Cannabis & Mental Health Primer Webinar
Zach Walsh

Overview - Me

- Clinical psychologists (#2011)
- Trained in addictions treatment
  - University of Chicago
  - Brown University - Center for Alcohol and Addiction Treatment
- Associate professor - UBC
- Lead - Therapeutic Recreational & Therapeutic Substance Use lab
- Published and presented widely on cannabis use and mental health
  - HOC
  - Senate
  - BC Supreme Court
  - Uruguay and Costa Rica
- PI - Canada's 1st clinical trial of cannabis to treat mental health d/o
- Advisory boards of MAPS Canada & Clinical team for MDMA for PTSD trials
- CIHR & SSHRC funded studies of cannabis use in young adults

Disclosure

- My research has received financial support from Tilray and Doja in the form of funding to sponsor research for which I am principal investigator.
- Director of clinical research for Indigenous Bloom as a directory board member.
- Potential for conflict(s) of interest:
  - Zach Walsh has received research support from Tilray & Doja.
  - Tilray & Doja are licensed producers of cannabis for medical purposes.
  - I hold shares in Indigenous Bloom.
  - Indigenous Bloom is an Indigenous operated cannabis company.
- Other funders of this research:

CIHR IRSC SSHRC CRSH Mitacs

Overview - Today

PART 1

- History
  - 3000 BCE to C-45
- The plant
  - Cannabinoids
    - THC-CBD…
  - Terpenes
    - Entourage effect
  - Strains/Chemovars
    - Indica / Sativa
  - Modes of Administration

Overview - Today

PART 2

- Cannabinoids in humans
  - The Endocannabinoid System
    - Endocannabinoid deficits
    - Endocannabinoid care
  - Cannabinoid pharmacology
- Medical Cannabis use
  - Patient reports
  - Cannabis for pain and anxiety
  - Substitution
    - Benzodiazapines
    - Opioids
    - Alcohol

Overview - Today

PART 3

- Cannabinoids and Mental Health
  - Anxiety
  - Depression
  - Psychosis
  - Cognition
  - Risk
  - PTSD
    - Trial
    - Case study

Overview - Today

PART 4

- Problems
  - Withdrawal
  - Disorder
  - Assessment
  - Treatment
  - Safe use
  - Driving
- Special populations
  - Youth
  - Older adults

Cannabinoids

- Endocannabinoids
  - Naturally occurring in animals
  - Anandamide
  - 2-AG
- Phytocannabinoids
  - From plants
  - THC, CBD and many others
- Synthetic
  - K9, Spice

History - China

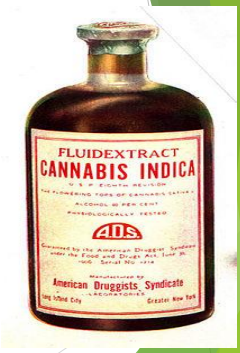
Shen-Nung (c.2700 B.C.)

History - India

- Ganja
- Bhang
- Holi
- The Vedas call cannabis a source of happiness, joy-giver, liberator that was compassionately given to humans to help us attain delight and lose fear (Abel, 1980).

History - Europe

- **William Brooke O'Shaughnessy**
  - **Introduced medical use of cannabis to Europe**
  - **From India - 1841**



History - Prohibition

"Marihuana is a short cut to the insane asylum. Smoke marihuana cigarettes for a month and what was once your brain will be nothing but a storehouse of horrid specters. Hasheesh makes a murderer who kills for the love of killing out of the mildest mannered man who ever laughed at the idea that any habit could ever get him…"

Harry Aslinger, 1937

1st Commissioner of the Federal Bureau of Narcotics

History

Canada - Recent

Background – Medical Cannabis in Canada

- *Parker* (2000) - constitutional right to choose cannabis as medicine without fear of criminal sanction
- In 2001, the *Marihuana Medical Access Regulations* (MMAR)
  - Access
    - Health Canada - Prairie PPS
    - Private production license
    - Designated grower (1:1…2:1)

CANADIAN MEDICAL MARIHUANA SYSTEM

MMAR	MMPR
ENDED MARCH 31, 2014	STARTED APRIL 1, 2014

Health Canada Santé Canada

MMPR

MARIHUANA FOR MEDICAL PURPOSES REGULATIONS

- Simplified/decentralized application process
- Multiple Licensed Producers
  - Increased quality & strain choice
- Research funding & materials
- No self-production or storefronts

  - Allard
- 2016 ACCESS TO CANNABIS FOR MEDICINAL PURPOSES REGULATIONS (ACMPR)

C-45: THE CANNABIS ACT

- Sale -provincial gov't
  - online (mail) and retail stores;
  - public/private models
- Minimum age of 18 (provinces can adjust)
- Adults -
  - up to 30 grams -
  - 4 plants per household
- Youth (12-17) -
  - decriminalized for 5 grams or less
  - Providing cannabis to minors - 14 year max
- Limits on advertising and branding
- Outside of regulated framework
  - 45+ new penalties

Cannabinoids

- The Cannabinoids
  - Delta-9-tetrahydrocannabinol (Δ^9-THC)
    - 5-25% "superweed?"
  - Cannabinoids
    - Over 100 Cannabinoids
      - Cannabinol and Cannabidiol (CBD)
  - THCA, THC, CBDA, CBD, CBGA, CBG, CBN
  - Some on plant ratios of 2:1, >20:1,
    - Terpenes
    - Entourage effect of herbal cannabis
    - Whole plant - coevolution with humans?
  - Synthetic Cannabinoids
    - Sativex - extract
    - Dronabinol (Marinol)-Levonantradol (30x THC)
    - Spice / K2
  - Rimonabant - antagonist

Pharmacology of THC

- THC functions by binding to the Cannabinoid Receptor (CB_1).
  - The presence of this receptor indicates that there is a naturally occur (endogenous) ligand, Anandimide, as well as other related compounds.
- The response can affect the hippocampus and hypothalamus
  - Hippocampus -involved in ***motivation*** and ***emotion*** as part of the limbic system; has a central role in the ***formation of memories***.
  - Hypothalamus -regulating ***sleep cycles***, ***body temperature***, ***appetite***, etc., and that acts as an endocrine gland by ***producing hormones***, including the releasing factors that control the hormonal secretions of the pituitary gland.

CBD

- **Well Documented:**
  - Anti-epileptic
- **Potential**:
  - Analgesic (acute and chronic pain)
  - Antipsychotic
  - Anxiolytic
  - Anti-cancer
  - Anti-inflammatory

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CBD

- **CBD does not activate CB1 or CB2 receptors**
- **Does not mimic endocannabinoids.**
- **Interacts indirectly with the endocannabinoid system**
- **Agonist**
  - **5 HT 1A** (anxiolytic; antidepressant)
  - **Adenosine** (anxiolytic)
  - **TRPV1** - (analgesic)
  - **Mu and delta opiate** - (analgesic)

Terpenes

- Biologically active cannabis constituents with pharmacologic effects.
- > 200 in the cannabis plant.
- Most are “Generally Recognized as Safe” as food additives.
- To optimize terpene absorption cannabis must be inhaled

Entourage?

British Journal of Pharmacology

Themed Issue: Cannabinoids in Biology and Medicine, Part I

REVIEW

Taming THC: potential cannabis synergy and phytocannabinoid-terpenoid entourage effects

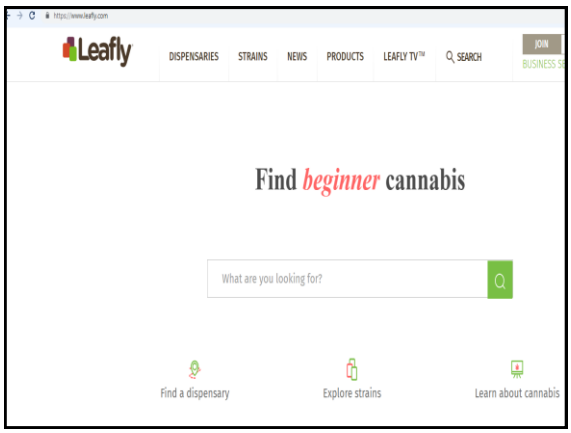
Ethan B Russo

SCIENTIFIC AMERICAN

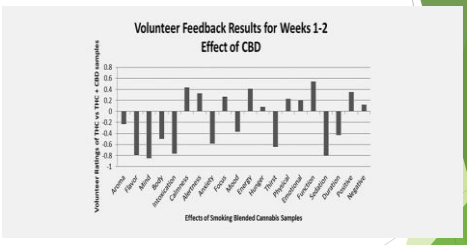
CHEMISTRY

Some of the Parts: Is Marijuana's "Entourage Effect" Scientifically Valid?

Industry players swear pot's many chemicals work in concert, but most scientists hear a THC solo

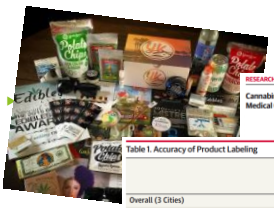


CBD vs



Lewis, Russo & Smith, 2018

Edibles



RESEARCH LETTER JAMA June 23/30, 2015 Volume 313, Number 24

Cannabinoid Dose and Label Accuracy in Edible Medical Cannabis Products

Ryan Vandrey, PhD
Jeffrey C. Raber, PhD
Mark E. Raber
Brad Douglass, PhD
Cameron Miller, MS
Marcel O. Bonn-Miller, PhD

Table 1. Accuracy of Product Labeling

	Accuracy of Labeled Tetrahydrocannabinol (THC) Content		
	Accurately Labeled[a]	Underlabeled[b]	Overlabeled[c]
Overall (3 Cities)			
Products tested, No. (%) (N = 75)	13 (17)	17 (23)	45 (60)
Type of product, No.			
Baked goods	2	7	13
Beverages	3	2	8
Candy or chocolate	8	8	24
Amount of THC, mg			
Label range	15 to 200	20 to 1000	2 to 325
Actual range	15 to 183	34 to 1236	<1 to 267
Deviation in THC content amount, %[d]			
Mean (SD)	−3 (4)	28 (13)	−47 (29)
Maximum	9	55	−99

Concentrates

Concentrates

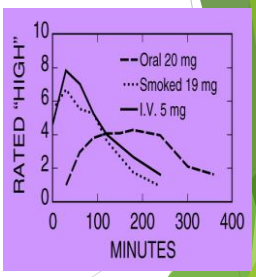
Modes of use

- Absorption
  - Oral Administration
    - Highly Lipid Soluble
      - Will hardly dissolve in water
      - Bake in food
        - First pass metabolism
      - Oral dose must be doubled or tripled to have same effect as inhalation
        - Peak effects: 1 to 3 hrs after ingestion
  - Inhalation
    - Depth of Inhalation
      - Vs duration
      - 10-25% cannabinoids
      - Peak effects: 15 to 60 minutes

Modes

Distribution

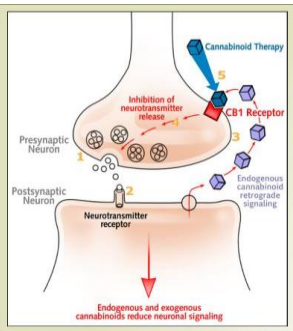
- The time course for intensity of a subjective "high" after consuming various doses of THC via different routes of administration



Part 2 – Cannabis & the Brain

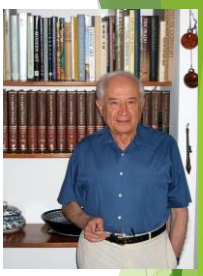
Neurological Effects of THC

- Endocannabinoid Synaptic Transmission
  1. Transmission of neurotransmitter into the post-synaptic neuron.
  2. Production of endocannabinoids in the post-synaptic neuron.
  3. The endocannabinoid (e.g. anadamide, 2AG) is released into the synaptic cleft.
  4. In the synaptic cleft the endocannabinoid binds to the Cannabinoid Receptor of the pre-synaptic neuron.
     - This in turn modulates neurotransmission pre-synapticly
     - Post-Synaptic Neuron → Pre-Synaptic Neuron (Retrograde Transmission)
- This mechanism is reverse of what is typically seen
  - Pre-Synaptic Neuron → Post-Synaptic Neuron (Normal Transmission)



1. Neurotransmitter (NT) released from vesicles within the presynaptic neuron activates the postsynaptic neuron
2. Activation of the postsynaptic neuron leads to the biosynthesis and nonvesicular release of an endocannabinoid
3. The endogenous CB1 ligand diffuses back to and binds to the presynaptic CB1 receptor
4. The CB1 receptor activates a G-protein, which leads to presynaptic events that result in inhibition of NT release
5. Exogenous cannabinoids activate CB1 receptors directly to regulate NT release

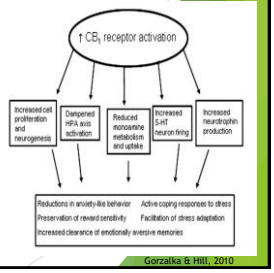
Neuropharmacology



- Receptors – 2 discovered 1990
  - Likely many more
  - Second Messenger System
- Endocannabinoids
  - Anandamide
  - 2-arachidonylglycerol (2-AG)
  - THC > duration & effect
- Presynaptic Neuromodulators
  - From post to pre synaptic
  - Effects depend on nature of pre
    - Depolarization-induced **suppression of inhibition**
    - Depolarization-induced **suppression of excitation**

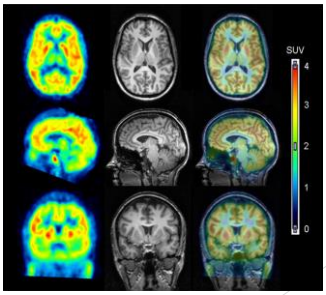
Neuropharmacology- ECS

- Affects neurons for NE, DA, 5-ht, Ach, GABA
- Receptor Location
  - Nucleus Accumbens
    - Mesolimbic DA via endorphir
  - Cerebellum
  - Basal Ganglia
  - Hippocampus
    - Memory
  - Amygdala
    - Stress & fear
  - Stress Recovery
    - Relax, eat, sleep, forget & protect



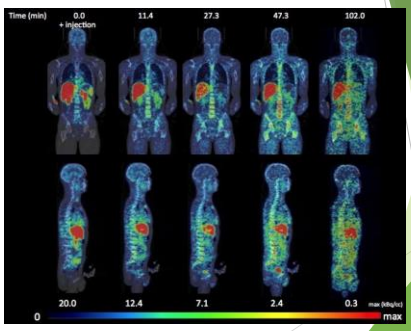
Gorzalka & Hill, 2010

CB1 Receptor Distribution in Human CNS



(Terry, 2010)

CB2 Receptor Distribution



(Ahmad, 2013)

Effects on Behavior of Humans

- Subjective Effects
  - Bipolar / contradictory
- Mood Changes and Getting High
  - Mood swings
  - Social effects
- Perception
  - Loss of sensitivity to pain
  - Time distortion

McKim, 2017

Effects on Behavior of Humans

- Memory
  - No effect on the ability to recall material already well learned or on recognition memory
  - Does disrupt the ability to recall words or narrative material
    - Short term memory
    - Temporal disintegration
- Attention
  - Easily distracted
- Creativity
  - Appreciation
  - No evidence that creativity is enhanced

McKim, 2017

Effects on Behavior of Humans

- Performance
  - Varied results
    - Level of use
    - Features of task
    - Ability vs attention/ motivation
- Performance Screening Tests
  - Standardized Field Sobriety Tests
    - Gaze nystagmus, Walk and turn test, One-leg stand
    - 56% of high THC group identified vs 2.5% placebo

McKim, 2017

Cannabis for Therapeutic Purposes

- Risks and benefits
- Cannabis is:
  - **"…one of the safest therapeutically active substances known to man"**

US Drug Enforcement Administration

Judge Francis Young -1988

Conditions in Clinical Practice

Rank order - Hergenrather 2016

- Pain (acute pain, chronic inflammatory, neuropathic)
- Mental disorders (all kinds)
- Cancers
- Gastrointestinal disorders
- Insomnia
- Migraine headaches
- Harm reduction, alternative to opioids . . .
- Spastic disorders
- Autoimmune disorders
- Neurodegenerative disorders
- Glaucoma
- Skin diseases
- Epilepsy, Autism, Tourettes, ADD, Dystonia, Dementia
- AIDS and other infections

Cannabis for Therapeutic Purposes


International Journal of Drug Policy 24 (2013) 511–516

Contents lists available at ScienceDirect

International Journal of Drug Policy

journal homepage: www.elsevier.com/locate/drugpo

Editors' choice

Cannabis for therapeutic purposes: Patient characteristics, access, and reasons for use

Zach Walsh, Robert Callaway, Lynne Belle-Isle, Rielle Capler, Robert Kay, Philippe Lucas, Susan Holtzman

International Journal of Drug Policy 25 (2014) 691–699

Contents lists available at ScienceDirect

International Journal of Drug Policy

journal homepage: www.elsevier.com/locate/drugpo

Research paper

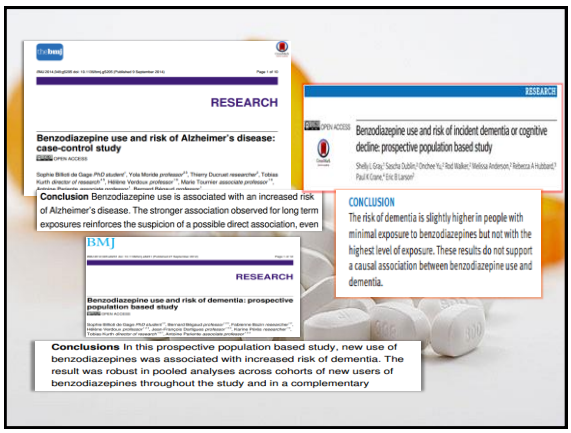
Barriers to access for Canadians who use cannabis for therapeutic purposes

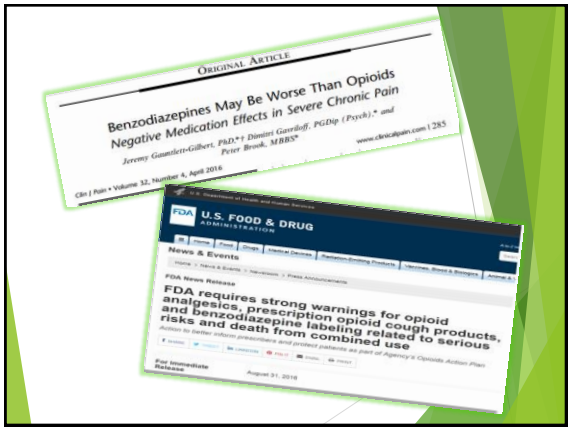
Lynne Belle-Isle, Zach Walsh, Robert Callaway, Philippe Lucas, Rielle Capler, Robert Kay, Susan Holtzman

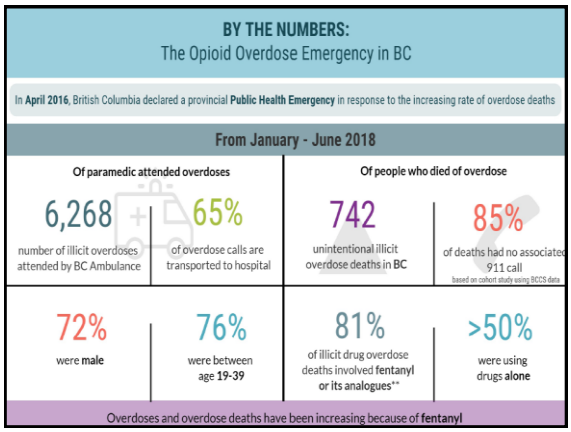
Institute for Healthy Living and Chronic Disease Prevention

Cannabis & Mental Health

Cannabis Access for Medical Purposes Study (CAMPS)	N=628
Sleep	85%
Pain	82%
Anxiety	78%
Depression	66%
Appetite/ Weight	56%
Nausea	49%




ORIGINAL ARTICLE
Benzodiazepines May Be Worse Than Opioids
Negative Medication Effects in Severe Chronic Pain
U.S. FOOD & DRUG
ADMINISTRATION
News & Events
FDA News Release
FDA requires strong warnings for opioid analgesics, prescription opioid cough products, and benzodiazepine labeling related to serious risks and death from combined use
For Immediate Release:
August 31, 2016


BY THE NUMBERS:
The Opioid Overdose Emergency in BC
In April 2016, British Columbia declared a provincial Public Health Emergency in response to the increasing rate of overdose deaths
From January - June 2018
Of paramedic attended overdoses
6,268
number of illicit overdoses attended by BC Ambulance
65%
of overdose calls are transported to hospital
Of people who died of overdose
742
unintentional illicit overdose deaths in BC
85%
of deaths had no associated 911 call
based on cohort study using BCCS data
72%
were male
76%
were between age 19-39
81%
of illicit drug overdose deaths involved fentanyl or its analogues**
>50%
were using drugs alone
Overdoses and overdose deaths have been increasing because of fentanyl


Global NEWS
Okanagan
TV News Programs
More people using pot as substitute for pills and booze
Drug and Alcohol REVIEW
Drug and Alcohol Review (2015)
DOI: 10.1111/dar.12323
Substituting cannabis for prescription drugs, alcohol and other substances among medical cannabis patients: The impact of contextual factors
PHILIPPE LUCAS, ZACH WALSH, KIM CROSBY, ROBERT CALLAWAY, LYNNE BELLE-ISLE, ROBERT KAY, RIELLE CAPLER & SUSAN HOLTZMAN

JAMA The Journal of the American Medical Association

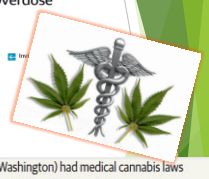
Research

JAMA Internal Medicine Published online August 25, 2014

Original Investigation

Medical Cannabis Laws and Opioid Analgesic Overdose Mortality in the United States, 1999-2010

Marcus A. Bachhuber, MD; Brendan Saloner, PhD; Chinazo O. Cunningham, MD, MS; Colleen L. Barry, PhD, MPP



IMPORTANCE Opioid analgesic overdose mortality continues to rise in the United States, driven by increases in prescribing for chronic pain. Because chronic pain is a major indication for medical cannabis, laws that establish access to medical cannabis may change overdose mortality related to opioid analgesics in states that have enacted them.

OBJECTIVE To determine the association between the presence of state medical cannabis laws and opioid analgesic overdose mortality.

DESIGN, SETTING, AND PARTICIPANTS A time-series analysis was conducted of medical cannabis laws and state-level death certificate data in the United States from 1999 to 2010; all 50 states were included.

RESULTS Three states (California, Oregon, and Washington) had medical cannabis laws effective prior to 1999. Ten states (Alaska, Colorado, Hawaii, Maine, Michigan, Montana, Nevada, New Mexico, Rhode Island, and Vermont) enacted medical cannabis laws between 1999 and 2010. States with medical cannabis laws had a 24.8% lower mean annual opioid overdose mortality rate (95% CI, −37.5% to −9.5%; $P = .003$) compared with states without medical cannabis laws. Examination of the association between medical cannabis laws and

PRESCRIPTION DRUGS

By Ashley C. Bradford and W. David Bradford

Medical Marijuana Laws Reduce Prescription Medication Use In Medicare Part D

"…the use of prescription drugs … **fell significantly**, once a medical marijuana law was implemented. National **reductions** in Medicare program and enrollee spending when states implemented medical marijuana laws were estimated to be **$165.2 million per year**"

Substituting Cannabis

PLOS | MEDICINE

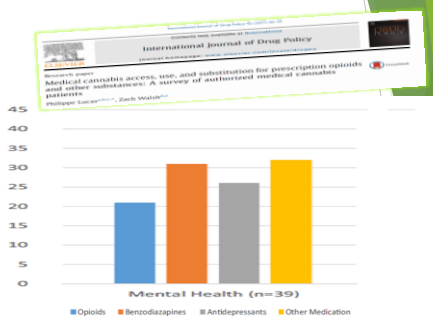
RESEARCH ARTICLE

Frequency of cannabis and illicit opioid use among people who use drugs and report chronic pain: A longitudinal analysis

Stephanie Lake[1,2], Zach Walsh[3], Thomas Kerr[1,4], Ziva D. Cooper[5], Jane Buxton[2,6], Evan Wood[1,4], Mark A. Ware[3,7], M. J. Milloy[1,4]*

- We found that people who used cannabis every day had about 50% lower odds of using illicit opioids every day compared to cannabis non-users. People who reported occasional use of cannabis were not more or less likely than non-users to use illicit opioids on a daily basis. Daily cannabis users were more likely than occasional cannabis users to report a number of therapeutic uses of cannabis including for pain, nausea, and sleep.
- Although more experimental research (e.g., randomized controlled trial of cannabis coupled with low-dose opioids to treat chronic pain among PWUD) is needed, these findings suggest that some PWUD with pain might be using cannabis as a strategy to alleviate pain and/or reduce opioid use.

Substituting Cannabis



Cannabis, Pain, & Anxiety

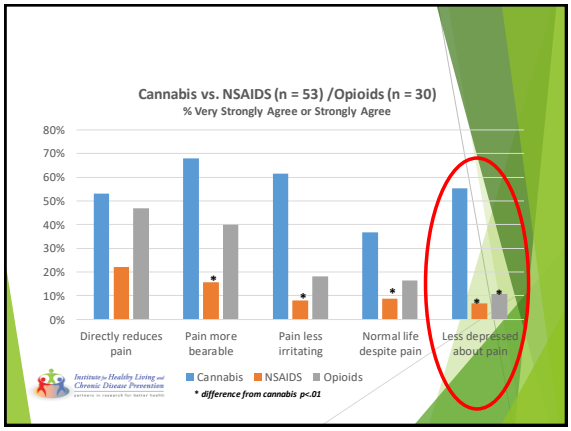
"I saw in it (cannabis)a means of effectively combating the fixed ideas of depressives, disruptin the chain of their ideas, of unfocusing their attention …

Jacques-Joseph Moreau (1845)

Cannabis, mental health & pain

- Kam Shojania, MD - Arthritis Research Centre
- Cheryl Koehn - Arthritis Consumer Experts
- 264 individuals with arthritis
- Not required to have used medical cannabis
- Online and hard copies mailed out

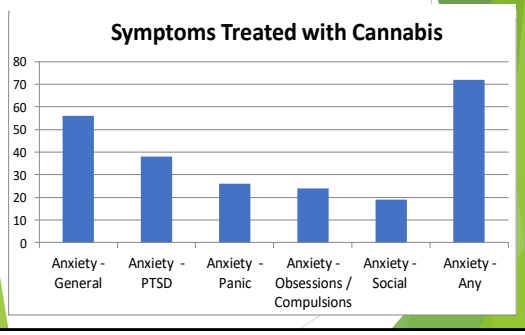
Arthritis Consumer Experts



Cannabis, Anxiety, & Pain

- Cross-sectional, in person
- BeKind Medical Cannabis Dispensary - Kelowna, BC
- 68 self-selected current medical cannabis users who use cannabis to treat pain
- Collected Jan - Nov 2013
- Detailed examination of anxiety and related constructs

Cannabis, Anxiety, & Pain



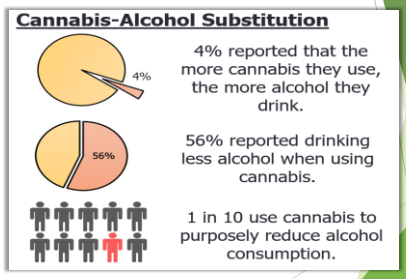
Substituting cannabis for alcohol

- 67 university students
- Cannabis & alcohol use in past 6 months
- Aged 17-24 (median age 20), 57% female
- Preliminary results from

"Cannabis and alcohol substitution among young adults"
Walsh, Lucas, Lozenski & Crosby, *in prep*

CANNABIS SUBSTITUTION

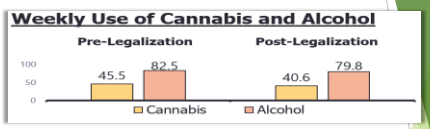
972 UBC students - + lifetime alcohol & cannabis use -67% female



Walsh et al., *in prep*

CANNABIS SUBSTITUTION

972 UBC students - + lifetime alcohol & cannabis use -67% female



Legalization	Pre	Post
Use cannabis instead of alcohol	**25% (n=131)**	**23% (n=98)**
Prefer feeling	79%	74%
Avoid hangovers	68%	65%
*Safer	56%	40%
Cheaper	35%	40%
*To drive	29%	16%
Socially acceptable	5%	3%

[*Journal of Law and Economics*, vol. 56 (May 2013)]

Medical Marijuana Laws, Traffic Fatalities, and Alcohol Consumption

D. Mark Anderson *Montana State University*
Benjamin Hansen *University of Oregon*
Daniel I. Rees *University of Colorado Denver*

Abstract

To date, 19 states have passed medical marijuana laws, yet very little is known about their effects. The current study examines the relationship between the legalization of medical marijuana and traffic fatalities, the leading cause of death among Americans ages 5–34. The first full year after coming into effect, legalization is associated with an 8–11 percent decrease in traffic fatalities. The impact of legalization on traffic fatalities involving alcohol is larger and estimated with more precision than its impact on traffic fatalities that do not involve alcohol. Legalization is also associated with sharp decreases in the price of marijuana and alcohol consumption, which suggests that marijuana and alcohol are substitutes. Because alternative mechanisms cannot be ruled out, the negative relationship between legalization and alcohol-related traffic fatalities does not necessarily imply that driving under the influence of marijuana is safer than driving under the influence of alcohol.

Addictive Behaviors

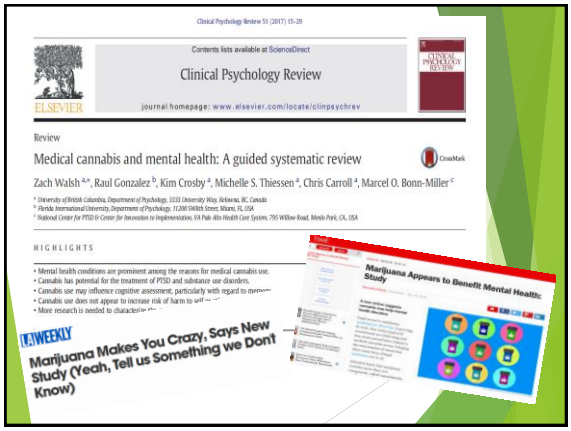
Intentional cannabis use to reduce crack cocaine use in a Canadian setting: A longitudinal analysis

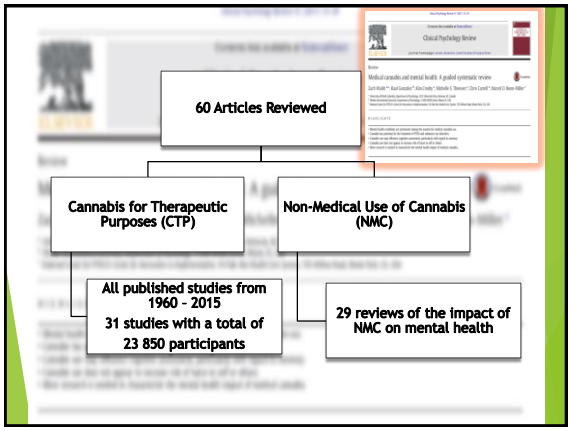
Drug and Alcohol Review

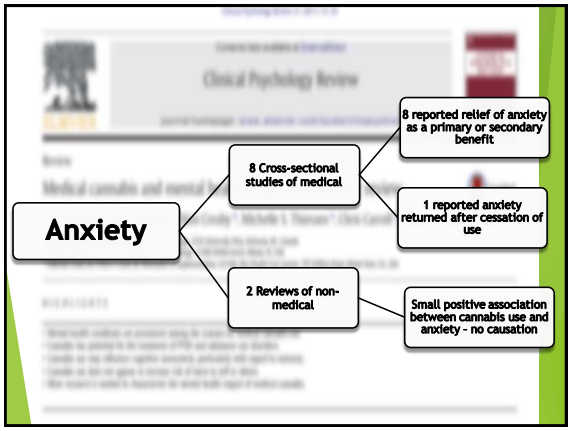
Cannabis use is associated with lower rates of initiation of injection drug use among street-involved youth: A longitudinal analysis

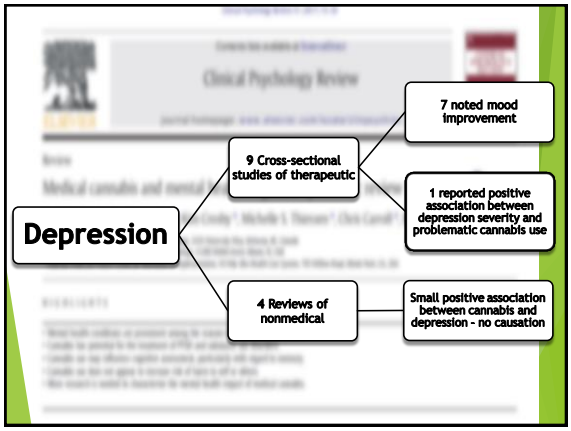
HUDSON REDDON[1,2], KORA DEBECK[1,3], MARIA EUGENIA SOCIAS[1,4], HUIRU DONG[1], EVAN WOOD[1,3,4], JULIO MONTANER[1,4], THOMAS KERR[1,4] & MICHAEL-JOHN MILLOY[1,4]

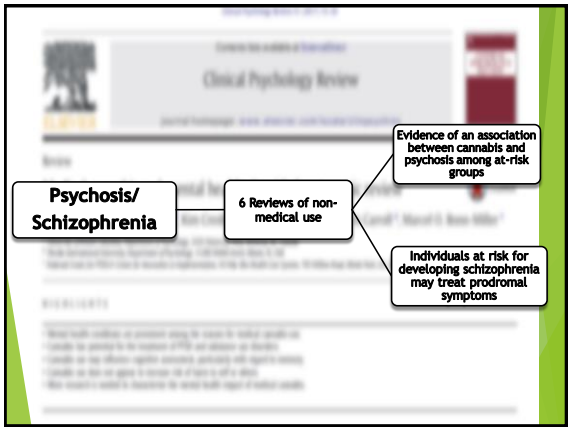
Part 3 – Cannabis & Mental Health

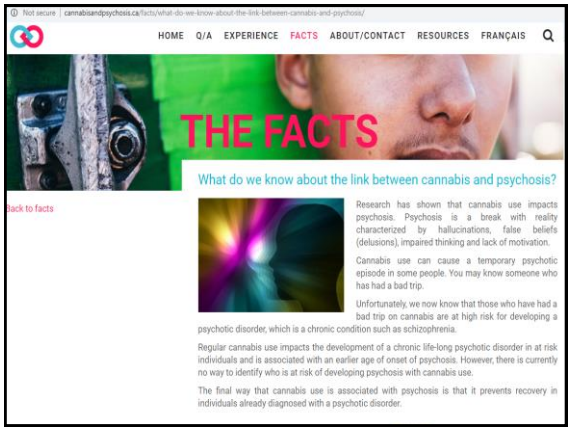

Clinical Psychology Review
Medical cannabis and mental health: A guided systematic review
Marijuana Appears to Benefit Mental Health: Study
Marijuana Makes You Crazy, Says New Study (Yeah, Tell us Something we Don't Know)

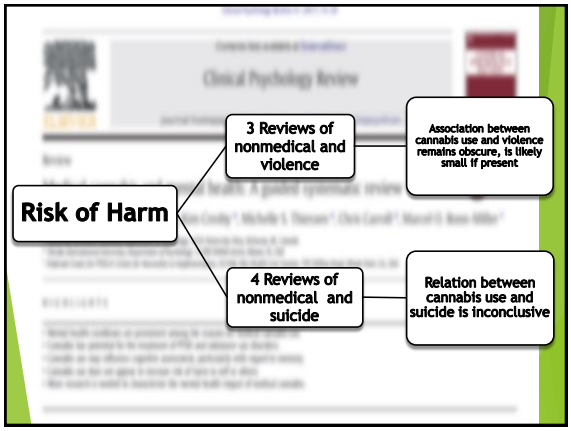

60 Articles Reviewed
Cannabis for Therapeutic Purposes (CTP)
Non-Medical Use of Cannabis (NMC)
All published studies from 1960 - 2015
31 studies with a total of 23 850 participants
29 reviews of the impact of NMC on mental health


Anxiety
8 Cross-sectional studies of medical
2 Reviews of non-medical
8 reported relief of anxiety as a primary or secondary benefit
1 reported anxiety returned after cessation of use
Small positive association between cannabis use and anxiety - no causation


Depression
9 Cross-sectional studies of therapeutic
7 noted mood improvement
1 reported positive association between depression severity and problematic cannabis use
4 Reviews of nonmedical
Small positive association between cannabis and depression - no causation


Psychosis/ Schizophrenia
6 Reviews of non-medical use
Evidence of an association between cannabis and psychosis among at-risk groups
Individuals at risk for developing schizophrenia may treat prodromal symptoms


HOME Q/A EXPERIENCE FACTS ABOUT/CONTACT RESOURCES FRANÇAIS
THE FACTS
What do we know about the link between cannabis and psychosis?
Back to facts
Research has shown that cannabis use impacts psychosis. Psychosis is a break with reality characterized by hallucinations, false beliefs (delusions), impaired thinking and lack of motivation.
Cannabis use can cause a temporary psychotic episode in some people. You may know someone who has had a bad trip.
Unfortunately, we now know that those who have had a bad trip on cannabis are at high risk for developing a psychotic disorder, which is a chronic condition such as schizophrenia.
Regular cannabis use impacts the development of a chronic life-long psychotic disorder in at risk individuals and is associated with an earlier age of onset of psychosis. However, there is currently no way to identify who is at risk of developing psychosis with cannabis use.
The final way that cannabis use is associated with psychosis is that it prevents recovery in individuals already diagnosed with a psychotic disorder.

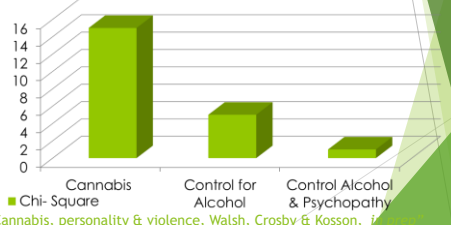


Cannabis & violence – General deviance/ spurious model

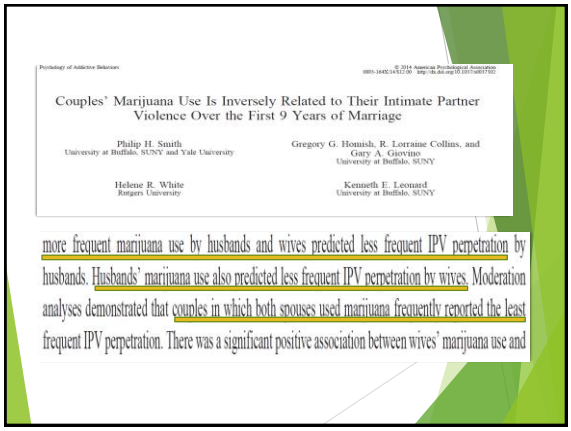
- Observed relationship with violence is due to confounding factors NOT related to direct effects of cannabis
  - Polysubstance use
  - Sensation seeking
  - Rule breaking
  - General antisociality

Cannabis & partner violence -

- 924 Canadian university students
- Cannabis Use Disorder scores
- Any partner violence – past 6 months



"Cannabis, personality & violence, Walsh, Crosby & Kosson, in prep"



Psychology of Addictive Behaviors

0893-164X/14/$12.00 http://dx.doi.org/10.1037/a0037502

Couples' Marijuana Use Is Inversely Related to Their Intimate Partner Violence Over the First 9 Years of Marriage

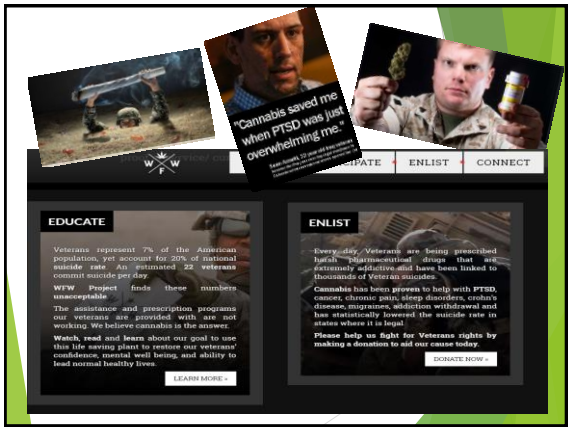
Philip H. Smith
University at Buffalo, SUNY and Yale University

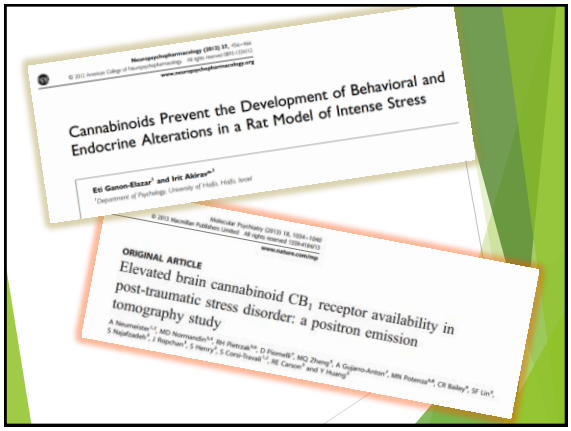
Gregory G. Homish, R. Lorraine Collins, and Gary A. Giovino
University at Buffalo, SUNY

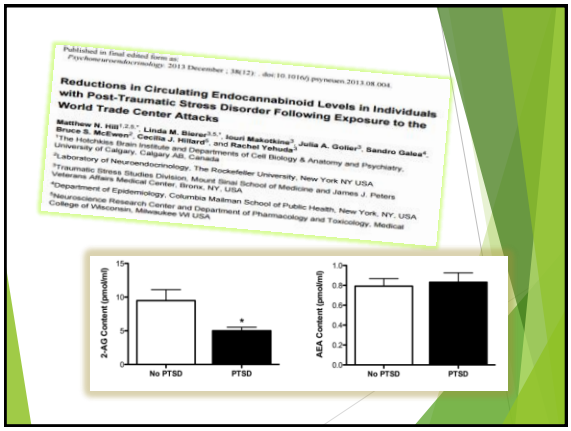
Helene R. White
Rutgers University

Kenneth E. Leonard
University at Buffalo, SUNY

more frequent marijuana use by husbands and wives predicted less frequent IPV perpetration by husbands. Husbands' marijuana use also predicted less frequent IPV perpetration by wives. Moderation analyses demonstrated that couples in which both spouses used marijuana frequently reported the least frequent IPV perpetration. There was a significant positive association between wives' marijuana use and







CRITERION B - Intrusion (5 Sx - Need 1)

Presence of one (or more) of the following intrusion symptoms associated with the traumatic event(s), beginning after the event(s) occurred:

1. Recurrent, involuntary, and intrusive distressing memories of the traumatic event(s)
2. **Recurrent distressing dreams in which the content and/or affect of the dream are related to the traumatic event.**
3. Dissociative reactions (e.g., flashbacks) in which the individual feels or acts as if the event(s) were recurring.
4. Intense or prolonged psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event(s).
5. **Marked physiological reaction to external or internal cues that symbolize or resemble an aspect of the traumatic event(s).**

CRITERION C - Avoidance (2 Sx – Need 1)

Persistent avoidance of stimuli associated with the traumatic event(s), beginning after the traumatic event(s) occurred, as evidenced by one or both of the following:

1. Avoidance of or efforts to avoid distressing memories, thoughts, or feelings about or closely associated with the traumatic event(s).
2. Avoidance of or efforts to avoid external reminders (people, places, conversations, activities, objects, situations) that arouse distressing, memories, thoughts, or feelings about or closely associated with the traumatic event(s).

D – negative alterations in cognition & mood (7 Sx – Need 2)

Negative alterations in cognitions and mood associated with the traumatic event(s), beginning or worsening after the event(s) occurred, as evidenced by two or more of the following:

1. Inability to remember an important aspect of the traumatic event
2. Persistent and exaggerated negative beliefs or expectations about oneself, others, or the world
3. Persistent, distorted cognitions about the cause or consequences of the traumatic event(s) that leads the individual to blame self or others.
4. **Persistent negative emotional state .**
5. **Marked diminished interest or participation in significant activities.**
6. **Feelings of detachment or estrangement from others**
7. **Persistent inability to experience positive emotions (e.g., happiness, satisfaction, or loving feelings).**

E – Arousal & Reactivity 6 Sx – Need 2)

Marked alterations in arousal and reactivity associated with the traumatic event(s), beginning or worsening after the traumatic event(s) occurred, as evidenced by two or more of the following:

1. **Irritable behavior and angry outbursts (with little or no provocation) typically expressed as verbal or physical aggression toward people or objects.**
2. Reckless or self-destructive behavior.
3. Hypervigilance.
4. **Exaggerated startle response.**
5. Problems with concentration.
6. **Sleep disturbance (e.g. problems falling or staying asleep or restless sleep).**

Posttraumatic Stress Disorder

4 studies of CTP

Substantial portion treat PTSD symptoms with cannabis

Self-report of good outcomes

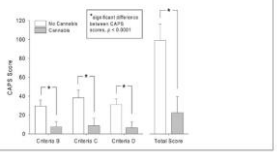
Effective for improving sleep and reducing nightmares

PTSD Symptom Reports of Patients Evaluated for the New Mexico Medical Cannabis Program

George R. Greer, M.D.*; Charles S. Grob, M.D.† & Adam L. Halberstadt, Ph.D.‡

Greer et al., 2014	80 (20)	New Mexico, US	Medical evaluations of patients seeking CTP	PTSD	Cross-sectional (5)	Patients who used CTP reported reductions of 75% in symptoms of trauma related re-experiencing, avoidance, and hyperarousal.

FIGURE 1
CAPS Scores for the No-Cannabis and Cannabis Conditions. Data Are Expressed as Group Means ± S.D.
*Significant Difference Between CAPS Scores, $p < 0.0001$.



ORIGINAL CONTRIBUTION

Use of a Synthetic Cannabinoid in a Correctional Population for Posttraumatic Stress Disorder–Related Insomnia and Nightmares, Chronic Pain, Harm Reduction, and Other Indications

A Retrospective Evaluation

Colin Cameron, MDCM, FRCPC, Diane Watson, MD, FRCPC, and Jeffrey Robinson, MA

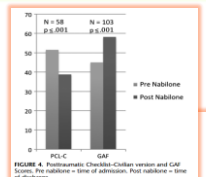


FIGURE 4. Posttraumatic Checklist–Civilian version and GAF Scores. Pre nabilone = time of admission. Post nabilone = time of discharge.

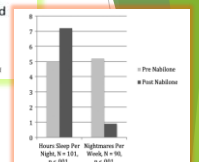


FIGURE 3. Sleep effects. Hours sleep per night = mean number of hours/night, nightmares per week = nights with nightmares/week. Pre nabilone = week prior to starting. Post nabilone = week after final dose was achieved.

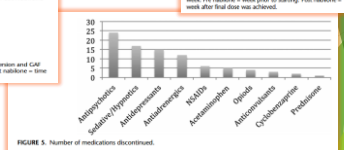


FIGURE 5. Number of medications discontinued.

CANNABIS & PTSD

Original Paper

Does cannabis use modify the effect of post-traumatic stress disorder on severe depression and suicidal ideation? Evidence from a population-based cross-sectional study of Canadians

Stephanie Lake[1,2], Thomas Kerr[1,3], Jane Buxton[2,4], Zach Walsh[5], Brandon Marshall[6], Evan Wood[1,3] and M-J Milloy[1,3]

Results: Among 24,089 eligible respondents, 420 (1.7%) reported a current clinical diagnosis of post-traumatic stress disorder. In total, 106 (28.2%) people with post-traumatic stress disorder reported past-year cannabis use, compared to 11.2% of those without post-traumatic stress disorder ($p<0.001$). In multivariable analyses, post-traumatic stress disorder was significantly associated with recent major depressive episode (adjusted odds ratio = 7.18, 95% confidence interval: 4.32–11.91) and suicidal ideation (adjusted odds ratio = 4.76, 95% confidence interval: 2.39–9.47) among cannabis non-users. post-traumatic stress disorder was not associated with either outcome among cannabis-using respondents (both $p>0.05$).

Conclusions: This study provides preliminary epidemiological evidence that cannabis use may contribute to reducing the association between post-traumatic stress disorder and severe depressive and suicidal states. There is an emerging need for high-quality experimental investigation of the efficacy of cannabis/cannabinoids for the treatment of post-traumatic stress disorder.

Medical Cannabis & PTSD - Protocol Design

- Randomized clinical trial
- Placebo-controlled with 2 active treatments
- Crossover design from Stage 1 to 2
- Triple-blinded
- 42 participants
- 2 treatment phases and 3 periods of cannabis abstinence

Primary Objective:
To compare the independent effects of two active concentrations of vaporized cannabis to placebo on PTSD symptom severity measured by changes in CAPS-5 total scores during three weeks of ad-libitum self-administration during Stage 1 of the study protocol.

Actigraphy

Actigraphy is an objective assessment to measure sleep parameters and will be used over the course of the study to evaluate changes in sleep.

To record sleep, the actigraphy device will be worn on the wrist like a watch to estimate sleep parameters.

The measures that will be reported include: time to bed, time out of bed, latency, percentage of efficiency, total time in bed (min), total sleep time (min), wake after sleep onset, number of awakenings, average awakenings (min).

Actigraphy has been well validated for the assessment of nighttime sleep parameters across age groups.

Case Study - Background

- 52 y/o Caucasian Female
- Multiple MVA
  - First one 22 years ago, coma, TBI
- History of moderate cannabis use
- BDI II: 28
- BAI: 24

Case Study - Background

- **Baseline CAPS 5**
  - **Total severity:** 36/80 (20-items X 4-points)
  - **Total # Sx:** 14
- Criterion B – Intrusion Symptoms: 10
- Criterion C – Avoidance: 3
- Criterion D – Negative Cognitions/Mood: 13
- Criterion E - Alterations in Arousal: 10

Case Study – FU 1

- <u>Reports from daily phone calls</u>
- **Day 2 of vaporizing**
  - Reports sleeping longer between nightmares
- **Day 4 of vaporizing**
  - Reports relief from chronic pain in neck and shoulders, felt them release
  - Reports dreams occurring much later in sleep
- **Day 5 of vaporizing**
  - Reports nightmares have ceased, was startled awake but for no apparent reason
- **Day 7 of vaporizing**
  - Reported that he can "de-escalate" much faster when anxious or "triggered" by something (TV show etc.)

Case Study – FU 1

- **Stage 1 follow-up CAPS 5**
  - **Total severity:** 30
  - **Total # Sx:** 12
- Criterion B – Intrusion Symptoms: 11 (+1)
- Criterion C – Avoidance: 2 (-1)
- Criterion D – Negative Cognitions/Mood: 7 (-6)
- Criterion E - Alterations in Arousal: 10 (0)

Case Study – Cessation 1

- **Cessation 1 follow-up CAPS 5**
  - **Total severity:** 40
  - **Total # Sx:** 14
- Criterion B – Intrusion Symptoms: 11
- Criterion C – Avoidance: 6
- Criterion D - Negative Cognitions/Mood: 11
- Criterion E - Alterations in Arousal: 12
- Self-report chronic pain, sleep, and general mood worse

CAPS 5 - Overview

	Criterion B	Criterion C	Criterion D	Criterion E	Total Severity
Baseline	**10**	**3**	**13**	**10**	**36**
Follow-up 1	**11**	**2**	**7**	**10**	**30**
Cessation 1	**11**	**6**	**11**	**12**	**40**

CAPS 5 - Overview

	BL	FU1	Cessation
Recurrent distressing dreams	3	2	3
Strong negative feelings such as fear	3	1	2
Felt distant or cutoff from others	3	1	3
Difficulty experiencing positive feelings	2	0	1
Exaggerated startle response	3	2	3
Problems with concentration	2	3	2

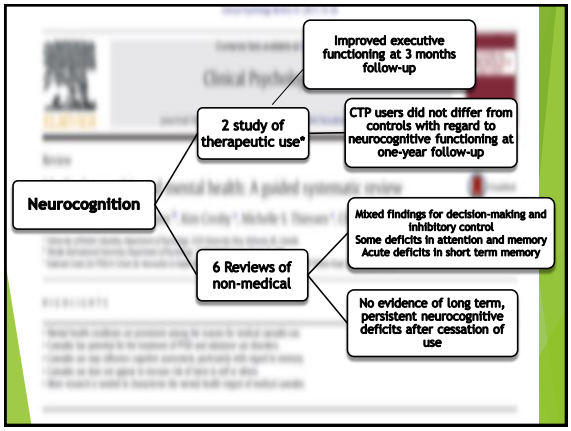
Case Study – Summary

- Criterion C and D made the biggest gains
  - Avoidance & Negative Cognitions/Mood
- Cessation period difficult
- Cannabis addressed issues secondary to the PTSD (i.e., chronic pain)

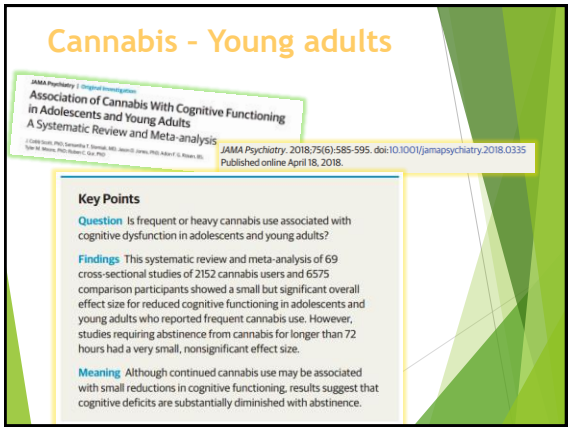
Case Study – Conclusions

- Consider mode of administration
- Prepare for withdrawal
- Consider symptoms profiles

PART 4 –PROBLEMS, SPECIAL POPULATIONS & MINDFUL USE


Neurocognition
2 study of therapeutic use*
Improved executive functioning at 3 months follow-up
CTP users did not differ from controls with regard to neurocognitive functioning at one-year follow-up
6 Reviews of non-medical
Mixed findings for decision-making and inhibitory control
Some deficits in attention and memory
Acute deficits in short term memory
No evidence of long term, persistent neurocognitive deficits after cessation of use


Splendor in the Grass? A Pilot Study Assessing the Impact of Medical Marijuana on Executive Function
Structural neuroimaging correlates of alcohol and cannabis use in adolescents and adults
Drug and Alcohol Dependence
Conclusions: Mid-life cannabis users had poorer verbal recall than non-users, but this was not related to their current level of cannabis use, and cannabis use was not associated with accelerated cognitive decline.


Cannabis - Young adults
Association of Cannabis With Cognitive Functioning in Adolescents and Young Adults
A Systematic Review and Meta-analysis
JAMA Psychiatry. 2018;75(6):585-595. doi:10.1001/jamapsychiatry.2018.0335
Published online April 18, 2018.
Key Points
Question Is frequent or heavy cannabis use associated with cognitive dysfunction in adolescents and young adults?
Findings This systematic review and meta-analysis of 69 cross-sectional studies of 2152 cannabis users and 6575 comparison participants showed a small but significant overall effect size for reduced cognitive functioning in adolescents and young adults who reported frequent cannabis use. However, studies requiring abstinence from cannabis for longer than 72 hours had a very small, nonsignificant effect size.
Meaning Although continued cannabis use may be associated with small reductions in cognitive functioning, results suggest that cognitive deficits are substantially diminished with abstinence.

Cannabis - Older adults

Literature Review

Marijuana Use Among Adults 50 Years or Older in the 21st Century

Gerontology & Geriatric Medicine
Volume 4: 1–14
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DOI: 10.1177/2333721418781668
journals.sagepub.com/home/ggm
SAGE

Shawnta L. Lloyd, MPH[1] and Catherine W. Striley, PhD, MSW, MPE[1]

Abstract

Background: Marijuana is the most commonly used illicit drug among older adults. As an older population grows in the United States that has a tolerant attitude toward marijuana use, the dynamics of marijuana use and the effects of marijuana on personal, social, and health outcomes among older adults require attention. **Objectives:** This review summarizes epidemiological literature on marijuana use among older adults. **Method:** A literature search was conducted using PubMed, AgeLine, and an online search engine from January 2000 to December 2017, resulting in 18 articles. **Results:** The greatest increase in marijuana use was observed among those in the older adult population 50 years or older, and those 65 years or older had the greatest increase in marijuana use in the older adult population. Common correlates of marijuana use among those in the older population included being male, being unmarried, having multiple chronic diseases, having psychological stress, and using other substances such as alcohol, tobacco, other illicit drugs, and prescription drugs. **Conclusion:** The increased use of marijuana in older populations requires surveillance and additional research to understand the use and effects of marijuana in older populations to avoid negative health outcomes.

Problems - Respiratory

Marijuana Use and the Risk of Lung and Upper Aerodigestive Tract Cancers: Results of a Population-Based Case-Control Study

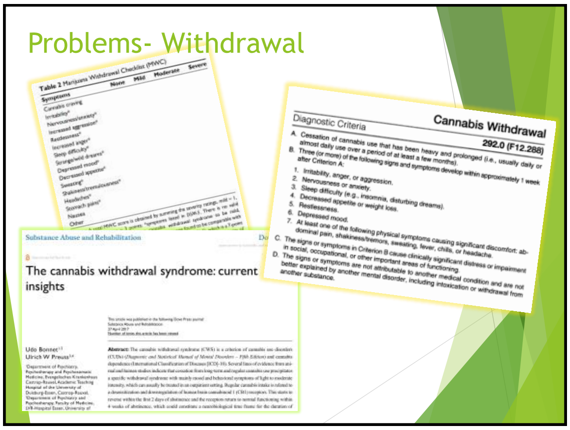
SPECIAL ARTICLE

Effects of Marijuana Smoking on the Lung

Donald P. Tashkin

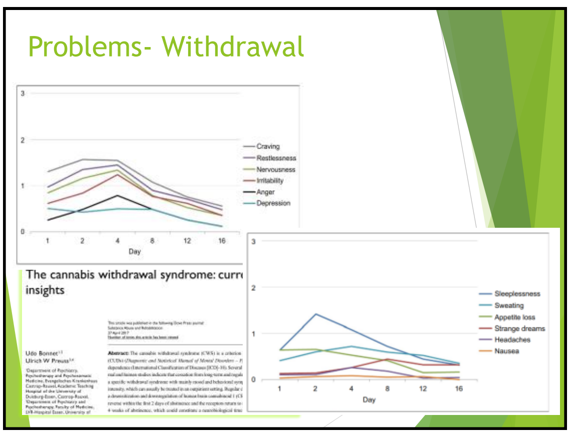
Problem use

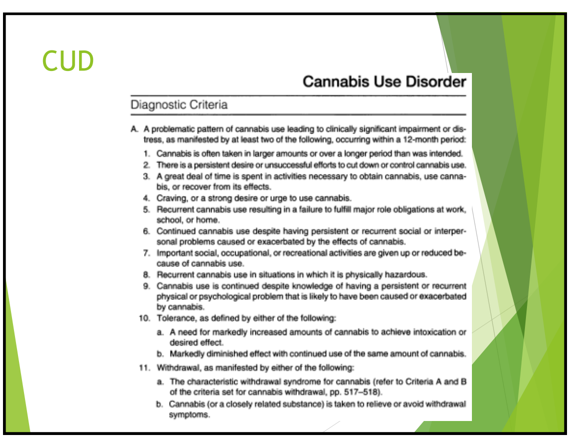
- Tolerance
  - Tolerance develops rapidly 5-6 days
  - Related to down-regulation of cannabinoid receptors
  - Sensitization or reverse tolerance not demonstrated in laboratory
- Withdrawal
  - Irritability, restlessness, insomnia



Diagnostic Criteria — Cannabis Withdrawal — 292.0 (F12.288)

A. Cessation of cannabis use that has been heavy and prolonged (i.e., usually daily or almost daily use over a period of at least a few months).
B. Three (or more) of the following signs and symptoms develop within approximately 1 week after Criterion A:
   1. Irritability, anger, or aggression.
   2. Nervousness or anxiety.
   3. Sleep difficulty (e.g., insomnia, disturbing dreams).
   4. Decreased appetite or weight loss.
   5. Restlessness.
   6. Depressed mood.
   7. At least one of the following physical symptoms causing significant discomfort: abdominal pain, shakiness/tremors, sweating, fever, chills, or headache.
C. The signs or symptoms in Criterion B cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.
D. The signs or symptoms are not attributable to another medical condition and are not better explained by another mental disorder, including intoxication or withdrawal from another substance.





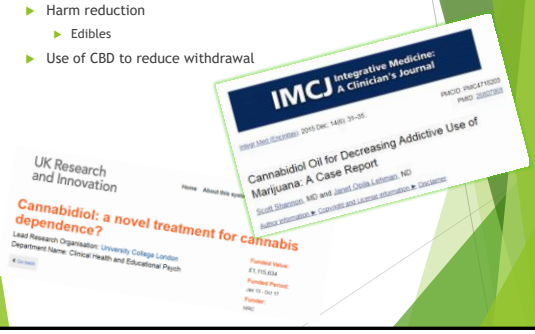
Cannabis Use Disorder

Diagnostic Criteria

A. A problematic pattern of cannabis use leading to clinically significant impairment or distress, as manifested by at least two of the following, occurring within a 12-month period:
   1. Cannabis is often taken in larger amounts or over a longer period than was intended.
   2. There is a persistent desire or unsuccessful efforts to cut down or control cannabis use.
   3. A great deal of time is spent in activities necessary to obtain cannabis, use cannabis, or recover from its effects.
   4. Craving, or a strong desire or urge to use cannabis.
   5. Recurrent cannabis use resulting in a failure to fulfill major role obligations at work, school, or home.
   6. Continued cannabis use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of cannabis.
   7. Important social, occupational, or recreational activities are given up or reduced because of cannabis use.
   8. Recurrent cannabis use in situations in which it is physically hazardous.
   9. Cannabis use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by cannabis.
   10. Tolerance, as defined by either of the following:
       a. A need for markedly increased amounts of cannabis to achieve intoxication or desired effect.
       b. Markedly diminished effect with continued use of the same amount of cannabis.
   11. Withdrawal, as manifested by either of the following:
       a. The characteristic withdrawal syndrome for cannabis (refer to Criteria A and B of the criteria set for cannabis withdrawal, pp. 517–518).
       b. Cannabis (or a closely related substance) is taken to relieve or avoid withdrawal symptoms.

Treatment considerations

- Harm reduction
  - Edibles
- Use of CBD to reduce withdrawal



CUDIT

Appendix I. The Cannabis Use Disorders Identification Test (CUDIT)

Have you used any cannabis over the past 6 months Yes No

If YES, please answer the following questions about your cannabis use.

Please tick the box that is most correct for you in relation to your cannabis use *over the past 6 months*

1. How often do you used cannabis?
never (Y) monthly or less (Y) 2–4 times a month (Y) 2–3 times a week (Y) 4 or more times a week (Y)
2. How many hours were you "stoned" on a typical day when you had been using cannabis?
1 or 2 (Y) 3 or 4 (Y) 5 or 6 (Y) 7 to 9 (Y) 10 or more (Y)
3. How often were you "stoned" for 6 or more hours?
never (Y) less than monthly (Y) monthly (Y) weekly (Y) daily or almost daily (Y)
4. How often during the past 6 months did you find that you were not able to stop using cannabis once you had started?
never (Y) less than monthly (Y) monthly (Y) weekly (Y) daily or almost daily (Y)
5. How often during the past 6 months did you fail to do what was normally expected from you because of using cannabis?
never (Y) less than monthly (Y) monthly (Y) weekly (Y) daily or almost daily (Y)
6. How often during the past 6 months did you needed to use cannabis in the morning to get yourself going after a heavy session of using cannabis?
never (Y) less than monthly (Y) monthly (Y) weekly (Y) daily or almost daily (Y)
7. How often during the past 6 months did you have a feeling of guilt or remorse after using cannabis?
never (Y) less than monthly (Y) monthly (Y) weekly (Y) daily or almost daily (Y)
8. How often in the past 6 months have you had a problem with your memory or concentration after using cannabis?
never (Y) less than monthly (Y) monthly (Y) weekly (Y) daily or almost daily (Y)
9. Have you or someone else been injured as a result of your use of cannabis over the past 6 months?
no (Y) yes (Y)
10. Has a relative, friend or a doctor or other health worker been concerned about your use of cannabis or suggested you cut down over the past 6 months?
no (Y) yes (Y)

(Adamson & Sellman, 2003)

BRIEF COMPOSITE CANNABIS ASSESSMENT TOOL

BCCAT

Item			
1. Substitution			
2. Relieve pain			
3. Improve sleep			
4. Unable to stop using			
5. Relieve nausea			
6. Refrain from activities			
7. Difficulty controlling			
8. Improve mood			
9. Like the feeling			
10. Think differently			
11. To relax			
12. Feel bad about use			

SUM	Therapeutic	Negative	Positive	Total Score
Therapeutic – (Negative – Positive) =		– (–)		=

*A single score is indicative of therapeutic versus problematic use, such that higher scores reflect therapeutic use and lower scores indicate more problematic use.

The ICE

Participants used a matrix of drop-down menus (pictured below) to rate cannabis dose for different routes of administration based on their own perceptions and experience

	Joint (1 **gram** joint, 1 joint = approx. 10-20 puffs)	Pipe (.5 **gram** = approx. 5-10 puffs)	Bong Hits	Cannabis Concentrate Vaporizer	Herbal Cannabis Vaporizer	Concentrate (Dab) (.05 **gram** = avg 1 dab)	Edibles (THC in mg)
Low Dose							
Medium Dose							
High Dose							

ROUTES OF ADMINISTRATION

JOINT

- 1 - 50 + Puffs

PIPE

- 1 - 50 + Puffs

EDIBLE

- 2.5 - 200 + mg
- mg in THC

BONG

- 1 - 30 + Hits

HERBAL VAPORIZER

- 1 - 50 + Puffs

CONCENTRATE VAPORIZER

- 1 - 50+ Puffs

CONCENTRATE (DAB)

- 0 - 8+ Dabs
- 1 Dab = approx. .05 grams

THE PRELIMINARY ICE

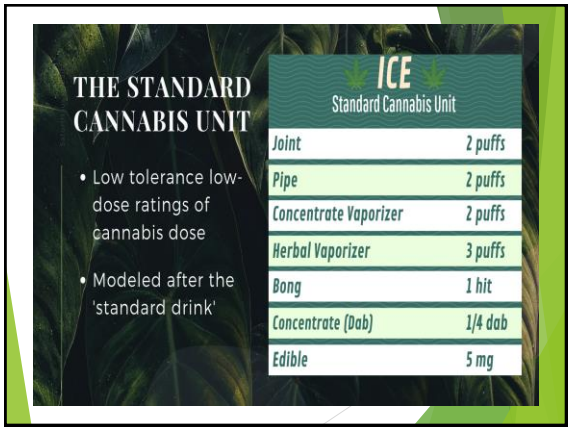
- User-derived cannabis dose across diverse routes of administration
- Low tolerance ratings used

"Start low, go slow"

CanniMed, 2019; NCSM, 2018; Simon, 2018

ICE; Index of Cannabis Equivalence

Route	Low Dose	Medium Dose	High Dose
Joint	2 puffs	6 puffs	11 puffs
Pipe	2 puffs	4 puffs	8 puffs
Bong	1 hit	3 hits	5 hits
Concentrate Vaporizer	2 puffs	4 puffs	7 puffs
Herbal Vaporizer	3 puffs	6 puffs	11 puffs
Concentrate (.05 g dab)	1/4 dab	3/4 dab	1 1/2 dab
Edible	5 mg	15 mg	35 mg



Overdose

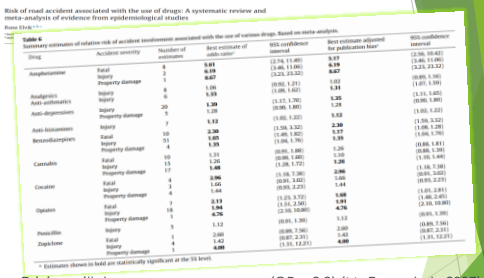
Green out

- *Canadian Institute of Health Information*
- 2017-2018 ~2,266 ER visits (>25, 000 for other substances)
- Mostly from edibles
  - Dabbing
- Symptoms:
  - Paranoia
  - Anxiety
  - Lethargy
  - Extreme dry mouth
  - Burning eyes
  - Shortness of breath
  - Increased heart rate
  - Shaking / trembling
  - Chills / sweats
  - Disorientation / lack of focus
  - Nausea

https://www.theleafnews.com/news/leaflet-Cannabis-overdoses-in-emergency-rooms-492201931.html

Cannabis & Driving

- Influence upon performance is short-lived
  - **Peak acute effects … obtained within 10 to 30 minutes** (NHTSA. 2004. *Drugs and Human Performance Facts Sheets*)
  - "impairment from cannabis **typically clears 3-4 hours after use.**…a minimum wait period before driving." (Fischer et al., 2011. *Lower risk cannabis use guidelines for Canada*)
- Experienced users become tolerant
  - "Experienced smokers who drive on a set course show **almost no functional impairment** under the influence of marijuana."(Sewell et al., 2009. *The effect of cannabis compared with alcohol on driving*)
  - "Patients … develop tolerance to the impairment of psychomotor performance, **so that they can drive vehicles safely.**" (Grotenhermen and Mueller Vahl. 2012. *The therapeutic potential of cannabis and cannabinoids*)


Accident Analysis and Prevention

Risk of road accident associated with the use of drugs: A systematic review and meta-analysis of evidence from epidemiological studies

- Driving with two or more passengers (OR = 2.2) (McEvoy et al., 2007)
- Exceeding the speed limit by 3+ mph (OR = 1.89) (Kloeden et al., 2002)
- Using a mobile phone (OR = 4.1) (Redelmeier and Tibshirani, 1997)

February, 2017

AJPH RESEARCH

US Traffic Fatalities, 1985–2014, and Their Relationship to Medical Marijuana Laws

"Medical marijuana laws were associated with immediate reductions in traffic fatalities in those aged 15 to 44 years …Dispensaries were also associated with traffic fatality reductions in those aged 25 to 44 years."

Lower-risk guidelines

Lower-Risk Cannabis Use Guidelines: A Comprehensive Update of Evidence and Recommendations

RECOMMENDATIONS

Recommendation 1: The most effective way to avoid any risks of cannabis use is to abstain from use. Those who decide to use need to recognize that they incur risks of a variety of—acute and long-term—adverse health and social outcomes. These risks will vary in their likelihood and severity with user characteristics, use patterns, and product qualities, and so may not be the same from user to user or use episode to another. *[Evidence Grade: None required.]*

Recommendation 2: Early initiation of cannabis use (i.e., most clearly that which begins before age 16 years) is associated with multiple subsequent adverse health and social effects in young adult life. These effects are particularly pronounced in early-onset users who also engage in intensive and frequent use. This may be in part because frequent cannabis use affects the developing brain. Prevention messages should emphasize that, the later cannabis use is initiated, the lower the risks will be for adverse effects on the user's general health and welfare throughout later life. *[Evidence Grade: Substantial.]*

Recommendation 3: High THC-content products are generally associated with higher risks of various (acute and chronic) mental and behavioral problem outcomes. Users should know the nature and composition of the cannabis products that they use, and ideally use cannabis products with low THC content. Given the evidence of CBD's attenuating effects on some THC-related outcomes, it is advisable to use cannabis containing high CBD:THC ratios. *[Evidence Grade: Substantial.]*

Recommendation 4: Recent reviews on synthetic cannabinoids indicate markedly more acute and severe adverse health effects from the use of these products (including instances of death). The use of these products should be avoided. *[Evidence Grade: Limited.]*

Recommendation 5: Regular inhalation of combusted cannabis adversely affects respiratory health outcomes. While alternative delivery methods come with their own risks, it is generally preferable to avoid routes of administration that involve smoking combusted cannabis material (e.g., by using vaporizers or edibles). Use of edibles eliminates respiratory risks, but the delayed onset of psychoactive effect may result in the use of larger than intended doses and subsequently increased (mainly acute, e.g., from impairment) adverse effects. *[Evidence Grade: Substantial.]*

Lower-risk guidelines

Lower-Risk Cannabis Use Guidelines: A Comprehensive Update of Evidence and Recommendations

Recommendation 6: Users should avoid practices such as "deep inhalation," breath-holding, or the valsalva maneuver to increase psychoactive ingredient absorption when smoking cannabis, as these practices disproportionately increase the intake of toxic material into the pulmonary system. *[Evidence Grade: Limited.]*

Recommendation 7: Frequent or intensive (e.g., daily or near-daily) cannabis use is strongly associated with higher risks of experiencing adverse health and social outcomes related to cannabis use. Users should be aware and vigilant to keep their own cannabis use—and that of friends, peers, or fellow users—occasional (e.g., use only on 1 day/week, weekend use only, etc.) at most. *[Evidence Grade: Substantial.]*

Recommendation 8: Driving while impaired from cannabis is associated with an increased risk of involvement in motor-vehicle accidents. It is recommended that users categorically refrain from driving (or operating other machinery or mobility devices) for at least 6 hours after using cannabis. This wait time may need to be longer, depending on the user and the properties of the specific cannabis product used. Besides these behavioral recommendations, users are bound by locally applicable legal limits concerning cannabis impairment and driving. The use of both cannabis and alcohol results in multiply increased impairment and risks for driving, and categorically should be avoided. *[Evidence Grade: Substantial.]*

Recommendation 9: There are some populations at probable higher risk for cannabis-related adverse effects who should refrain from using cannabis. These include individuals with predisposition for, or a first-degree family history of, psychosis and substance use disorders, as well as pregnant women (primarily to avoid adverse effects on the fetus or newborn). These recommendations, in part, are based on precautionary principles. *[Evidence Grade: Substantial.]*

Recommendation 10: While data are sparse, it is likely that the combination of some of the risk behaviors listed above will magnify the risk of adverse outcomes from cannabis use. For example, early-onset use involving frequent use of high-potency cannabis is likely to disproportionately increase the risks of experiencing acute or chronic problems. Preventing these combined high-risk patterns of use should be avoided by the user and a policy focus. *[Evidence Grade: Limited.]*

Cannabis

https://www.ncbi.nlm.nih.gov/books/NBK423845/pdf/Bookshelf_NBK423845.pdf

CANNABIS 1 SUMMARY REPORT

Proposed Criteria for Differentiating Use Types

	Environment	Quantity	Frequency	Period of use and intensity
Experimental / Occasional	Curiosity	Variable	A few times over lifetime	None
Regular	Recreational, social Mainly in evening Mainly in a group	A few joints Less than one gram per month	A few times per month	Spread over several years but rarely intensive
At-risk	Recreational and occupational (to go to school, to go to work, for sport…) .Alone, in the morning Under 16 years of age	Between 0.1 and 1 gram per day	A few times per week, evenings, especially weekends	Spread over several years with high intensity periods
Excessive	Occupational and personal problems No self regulation of use	Over one gram per day	More than once per day	Spread over several years with several months at a time of high intensity use

Even if **cannabis itself poses very little danger to the user and to society as a whole, some types of use involve risks**. It is time for our public policy to recognize this and to **focus on preventing at-risk use and on providing treatment for excessive cannabis users**.

Cannabis – Young adults

CSSDP CANADIAN STUDENTS FOR SENSIBLE DRUG POLICY

Sensible Cannabis Education
A Toolkit for Educating Youth

www.cssdp.org/youthtoolkit

1. 10 Principles for Approaching Cannabis Education with Young People
2. Pull Away Curriculum
   a. Cannabis 101
   b. Why Youth Use and Don't Use Cannabis
   c. Harm Reduction
   d. Legislative Overview
   e. Literature Review of Health Harms

TEN GUIDING PRINCIPLES

- 1. Education grounded in evidence-based information rather than fear
- 2. Open dialogue that is non-judgmental and use interactive approaches
- 3. Meaningful inclusion
- 4. Delivery by a trained facilitator or peer
- 5. Starting earlier with age-appropriate content

TEN GUIDING PRINCIPLES

- 6. Supporting parents to have age appropriate and open conversations
- 7. The inclusion of harm reduction
- 8. Education tailored to the specific context
- 9. Ongoing education available to youth
- 10. Attention to overlapping issues of racism, social justice, and stigma

SUPPORT PARENTS TO HAVE OPEN AND INFORMED CONVERSATIONS

- Families also need support to initiate and encourage ongoing conversations around cannabis
- Parents are often left out of educational efforts for drug education, but can be a key component to ensuring consistent messaging around cannabis, particularly in a legalized context[1]
- Supporting parents' access to information is an essential, but often overlooked piece

For parents and guardians, this means discussions around cannabis use should be ongoing, open, and non-judgmental

[1] Soole D, Mazerolle L, Rombouts S. School Based Drug Prevention Programs: A Review of What Works. *Aus NZ J Crim*. 2008; 41(2): 258-286

INCLUDE HARM REDUCTION

- Harm reduction strategies also address the needs of young people who may already be using
- Most effective with older youth (senior high school and above) and heavy youth cannabis users[1]
- Teaching harm reduction strategies doesn't encourage youth to use cannabis, and is an effective approach in a range of contexts[2]
- Brief Interventions - short and easy to administer interventions; can be delivered in medical (e.g., GP'S offices) or more general, non-medical settings[3]

2 Kohler PK, Manhart LE, Lafferty WE. Abstinence-Only and Comprehensive Sex Education and the Initiation of Sexual Activity and Teen Pregnancy. *J Adolesc Health*. 2007; 42(4): 344-51.

YOUTH REVISED HR TIPS - TOOLKIT

- 1. Start low and go slow
- 2. Consider appropriate time and place
- 3. Choose less risky cannabis products
- 4. Choose safer methods of consumption
- 5. Utilize safer smoking practices
- 6. Reduce the amount of cannabis used, and how frequently its used
- 7. Avoid synthetic cannabis altogether
- 8. Avoid mixing cannabis with tobacco and alcohol
- 9. Don't drive high and be informed about changing driving laws (e.g. zero tolerance under 21)
- 10. Consider your risk profile and avoid if pregnant

Treatment- Cannabis Check-Up

- In-School MET Intervention
- Individual Sessions
- Brief
- Not Treatment
- No pressure, no judgment
- Computerized Assessment
- No Parental Consent

Walker, Roffman, Stephens, Berghius, & Kim (2006)

Treatment- Cannabis Check-Up

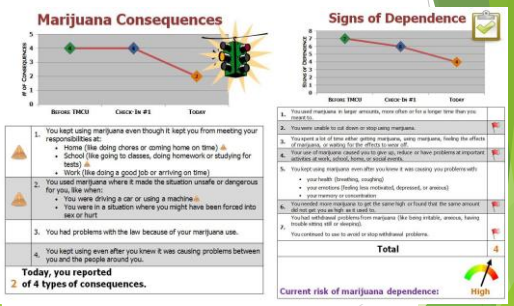
- Two individual sessions (30-60 minutes)
- Motivational Interviewing
- Review of Personal Feedback Report
- Personal Feedback Report included:
  - Normative data
  - Summaries of
    - Recent use patterns
    - Abuse and dependence symptoms
    - Goals
    - Social supports
    - Benefits of Quitting

Walker, Roffman, Stephens, Berghius, & Kim (2006)

Treatment- Cannabis Check-Up

Walker, Roffman, Stephens, Berghius, & Kim (2006)

Treatment- Cannabis Check-Up



Walker, Roffman, Stephens, Berghius, & Kim (2006)

Treatment- Cannabis Check-Up

Life Goals

Very Negatively 1	Negatively 2	Not Positively or Negatively 3	Positively 4	Very Positively 5

Your Goals:	Your marijuana use affects this goal:	Reducing your marijuana use would affect this goal:
1)		
2)		
3)		
4)		
5)		

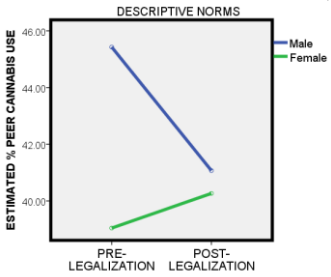
Walker, Roffman, Stephens, Berghius, & Kim (2006)

METRIC-L - CANNABIS USE NORMS

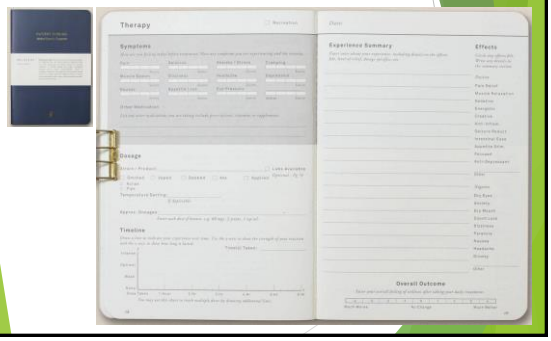
N = 1496 - 66% Female - 63% Euro-Canadian - 20 y/o

Pre-Legalization	Post-Legalization
• 66% reported lifetime use • 59% reported past year use • 38% reported past month use	• 66% reported lifetime use • 59% reported past year use • 35% reported past month use
• Frequency: 39% Never 33% Monthly or less 14% 2-4 times a month 7% 2-3 times a week 8% 4+ times a week	• Frequency: 41% Never 36% Monthly or less 13% 2-4 times a month 5% 2-3 times a week 5% 4+ times a week

METRIC-L - CANNABIS USE NORMS



Mindful Cannabis Use



Jeffrey Y. Hergenrather, MD
General practice physician
Solo private practice
Cannabis consultations since 1997
Sebastopol, California

SOCIETY of CANNABIS CLINICIANS

President and founding member of
The Society of Cannabis Clinicians

Treatment plan

Dosing range:

Titrate for desired effect (low and slow)

Frequency of dosing

- Episodic or as needed
- Daily administration: morning, evening or bedtime
- Multiple or frequent administrations daily
- Holidays

Treatment Plan

Method of Admininistration (MOA):

- ☐ Oral tincture, infusion, or spray, alcohol or oil based
- ☐ Full extract cannabis oil, FECO
- ☐ Other ingested flowers, products, or concentrates
- ☐ Vapor or smoke
- ☐ Suppositories
- ☐ Topical

Cannabinoid ratio: Preferred ratio of principle cannabinoids, THC:CBD.

- ☐ **High CBD** strain: CBD:THC (30:1 <-> 10:1) , (ACDC, Charlotte's Web, and others)
- ☐ **Balanced**: 6:1<-> **1:1** <-> 1:2 THC:CBD, nominally 1:1
- ☐ **High THC** strain: (THC:CBD – 100:1 <-> 50:1)
- ☐ **Other:** e.g. consider a High CBD tincture in the AM before breakfast and a balanced THC:CBD tincture at bedtime

Frequency: Frequency varies depending therapeutic goal, variations in the rate of hepatic metabolism, and MOA.

- ☐ Once daily
- ☐ Twice daily, AM before breakfast or PM, and bedtime
- ☐ Three times daily, every 8 hours – AM before breakfast, PM, and bedtime
- ☐ Other _____

Developing the Treatment Plan

Suggested Dose: Wide range in dosing depending on tolerance and individual differences. Generally dosing is increased by slow titration to effective dose.

- ☐ 2 1/2 mg to 5 mg per dose
- ☐ 5 - 10 mg per dose
- ☐ 10 - 20 mg per dose
- ☐ 20 - 40 mg per dose
- ☐ ~ 50 mg per dose
- ☐ Other: e.g. Increase dose gradually and speadily..

Target dose: (SPECIAL CONDITIONS)

- ☐ Minimum target dose: _____ mg / day, (or mg/dose)
- ☐ Maximum target dose: _____mg / day, (or mg/dose)

Tolerance (a reminder): Develops with a steady, at least daily, dosing with induction of auto-regulation of cannabinoid CB1 receptor population (internalization of CB1 receptors). From onset tolerance develops in ~ 1-2 weeks,

Footnotes:

1. All products are considered to be organically grown and produced.
2. Products have accurately measured cannabinoid content and terpenes when available.
3. . Hold dose if too sleepy
4. Drug-Drug interactions: For nearly all conventional pharmaceuticals there is no significant drug-drug interactions with cannabis/cannabinoids. Clobazam and other anti-epileptics drugs metabolized by the hepatic CYP 2C19 and CYP 3A4 families, with concurrent high doses of cannabis concentrates (> 1 mg/kg/day) should be monitored for safe and effective blood levels of these anti-epileptic medications.

Treatment Plan - Precautions

- Anxiety and panic in the neophyte or THC sensitive
- Syncope and/or fall risk especially with high dose "dabs"
- Smoking > bronchitis ~ No COPD, emphysema, or cancers
- Habit Forming ~ Not addictive, minor withdrawal
- Drug Drug interaction: CYP450 2C and 3A families
- Association with schizophrenia and psychosis
- Association with the hyperemesis syndrome

Case 1 - Janis

- 27y/o female
- Recently separated
  - 2 & 5 y/o daughters
- Symptoms of anxiety & depressed mood
  - Sleep disturbance
  - Use cannabis –
    - Mild in late teens
    - Currently smoked in pipe
    - 3-5x week evenings
    - sleep
  - Guilt related to use

Case 2 - Jurgen

- 19y/o male
- Single
- Living with parents
- Part time – service industry
- Referred by parents
  - Use cannabis –
    - Started 14 y/o
    - Daily 3-5x
    - 3-7 grams week
  - Low motivation to change

Case 3 - Sunil

- 64 y/o male
- Single
- Living alone
- Chronic pain & d/t MVA 5 years ago
  - depression
- Alcohol and opioid use
  - Referred by children
  - Cannabis naive

FAQ

- What is the most important sign of a cannabis use problem?
- What do you recommend as a first step for people who are concerned about their cannabis use?
- Does cannabis use lead to the use of other drugs?
- What kind of adjunctive behavioral therapies are a good march
- Why are there so many gaps in research?
- What do you see as the biggest risks associated with medical cannabis use?
- What is the biggest myth about medical cannabis?
- Are there ethnic or gender differences?
- What about growing your own/ producing your own edibles?
- What is the most important area of research?

THANKS

http://blogs.ubc.ca/walshlab/ ZACHARY.WALSH@UBC.CA