The Facts…and only the Facts: Medical Marijuana

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Disclosures

- None
Objectives

Discuss cannabinoid pharmacology and therapeutics
Discuss potential benefits of marijuana use
Discuss potential harms of marijuana use
Discuss controversies and legal issues surrounding marijuana
What do you call money that grows on trees?

Marijuana
What is marijuana?

- Plant, herb, hemp
- Cannabis species *sativa*, *indica*, *ruderalis*
- Known as weed, pot, grass, herb, bud, ganja, Mary Jane
- Used in joints, blunts, pipes, bongs
- Smoked, vaporized, orally, sublingual, transdermal, rectal, ophthalmic drops
- Brewed as a tea, frequently mixed into foods ("edibles") such as brownies, cookies, candies, lollipops, and snickerdoodles
- Use is increasing with the popular concentrated resins containing high doses of cannabinoids, including honey-like "hash oil," waxy "budder," and hard amber-like "shatter"
Historically

**Cannabis potency**

1976
- DEA seizures found an average THC content of 0.5% to 1%

1995
- Average potency of THC was 4%

2011
- DEA seizures found an average THC content of 12%, with some samples nearing 20 to 30%.

DEA seizures are declining

Cannabinoid Pharmacology

- The plant contains 500 chemical constituents in its entirety, with 100 constituents called cannabinoids. The other constituents are flavonoids, terpenes/terpenoids and other unknown constituents.

- 2 major known cannabinoids
  - The psychoactive component responsible for intoxicating effects is Delta-9-tetrahydro-cannabinol (THC)
  - Cannabidiol (CBD) is a non-psychoactive constituent

- Tetrahydrocannabivarin (THCV), new potential psychoactive component
Cannabinoid Pharmacology

Receptors

• The cannabinoid receptors:
  • CB₁ - Brain, spine and peripheral nervous system
  • CB₂ - Peripheral immune system, gut and the brain

• Agonist
• Partial agonist
• Inverse agonist
• Antagonist
Cannabinoid Pharmacology

Dose and Dosage Forms

• A typical marijuana cigarette contains 0.5–1 g of plant material. The usual THC concentration varies between 10 and 40 mg and may be as much as 100 mg.

• Hashish is prepared from concentrated resin of cannabis and contains a THC concentration of between 8 and 12%.

• “Hash oil,” a lipid-soluble plant extract, may contain THC between 25% and 80% and may be added to marijuana or hashish to enhance its THC concentration.

• Smoking is the most common mode of marijuana or hashish use. Marijuana is the most common illicit drug used with an estimated more then 15 million users in the past month.

Reference: US Department of Health and Human Services, 2008
Cannabinoid Pharmacology

**Mechanism**

- THC’s mechanism is not well understood, can have a bi-phasic effect, varying effects can be seen with low and high doses, and its interplay with cannabidiol (CBD) is not well understood

- Some literature suggests cannabis with high cannabidiol (CBD) content is associated with less psychotic experiences

- Cannabidiol (CBD) may block or modify the effect of THC, which can lessen stimulation of receptors for anxiety via THC

References:
Schubart CD. Cannabis with high cannabidiol content is associated with fewer psychotic experiences. *Schizophr Res.* 2011;130(1-3):216-221.
Cannabinoid Pharmacology

• Administration
  • Bioavailability is variable oral vs inhaled
    • Smoking results in 25-50% of THC content in circulation,
    • Oral ingestion is in the range of 10% but may be as low as 3%
  • First pass metabolism
  • Indica has higher CBD content than THC whereas Sativa has higher THC

• Distribution
  • Highly lipid soluble

• Metabolism
  • Liver
    • CYP450
  • Interactions?

• Excreted
  • Feces
  • Hair
Scotts Miracle Gro is betting on pot. It is providing hydroponics for cannabis. Scotts is betting on the legalization of marijuana, procuring leading companies that provide special fertilizers, lighting and other supplies.

- Scotts stock recently increased as much as 30%
- Hydroponics generates 250 million in revenue a year
- Hydroponics are mostly sold in specialty shops, but Scotts Black Magic brand for indoor growing is available in 165 home depot stores
Cannabinoid Pharmacology
Cannabinoid Therapeutics
  • Endogenous
    • Endocannabinoids
  • Phytocannabinoids
  • Synthetics
Cannabinoid Therapeutics

• Endocannabinoids:
  • One of the oldest known cell signaling mechanisms
  • Arachidonic acid derivatives that interact endogenously with receptors
  • CB1 and CB2 receptors
  • Involved in most aspects of physiology
Cannabinoid Therapeutics

- Phytocannabinoids:
  - Cannabidiol (CBD) - Nonpsychotropic component
    - Anxiolytic
    - Antidepressant
    - Antipsychotic
    - Anticonvulsant
    - Antispastic
    - Antioxidant
    - Antineoplastic
Cannabinoid Therapeutics

• Phytocannabinoids:
  • Tetrahydrocannabinol (THC) - psychotropic component causes the “high”
    • Responsible for psychoactive and antiemetic effects, high dose THC can help pain and nausea but can cause paranoia and hallucinations
  • Organic: plant. Nabiximols (Sativex is CBD:THC/1:1 approved in the UK/Canada for MS spasticity and neuropathy, intractable cancer pain, potentially available in US, phase 3 trials
  • Synthetic: dronabinol (Marinol) approved for anorexia in HIV and N/V in patients with chemotherapy, nabilone (Cesamet) indicated for refractory nausea and vomiting in patients receiving chemotherapy
Why do people use marijuana?

- Use it as a medicine
- For the “high”
- Relieve stress, anxiety, fear, or anger related to social issues
- Popular culture endorses its use
- Low perception of harm
- The opportunity presents itself
- Role model, peer or family influence
- Curiosity
- Relaxation
Why do people use marijuana?

• Euphoria
• Sleep
• Increase appetite
• Helps with nausea and vomiting
• Pain (45 to 80% of people who seek medical cannabis)
• Anti-spastic
• Many unknown benefits
Cannabinoids for Medical Use: A systematic review and meta-analysis


79 trials (6462 participants) were included; 4 were judged at low risk of bias. Most trials showed improvement in symptoms associated with cannabinoids but these associations did not reach statistical significance in all trials.

Compared with placebo:

- Cannabinoids helped with nausea and vomiting, reduction in pain, average reduction in the Ashworth spasticity scale

There was an increased risk of short-term adverse effects (AEs) with cannabinoids, including serious AEs. Common AEs included dizziness, dry mouth, nausea, fatigue, somnolence, euphoria, vomiting, disorientation, drowsiness, confusion, loss of balance, and hallucination.

There was moderate-quality evidence to support the use of cannabinoids for the treatment of chronic pain and spasticity.

There was low-quality evidence suggesting that cannabinoids were associated with improvements in nausea and vomiting due to chemotherapy, weight gain in HIV infection, sleep disorders, and Tourette syndrome. Cannabinoids were associated with an increased risk of short-term AEs.
Cannabinoid–Opioid Interaction in Chronic Pain

DI Abrams¹, P Couey¹, SB Shade², ME Kelly¹ and NL Benowitz³

Cannabinoids and opioids share several pharmacologic properties and may act synergistically. The potential pharmacokinetics and the safety of the combination in humans are unknown. We therefore undertook a study to answer these questions. Twenty-one individuals with chronic pain, on a regimen of twice-daily doses of sustained-release morphine or oxycodone were enrolled in the study and admitted for a 5-day inpatient stay. Participants were asked to inhale vaporized cannabis in the evening of day 1, three times a day on days 2–4, and in the morning of day 5. Blood sampling was performed at 12-h intervals on days 1 and 5. The extent of chronic pain was also assessed daily. Pharmacokinetic investigations revealed no significant change in the area under the plasma concentration–time curves for either morphine or oxycodone after exposure to cannabis. Pain was significantly decreased (average 27%, 95% confidence interval (CI) 9, 46) after the addition of vaporized cannabis. We therefore concluded that vaporized cannabis augments the analgesic effects of opioids without significantly altering plasma opioid levels. The combination may allow for opioid treatment at lower doses with fewer side effects.
The Effects of Cannabis Among Adults With Chronic Pain and an Overview of General Harms: A Systematic Review

- Systematic review
  - Chronic neuropathic pain – 13 trials – low strength of evidence for use
  - MS – 9 trials – insufficient evidence for use
  - Cancer Pain - 3 trials – insufficient evidence for use
  - Other or mixed pain – 2 trials – insufficient evidence for use

Citations identified from electronic database searches (n = 13 691)
- Ovid MEDLINE: 8714
- EMBASE: 3645
- PsycINFO: 300
- EBMR (CDSR, DARE, HTA, Central): 180
- PILOTS database: 79
- Trial registries and other gray literature sources: 773

Excluded (n = 1217)
- Intervention or exposure did not consist of included cannabis preparations: 48
- Excluded study design or publication type: 220
- Excluded population: 202
- No outcomes of interest: 14
- Ongoing research: 547
- Used for background or contextual purposes: 186
• Cannabinoids show activity against seizures in animal models.

• Moreover, initial clinical data suggest they may decrease seizures in some children with refractory epilepsy.
  • Retrospective study from Children’s Hospital Colorado reliant upon parental reports of improvement (Epilepsy Behav. 2015 Apr;45:49-52),
  • Israeli retrospective study (Seizure. 2016 Feb;35:41-4),
  • An open-label trial of an investigational oral oil-based solution of a pharmaceutical-grade cannabidiol known as Epidiolex (Lancet Neurol. 2016 Mar;15[3]:270-8)

• Cannabidiol cuts drop seizure frequency in Lennox-Gastaut syndrome Sharon Worcester Pediatric News Publish date: April 28, 2017. Two trials show drop seizure reductions of 37%-44% with cannabidiol in patients with a median of 70-plus drop seizures per month
Therapeutic limitations:

• Small studies
• Short duration
• Many methodological flaws
• No comparison trials
• Mostly plant cannabis
Marijuana Fun Facts

Estimates suggest that 20 billion will be spent on infrastructure through 2020 to support demand of marijuana from legalization

Reference:
Potential Untoward Effects with Cannabis

Acute effects:

• Heart rate increase (Risky in patients with hx of MI, CHF)
• Dry mouth
• Red irritated eyes
• Major concern, especially with high doses, in patients who are drug naïve or history of psychosis or severe mental health issues, it can lead to severe acute, strong panic and paranoid reactions, can last hours, or in some cases days
• Cannabinoid hyperemesis syndrome—associated with chronic use, if use stops, so does nausea and vomiting
• Cognitive impairment and attention issues
• Time estimation problems
Cannabis Concerns

Long term chronic use:

- Hepatic fibrosis in hepatitis C
- Dependence
  - Biological tolerance
  - Receptor down regulation
  - Need for increased dosages
  - Withdrawal occurs
- Psychosocial problems
  - Impacts self esteem, social isolation, and can lead to arrest or other social problems
Cannabis Concerns

- Moderate strength evidence that light to moderate use of cannabis does not adversely effect lung function, but are there not enough studies and we do not know what happens with heavy use.

- Low strength evidence that light to moderate use of cannabis is not associated with lung or head and neck cancer, independent of tobacco use, but again very limited data.

- Insufficient data examining cannabis and cardiovascular events.

- Smoking cannabis has been associated with aspergillosis (spore inhalation) and tuberculosis, concerning in transplant and immunosuppressed patients.

- Moderate strength evidence of acute cannabis intoxication is associated with a moderate increase in collision risk.
Cannabis Concerns

- Addiction, 1 out of 10, younger users 1 in 6
- Lower IQ
- Decrease memory
- Altered brain structure
- Dunedin Study
- Synthetic cannabinoids
  - K2, spice, blaze
Cannabis Use Is Quantitatively Associated with Nucleus Accumbens and Amygdala Abnormalities in Young Adult Recreational Users

Jodi M. Gilman, John K. Kuster, Sang Lee, Myung Joo Lee, Byoung Woo Kim, Nikos Makris, Andre van der Kouwe, Anne J. Blood and Hans C. Breiter

marijuana group. These data suggest that marijuana exposure, even in young recreational users, is associated with exposure-dependent alterations of the neural matrix of core reward structures and is consistent with animal studies of changes in dendritic arborization.
• Staci Gruber, PhD
  • Presented work at the annual meeting of the Society for Neuroscience in San Diego. She reported that subjects who started using marijuana before age 16 made twice as many mistakes on tests of executive function, which includes planning, flexibility, abstract thinking, and inhibiting inappropriate responses, as those who began smoking after age 16

• On going research - Long term effects of medical marijuana – Dr Staci Gruber at McLean Hospital. The patients then record how much marijuana they’re using, and how often. At intervals of three, nine, 12, 18 and 24 months, MIND researchers conduct more tests, brain scans, and interviews to measure the effects of the cannabis on their brain structures, cognition, and daily life
Marijuana and effects on the brain

CONCLUSION: Multiple brain regions show low perfusion on SPECT in marijuana users. The most predictive region distinguishing marijuana users from healthy controls, the hippocampus, is a key target of Alzheimer's disease pathology. This study raises the possibility of deleterious brain effects of marijuana use.
Potential Harm

Marijuana use triples risk of death from hypertension

_Publish date:_ August 14, 2017
_By:_ Heidi Splete, Cardiology News

The risk of death from hypertension is three times greater in adults who use marijuana, compared with nonusers, based on data from a retrospective study of 1,213 adults.

Overall, marijuana users had a 3.42 times greater risk of death from hypertension than did nonusers (95% confidence interval, 1.20-9.79), and the risk increased by 1.04 for each year of use (95% CI, 1.00-1.07). The average duration of marijuana use was 11.5 years. At the time of study entry, the average age of the participants was 38 years, and the average body mass index was 29 kg/m²; 23% of marijuana users and 21% of nonusers had a prior diagnosis of hypertension.

ATLANTA, GA — Marijuana users have about a threefold risk of dying from hypertension, and the risk increases with each additional year of use, according to a National Health and Nutrition Examination Survey (NHANES) analysis.

The cardiovascular risk associated with marijuana use "may be greater than the cardiovascular risk already established for cigarette smoking," report the authors, led by Barbara Yankey (Georgia State University, Atlanta).

"We are not disputing the possible medicinal benefits of standardized cannabis formulations; however, recreational use of marijuana should be approached with caution."

The study was published online August 8, 2017 in the _European Journal of Preventive Cardiology_.

_Vitals_

FROM THE EUROPEAN JOURNAL OF PREVENTIVE CARDIOLOGY
Marijuana Use Tied to Death from Hypertension, Study Suggests

By Amy Orciari Herman

Edited by Susan Sadoughi, MD

Patients may ask about a widely reported study suggesting that marijuana use is associated with increased risk for death from hypertension. The findings appear in the European Journal of Preventive Cardiology.

Researchers studied 1200 adults who completed the 2005 National Health and Nutrition Examination Survey. Over half reported having ever used marijuana.

During follow-up through 2011, the incidence of death from hypertension was 2.6 per 1000 among marijuana users versus 1.4 per 1000 among nonusers. After adjustment for confounders, including prior diagnosis of hypertension, the risk for hypertension mortality was significantly higher with marijuana use (hazard ratio, 3.4). Risks for heart disease and cerebrovascular mortality were not significantly increased in marijuana users.

The authors point to numerous study limitations but conclude that "recreational use of marijuana should be approached with caution."
How is marijuana perceived by your neighbor?

PERCENT OF AMERICANS IN FAVOR OF LEGALIZING MARIJUANA:

October 2015: 58%

Source: Gallup

The Washington Post
MARIJUANA BY STATE (%)
Percentage of people 18-60 who have ever smoked pot

Source: National Survey on Drug Use and Health (SAMHSA.GOV)
ANITA RAHMAN / © LiveScience.com
How is marijuana perceived by your children?

National Survey on Drug Use and Health conducted by the US Department of Health and Human Services –

- Only 41% of participants ages 12 to 17 perceived "great risk" in smoking marijuana once or twice a week in 2015, **down** from 55% in 2007.

- Adverse effects are well-documented
  - Impaired short-term memory and concentration
  - Alterations in judgment, coordination, and motor control
  - Diminished lung function
  - Increased risk for mental health disorders such as depression and psychosis.

- Studies have shown alterations in brain development in areas such as the amygdala, hippocampus, and prefrontal cortex

- On average, adolescents who become addicted, remain addicted for 10 years
MARIJUANA USE AMONG 12TH GRADERS* VS. PERCEIVED RISK

PAST YEAR USE:
- 2008: 32.4%
- 2010: 25.8%
- 2012: 20.6%

PERCEPTION OF RISK (see great risk in smoking marijuana occasionally):
- 2008: 34.8%
- 2010: 24.5%
- 2012: 36.4%
Teen perception of marijuana risk declines

Teen use, perception of risk, and ease of obtaining marijuana

% SAYING MJ IS EASY TO GET
% SAYING MJ USE IS RISKY
MARIJUANA USE


WASHINGTONPOST.COM/WONKBLOG

Source: NSDUH
Marijuana in Adolescents

• Overall, about 9% of marijuana users will become addicted

• However, marijuana data shows that younger is not always better:
  • 17% of adolescents users will become addicted
  • The risk of dependence increases with use, can increase up to 50%
    • Regular use – 10 to 19 times per month
    • Heavy use – 20 or more times a month
What happens when someone seeks treatment for cannabis dependency

• Reason for quitting – does not matter (i.e. court ordered, parent or individually directed due to social loss)

• Studies show people have a hard time quitting
  • Rates are similar to other drugs of abuse
  • Reasons for not being able to quit are the same for other drugs of abuse

• Quit rates are only about 15 to 25% in studies

• Unfortunately, at the end of one year, most are back to using cannabis
Hard to quit…

- Randy Gregory had it all…
- He tested positive 2 times while playing for Nebraska
- He was supposed to be a first round NFL draft pick
- However, due to his marijuana use, he ended up being the 60\textsuperscript{th} overall and it cost him millions of dollars.
- February 19, 2016, Gregory was suspended for the first four games of the 2016 NFL season for violating the league’s drug policy. A few months later, Gregory failed a second drug test and was suspended until December 19, 2016
- April 29 2017, Gregory reportedly failed a 7\textsuperscript{th} drug test
Potential Harm

MEDICAL NEWS | PHYSICIAN’S FIRST WATCH

April 27, 2017

Medical Marijuana Legalization Tied to Increases in Illicit Marijuana Use

By Kelly Young

Edited by Susan Sadoughi, MD, and Richard Saitz, MD, MPH, FACP, DFASAM

States that have passed medical marijuana legislation have higher rates of illicit marijuana use, according to a JAMA Psychiatry study.

Researchers used data from three separate surveys that asked over 100,000 U.S. adults about their illicit cannabis use in the past year and whether they had been diagnosed with a cannabis use disorder.

Both illicit cannabis use and cannabis use disorder diagnoses increased from 1991 to 2013. The increases were higher in states that had passed medical marijuana laws (e.g., 3.6-percentage-point increase in illicit use in states with medical marijuana laws vs. 2.2-percentage-point increase in states without such laws).

The authors conclude: "Clinical professionals should recognize that cannabis disorders can be severe, treatment needs are increasing, and treatment can be effective."
Legal Controversies

Marijuana Use, Abuse More Likely In States Where Medical Marijuana Is Legal

USA Today (4/26, Hughes) reports people who live in states that have “legalized medical marijuana are more likely to use and abuse cannabis than people” who live in states that have not legalized medical marijuana, according to a study published online in JAMA Psychiatry. Researchers found that the number of people using marijuana “without a doctor’s note” as well as the number of people with a marijuana use disorder both increased in states with legalized medical marijuana from 2001 to 2013. The article mentions that the study was funded by the National Institute on Drug Abuse and the National Institute on Alcohol Abuse and Alcoholism.

Reuters (4/26, Seaman) reports in an accompanying editorial, Wilson Compton, MD, and others at the National Institute on Drug Abuse “say policymakers need to understand which parts of medical marijuana laws are tied with positive and negative effects.”
Marijuana Use Increasing Among Pregnant Women

By Kelly Young

Edited by David G. Fairchild, MD, MPH, and Jaye Elizabeth Hefner, MD

Women have increasingly been using marijuana while pregnant, according to a research letter in JAMA.

Using data from the National Survey on Drug Use and Health, researchers found that in 2002, some 2.37% of pregnant women in the U.S. said they had used marijuana in the past month. By 2014, that figure had reached 3.85%, an increase of 62%. Among pregnant women aged 18 to 25, the prevalence of past-month use was 7.47% in 2014.

The authors of an accompanying viewpoint article conclude: "Pregnant women and those considering becoming pregnant should be advised to avoid using marijuana or other cannabinoids either recreationally or to treat their nausea."

In a separate research letter, researchers found that 10% of U.S. adults who used marijuana said they did so for medical purposes. Of these medical marijuana users, 21% reported that they lived in a state that had not legalized medical cannabis use — indicating that clinicians could be recommending medical marijuana regardless of its legal status, the authors write.
Fun Marijuana Facts

Eight states and the District of Columbia all have passed legalization of recreational use of marijuana. California, Maine, Massachusetts and Nevada all passed measures last November legalizing recreational marijuana. Twenty-eight states and the District of Columbia have legalized marijuana for medical purposes.
Washington - Fatal accidents double

- Source – AAA
- Date May 2016
- Crash fatalities increased from 8 to 17 percent between 2013 and 2014

Fatal crashes involving drivers who recently used marijuana doubled in Washington after the state legalized the drug, according to the latest research. New research also shows that legal limits for marijuana and driving are arbitrary and unsupported by science, which could result in unsafe motorists going free and others being wrongfully convicted for impaired driving.
Colorado passed legislation setting a limit of 5 ng of $\Delta^9$-THC per milliliter of blood at which drivers are considered to be operating under the influence. The Colorado Department of Transportation launched a public education campaign about impaired driving in 2014. In addition, Colo-
Nevada: Statement of Emergency

The first four days of legal sales resulted in over 40,000 retail transactions and generated $3 million in sales, according to the Taxation Department and the Nevada Dispensary Association.
Legalization Status

Marijuana Legalization Status
- Medical marijuana broadly legalized
- Marijuana legalized for recreational use
- No broad laws legalizing marijuana
Users and Legalization

Users

Legalization

MARIJUANA BY STATE (%)
Percentage of people 18-60 who have ever smoked pot

Marijuana Legalization Status
- Medical marijuana broadly legalized
- Marijuana legalized for recreational use
- No broad laws legalizing marijuana

Source: National Survey on Drug Use and Health (SAMHSA.GOV)
ANITA RAHMAN / © LiveScience.com
Hospitalizations Related to Marijuana

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SOURCE: Colorado Hospital Association, Emergency Department Visit Dataset. Statistics prepared by the Health Statistics and Evaluation Branch, Colorado Department of Public Health and Environment (CDPHE)
Petitions can be circulated to legalize marijuana in South Dakota
South Dakota

- Senate Bill 157
  - On February 14, 2017, the South Dakota senate passed Senate Bill 157 (SB 157) to create an exception for people with a certain quantity of marijuana who have a valid medical marijuana card that was issued in another state where medical marijuana has been legalized.
    - Introduced by Senators Heinert, Peters, Nesiba, and Sutton as well as Reps. Wismer, McCleerey and Bordeaux, seeks to amend Sections 22-42-6 which states the penalties for possession of marijuana

- Currently 2 proposed measures
  - “An initiated measure to legalize marijuana for medical use.”
  - “An initiated measure to legalize certain amounts of marijuana, drugs made from marijuana, and drug paraphernalia, and to regulate and tax marijuana establishments.”
How three missing words cast confusion over marijuana ballot measure

• “the state or”

Notice the difference: The paraphernalia section addresses the law of "the state or the subdivision" (cities or counties), but the marijuana section addresses only subdivisions. It's that missing phrase — "the state or" — that prompted the Legislative Research Council to conclude the state's law against recreational marijuana would not be affected by the ballot measure should it make it to the ballot and be approved by voters in 2018.

Supporters must collect nearly 14,000 valid signatures by November to place the question on the 2018 ballot.
Nebraska and Oklahoma sue Colorado over Marijuana Legalization - 2015

U.S. Supreme Court Rejects States' Challenge to Colorado Marijuana Law

- A 6-2 vote, the justices turned away a lawsuit brought by Nebraska and Oklahoma, whose state attorneys complained that illegal marijuana was pouring into their states as a result of Colorado's liberalized laws.

- State border problems
  - In Colorado traffic fatalities have doubled
  - Out of state purchases, arrests and legal costs have been a problem with Nebraska border towns
Nebraska cannabis

- State Senator Tommy Garrett
  - LB 643. Cannabis Compassion and Care Act
    - Legalize medical marijuana for patients with specific chronic or terminal illnesses, including cancer, glaucoma, Crohn’s disease and epilepsy. The cannabis could be ingested as a liquid, pill or liquid vapor, but could not be smoked. Indefinitely postponed as of 4/20/2016.

- State Senator Anna Wishart
  - LB 622. Medical Cannabis Act
    - Wishart’s bill would authorize a limited number of manufacturers and distribution centers to provide medical marijuana for people suffering from 19 different medical conditions, including seizures, anxiety or “any other illness for which medical cannabis provides relief as determined by the participating health care practitioner.”
Controversial issues

• Concern that widespread adoption of medical marijuana provides a path for future legalization

• Driving under the influence, how do we detect and enforce

• Concerning patterns and trends in marijuana use and attitudes, particularly among adolescents

• Short, medium and long term effects of THC on the brain and behavior need to be studied

• Long-term effects of prenatal and adolescent cannabis exposure on brain development

• Medications and behavioral treatments for cannabis use disorder

• Social, behavioral, and public health impacts of policy changes related to marijuana (i.e., “medical marijuana” and recreational legalization)
Controversial issues

• Gateway drug, but this argument can be used for tobacco, ETOH
• Addiction, good evidence
• Optimal dose, mode of administration, bioavailability to maximize the beneficial effects while avoiding potential harmful effects – Novel therapeutics
  • If we do this then the cost of the medication will likely increase?
• Can we really smoke a medication? Institute of medicine or NAM, will they approve?
• Monitoring, detecting in drug tests, driving
• Advertising? Will we learn from tobacco, alcohol, pharmaceutical and herbal marketing
• In states, facilities that receive medicare dollars, they can not have cannabis on the premises or they will lose funding
Controversial issues

- Need for science – NIH, drug companies, dispensaries, who will fund the studies? Government does not appear to be significantly interested

- Packaging and dosage forms, candy, lollipops, brownies, this needs to be looked at, concerns for children

- Diversion – higher potency, easier to obtain, will it be any different then diversion of opioids or other Rx drugs

- Novel new treatments - very important and is the future

- Quality control, largely unregulated, dispensaries have no idea who prepared the product - “El Chapo” versus ”Jimmy’s John”
  - Sterile environment - Pesticides, molds and bacteria
  - Netherlands and Canada are developing methods to grow plant in sterile environments
Summary

- Cannabis is a controversial drug
- Cannabis is neither a benign nor an ideal medicine
- Chronic pain, cannabis has moderate evidence for its use
- Physicians need controlled science to help make decisions
- Physicians need to think about cannabis as an alternative in patients who have tried other drugs unsuccessfully, as we would with any other novel therapeutic agent
- Legal landscape is changing rapidly
- We are in the early stages of cannabis development and use as a medicine, potential harms need to be studied, measured and addressed
- Standardized dosages, dosage forms, targeted for specific therapeutic indications are needed and we need the science to support its use
- Novel therapeutics will be the future
Questions