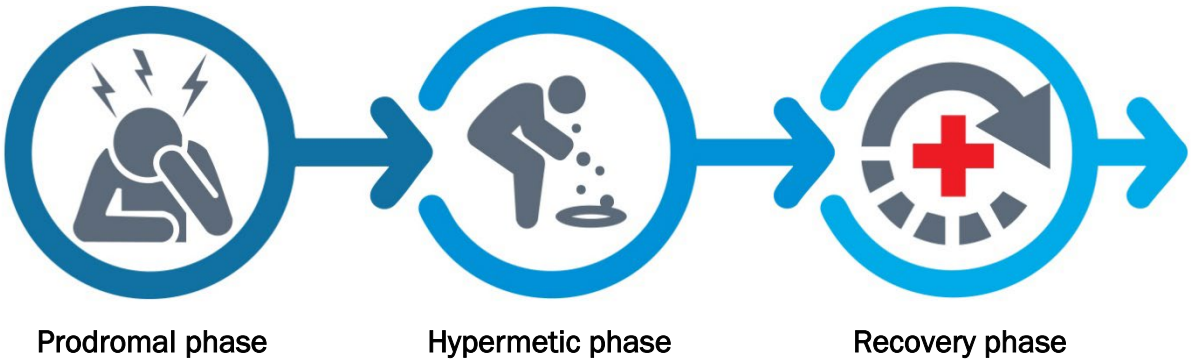
There is no single agreed-upon definition. Some experts define them as products that contain 20% THC or more, while others describe them as products that exceed the typical THC levels found in cannabis plants. Regardless of the definition, high-THC products are becoming more common and deserve careful attention because of their possible effects on public health and safety.

What Is CHS?

First described in 2004, CHS is an under-recognized condition seen in people who use cannabis often, and may also be associated with the use of high-THC products. It is characterized by repeated episodes of severe nausea, vomiting and stomach pain. Symptoms usually follow a three-phase pattern: prodromal, hyperemetic and recovery (Allen et al., 2004; DeVuono & Parker, 2020; Venkatesan et al., 2019):

- **Prodromal phase:** People feel persistent nausea, anxiety and other symptoms such as sweating, flushing and increased thirst. Symptoms often feel worse in the morning. This phase can last for months.
- **Hyperemetic phase:** People have severe nausea, frequent vomiting and intense stomach pain.
- **Recovery phase:** With sustained abstinence (not using cannabis), symptoms gradually improve and then stop. Recovery can take weeks to months. If cannabis use resumes, symptoms can return, showing the cyclical nature of CHS.

Figure 1 illustrates these phases



What Is CHS Prevalence in Canada?

Estimating how common CHS is in Canada is challenging. Although clinical diagnostic tools such as the Rome IV criteria exist, they have limits. Until recently, there was no specific ICD-10 code for CHS. Because of these gaps, many people may not have reported symptoms, and some healthcare providers may still be unaware of CHS.

Previously, most health systems recorded CHS using a combination of codes for nausea and vomiting plus a code indicating cannabis use or cannabis use disorder. As of October 1, 2025, the United States introduced a new ICD-10-CM diagnosis code for CHS (University of Washington, Addictions, Drug & Alcohol Institute, 2025). This code supports clearer diagnosis and should improve monitoring, treatment and reporting. It will also make it easier for researchers to collect reliable data and conduct public health surveillance on cannabis-related issues.

Up to now, the Rome IV criteria have guided clinical diagnosis of CHS, but they have limits (Venkatesan et al., 2019). One requirement is that symptoms resolve after a person stops using cannabis. However, experts do not agree on how long abstinence must last to count as recovery, which makes diagnosis harder for people who struggle to stop using cannabis.

Studies have also used different definitions and criteria for CHS. Not all followed Rome IV, which makes it harder to estimate how common CHS really is. The condition can look like cyclic vomiting syndrome, a similar illness. Without a full patient history and proper clinical assessment, it can be difficult to tell them apart (Beals et al., 2022; Venkatesan et al., 2019). With a specific ICD-10-CM code for CHS, diagnosis and data collection should become more consistent and complement clinical criteria such as Rome IV.

Because of these challenges, the true prevalence of CHS is still uncertain. Some experts estimate that about one in every 200 people who use cannabis frequently (ages 16 to 44) will develop CHS (Zannese, 2022).

Research also shows a rise in CHS-related emergency department (ED) visits after cannabis legalization in both the United States and Canada (Andrews et al., 2022; Beals et al., 2022; Kim et al., 2015; Myran et al., 2022; Yeung et al., 2020; Yeung et al., 2021, Wang et al., 2021). In one Canadian study (Myran et al., 2022), the number of monthly CHS-related ED visits in Ontario increased 13-fold between January 2014 and June 2021.

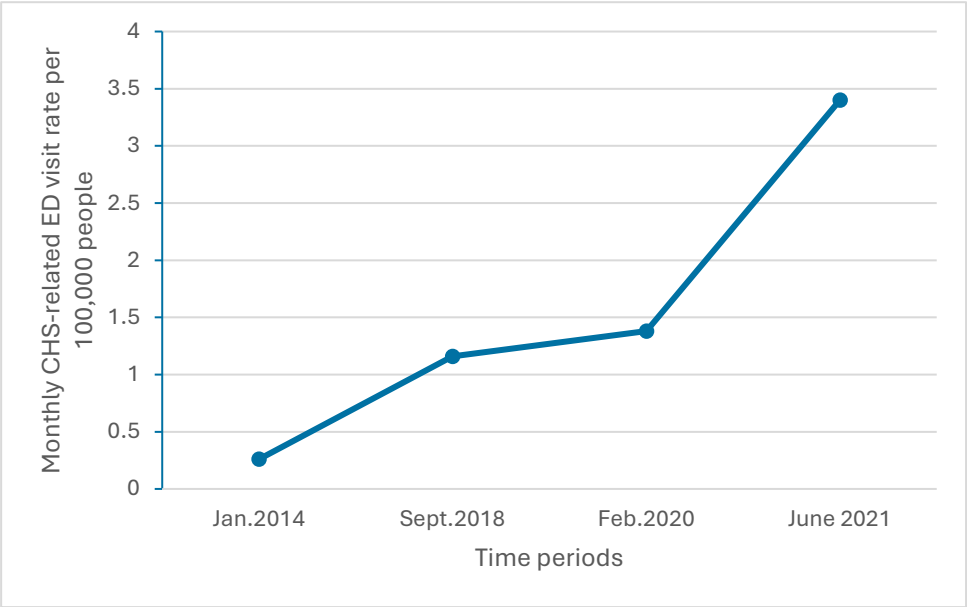
Figure 2 illustrates this trend. The monthly rate of CHS-related ED visits per 100,000 people aged 15 and older increased from 0.26 in January 2014 to 1.16 in September 2018, 1.38 in February 2020 and 3.40 in June 2021.

Notably, the first phase of legalization had little impact on visit rates. The sharp increase came later, during the commercialization phase, when retail access expanded and high-THC products such as concentrates and edibles became widely available. The rise was greatest among women and among people over the legal purchasing age.

Phases of Legalization in Canada

In the first 15 months after legalization began in October 2018, only dried cannabis flower and cannabis oil were legal for sale. Starting in January 2020, most provinces allowed a wider range of products with higher THC potency, including concentrates, THC-infused beverages and commercially produced edibles.

Figure 2. Monthly CHS-related ED visit rates (2014–2021) (adapted from Myran et al., 2022)



While the rise may be partly linked to commercialization of cannabis (more retail access and more high-THC products), these products alone are unlikely to explain a short-term spike in new CHS cases. CHS usually follows a long history of cannabis use before symptoms start.

Increased awareness may have played a role. More public attention, media coverage and clinical recognition may have contributed to higher rates of diagnosis and reporting during this period.

Even so, the upward trend in ED visits for vomiting and cannabis use is notable and points to a growing burden on the healthcare system.

Using Alberta health data on people who use cannabis frequently, Andrews et al. (2022) found a similar pattern (more ED visits for CHS-related symptoms). They estimated that 0.5% to 0.6% of frequent cannabis users aged 15 to 44 required an ED visit for CHS symptoms after legalization (2020–2021).

What Are the Underlying Mechanisms of CHS?

Research over several decades has shown that THC can stimulate appetite and reduce nausea and vomiting (Sharkey et al., 2014; DeVuono & Parker, 2020; Frytak et al., 1979; Orr & McKernan, 1981). In both Canada and the United States, nabilone, a synthetic form of THC taken orally, is approved to treat chemotherapy-induced nausea and vomiting when standard medications do not work.

However, studies have also found that high doses of THC can have the opposite effect. At these levels, THC may trigger nausea and vomiting instead of relieving them (Cluny et al.,

2008; DeVuono et al., 2018; Sharkey et al., 2014). This paradox helps explain why long-term use of high-THC products in people is believed to be linked to CHS (Allen et al., 2004).

Such opposite effects are not unexpected. THC is known to have biphasic effects, meaning that low and high doses can produce opposite outcomes. This pattern also occurs in other processes, such as eating behaviour, movement, motivation and anxiety (Hill et al., 2006; Marco et al., 2004; Rey et al.,2012; Zuurman et al., 2009).

The mechanisms by which high doses of THC may lead to CHS symptoms remain poorly understood. Evidence points to possible disruptions in the body's endocannabinoid system, which helps regulate many gut functions such as digestion, appetite, inflammation and the urge to vomit. Researchers suggest several explanations, including:

- Reduced sensitivity of CB1 receptors, which normally respond to THC;
- Changes in natural endocannabinoid levels;
- Stress response dysfunction;
- Altered temperature regulation and TRPV1 (capsaicin) channel activity;
- Slowed stomach movement (gastric motility); and
- Imbalances in the brain–gut connection (hypothalamic–gut axis).

These interconnected systems may work together to produce the symptoms seen in CHS (more about this later) (Hornby et al., 2004; Perisetti et al., 2020; DeVuono & Parker, 2020).

What Are the Risk Factors for CHS?

It is difficult to identify who is most at risk for CHS because the condition is still not fully understood. Frequent use of high-THC cannabis, typically daily or several times per week for at least a year, seems to be a key risk factor.

However, this does not explain why some people develop CHS while others do not. Recent research suggests that frequent high-THC cannabis exposure alone may not be enough to cause the condition (Albert et al., 2019). Other factors may contribute, such as genetic predisposition, age, gender, co-occurring mental or physical health conditions, and socioeconomic or environmental influences.

Age and Gender

Recent studies of CHS-related ED visits in Ontario and Alberta have helped identify who is most affected by CHS (Myran et al., 2022; Andrews et al., 2022).

In Ontario, young adults aged 19 to 24 had the highest number of CHS-related ED visits. Cases also rose notably among women, particularly after cannabis commercialization, increasing from 47.5% before legalization to 53.5% afterward. CHS was also more common in lower-income neighbourhoods, raising questions about healthcare access, exposure to high-THC products, and other social determinants of health (Myran et al., 2022).

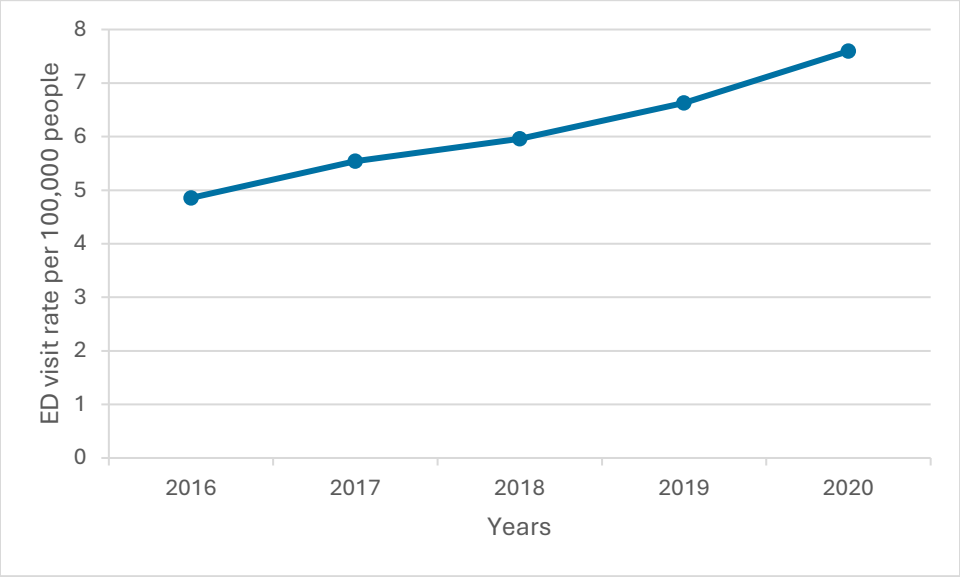
Similar patterns were found in Alberta. CHS-related ED visits were highest among young adults aged 16 to 34 who used cannabis frequently. The largest increase was among women, rising from 45% before legalization to 54% afterward. Overall, 85.2% of CHS patients reported daily or near-daily cannabis use for a median of 10 years, reinforcing the link between long-term, frequent cannabis use and increased CHS risk (Andrews et al., 2022).

CHS and CUD

Frequent cannabis use is also linked to a higher risk of CUD. This risk increases further for people who use high-THC products or who begin using cannabis frequently at an early age (Butterworth et al.,2014; Behrendt et al., 2009; Freeman & Winstock, 2015; Le Strat et al., 2015).

As shown in Figure 3, between 2016 and 2020, the rate of ED visits for cannabis-related dependence and withdrawal among people aged 15 to 34 in Canada nearly doubled, rising from 4.8 to 7.6 per 100,000.

Figure 3. ED visit rates for cannabis dependence and withdrawal among young adults (aged 15–34) in Canada (2016–2020)



Source: Canadian Institute for Health Information, ICD-10 Code F12.288, which classifies cannabis dependence with other cannabis-induced disorders as part of the WHO-defined category of mental, behavioural and neurodevelopmental disorders.

Recent research shows a strong relationship between CHS symptoms and CUD (Ajayi et al., 2017; Alshaarawy et al., 2024; Andrews et al., 2022; Patel et al., 2020).

In the Andrews et al. (2022) study, which examined frequent cannabis users with CHS-related symptoms in the United States and Canada, 98% of patients met the screening

criteria for CUD (CUDIT-R score ≥12). Most patients (80.3%) reported used inhaled cannabis flower (smoked or vaporized), with THC concentrations above 20%.

Notably, ED visits were common. About 78% had previously visited an ED for CHS symptoms, and 61% had visited multiple times within the past year. These patterns suggest that prevention, early intervention and patient education remain limited or ineffective, or are not reaching people most at risk. Repeated visits also suggest that healthcare providers may not be consistently recognizing, diagnosing or managing CHS, leading to ongoing symptoms and repeated emergency care.

Together, these findings highlight the potential connection between CHS and CUD, the burden CHS places on the healthcare system, and the need for stronger prevention and awareness efforts (Andrews et al., 2022).

Genetic Vulnerability

Genetic factors may help explain why some people who use cannabis frequently develop CHS while others do not. However, there have been no genome-wide association studies focused specifically on CHS. One small exploratory study found several single-nucleotide polymorphisms that may increase CHS risk, but the small sample limits how much can be concluded (Russo et al., 2022).

Most genetic markers discussed in the literature are linked to cyclic vomiting syndrome, and CHS may represent a cannabis-induced form of it. These include variations in genes related to cytochrome P450 enzymes, CB1 receptors, mu-opioid receptors and FAAH, which influence how the body metabolizes cannabis (DeVuono & Parker, 2020; Soriano-Co et al., 2010; Wasilewski et al., 2017). Such genetic differences could indirectly increase CHS risk by affecting cannabis metabolism or use patterns.

More research is needed to understand how these genetic factors contribute to CHS and whether they can help identify people at higher risk.

Stress and Mood Disorders

Research suggests that people who experience anxiety, depression or chronic stress may be more likely to develop CHS (Andrews et al., 2022; Patel et al., 2004; Sharkey & Wiley, 2016). In one study, 59% of CHS patients had moderate to severe anxiety, and 68% had moderate to severe depression (Andrews et al., 2022).

Researchers have proposed several ways stress and mood disorders might increase CHS risk. Long-term cannabis use may disrupt the hypothalamic-pituitary-adrenal (HPA) axis which regulates the body's stress response. This disruption may occur through downregulation of CB1 receptors (Cheung et al., 2010; Patel et al., 2004; Richards et al., 2017; Sharkey & Wiley, 2016).

Stored cannabinoids in body fat may also enter the bloodstream during stressful events, worsening symptoms (Richards et al., 2017). THC may directly affect stress hormones, including corticotropin-releasing hormone (CRH), adrenocorticotropic hormone and glucocorticoids, potentially adding to CHS symptoms (Richards et al., 2017). Blocking CRH receptors in preclinical studies has been shown to prevent THC-induced nausea, suggesting a link between stress pathways and CHS symptoms (DeVuono et al., 2020).

Stress and mood disorders are also closely connected to gastrointestinal (GI) conditions. People with GI disorders often have co-existing anxiety or depression, which can amplify symptoms and complicate diagnosis (Graff et al., 2023).

Together, these finding point to a multifactorial relationship between cannabis use, stress regulation, mood and gut function that may help explain CHS risk. Further research is needed to clarify this complex interplay.

Early Cannabis Initiation

Some evidence suggests that starting cannabis use during adolescence may increase CHS risk (Sorensen et al., 2017). Cannabis use during this stage of brain development may disrupt normal endocannabinoid signalling and raise vulnerability later in life (Renard et al., 2014).

In Andrews et al. (2022), most CHS patients began using cannabis at a median age of 16, with regular use (weekly or more) starting at around age 18. More research is needed to explore how early cannabis exposure may influence the development of CHS and whether cannabis use during adolescence is a long-term risk factor.

What Is the Treatment for CHS?

Prompt treatment can prevent serious complications of CHS such as dehydration and kidney (renal) failure, which are both common and potentially life-threatening (Habboushe & Sedor, 2013; Nourbakhsh et al., 2019).

Among available medications, anxiolytics and sedatives such as benzodiazepines (e.g., diazepam) and antipsychotics (e.g., haloperidol) have show effectiveness in relieving symptoms (Blumentrath et al., 2017; Levinthal et al., 2024; Richards et al., 2017). By contrast, typical anti-nausea medications like 5-HT3 receptor antagonists do not appear effective in treating nausea and vomiting caused by CHS (Richards et al., 2017).

Many CHS patients report temporary symptom relief from long, hot baths or showers. This effect may be related to transient receptor potential vanilloid 1 (TRPV1) receptors, which help regulate pain and body temperature and are activated at temperatures above 43°C (Levinthal et al., 2024; Perisetti et al., 2020; Richards et al., 2017). Capsaicin, a TRPV1 activator found in chili peppers, has also shown promise as a topical treatment for CHS (Wagner et al., 2020). These findings suggest that TRPV1 pathways may play a role in CHS symptom management.

Challenges with CHS Treatment

Why some medications relieve CHS symptoms while others do not is still unclear, and more research is needed. Experts generally agree that stopping cannabis use entirely (sustained abstinence) is currently the only known way to fully resolve CHS symptoms (Gajendran et al., 2020; Venkatesan et al., 2019).

Achieving and maintaining abstinence, however, is not simple. For people with CUD, quitting can be especially difficult due to cravings, withdrawal symptoms, limited access to treatment and co-occurring mental health disorders. Many people also use cannabis for self-medication, which complicates cessation efforts.

Tracking abstinence can be challenging for both clinicians and researchers, making it difficult to measure long-term outcomes. A systematic review found that only 16 to 25% of CHS cases were followed for at least four weeks, leaving uncertainty about whether sustained cannabis cessation consistently leads to full recovery (Venkatesan et al., 2019).

Given these challenges, comprehensive support from healthcare providers, structured follow-ups and better access to cannabis-specific treatment resources are essential to help patients achieve and maintain abstinence. More research is also needed to clarify the long-term effects of cannabis cessation on CHS symptoms and to develop targeted interventions for people with CHS and CUD.

Conclusion and Policy Recommendations

With cannabis now easier to access and more high-THC products available, CHS has become an increasing public health concern in Canada. Addressing it calls for a comprehensive approach that includes public education, better clinical recognition, expanded access to treatment and supports for cessation, and stronger oversight of high-THC products so legalization continues to align with public health priorities.

ED visits for cannabis-related issues, including CHS, CUD and other harms, are rising. This growth adds pressure on Canada's healthcare system, in both capacity and costs. From 2007 to 2020, the ED costs attributable to cannabis use in Canada increased by 125%, from about $7.1 million to $15.9 million, reflecting a growing financial burden on the healthcare system (Canadian Substance Use Costs and Harms (CSUCH) Scientific Working Group, 2023).

Targeted policy actions are needed to address the growing healthcare and economic impacts of cannabis-related harms and to support the health and well-being of people who experience CHS. The recommendations below outline strategies to help strengthen prevention, improve clinical recognition and diagnosis, expand research and enhance access to treatment and cessation supports, with the goal of reducing the public health impact of CHS in Canada.

1. Enhance public awareness and education

- Run targeted public health campaigns for people who use cannabis, especially young adults, women, people in vulnerable communities and those who use cannabis frequently, on the risks of CHS and the potential role of high-THC products.
- Implement harm reduction strategies to help people recognize early CHS symptoms and seek timely care.

2. Improve clinical recognition and diagnosis

- Increase CHS knowledge among healthcare providers through targeted education and training.
- Integrate CHS screening into routine care, especially in the ED and primary care.
- Provide standardized clinical guidance to help healthcare providers recognize CHS, distinguish it from other vomiting syndromes and diagnose earlier.

3. Improve access to cannabis use disorder treatment and support

- Expand cannabis-specific cessation programs within existing addiction services, with tailored support for people with CUD and CHS.
- Strengthen access to mental health and addiction services to address the links among CHS, CUD and mood disorders.
- Support integrated care models that connect physicians, addiction specialists and mental health professionals for comprehensive care.

4. Strengthen data collection and research

- Improve tracking and collection of CHS-related data, including patient history, psychiatric comorbidities, predisposing factors and cannabis potency (THC concentration), to better understand causes and risk factors.
- Improve tracking of CHS-related ED visits to monitor trends and guide policy.
- Conduct longitudinal studies to assess the long-term effects of cannabis cessation on CHS recovery.

5. Regulate high-THC products

- Set clear THC potency thresholds and limit the availability of high-THC products, which may be linked to higher rates of CHS and CUD.
- Require product labelling and risk warnings on cannabis packaging that highlight potential risks for CHS and CUD.

References

Ajayi, T., Adejumo, A., Alliu, S., Adejumo, K., Adegbala, O., & Onyeakusi, N. (2017). Cannabis use increases the odds of irritable bowel syndrome among hospitalized patients: A propensity matched analysis. American Journal of Gastroenterology, 112, S237–S238. https://journals.lww.com/ajg/fulltext/2017/10001/cannabis_use_increases_the_odds_of_irritable_bowel.446.aspx

Albert, K., Sivilotti, M. L. A., Gareri, J., Day, A., Ruberto, A. J., & Hookey, L. C. (2019). Hair cannabinoid concentrations in emergency patients with cannabis hyperemesis syndrome. Canadian Journal of Emergency Medicine, 21(4), 477–481. https://doi.org/10.1017/cem.2018.479

Allen, J. H., de Moore, G. M., Heddle, R., & Twartz, J. C. (2004). Cannabinoid hyperemesis: Cyclical hyperemesis in association with chronic cannabis abuse. Gut, 53(11), 1566–1570. https://doi.org/10.1136/gut.2003.036350

Andrews, C. N., Rehak, R., Woo, M., Walker, I., Ma, C., Forbes, N., ... & Sharkey, K.A. (2022). Cannabinoid hyperemesis syndrome in North America: Evaluation of health burden and treatment prevalence. Alimentary Pharmacology & Therapeutics, 56(11–12), 1532–1542. https://doi.org/10.1111/apt.17265

Alshaarawy, O., Balasubramanian, G., & Venkatesan, T. (2024). Cannabis use in the United States and its impact on gastrointestinal health. Nutrition in Clinical Practice, 39(2), 281–292. https://doi.org/10.1002/ncp.11111

Beals, L., Sarjinsky, S., Faltyn, M., Issenman, R. M., & Kam, A. J. (2022). Cyclic vomiting syndrome in the emergency department: A 10-year review of clinical presentation and management. Pediatric Emergency Care, 38(10), e1578–e1583. https://doi.org/10.1097/PEC.0000000000002694

Behrendt, S., Wittchen, H. U., Höfler, M., Lieb, R., & Beesdo, K. (2009). Transitions from first substance use to substance use disorders in adolescence: Is early onset associated with a rapid escalation? Drug and Alcohol Dependence, 99(1–3), 68–78. https://doi.org/10.1016/j.drugalcdep.2008.06.014

Blumentrath, C. G., Dohrmann, B., & Ewald, N. (2017). Cannabinoid hyperemesis and the cyclic vomiting syndrome in adults: Recognition, diagnosis, acute and long-term treatment. GMS German Medical Science, 15. https://doi.org/10.3205/000247

Butterworth, P., Slade, T., & Degenhardt, L. (2014). Factors associated with the timing and onset of cannabis use and cannabis use disorder: Results from the 2007 Australian National Survey of Mental Health and Well-Being. Drug and Alcohol Review, 33(5), 555–564. https://doi.org/10.1111/dar.12183

Canadian Institute for Health Information. (2001). F12.288, Cannabis dependence with other cannabis-induced disorder. In International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Canada (ICD-10-CA).

Canadian Substance Use Costs and Harms Scientific Working Group. (2023). Canadian substance use costs and harms visualization tool, version 3.0.2 [Online tool]. https://csuch.ca/explore-the-data/

Cheung, J. T., Mann, R. E., Ialomiteanu, A., Stoduto, G., Chan, V., Ala-Leppilampi, K., & Rehm, J. (2010). Anxiety and mood disorders and cannabis use. American Journal of Drug and Alcohol Abuse, 36(2), 118–122. https://doi.org/10.3109/00952991003713784

Cluny, N. L., Naylor, R. J., Whittle, B. A., & Javid, F. A. (2008). The effects of cannabidiol and tetrahydrocannabinol on motion-induced emesis in Suncus murinus. Basic & Clinical Pharmacology & Toxicology, 103(2), 150–156. https://doi.org/10.1111/j.1742-7843.2008.00253

Colizzi, M., Ruggeri, M., & Bhattacharyya, S. (2020). Unraveling the intoxicating and therapeutic effects of cannabis ingredients on psychosis and cognition. Frontiers in Psychology, 11, Article 833. https://doi.org/10.3389/fpsyg.2020.00833

DeVuono, M. V., Hrelja, K. M., Sabaziotis, L., Rajna, A., Rock, E. M., Limebeer, C. L., … & Parker, L. A. (2018). Conditioned gaping produced by high dose Δ9-tetrahydrocannabinol: Dysregulation of the hypothalamic endocannabinoid system. Neuropharmacology, 141, 272–282. https://doi.org/10.1016/j.neuropharm.2018.08.039

DeVuono, M. V., & Parker, L. A. (2020). Cannabinoid hyperemesis syndrome: A review of potential mechanisms. Cannabis and Cannabinoid Research, 5(2), 132–144. https://doi.org/10.1089/can.2019.0059

DeVuono, M. V., La Caprara, O., Sullivan, M. T., Bath, A., Limebeer, E., Rock, E. M., … & Hill, M. N. (2020). Role of the stress response and the endocannabinoid system in Δ9-tetrahydrocannabinol (THC)-induced nausea. Psychopharmacology, 237, 2187–2199. https://doi.org/10.1007/s00213-020-05529-5

Freeman, T. P., & Winstock, A. R. (2015). Examining the profile of high-potency cannabis and its association with severity of cannabis dependence. Psychological Medicine, 45(15), 3181–3189. https://doi.org/10.1017/S0033291715001178

Frytak, S., Moertel, C. G., O'Fallon, J. R., Rubin, J., Creagan, E. T., O'Connell, M. J., … & Schwartau, N. W. (1979). Delta-9-tetrahydrocannabinol as an antiemetic for patients receiving cancer chemotherapy: A comparison with prochlorperazine and a placebo. Annals of Internal Medicine, 91(6), 825–830. https://doi.org/10.7326/0003-4819-91-6-825

Gajendran, M., Sifuentes, J., Bashashati, M., & McCallum, R. (2020). Cannabinoid hyperemesis syndrome: Definition, pathophysiology, clinical spectrum, insights into acute and long-term management. Journal of Investigative Medicine, 68(8), 1309–1316. https://doi.org/10.1136/jim-2020-001564

Graff, L. A., Geist, R., Kuenzig, M. E., Benchimol, E. I., Kaplan, G. G., Windsor, J. W., … & Bernstein, C. N. (2023). The 2023 impact of inflammatory bowel disease in Canada: Mental health and inflammatory bowel disease. Journal of the Canadian Association of Gastroenterology, 6(Suppl. 2), S64–S75. https://doi.org/10.1093/jcag/gwad012

Habboushe, J., & Sedor, J. (2013). Cannabinoid hyperemesis acute renal failure: A common sequela of cannabinoid hyperemesis syndrome. American Journal of Emergency Medicine, 32(6), 690.e1–690e2. https://doi.org/10.1016/j.ajem.2013.12.013

Health Canada. (2024a). Canadian Cannabis Survey: Cannabis use for non-medical purposes among people in Canada (aged 16+). Ottawa: Author.

Health Canada. (2024b). Legislative review of the Cannabis Act: Final report of the expert panel. Ottawa: Author. https://www.canada.ca/en/health-canada/services/publications/drugs-medication/legislative-review-cannabis-act-final-report-expert-panel.html

Hill, M. N., Froese, L. M., Morrish, A. C., Sun, J. C., & Floresco, S. B. (2006). Alterations in behavioral flexibility by cannabinoid CB1 receptor agonists and antagonists. Psychopharmacology, 187, 245–259. https://doi.org/10.1007/s00213-006-0421-4

Hornby, P. J., & Prouty, S. M. (2004). Involvement of cannabinoid receptors in gut motility and visceral perception. British Journal of Pharmacology, 141(8), 1335–1345. https://doi.org/10.1038/sj.bjp.0705783

Kim, H. S., Anderson, J. D., Saghafi, O., Heard, K. J., & Monte, A. A. (2015). Cyclic vomiting presentations following marijuana liberalization in Colorado. Academic Emergency Medicine, 22(6), 694–699. https://doi.org/10.1111/acem.12655

Le Strat, Y., Dubertret, C., & Le Foll, B. (2015). Impact of age at onset of cannabis use on cannabis dependence and driving under the influence in the United States. Accident Analysis & Prevention, 76, 1–5. https://doi.org/10.1016/j.aap.2014.12.015

Levinthal, D. J., Killian, B., & Issenman, R. M. (2024). Acute care of cyclic vomiting syndrome and cannabinoid hyperemesis in the home and emergency department. Neurogastroenterology & Motility, 36(S1), e14778. https://doi.org/10.1111/nmo.14901

Marco, E. M., Pérez-Alvarez, L., Borcel, E., Rubio, M., Guaza, C., Ambrosio, E., … & Viveros, M. P. (2004). Involvement of 5-HT1A receptors in behavioural effects of the cannabinoid receptor agonist CP 55,940 in male rats. Behavioural Pharmacology, 15(1), 21–27. https://doi.org/10.1097/00008877-200402000-00003

Murray, R. M., & Hall, W. (2020). Will legalization and commercialization of cannabis use increase the incidence and prevalence of psychosis? JAMA Psychiatry, 77(8), 777–778. https://doi.org/10.1001/jamapsychiatry.2020.0339

Myran, D. T., Roberts, R., Pugliese, M., Taljaard, M., Tanuseputro, P., & Pacula, R. L. (2022). Changes in emergency department visits for cannabis hyperemesis syndrome following recreational cannabis legalization and subsequent commercialization in Ontario, Canada. JAMA Network Open, 5(9), e2231937. https://doi.org/10.1001/jamanetworkopen.2022.31937

National Academies of Sciences, Engineering and Medicine. (2024). Cannabis policy impacts public health and health equity. Washington, D.C.: The National Academies Press. https://doi.org/10.17226/27766

Nourbakhsh, M., Miller, A., Gofton, J., Jones, G., & Adeagbo, B. (2019). Cannabinoid hyperemesis syndrome: Reports of fatal cases. Journal of Forensic Sciences, 64(1), 270–274. https://doi.org/10.1111/1556-4029.13819

Orr, L. E., & McKernan, J. F. (1981). Antiemetic effect of Δ9-tetrahydrocannabinol in chemotherapy-associated nausea and emesis as compared to placebo and compazine. Journal of Clinical Pharmacology, 21(S1), 76S–80S. https://doi.org/10.1002/j.1552-4604.1981.tb02578.x

Patel, S., Roelke, C. T., Rademacher, D. J., Cullinan, W. E., & Hillard, C. J. (2004). Endocannabinoid signaling negatively modulates stress-induced activation of the hypothalamic-pituitary-adrenal axis. Endocrinology, 145(12), 5431–5438. https://doi.org/10.1210/en.2004-0638

Patel, R. S., Goyal, H., Satodiya, R., & Tankersley, W. E. (2020). Relationship of cannabis use disorder and irritable bowel syndrome (IBS): An analysis of 6.8 million hospitalizations in the United States. Substance Use & Misuse, 55(2), 281–290. https://doi.org/10.1080/10826084.2019.1664591

Perisetti, A., Rimu, A. H., Khan, S. A., Bansal, P., & Goyal, H. (2020). Role of cannabis in inflammatory bowel diseases. Annals of Gastroenterology, 33, Article 134. https://doi.org/10.20524/aog.2020.0452

Renard, J., Krebs, M. O., Le Pen, G., & Jay, T. M. (2014). Long-term consequences of adolescent cannabinoid exposure in adult psychopathology. Frontiers in Neuroscience, 8, 361. https://doi.org/10.3389/fnins.2014.00361

Rey, A. A., Purrio, M., Viveros, M. P., & Lutz, B. (2012). Biphasic effects of cannabinoids in anxiety responses: CB1 and GABAB receptors in the balance of GABAergic and glutamatergic neurotransmission. Neuropsychopharmacology, 37, 2624–2634. https://doi.org/10.1038/npp.2012.123

Richards, J. R., Gordon, B. K., Danielson, A. R., & Moulin, A. K. (2017). Pharmacologic treatment of cannabinoid hyperemesis syndrome: A systematic review. Pharmacotherapy, 37(6), 725–734. https://doi.org/10.1002/phar.1931

Russo, E. B., Spooner, C., May, L., Leslie, R., & Whiteley, V. L. (2022). Cannabinoid hyperemesis syndrome survey and genomic investigation. Cannabis Cannabinoid Research, 7(3), 336–344. https://doi.org/10.1089/can.2021.0046

Sharkey, K. A., Darmani, N. A., & Parker, L. A. (2014). Regulation of nausea and vomiting by cannabinoids and the endocannabinoid system. European Journal of Pharmacology, 722, 134–146. https://doi.org/10.1016/j.ejphar.2013.09.068

Sharkey, K. A., & Wiley, J. W. (2016). The role of the endocannabinoid system in the brain–gut axis. Gastroenterology, 151(2), 252–266. https://doi.org/10.1053/j.gastro.2016.04.015

Sorensen, C. J., DeSanto, K., Borgelt, L., Phillips, K. T., & Monte, A. A. (2017). Cannabinoid hyperemesis syndrome: Diagnosis, pathophysiology, and treatment — A systematic review. Journal of Medical Toxicology, 13, 71–87. https://doi.org/10.1007/s13181-016-0595-z

Soriano-Co, M., Batke, M., & Cappell, M. S. (2010). The cannabis hyperemesis syndrome characterized by persistent nausea and vomiting, abdominal pain, and compulsive bathing associated with chronic marijuana use: A report of eight cases in the United States. Digestive Diseases and Sciences, 55, 3113–3119. https://doi.org/10.1007/s10620-010-1131-7

University of Washington, Addictions, Drug & Alcohol Institute. (2025, October 17). New ICD-10-CM code for cannabinoid hyperemesis syndrome: R11.16 [News release]. https://adai.uw.edu/icd-10-code-chs/

Venkatesan, T., Levinthal, D. J., Li, B. U. K., Tarbell, S. E., Adams, K. A., Issenman, R. M., … & Hasler, W. L. (2019). Role of chronic cannabis use: Cyclic vomiting syndrome vs cannabinoid hyperemesis syndrome. Neurogastroenterology & Motility, 31(Suppl. 2), e13606. https://doi.org/10.1111/nmo.13606

Wagner, S., Hoppe, J., Zuckerman, M., Schwarz, K., & McLaughlin, J. (2020). Efficacy and safety of topical capsaicin for cannabinoid hyperemesis syndrome in the emergency department. Clinical Toxicology, 58(6), 471–475. https://doi.org/10.1080/15563650.2019.1660783

Wang, G. S., Buttorff, C., Wilks, A., Schwam, D., Tung, G., & Pacula, R. L. (2021). Changes in emergency department encounters for vomiting after cannabis legalization in Colorado. JAMA Network Open, 4(9), e2125063. https://doi.org/10.1001/jamanetworkopen.2021.25063

Wasilewski, A., Lewandowska, U., Mosinska, P., Watala, C., Storr, M., Fichna, J., & Venkatesan, T. (2017). Cannabinoid receptor type 1 and mu-opioid receptor polymorphisms are associated with cyclic vomiting syndrome. American Journal of Gastroenterology, 112(6), 933–939. https://doi.org/10.1038/ajg.2017.73

Yeung, M. E., Weaver, C. G., Janz, K., Haines-Saah, R., & Lang, E. (2020). Clearing the air: A study of cannabis-related presentations to urban Alberta emergency departments following legalization. Canadian Journal of Emergency Medicine, 22(6), 776–783. https://doi.org/10.1017/cem.2020.384

Yeung, M. E., Weaver, C. G., Hartmann, R., Haines-Saah, R., & Lang, E. (2021). Emergency department pediatric visits in Alberta for cannabis after legalization. Pediatrics, 148(4). https://doi.org/10.1542/peds.2020-045922

Zannese, K. (2022). Clues emerging to mysterious cannabinoid hyperemesis syndrome. Canadian Medical Association Journal, 194(46), E1576–E1577. https://doi.org/10.1503/cmaj.1096027

Zuurman, L., Ippel, A. E., Moin, E., & van Gerven, J. M. (2009). Biomarkers for the effects of cannabis and THC in healthy volunteers. British Journal of Clinical Pharmacology, 67(1), 5–21. https://doi.org/10.1111/j.1365-2125.2008.03329.x

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CCSA was created by Parliament to provide national leadership to address substance use in Canada. A trusted counsel, we provide national guidance to decision makers by harnessing the power of research, curating knowledge and bringing together diverse perspectives.

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