A PALLIATIVE CARE PROVIDER'S PERSPECTIVE ON MEDICAL CANNABIS

Molly Collins, MD, FACP
June 6th, 2019

Share something you learned about medical cannabis…
AND
What would you like to learn about medical cannabis today?

SESSION OBJECTIVES:

- Build your knowledge base about potential benefits and risks of medical cannabis
- Describe the certification process
- Develop tools to advise patients about medical cannabis

TODAY WE WILL REVIEW:

- One provider's perspective entering the Wild West
- A brief overview of:
  - History of cannabis medicine
  - Endocannabinoid system
  - Clinical research
- The certification process
- What I take into account when advising patients

What are our patients seeing online?

WE ALL NEED TO BALANCE:

- Enormous public demand
- Limited current evidence → ***does not mean no benefit***
- Potential benefit and safety

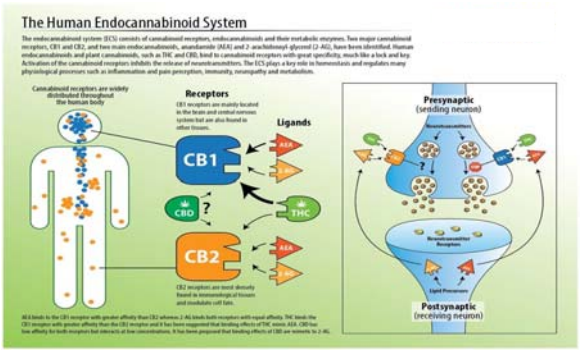
CANNABIS AND CANCER: "SIBERIAN ICE MAIDEN"

http://siberiantimes.com/science/casestudy/features/iconic-2500-year-old-siberian-princess-died-from-breast-cancer-reveals-unique-mri-scan/

A BRIEF HISTORY OF CANNABIS MEDICINE:

- Humans may have cultivated Cannabis for at least 12,000 years
- 1838 – introduced to Western medicine
- 1890 – "*In almost all painful maladies I have found Indian hemp by far the most useful of drugs*"
- 1942 – Cannabis is removed from the USP
- 1964 – THC is discovered by Dr. Raphael Mechoulam

Have you ever heard of the endocannabinoid system?



Nahtigal I, Blake A, Hand A, Florentinus-Mefailoski A, Hashemi H, Friedberg J.
The pharmacological properties of cannabis2016. 481-91 p.

WHAT ARE CANNABINOIDS?

- **Endocannabinoids:**
  - Anandamide
  - 2AG
- **Phytocannabinoids:**
  - THC
  - CBD
- **Synthetic Cannabinoids:**
  - Dranabinol (Marinol)
  - Nabilone (Cesamet)
  - Nabiximols (Sativex) – whole plant extract; 1:1 THC/CBD oral mucosal spray;

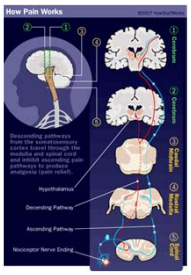
What does the research show?

ISSUES IN CANNABINOID RESEARCH:

- Small studies
- Short duration
- Most include patients with prior history of cannabis use
- Interventions studied are different than what most patients are accessing
- Unblinding was very common

Cannabis for pain

ANALGESIC EFFECTS OF CANNABINOIDS:



- Affects descending and ascending pain transmissions
- May target affective qualities of pain
- May attenuate low grade inflammation
- May potentiate the effects of opioids

Research

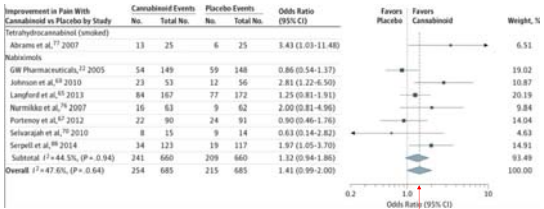
Original Investigation

Cannabinoids for Medical Use
A Systematic Review and Meta-analysis

Penny F. Whiting, PhD; Robert F. Wolff, MD; Sohan Deshpande, MSc; Marcello Di Nisio, PhD; Steven Duffy, PgD; Adrian V. Hernandez, MD, PhD; J. Christiaan Keurentjes, MD, PhD; Shona Lang, PhD; Kate Misso, MSc; Steve Ryder, MSc; Simone Schmidlkofer, MSc; Marie Westwood, PhD; Jos Kleijnen, MD, PhD

JAMA. 2015;313(24):2456-2473.

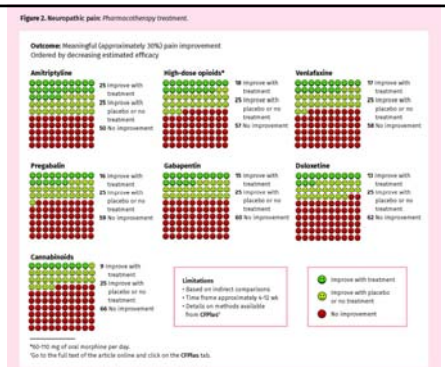
≥30% IMPROVEMENT IN PAIN:



Improvement in Pain With Cannabinoid vs Placebo by Study	Cannabinoid Events No.	Cannabinoid Events Total No.	Placebo Events No.	Placebo Events Total No.	Odds Ratio (95% CI)	Weight, %
Tetrahydrocannabinol (smoked)						
Abrams et al,[77] 2007	13	25	6	25	3.43 (1.03-11.48)	6.51
Nabiximols						
GW Pharmaceuticals,[52] 2005	54	149	59	148	0.86 (0.54-1.37)	19.02
Johnson et al,[69] 2010	23	53	12	56	2.81 (1.22-6.50)	10.87
Langford et al,[65] 2013	84	167	77	172	1.25 (0.81-1.91)	20.19
Nurmikko et al,[70] 2007	16	63	9	62	2.00 (0.81-4.96)	9.84
Portenoy et al,[67] 2012	22	90	24	91	0.90 (0.46-1.76)	14.04
Selvarajah et al,[72] 2010	8	15	9	14	0.63 (0.14-2.82)	4.63
Serpell et al,[66] 2014	34	123	19	117	1.97 (1.05-3.70)	14.91
Subtotal I^2 = 44.5%, (P = .0.94)	241	660	209	660	1.32 (0.94-1.86)	93.49
Overall I^2 = 47.6%, (P = .0.64)	254	685	215	685	1.41 (0.99-2.00)	100.00

JAMA. 2015;313(24):2456-2473.

OR = 1.41



Allan, G. M., Ramji, J., Perry, D., Tan, J., Beahm, N. P., Crisp, N., ...&Fleming, M. (2018). Simplified guideline for prescribing medical cannabinoids in primary care. *Canadian Family Physician*, *64*(2), 111-120.

Cannabis for nausea

MEDICAL CANNABINOIDS VS PLACEBO IN CINV:

A)

STUDY OR SUBGROUP	EXPERIMENTAL EVENTS	EXPERIMENTAL TOTAL	CONTROL EVENTS	CONTROL TOTAL	WEIGHT, %	RISK RATIO* (95% CI)
Duran, 2010	5	7	2	9	5.4	3.21 (0.87 to 11.90)
Frytak, 1979	16	38	7	37	21.8	2.23 (1.04 to 4.78)
Meiri, 2007	8	14	3	13	9.6	2.48 (0.83 to 7.37)
Melhem-Bertrandt, 2014	11	30	5	29	15.6	2.13 (0.84 to 5.37)
Orr, 1980	40	55	5	55	15.4	8.00 (3.42 to 18.74)
Sallan, 1975	5	15	0	14	1.6	10.31 (0.62 to 170.96)
Wada, 1982	32	92	10	92	30.7	3.20 (1.67 to 6.12)
Total (95% CI)		**251**		**249**	**100.0**	**3.60 (2.55 to 5.09)**
Total events	117		32			

Heterogeneity: χ^2_7 = 7.29 (*P* = .29); I^2 = 18%

Test for overall effect: *Z* = 7.24 (*P* < .00001)

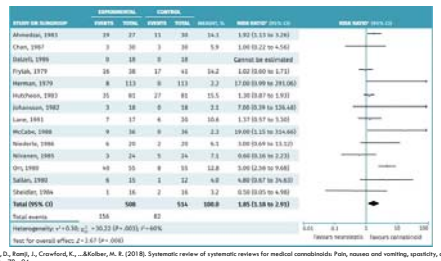
RISK RATIO* (95% CI)

0.01 0.1 1 10 100

Favours placebo Favours cannabinoid

Allan, G. M., Finley, C. R., Tan, J., Perry, D., Ramji, J., Crawford, K., ...&Kolber, M. R. (2018). Systematic review of systematic reviews for medical cannabinoids: Pain, nausea and vomiting, spasticity, and harms. *Canadian Family Physician*, *64*(2), e78-e94.

MEDICAL CANNABINOIDS VS NEUROLEPTICS IN CINV:



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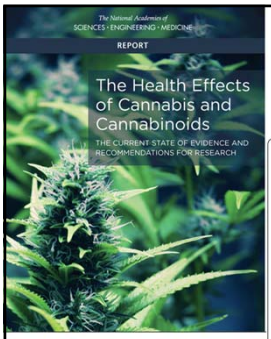
CLINICAL PRACTICE GUIDELINES

Table 1. Medical cannabinoids' estimated benefit when treating chronic pain, chemotherapy-induced nausea and vomiting, or spasticity with GRADE rating of evidence

INDICATION	ESTIMATED BENEFIT: CANNABINOIDS	ESTIMATED BENEFIT: CONTROL (PLACEBO UNLESS INDICATED)	NNT	GRADE QUALITY OF EVIDENCE
Chronic pain (median follow-up 4 wk)				
• ≥30% reduction in chronic (neuropathic plus cancer) pain*	39%	30%	11	Very low
• ≥30% reduction in neuropathic pain	38%	30%	14	Very low
• ≥30% reduction in palliative pain	30%	23%	NS (approximately 15)†	Very low
• Change in chronic pain scales (possible score 0-10)‡	Baseline: approximately 6 Decrease: 1.2-1.6	Baseline: approximately 6 Decrease: 0.8	NA	Very low
Chemotherapy-induced nausea and vomiting (median follow-up 1 d)				
• Control of nausea and vomiting (cannabinoids vs placebo)	47%	13%	3	Moderate
• Control of nausea and vomiting (cannabinoids vs neuroleptics)	31%	16% (vs neuroleptics)	7	Low

Allan, G. M., Ramji, J., Perry, D., Ton, J., Beahm, N. P., Crisp, N., ...&Fleming, M. (2018). Simplified guideline for prescribing medical cannabinoids in primary care. *Canadian Family Physician*, *64*(2), 111-120.



2017

"The absence of evidence is not necessarily indicative of evidence of the absence of effectiveness"

Chapter Highlights

- In adults with chemotherapy-induced nausea and vomiting, oral cannabinoids are effective antiemetics.
- In adults with chronic pain, patients who were treated with cannabis or cannabinoids are more likely to experience a clinically significant reduction in pain symptoms.
- In adults with multiple sclerosis (MS)-related spasticity, short-term use of oral cannabinoids improves patient-reported spasticity symptoms.
- For these conditions the effects of cannabinoids are modest; for all other conditions evaluated there is inadequate information to assess their effects.

Cannabis is an old drug that interacts with our body in many ways. We do not fully understand it. Current evidence is limited, though the potential may be significant.

Cannabis side effects

SHORT TERM SIDE EFFECTS ARE USUALLY MILD:

Tachycardia, vasodilation, hypertension, postural hypotension

Coughing, wheezing from vaping

Dry mouth, reddening of the eyes, blurred vision

Dizziness, headache

Increased appetite

Euphoria, anxiety, sedation

Impaired motor function

Hyperemesis syndrome – can be treated with a hot shower

Lambert Center. "Medicinal Cannabis: Education for Health Care Providers." https://www.lambert-medicalcannabis-edu.com/

SERIOUS AND LONG TERM SIDE EFFECTS:

- High dose: Tachycardia, paranoia, delusions, anxiety, insomnia, hallucinations
- Decreases in cognition, mood, motivation
- Dependence/cannabis use disorder
- Brain maturation in youth
- Short term memory and cognition
- Lung damage in heavy users from contaminants

Lambert Center. "Medicinal Cannabis: Education for Health Care Providers." https://www.lambert-medicalcannabis-edu.com/

CAUTIONS AND CONTRAINDICATIONS:

- Pregnancy and lactation
- History of psychosis, schizophrenia
- Medication interactions
- Act 16 states patients under the influence may not work in: electricity, public utilities, permit chemicals, mining, public health/safety risk

Lambert Center. "Medicinal Cannabis: Education for Health Care Providers." https://www.lambert-medicalcannabis-edu.com/. "Medical Marijuana Act." 2016.

Obtaining Medical Cannabis in Pennsylvania

PENNSYLVANIA ACT 16 DEFINES:

- Qualifying conditions
- Patients
- Certifying physicians
- Dispensaries
- Product
- Research

THERE ARE CURRENTLY 21 QUALIFYING CONDITIONS:

- Amyotrophic Lateral Sclerosis
- Autism
- Cancer, including remission therapy
- Crohn's Disease
- Damage to the nervous tissue of the central nervous system (brain-spinal cord) with objective neurological indication of intractable spasticity, and other associated neuropathies
- Dyskinetic and spastic movement disorders
- Epilepsy
- Glaucoma
- HIV/AIDS
- Huntington's Disease
- Inflammatory Bowel Disease
- Intractable Seizures

https://www.health.pa.gov/topics/programs/Medical%20Marijuana/Pages/Patients.aspx

QUALIFYING CONDITIONS, CONTINUED

- Multiple Sclerosis
- Neuropathies
- Opioid use disorder for which conventional therapeutic interventions are contraindicated or ineffective, or for which adjunctive therapy is indicated in combination with primary therapeutic interventions
- Parkinson's Disease
- Post-traumatic Stress Disorder
- Severe chronic or intractable pain of neuropathic origin or severe chronic or intractable pain
- Sickle Cell Anemia
- Terminal Illness

https://www.health.pa.gov/topics/programs/Medical%20Marijuana/Pages/Patients.aspx

CERTIFICATION REQUIRES AN ASSESSMENT:

- Physician determines that the patient:
  - Has a serious medical condition documented in the EHR
  - Is likely to receive therapeutic or palliative benefit based on:
    - Professional opinion
    - PMH as documented
    - Controlled substance history, review of PDMP

MY GOALS IN THE ENCOUNTER

- Assess:
  - Patient's goals and the symptoms they are looking to treat
  - Prior experience and SEs
  - Medical conditions with special attention to:
    - Frailty
    - Med interactions
    - Route of delivery
- Describe the process for obtaining certification
- Discuss dosing and product choice
- Manage expectations
- Follow-up & learn from my patients

RATIO OF THC:CBD MAY BE PATIENT AND CONDITION SPECIFIC:

- Naïve patients: include at least some CBD
- Neuropathic pain: possible synergy with THC/CBD → may need to trial agents empirically
- Nausea/anorexia: THC most studied

Lambert Center. "Medicinal Cannabis: Education for Health Care Providers." https://www.lambert-medicalcannabis-edu.com/

ACTIVITY OF THE AVAILABLE FORMS:

- Vaporization or nebulization
- Tincture/Oil
- Pill/capsule
- Topical
- Plant material for vaporization

GENERAL GUIDELINES:

- Store safely, away from children, in a cool, sealed, dark location.
- Begin with a low dose
- Take a few small doses/day
- Do not redose orally too quickly (may need to wait 30min-2hr to feel effect), effect may last hours
- Increase gradually, looking for balance of function vs SEs/euphoria
- Use only as directed by dispensary professional
- Be alert for adverse effects

BOTTOM LINE

- The evidence for medical cannabis is limited
- Patient expectations and demand is high
- With time we will learn more about which patients and conditions are best candidates for use
- Educate yourself!

What will you take away from this talk about medical cannabis?

Questions?

REFERENCES

Abrams, D. I. (2018). The therapeutic effects of Cannabis and cannabinoids: An update from the National Academies of Sciences, Engineering and Medicine report. *European Journal of Internal Medicine*, 49:7-11.

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Backes, M. (2017). *Cannabis Pharmacy: The Practical Guide to Medical Marijuana--Revised and Updated*. Hachette UK.

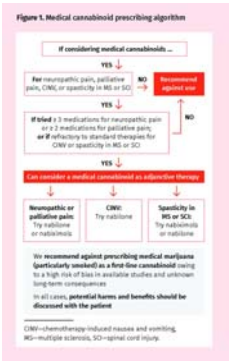
Davis, M. P. (2016). Cannabinoids for symptom management and cancer therapy: the evidence. *Journal of the National Comprehensive Cancer Network*, *14*(7): 915-922.

Lambert Center. "Medicinal Cannabis: Education for Health Care Providers." https://www.lambert-medicalcannabis-edu.com/.

National Academies of Sciences, Engineering, and Medicine. (2017). *The health effects of cannabis and cannabinoids: The current state of evidence and recommendations for research*. National Academies Press.

Rocha, F. C. M., dos Santos Júnior, J. G., Stefano, S. C., & da Silveira, D. X. (2014). Systematic review of the literature on clinical and experimental trials on the antitumor effects of cannabinoids in gliomas. *Journal of neuro-oncology*, *116*(1), 11-24.

CANADIAN GUIDELINES IN PRIMARY CARE:



There is a tension as we have researched this:

On the one hand evidence for MMJ efficacy is quite limited, on the other hand it may be comparatively safe and worth a try

EDUCATE YOURSELF – YOU WILL BE ASKED

PRECLINICAL STUDIES OF MMJ IN CANCER:

- 1975 NCI study: THC and CBD inhibited the growth of Lewis lung adenocarcinoma cells in vitro in mice and rats.
  - Munson AE, Harris LS, Friedman MA, Dewey WL, Carchman R A. Antineoplastic activity of cannabinoids. J Natl Cancer Inst 1975;55:597–602.
- Combined with gemcitabine, cannabinoids reduce the viability of pancreatic cancer cells
  - Donadelli M, Dando I, Zaniboni T, et al. Gemcitabine/ cannabinoid combination triggers autophagy in pancreatic cancer cells through a ros -mediated mechanism. Cell Death Dis 2011; 2 : e152.
- Adding THC to temozolomide reinstated glioma suppression in tumors that had become resistant to chemotherapy
  - Torres S, Lorente M, Rodriguez-Fornes F, et al. A combined preclinical therapy of cannabinoids and temozolomide against glioma. Mol Cancer Ther 2011;10 : 90

"But again, mice and rats are not people, and what is observed in vitro does not necessarily translate into clinical medicine. The preclinical evidence that cannabinoids might have direct anticancer activity is provocative as well, but more research is warranted."

Maida, V., & Daeninck, P. J. (2016). A user's guide to cannabinoid therapies in oncology. *Current Oncology*, 23(6), 398.

PRECLINICAL DATA SUPPORTS USE IN CIPN:

- Activation of of the CB1 and CB2 receptors suppresses the development of vincristine-induced peripheral neuropathy in rats
  - Br J Pharmacol 2007; 152:765-77
- Administration of Anandamide attenuated CIPN in mice receiving daily cisplatin
  - J Neurosci 2012; 32 :7091-101
- Cannabidiol pretreatment stops paclitaxel induced neuropathy in mice
  - Br J Pharmacol 2014; 171:636-45

Brief Report

A Double-Blind, Placebo-Controlled, Crossover Pilot Trial With Extension Using an Oral Mucosal Cannabinoid Extract for Treatment of Chemotherapy-Induced Neuropathic Pain

Mary E. Lynch, MD, FRCPC, Paula Cesar-Rittenberg, MD, FRCPS, and Andrea G. Hohmann, PhD
Pain Management Unit (M.E.L.), Queen Elizabeth II Health Sciences Centre, Department of Anesthesia, Psychiatry and Pharmacology (M.E.L.), and Division of Gynecologic Oncology (P.C.-R.), Dalhousie University, Halifax, Nova Scotia, Canada; and Department of Psychological and Brain Sciences (A.G.H.), Indiana University, Bloomington, Indiana, USA

NABIXIMOLS VS PLACEBO IN CIPN:

Lynch 2014

Methods	**Disease**: chemotherapy-induced neuropathic pain **Study setting**: single centre, Canada; year of study not reported **Study design**: cross-over design **Study duration**: 4 weeks each and 2 weeks washout
Participants	**Inclusion criteria**: neuropathic pain persisting for 3 months after completing chemotherapy with paclitaxel, vincristine, or cisplatin. The average 7-day intensity of pain had to be ≥ 4 on an 11-point NRS. Participants also exhibited sensory abnormalities comprising allodynia, hyperalgesia, or hypesthesia. Concurrent analgesics had to be stable for 14 days before entry into the trial **Exclusion criteria**: ischaemic heart disease, ongoing epilepsy, a personal or family history of schizophrenia, or psychotic disorder or substance abuse or dependency within the previous 2 years. Exclusion criteria also included pregnancy or other medical condition that might compromise safety in the trial **Both groups**: N = 18; mean age 58 (SD 11.34) years; 15/18 female; previous cannabis use 5/18

Cannabis-based medicines for chronic neuropathic pain in adults (Review) 43
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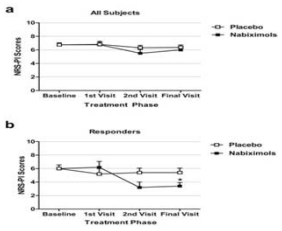
IN LIMITED STUDY SOME MAY RESPOND:



MAINTAINING HOMEOSTASIS:

- Pain, Stress
- Control energy balance
- Immune regulation

Donvito G, Nass SR, Wilkerson JL, Curry ZA, Schurman LD, Kinsey SG, Lichtman AH. The Endogenous Cannabinoid System: A Budding Source of Targets for Treating Inflammatory and Neuropathic Pain. Neuropsychopharmacology. 2017;43:52. doi: 10.1038/npp.2017.204.

"Modern-day scientists have increasingly been turning their attention to cannabis due to its potential to inhibit or destroy cancer cells, and at the very least, manage the pain and symptoms that come with the illness. But then, ancient people seem to have known that already."

Holloway A. Did ancient Siberian princess use cannabis to cope with breast cancer? [Web article]. London, UK: Ancient Origins; 2014.

CANNABIS USE DISORDER

Same criteria as with other crugs of abuse

1 in 10 who try cannabis for an addiction (lower than with other drugs of abuse)

Connection between marijuana use and psychiatric conditions is unknown. Cannabis use is highly associated with psychiatric disorders but unclear if causal or makes it worse. Be wary of use with schizophrenia/psychotic disorders as connection is stronger. MJ may also worsen PTSD.

- Cannabis withdrawal syndrome
- Cannabis intoxication disorder

ADDICTION

Dependence (regular use despite mental and physical impairment and withdrawal symptoms upon stopping) is 21.7-38%

Withdrawal symptoms can include anger, aggression, anxiety, anorexia, insomnia, stomach pain, tremors and headache

Higher concentrations of THC (preparations such as oil) cause rapid spikes in dopamine which the beginning of addiction

USES

THC – nausea/vomiting, appetite, some pain. Important for spasticity (MS).

CBD – anti-seizure, anti-spasmodic, anxiolytic, antipsychotic, antiemetic. Less clear how it works. Doesn't bind to CB1 receptors, so doesn't cause as much anxiety, euphoria. Pain control.

Indications:

Auto immune disease

Migraine – NSAIDs boost endocannabinoid levels

ROUTE-DEPENDENT EFFECTS

Smoked: Fast (secs-minutes), max dose 30mins, subsides over 1-3.5hrs

Vaping: Seems to avoid lung damage due to contaminants

Eating: Slower onset (30min-2hrs), longer duration (5->8hrs). THC converted in the liver to a longer-acting metabolite. Harder to titrate due to delayed and variable onset.

SL Tincture: Avoids 1st pass metabolisms.

Topical: Variable absorption

Rectal: Rapid absorption. Avoids 1st pass metabolism. 2nd highest bioavailability after vaping

THERE ARE IMPORTANT MEDICATION INTERACTIONS

Avoid cyp3A4, cyp2c9 inhibitors – cannabis is metabolized by these enzymes so medications can be anticipated to inhibit elimination or increase concentration:

- Amiodarone, cimetidine, fluoxetine, ketoconazole, cotrimoxazole, metronidazole, voriconazole, clarithromycin, erythromycin, cyclosporine, verapamil

Rifampin, a Cyp3A4 inducer decreases levels.

Anticipate interaction with anticholinergic, CNS depressant, and sympathomimetic medications.

Cannabis may decrease levels of epileptic medications.

Beware of additive SEs with multiple medications

SAFETY

Ecological data that shows in states with MMJ laws there are decreased opioid-related adverse events (ie MVAs, o/ds) on a statewide level, but this data is inconsistent.

Unknown risks in pregnancy, advised against use although rates of use are increasing

HISTORY-TAKING

Add questions about cannabis to your medical history – find out what they're using, what they're hoping from it, route, how much.

Consider treatment and its SEs, e.g. radiation in the mouth or chest may affect SL absorption, or vaping may be a bad idea

CERTIFICATION LETTER INCLUDES

Certification Letter:

Pt's info

Practitioner's info

Date

Specific medical condition

A statement by the practitioner that the pt has a serious medical condition, and the pt is under the practitioner's continuing care for the condition

Length of time pt would benefit, cannot exceed 1 year

Recommendations, requirements, or limitations as to dosage or form OR recommendation that pt consult with onsite practitioner at dispensary

Note if pt terminally ill

Any other relevant information

If the pt is homebound

Statement that you have explained potential risks and benefits to pt and documented in EHR, including that informed consent has been obtained

A statement that a false statement is punishable by law.

AFTER CERTIFYING

Submit original certification (w/ signature) to DOH, can be done electronically

Give pt a copy of certification

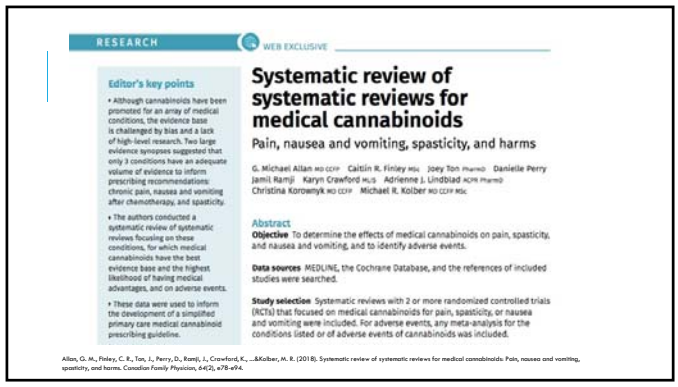
Scan copy into chart

Notify dispensary if pt has a reaction to marijuana

You can modify the certification, but not w/in the first 30 days (except by reaching out to DOH).

Need to notify DOH immediately if: pt no longer has serious medical condition, pt died, use of MMJ would no longer be therapeutic or palliative

You may w/draw certification at any time by notifying DOH and pt at any time in writing



RESEARCH WEB EXCLUSIVE

Editor's key points

- Although cannabinoids have been promoted for an array of medical conditions, the evidence base is challenged by bias and a lack of high-level research. Two large evidence synopses suggested that only 3 conditions have an adequate volume of evidence to inform prescribing recommendations: chronic pain, nausea and vomiting after chemotherapy, and spasticity.
- The authors conducted a systematic review of systematic reviews focusing on these conditions, for which medical cannabinoids have the best evidence base and the highest likelihood of having medical advantages, and on adverse events.
- These data were used to inform the development of a simplified primary care medical cannabinoid prescribing guideline.

Systematic review of systematic reviews for medical cannabinoids

Pain, nausea and vomiting, spasticity, and harms

G. Michael Allan MD CCFP Caitlin R. Finley MSc Joey Ton PharmD Danielle Perry Jamil Ramji Karyn Crawford MLIS Adrienne J. Lindblad ACPR PharmD Christina Korownyk MD CCFP Michael R. Kolber MD CCFP MSc

Abstract

Objective To determine the effects of medical cannabinoids on pain, spasticity, and nausea and vomiting, and to identify adverse events.

Data sources MEDLINE, the Cochrane Database, and the references of included studies were searched.

Study selection Systematic reviews with 2 or more randomized controlled trials (RCTs) that focused on medical cannabinoids for pain, spasticity, or nausea and vomiting were included. For adverse events, any meta-analysis for the conditions listed or of adverse events of cannabinoids was included.

Allan, G. M., Finley, C. R., Ton, J., Perry, D., Ramji, J., Crawford, K., ...&Kolber, M. R. (2018). Systematic review of systematic reviews for medical cannabinoids: Pain, nausea and vomiting, spasticity, and harms. *Canadian Family Physician*, *64*(2), e78-e94.

META-ANALYSIS OF PATIENTS >30% REDUCTION IN PAIN WITH CANNABINOIDS VS PLACEBO:

Figure 1. Responder meta-analysis of patients attaining ≥ 30% reduction in pain with medical cannabinoids compared with placebo

We need to walk a fine line between dismissing very real potential and promoting quackery

THE CANNABIS PLANT:

- **Phytocannabinoids:**
  - THC - tetrahydrocannabinol
  - CBD - cannabidiol
  - CBN - cannabinol
  - CBG - cannabigerol
  - THCV - tetrahydrocannabivarin

THC VS. CBD

THC

- Responsible for the psychoactive effects and pain relieving properties

CBD

- Counteracts the negative effects of THC on memory, mood, cognition
- Potential analgesic, antiepileptic, anti-nausea, anti-emetic, anti-inflammatory, anxiolytic properties