

▶ Using Cannabis – the nuts and bolts

▪ David Dansky, MD

Non-Cannabis alternatives to Opiates

- ▶ Ketamine: IV, cream, lozenges (“troches”)... Esketamine
- ▶ Baclofen (Lioresal) – activates GABA receptors
- ▶ Gabapentin (Neurontin) – good for neuropathic pain
- ▶ Pregabalin (Lyrica) – good for neuropathic pain
- ▶ NSAID’s (Non-Steroidal Anti-Inflammatory Drugs)
- ▶ Compounded creams: Lipoderm infused with ketamine + gabapentin + clonidine + baclofen (+... cannabis)

...and don’t forget the grapefruit juice...

CYP3A4 inhibitor (cytochrome P450 system)

Buprenorphine (Buprenex, Subutex)

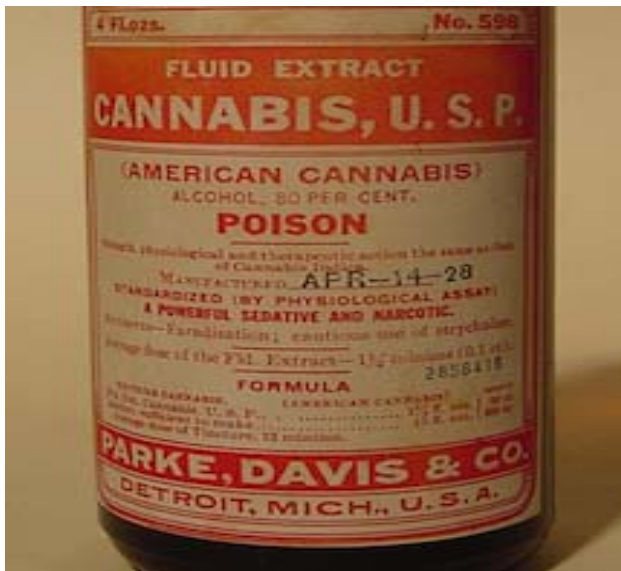
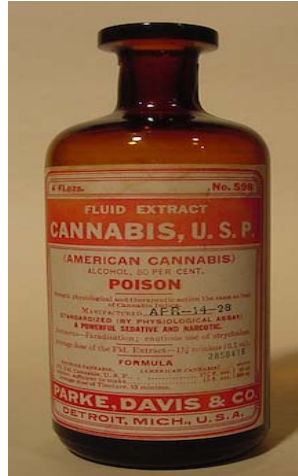
- ▶ Opiate alternative to opiates
- ▶ Potent Mu agonist analgesic
- ▶ Synergistic additive analgesia when combined with morphine at low doses
- ▶ Anti-hyperalgesic (Kappa antagonist)
- ▶ Reduced opioid tolerance
- ▶ Long half life (6–8 hours IV)
- ▶ Ceiling on respiratory depression
- ▶ Less constipation, gonadal and immune suppression

The First Anesthetic Ever – Ma fei san



- ▶ Ma fei san is the first anesthetic in the world and was invented by [Hua Tuo](#), an outstanding doctor, in the 2nd century. Although Hua Tuo's ancient prescriptions are lost; the ingredients are thought to have included include cannabis and datura (a hallucinogenic plant), which later was recorded as an anesthetic during the Song Dynasty.

20th century technology...



“Antidotes – Faradization;
cautious use of strychnine.”

I. How does cannabis work? A review of herbal medicine



What is an Herbal Medicine

- ▶ Herbal medicines are plant extracts, that use a solvent such as water, ethanol, or other organic solvent to capture the medicinal attributes of a plant.
- ▶ Certain modern medication were originally derived from plants:
 - Vincristine – periwinkle plant.
 - Metformin – French lilac (“goat’s rue”)
 - Aspirin – Willow Bark Tea

Cannabis and Cannabinoids

- ▶ The complexity of the plant has long been poorly understood by chemists and scientific analysts.
- ▶ Now over 100 cannabinoids and over 200 terpenoids have been identified. 480 botanical chemicals
- ▶ THC, CBD, CBN...
- ▶ Cannabis choices - "Indica vs Sativa" - not so much

Effects of THC

- ▶ psychoactive
- ▶ euphoric
- ▶ analgesic
- ▶ anti-bacterial
- ▶ anti-emetic
- ▶ a bronchodilator
- ▶ appetite stimulant
- ▶ neuroprotective
- ▶ sleep-inducing
- ▶ anti-convulsant
- ▶ muscle relaxant
- ▶ immunomodulating

Effects of CBD

- ▶ non-psychoactive
- ▶ anti-inflammatory
- ▶ anti-anxiety
- ▶ anti-bacterial
- ▶ anti-convulsant
- ▶ anti-ischemic
- ▶ neuroprotective
- ▶ muscle relaxant
- ▶ Immunomodulating
- ▶ Sedating only at high doses (150–400mg)

Cannabis and Terpenes

- ▶ Terpenes are the compounds in cannabis that give the plant its unique smell. They contribute to the full and unique medicinal properties of a specific strain.
- ▶ Terpenes are potent, and affect mood and behavior among other actions when inhaled at low concentrations.
- ▶ TERPENES determine difference between “Indica” and “Sativa.”

Common Terpenes in cannabis are

- β Caryophyllene – has a light spice aroma. Rx: anxiety, depression
- α Pinene – has a pine oil aroma. Rx: alertness, memory, counteracts THC
- Linalool – has a pleasant floral aroma. Rx: anxiety, depression
- Limonene – has a citrus aroma. Rx: anxiety, depression
- Myrcene – has a resinous, musky, slightly metallic odor. Couch lock! Rx: insomnia
- Humulene – has a ‘hoppy’ aroma, as in beer. Rx: anti-inflammatory

...so why not add your own...?

Spike your cannabis oil with terpenes?

- ▶ Cigarette companies and nicotine
- ▶ Drug cartels and sufentanil, carfentanil

- ▶ Trueterpenes.com
- ▶ Theterpenestore.com
- ▶ Medicalterpenes.com
- ▶ etc...

▶▶. delivery and dosage

RAW
Cannabis can be eaten or juiced and ingested in "green" form. High in chlorophyll, fiber, vitamins, minerals, antioxidants, and cannabinoids, it is thought that the presence of chlorophyll, magnesium, potassium, and other nutrients found in the living plant. These nutrients are essential for the body to be able to absorb and utilize the cannabinoids. The green juice is also thought to be able to reduce inflammation and pain. The juicing process can be done at home or in a professional juicing facility. The juicing process can be done at home or in a professional juicing facility. The juicing process can be done at home or in a professional juicing facility.

INGESTION
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SMOKING
Cannabis can be smoked in a pipe, bong, or joint. The smoke is inhaled into the lungs and enters the bloodstream. The effects are felt almost immediately. Smoking is the most common method of consumption. However, it is not recommended for people with respiratory issues or who are pregnant. Smoking is the most common method of consumption. However, it is not recommended for people with respiratory issues or who are pregnant.

VAPORIZING
Cannabis can be vaporized using a vaporizer. The vapor is inhaled into the lungs and enters the bloodstream. The effects are felt almost immediately. Vaporizing is a safer alternative to smoking. However, it is not recommended for people with respiratory issues or who are pregnant. Vaporizing is a safer alternative to smoking. However, it is not recommended for people with respiratory issues or who are pregnant.

SUBLINGUAL
Cannabis can be placed under the tongue and held in place for 30-90 minutes. The cannabinoids are absorbed into the bloodstream through the mucous membranes. The effects are felt within 15-30 minutes. Sublingual is a good option for people who do not want to smoke or vaporize. However, it is not recommended for people with respiratory issues or who are pregnant. Sublingual is a good option for people who do not want to smoke or vaporize. However, it is not recommended for people with respiratory issues or who are pregnant.

TOPICAL
Cannabis can be applied topically to the skin. The cannabinoids are absorbed into the bloodstream through the skin. The effects are felt within 15-30 minutes. Topical is a good option for people who do not want to smoke or vaporize. However, it is not recommended for people with respiratory issues or who are pregnant. Topical is a good option for people who do not want to smoke or vaporize. However, it is not recommended for people with respiratory issues or who are pregnant.

From the Screen Director of **SOMETHING'S GOTTA GIVE**
MERYL STREEP **ALEC MARTIN** **ALEC BALDWIN**
 Written and Directed by Nancy Meyers
it's
Complicated
 "MEMORABLY HILARIOUS!"
 - Peter Travers, ROLLING STONE

Modes of Delivery

- ▶ Smoking
- ▶ Raw
- ▶ Vaporizing
- ▶ Ingestion
- ▶ Sublingual
- ▶ Topical
- ▶ Rectal



Why Cannabis is Heated

- ▶ Cannabinoids in the raw plant exist in acid form, i.e. THCA, CBDA, which is not psychoactive.
- ▶ THCA and CBDA are heated to decarboxylate the acid to form THC and CBD.
- ▶ So.... What if it is consumed raw...?

Flowering Tops



Raw Delivery

- ▶ Cannabis can be eaten raw, but... stalactites (tiny leaf hairs) irritating. Flowering tips covered in a sticky resin which sticks to the mouth.
- ▶ One can avoid these problems by eating tender young leaves right off the plant or juicing leaves and buds.
- ▶ It is usually juiced with other fresh vegetables, making a “super-green” food, high in chlorophyll, oxygen, vitamins, minerals, antioxidants, and cannabinoids.
- ▶ Medicinal activity thought due to THCA, CBDA
- ▶ A typical juiced regimen consists of fresh juice daily divided into 4-5 doses.

Raw Methods



Raw Dosage

- ▶ The cannabinoid acids do not have a psychoactive effect, but other compounds in the plant, such as the terpenes, may have an effect on mood or energy levels. Most if not all of the volatile terpenes are retained.
- ▶ Dr. William Courtney recommends using 25 large fan leaves per day in juice, salsa, pesto, salad, etc. If you have access to fresh bud, he recommends one bud/day for general health maintenance. (7)
- ▶ To determine the cannabinoid content of fan leaves, a prospective juicer sent 30 large leaves from a flowering plant for analysis. They were found to contain a combined total of 11.5 milligrams of THCA and CBDA. (7)
- ▶ Leaves in general have 10% the level of cannabinoids as buds.

Raw BENEFITS/RISKS

ADVANTAGES

- ▶ superfood, high in chlorophyll, vitamins and minerals
- ▶ rapid onset in 15 minutes
- ▶ success with chronic disease
- ▶ no health risk
- ▶ moderately long-acting - 4-8 hours
- ▶ food as medicine

DISADVANTAGES

- ▶ may cause stomach irritation
- ▶ can have mold or other contaminants, such as pesticides
- ▶ cost for equipment if juicing
- ▶ much daily preparation time, cannot store it
- ▶ requires large fresh plant supply, hard to find

Vaporizing Methods



Vaporizing Delivery

- ▶ Vaporizers heat cannabis to a specified temperature. Temperatures of 180 – 200° C (356° – 392° F) releases cannabinoids as a vapor without smoke.
- ▶ Vapor pens concentrates are partial plant extracts, often terpenes are lost in these products. Entourage effect?
- ▶ Many vaporizer designs are available: portable hand-held models (PAX 3, Firefly 2, Prohibited in the 5th Degree), ultra portable vapor pens (PAX, Absolute Extracts), and larger desktop models (Volcano).
- ▶ Bottom line: if you want to smoke, vape!

Vaporizing BENEFITS/RISKS

ADVANTAGES

- ▶ rapid onset in 5–10 minutes
- ▶ no smoke, no health risk
- ▶ no irritation to throat and lungs
- ▶ can select strain of cannabis desired

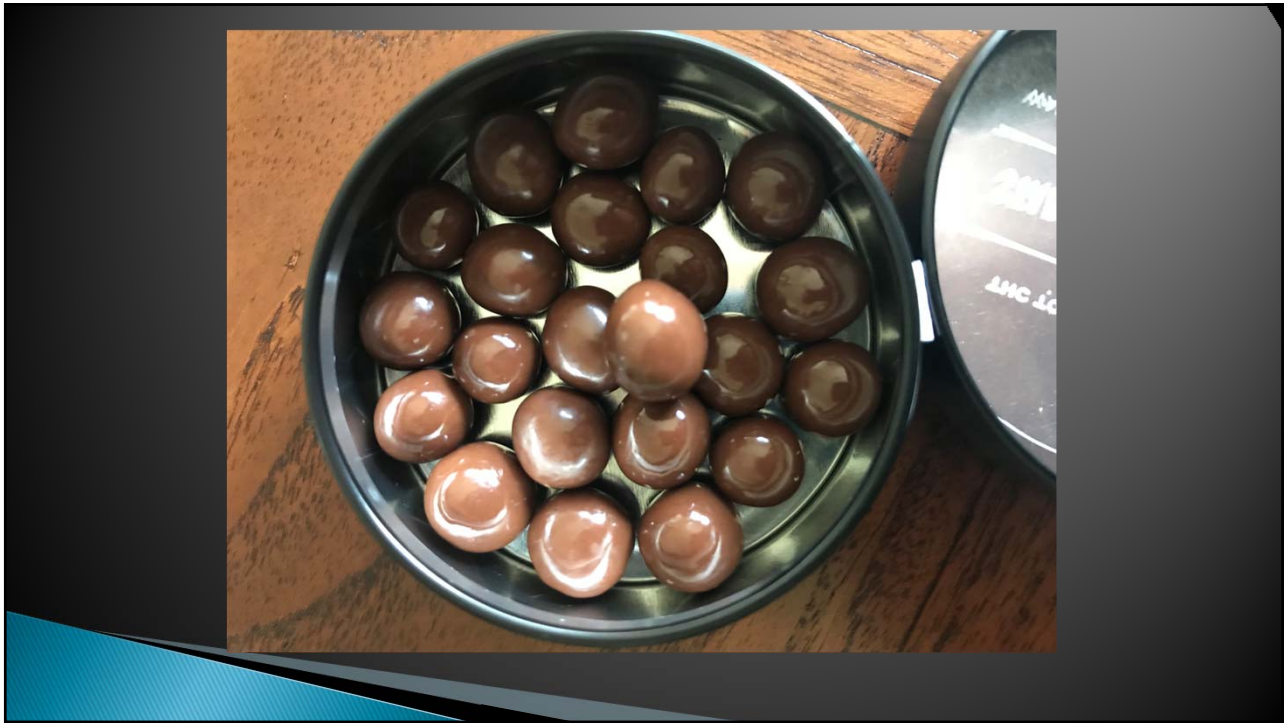
DISADVANTAGES

- ▶ difficult to transport desktop device (i.e. Volcano)
- ▶ vapor pens require concentrates, some of which may contain residual butane
- ▶ may be too short-acting, 2–4 hours

Ingestion Delivery

- ▶ When eaten cannabis has longer, stronger, and a more physical effects than using a vaporizer.
- ▶ The onset of effects is delayed by about an hour or more, with peak concentrations and effects available for 1 to 6 hours.
- ▶ Cannabis can be cooked directly into edibles in herbal or resin form as an ingredient, or made into butter or oil, packaged into capsules, also infused into honey, teas, and drinks.
- ▶ Oral preparations are a good choice for chronic conditions requiring maximum dosage.





10mg THC Infused Dark Chocolate



Ingestion Dosage

- ▶ Effects onset in one to two hours and last 6–8 hours.
- ▶ It is easy to overdose on “edibles”.
 - Start with small amounts, especially in naïve users.
 - “DHOM, dude...” (Maureen Dowd, NY Times, 2014)
- ▶ Use depends on the potency of the substance, i.e. 1/4 cookie, 1 teaspoon of oil or butter, 1 capsule.
- ▶ The use estimates for edibles can vary by a factor of 10!
 - potency of plant, dilution in oil, butter or food.

Ingestion BENEFITS/RISKS

ADVANTAGES

- ▶ long-acting - 8 hours
- ▶ lasts through the night
- ▶ foods can be stored frozen for months
- ▶ can dose as other oral medicines, 3x/day

DISADVANTAGES

- ▶ slow onset: up to 1-2 hours
- ▶ may be too long-acting... "can't turn it off"
 - lemon rind, black peppercorns, CBD oil
- ▶ dosing is difficult due to variability of digestion and product

Sublingual (Oromucosal) Delivery

- ▶ Cannabis can be delivered by mucosal absorption using a tincture. Absorption is rapid, doses are easily measured.
- ▶ Tinctures are extracts of cannabis in an organic solvent, such as alcohol or glycerin.
- ▶ Alcohol-based tinctures circumvent the digestive tract and are absorbed directly into the bloodstream through the throat and stomach lining.
- ▶ May be taken sublingually from a dropper bottle or delivered by a mouth spray via an atomizer bottle.
- ▶ Cannabis lozenges, lollipops, mouth strips, gum and tablets also use submucosal absorption.

Sublingual (Oromucosal) Dosage

- ▶ Onset in 15–30 minutes.
- ▶ Lasts two hours as mouth spray, three to five hours if swallowed.
- ▶ Mouthstrips dosing – lasts 2–4 hours.
- ▶ Amount to use depends on the potency of the tincture. Patients should begin with a few drops, and increase up to several dropperfuls per dose. (One dropper is approx. = 1 ml).
- ▶ Concentrations typically range from 0.03 to 0.2 grams/ml, containing 3 – 20 mg cannabinoids/ml.
- ▶ Cannastrips contain 20 mg cannabinoids/strip.
- ▶ Typical tincture dosage is 3–4x/day for 24 hour effects.

Sublingual (Oromucosal) Methods



CBD:THC 4:1 soft gels



CBD:THC 4:1 sublingual tincture



THC 5mg sublinguals



Sublingual BENEFITS/RISKS

ADVANTAGES

- ▶ rapid onset in 15 minutes
- ▶ easily transportable
- ▶ no cannabis odor
- ▶ measured dosing, easy to repeat
- ▶ long shelf-life
- ▶ moderately long-acting - 5-6 hours

DISADVANTAGES

- ▶ cannot select strain
- ▶ may be hard to find, especially as a spray
- ▶ variable range of potency

Topical Delivery

- ▶ Cannabis can be applied topically for treatment of local symptoms such as muscle spasm, inflammation or pain.
- ▶ Penetration: Olive Oil >> Coconut Oil >> Grape Seed Oil >> Avocado Oil >> Crocodile Oil >> Emu Oil
- ▶ Peripheral pain conditions do well with topical cannabis.
- ▶ Applying a cannabis preparation to the skin does not affect central receptors, minimizing psychoactive effects.

Topical Methods





Topical Dosage

- ▶ Dose is a function of area to be covered.
- ▶ Duration of action has not yet been reported in a scientific study. Once absorbed through the skin, effects may last four hours or more.
- ▶ Topical may be applied multiple times a day.

Topical BENEFITS/RISKS

ADVANTAGES

- ▶ no psychoactive effect
- ▶ helps peripheral symptoms
- ▶ easily portable
- ▶ moderately long-acting – 4–6 hours
- ▶ long shelf-life in alcohol

DISADVANTAGES

- ▶ can be oily or messy... or even stinky!
- ▶ variable range of potency

Rectal Delivery

- ▶ Rectal administration of cannabis – ? bioavailability. Theory: absorbed directly into bloodstream (decreased first-pass metabolism through the liver), with less 11-Hydroxy- Δ^9 -THC by-product produced (so also less psychoactive).
- ▶ Suppositories bring the medicine into the local rectal and pelvic veins and lymphatics for pelvic and lower GI focus.
- ▶ Suppositories may be used vaginally as well.
- ▶ Suppositories are made from cannabis infused into coconut oil or oil infused into cocoa butter, or delivery can be with a syringe with oil.
- ▶ Effects come on in 15 min and can last up to 8 hours.
- ▶ Potential delivery of high doses of cannabis oil. Lower cost due to increased bioavailability.

Rectal Methods



III. Important points for choosing
»» which product to use

Considerations in Choosing Cannabis Herbal Medicine

- ▶ Access
- ▶ Selection of strain
- ▶ Delivery method
- ▶ Cost of medicine

Frequency and Dosage

- ▶ Frequency of use depends upon the frequency of symptoms.
- ▶ Inhalation is 5–6x/day, Sublinguals are 3x/day, and Ingestion may be 2x/day.
- ▶ Cannabinoids display a biphasic effect:
- ▶ Lower THC for mood and pain management, i.e. small amounts raise serotonin levels, while larger amounts seem to lower them.
- ▶ Medicinal cannabis should be used at the correct dosage for each patient, more is not necessarily better.
- ▶ Entourage effect...?

Medications Cannabis Could Augment/Replace

- ▶ Antiinflammatories
- ▶ Muscle Relaxants
- ▶ Analgesics
- ▶ Glaucoma medicines
- ▶ Neuropathic medicines
- ▶ Antirheumatics (DMARDS)
- ▶ Antidepressants
- ▶ Antianxiety medicines
- ▶ ADHD stimulant medicines
- ▶ Antiseizure medicines (Charlotte Figi)
- ▶ Sleep medicines
- ▶ Anti-emetics
- ▶ Bronchodilators

IV. Cannabis used for different conditions illustrating the importance
» of delivery and dosage

Insomnia

- ▶ Indica rather than Sativa (yeah... not so much...)
- ▶ Inhalation only covers 4 hours, for longer delivery sublinguals are ideal.
- ▶ Need to wean off a sleeper like Ambien? Use long delivery methods, add vape as needed (to initiate sleep)
- ▶ CBN (cannabinol)... sedating, content higher in older cannabis

Mary's Medicinals (patches)



Advantages: discretion,
long-lasting,
pure CBN (for anxiety)
Disadvantages: cost

Chronic Pain

- ▶ Chronic pain is the most common condition for which cannabis is used medically.
- ▶ It usually requires round the clock pain management, so smoking or vaporizing are not adequate. 2–4 hour bursts of medicine are not as effective as sublinguals taken 3–4x/day or edibles taken 2–3x/day.
- ▶ THC amplifies the effect of opiates making them easier to wean off of.
- ▶ CBD does not treat pain per se, but does treat inflammation and neuropathy.
- ▶ One strategy is to use a CBD/THC 1:1 mix with low psychoactivity during the day.
- ▶ 10mg of cannabinoids/dose is a reasonable place to start if weaning from opiate-dependency.

Using Cannabis to wean off Opiates

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

Using Cannabis to wean off Opiates

- ▶ States with medical cannabis laws had a 24.8% lower mean annual opioid overdose mortality rate compared with states without medical cannabis laws.
- ▶ *Bachhuber et al, JAMA Intern Med. 2014;174(10):1668-1673*
- ▶
- ▶ (more) research needed...

Anti-inflammatory

- ▶ CBD is anti-inflammatory, can replace NSAIDs and muscle relaxants. Cannabinoid Acids are also anti-inflammatory.
- ▶ Anti-inflammatory action may need to be in place for weeks or months to see results. Don't quit early.
- ▶ THC is also anti-inflammatory, muscle relaxant and pain relieving.
- ▶ Autoimmune diseases are inflammatory, and respond well to both CBD and THC.
- ▶ Topicals do well on inflamed joints or back pain.

Cannabinoid Dosing Tips – Summary

- ▶ Psychoactive effects – THC.
- ▶ For depression, fatigue, focus – use THC for stimulation.
- ▶ Treatment of pain – some THC is helpful.
- ▶ Insomnia – overnight use – use edible or sublingual for 7–8 hour effect. THC:CBD 4:1 or 1:1, + CBN
- ▶ Anti-anxiety use – consider “high CBD” products, + CBN.
- ▶ Treatment of seizures – “ultra-high CBD” (Charlotte’s Web).
- ▶ For anti-inflammatory and immune modulating effects ALL cannabinoids are options, including cannabinoid acids.

V. Don't I need a medical card for this?



Medical Marijuana Identity Card... qualifying illnesses

A serious medical condition, as defined by SB 420, is any of the following: AIDS; anorexia; arthritis; cachexia (wasting syndrome); cancer; chronic pain; glaucoma; migraine; persistent muscle spasms (e.g., spasms associated with multiple sclerosis); seizures (e.g., epileptic seizures); severe nausea; any other chronic or persistent medical symptom that either substantially limits a person's ability to conduct one or more of major life activities as defined in the Americans with Disabilities Act of 1990, or if not alleviated, may cause serious harm to the person's safety, physical, or mental health.

Medical Marijuana Identity Card... qualifying illnesses

Unlike other states, California has a practically endless list of conditions that may qualify a patient for the California Medical Marijuana Program. They include:

- Anxiety
- Anorexia
- Arthritis
- Cachexia (Wasting Syndrome)
- Cancer
- Chronic Pain: any persistent medical symptom that can cause serious harm and limits the ability to conduct one or more major life activity
- Fibromyalgia
- Glaucoma
- HIV/AIDS
- Migraines
- Multiple Sclerosis/Chronic Muscle Spasms
- Seizures

Online Medical Card Advantages

- ▶ Age 18 (or emancipated minor)
- ▶ Can carry over 1 oz cannabis or 8g concentrate
- ▶ 100 sq. ft. plot for personal cannabis growth

- ▶ A doctor's "prescription" (written recommendation) equally adequate

Online Medical Marijuana Cards

- ▶ Nuggmd.com
- ▶ Mmjdoctoronline.com
- ▶ Mmjherb.com
- ▶ Etc...
- ▶ Usually \$39-\$49/yr.

not your county MMIC, however...

Marijuana Medical Identification Card

- ▶ Age 18 (or emancipated minor)
- ▶ Can carry over 1 oz cannabis or 8g concentrate
- ▶ Cost savings: avoid the 15% excise tax
- ▶ 100 sq. ft. plot for personal cannabis growth

- ▶ AND... ability to deduct sales tax

- ▶ Not worth it unless you are spending more than \$180/mo.

Medical Marijuana Identity Card Application

State of California - Health and Human Services Agency California Department of Public Health

**Medical Marijuana Program
APPLICATION/RENEWAL**
(Please Print)

For application instructions, view page 4.

This application is for:

Patient Only (Applicant) Primary Caregiver Only Patient and Primary Caregiver

SECTION 1 TO BE COMPLETED BY ALL APPLICANTS.

Name (last, first, middle initial)		Date of birth (if less than 18 years of age)	
Mailing address (number, street)			Telephone number ()
City	State	ZIP code	County of residence

Additional contact information

Is applicant under 18 years of age? Yes No

If yes, complete Section 2 for the parent, legal guardian, or person with legal authority to make medical decisions for minor applicant, unless minor applicant is (check one):

Lawfully emancipated; or Declares self-sufficient minor status or is a minor capable of medical consent

SECTION 2 TO BE COMPLETED FOR MINOR APPLICANT IDENTIFIED IN SECTION 1.

Parent/guardian/other name (last, first, middle initial)		Telephone number if different from above ()	
Mailing address if different from above (number, street)	City	State	ZIP code

google.. CDPH 9042

VI. The canna-future...



Coming soon... to a bar near you...?



From growing to blending your own



Oblend



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- Castleman M. *The new healing herbs: The classic guide to nature's medicine.* 2001, Rodale Press Inc.

Where to Learn More

- ▶ National Organization for the Reform of Marijuana Laws – NORML.org
- ▶ Americans for Safe Access – www.safeaccessnow.org
- ▶ Project CBD – www.projectcbd.com
- ▶ Patients Out of Time – patientsoutoftime.org
- ▶ United Patients Group – unitedpatientsgroup.com
- ▶ The American Alliance for Medical Cannabis – www.letfreedomgrow.com
- ▶ www.Leafly.com
- ▶ www.ProjectCBD.org
- ▶ The Medical Cannabis Institute (online CME course)
(<https://themedicalcannabisinstitute.org/>)

Podcasts

- ▶ What are you smoking? (Leafly.com)
- ▶ CannalInsider
- ▶ State of Cannabis

- ▶ more infomercial than journalism...

Consultants

- ▶ Karen Mankins, RN (Carmel Valley), (831) 594-2864
- ▶ Debra Malka, MD, PhD (New Mexico), (831) 359-7679