HR30 Webinar
Medical Marijuana: Miracle Drug or Safety Nightmare?

Fred Kohanna, MD, MBA, FACOEM
V.P. of Occupational Health &
Chief Medical Officer
AllOne Health

ALLONE® HEALTH

What We're Going To Talk About

- Historical perspective on medical marijuana
- Mechanism of action of marijuana
- Federal vs. state laws
- Indications for medical use
- Contraindications and side effects
- The risk of impairment and impact on safety
- Implications for drug testing programs
- Conclusions

Historical Perspective On Marijuana

- Chinese Emperor Shen Nung in 2737 B.C. described therapeutic use for joint pain, constipation, malaria, and childbirth
- Therapeutic and religious use achieved great popularity in India around 1000 B.C.
- Medicinal use of marijuana continued and spread to Africa, the Middle East, and the Arabian Peninsula into the 18th century
- Marijuana was introduced into western medicine by a physician, W.B. O'Shaughnessy, who in 1839, described its use for pain control, muscle relaxation, appetite stimulation, and as a treatment for nausea, and for seizures
- The psychiatrist, Moreau, in 1845 published an article describing the use of marijuana in his patients
- In 1850, Marijuana was added to the U.S. Pharmacopoeia
- Information regarding medical uses of marijuana disseminated throughout North America and Europe

Historical Perspective On Marijuana Continued

- By 1900, more than 100 scientific articles had been published on medical Marijuana
- Marijuana extracts were being marketed by prominent pharmaceutical companies
- Use declined in the U.S. from 1900 through the 1930's due to difficulty standardizing preparations, development of alternative "mainstream" pharmaceuticals, and taxation by the Federal Marijuana Tax Act of 1937
- By the 1930's, there were at least 2000 medicines, with over 280 manufacturers.
- Marijuana was removed from the U.S. Pharmacopoeia in 1942
- In 1970, The Controlled Substances Act classified Marijuana as a "Schedule 1" drug along with Heroin

Mechanism of Action of Marijuana

- Marijuana is a synonym (slang) for Cannabis which is derived from the marijuana plant, Cannabis sativa
- The primary active constituents in the marijuana plant are Delta9-tetrahydrocannabinol (THC) and Cannabidiol (CBD)
- The human body has a receptor signaling system for marijuana known as the Endogenous Cannabinoid System (ECS). The ECS has 2 types of receptors that activate very different bodily functions:
  - CB1 receptors are very abundant in the brain, and solely mediate the behavioral, analgesic, and euphoric effects of marijuana (THC) (e.g. memory, cognition, perception, and pain)
  - CB2 receptors are not very abundant in the brain, but are highly expressed in the gut and immune cells where they regulate inflammation and immune function. Cannabidiol (CBD) activates these receptors (e.g. anti-inflammatory, anti-seizure, anti-nausea, and anti-anxiety)

Mechanism of Action of Marijuana Continued

- Potency of cultivated marijuana has steadily increased
- In the 1980's, THC content averaged 3%
- By 2012, THC content had increased to 12%
- Duration of action
  - Inhaled marijuana peaks in 15 to 30 minutes and effects taper in 2-3 hours
  - Ingested marijuana peaks in 2-3 hours and effects taper in 4-12 hours
- Marijuana is metabolized predominantly in the liver and is excreted into the bile and urine
- Marijuana is stored in body fat and can be excreted in the urine for up to 1-2 months in heavy users

Federal vs. State Laws

- Marijuana remains illegal at the Federal level
- As of January, 2017, 28 states and the District of Columbia have legalized medical marijuana. Eight states and the District of Columbia have legalized marijuana for recreational use
- Several synthetic marijuana preparations have been FDA approved
  - Dronabinol (Marinol) is synthetic THC and is approved for chemotherapy induced nausea/vomiting, and for appetite stimulation in patients with AIDS
  - Nabilone (Cesamet) is a synthetic analogue of THC with similar indications for use
  - FDA is investigating 2 additional marijuana preparations for “fast-track” approval
    - Nabiximols (Sativex) is an oral spray with THC and CBD in a 1:1 ratio indicated for symptomatic relief in multiple sclerosis and for pain relief in cancer patients
    - Epidiolex is a concentrated CBD oil indicated as an anti-seizure medications for intractable epilepsy

Indications For Medical Use

- Marijuana is **not** a first line drug of choice for any medical condition
- Marijuana is typically recommended when available therapies have been ineffective or when side-effects of those therapies have been unacceptable
- In 2014, 94% of applicants for medical marijuana in Arizona reported “severe pain” as their reason for requesting marijuana use
- It is not typically helpful for acute pain
- Marijuana may act synergistically with opioids to enhance analgesia and to allow lower doses of opioids

Indications For Medical Use Continued

- Appropriate indications for medical marijuana have been promulgated by organizations such as the National Academy of Sciences, Health Canada, the State of New York and the Office of Medicinal Cannabis (OMC) in the Netherlands. These indications only apply to patients for whom standard therapies have been ineffective or have had intolerable side effects:
  - Poor appetite, weight loss, and wasting in cancer or HIV/AIDs
  - Autoimmune disorders such as rheumatoid arthritis, inflammatory bowel disease, and lupus
  - Pain from HIV/AIDs or cancer
  - Chronic neuropathic pain from multiple causes including diabetes, nerve trauma, post-shingles, complex regional pain syndrome (CRPS), etc.
  - Nausea and vomiting from chemotherapy, radiation, or other medications
  - Neuropsychiatric conditions including epilepsy, Parkinson's disease, Tourette's syndrome, and PTSD
  - Intractable glaucoma
  - Pain and spasticity from multiple sclerosis or spinal cord injury

Contraindications and Side Effects

- Medical marijuana should not be used in the following situations:
  - Pregnancy or planning to get pregnant
  - Breastfeeding
  - Severe heart, lung, liver, or kidney disease
  - Allergy to cannabinoids or smoke
  - Schizophrenia or other psychotic disorders
- Relative contraindications include:
  - Substance abuse history
  - Use of psychoactive medications
  - Other psychiatric illnesses (e.g. anxiety/panic attacks)
  - Asthma/Chronic obstructive pulmonary disease (COPD)

Contraindications and Side Effects Continued

- Side effects include:
  - There are no cases of fatal overdoses from marijuana alone
  - Panic attacks
  - Cognitive impairment
  - Seizures
  - Hallucinations/psychosis
  - Sedation
  - Dry mouth
  - Impaired reaction time
  - Palpitations/Arrythmias
  - Addiction (approximately 9% of recreational marijuana users will develop addiction)
  - Withdrawal syndrome (e.g. craving, restlessness, irritability, anger, insomnia, and loss of appetite)
  - No definitive evidence at this time that Marijuana is a “gateway” to other drugs

The Risk of Impairment and Impact on Safety

- Marijuana use has a negative effect on learning, memory, attention, reasoning, and concentration (Crane NA, Schuster RM, Fusar-Poli P, Gonzalez R, Effects of cannabis on neurocognitive functioning: recent advances, neurodevelopmental influences and sex differences. Neuropsychol Rev. 2013;23:117-137.)
- In a flight simulator study, pilots were impaired after marijuana use at 1, 4, and even 24 hours after consumption (Yesavage JA, Leirer VO, Denari M, Hollister LE. Carry-over effects of marijuana intoxication on aircraft pilot performance: a preliminary report. Am J Psychiatry. 1985; 142: 1325-1329.)
- Marijuana use (acutely) is associated with an increased risk of motor vehicle collisions and especially fatal crashes (Asbridge M, Hayden JA, Cartwright JL. Acute cannabis consumption and motor vehicle collision risk: systematic review of observational studies and meta-analysis. Brit Med J. 2012; 344.)
- Marijuana use results in delayed braking reaction time, impaired lane tracking, aversion to lane changing, and inattention to speed (Liquori A, Gatto CP, Robinson JH. Effects of marijuana on equilibrium, psychomotor performance and simulated driving. Behav Pharmacol. 1998; 9:599-609)

The Risk of Impairment and Impact on Safety Continued

- Simulator studies indicate that use of Marijuana adversely affects psychomotor skills required for safe driving in a dose-response fashion (Sewell, RA, J. Poling, and M. Sofuoglu. 2009. The effect of cannabis compared with alcohol on driving. American Journal on Addictions 18(3):185-193.)
- A meta-analysis of 21 studies in 13 countries with 239,739 participants found that marijuana use (self-reported or found in blood, urine, or saliva tests) was associated with a 20% to 30% greater risk of a motor vehicle crash (Rogeberg, O, and R. Elvik. 2016. The effects of cannabis intoxication on motor vehicle collision revisited and revised. Addiction 111(8):1348-1359.)
- Marijuana use could impair human performance up to 24 hours (Heishman SJ, Huestis, MA, Henningfield JE, Cone EJ. Acute and residual effects of Marijuana: profiles of plasma THC levels, Physiological, subjective, and performance measures. Pharmacol Biochem Behav. 1990;73:561-565.)
- Postal workers who tested positive for marijuana on a pre-placement drug test, had 55% more industrial accidents and their absentee rate was 75% higher (Normand J, Salyards S. An Empirical Evaluation of Preemployment Drug Testing in the United States Postal Service: Interim Report of Findings. Drugs in the Workplace: Research and Evaluation Data. National Institute on Drug Abuse; 1989: NIDA research monograph 91:111-138.)

The Risk of Impairment and Impact on Safety Continued

- Some studies showed no association between marijuana use and workplace safety
- In 1994, a survey of 9,097 employees aged 18 and older were surveyed on drug use. There was no association between marijuana use (recent or remote) and the risk of work-related accidents (Hoffman, J. and C. Larison. 1999. Drug use, workplace accidents and employee turnover. Journal of Drug Issues 29(2):341-364)
- In 2014, employees who had a work-related injury were tested for marijuana and compared to a control group. The workers who tested positive for marijuana were not more likely to have had a work-related injury than the control group (Price, JW. 2014. Marijuana and workplace safety: An examination of urine drug tests. Journal of Addictive Diseases 33(1):24-27.)
- Studies suggest that tolerance to the effects of marijuana develop in long-term users, and that impairment for short-term users is significantly greater by comparison

Marijuana-related fatal car accidents surge in Washington State after legalization

By Andrea Noble - The Washington Times - Tuesday, May 10, 2016

Roughly 10 percent of Washington state drivers involved in fatal car crashes between 2010 and 2014 tested positive for recent marijuana use, with the percentage of drivers who had used pot within hours of a crash doubling between 2013 and 2014, according to a new study by the AAA Foundation for Traffic Safety.

Unpacking Pot's Impact in Colorado

By Vanessa Schipani
Posted on August 19, 2016
Scicheck-The Wire

From 2009 to 2012, the "medical marijuana commercialization years," the average yearly marijuana-related traffic deaths increased by 48 percent compared with the "early medical marijuana era" between 2006 and 2008. In the first two years after the recreational use of marijuana became legal (2013 to 2014), the average yearly marijuana-related traffic deaths increased by another 41 percent.

Additional News

Worcester News - MassLive.com

Posted on May 18, 2016 at 3:51 PM

Driver in crash that killed Trooper Thomas Clardy charged with manslaughter, allegedly smoked medical marijuana before crash

Implications for Drug Testing Programs – Should Employers Maintain the Status Quo

- Medical marijuana cannot be allowed by any employer who is governed by federal or state regulations that specifically prohibit its use (e.g. FMCSA, NRC)
- Employer prohibition of marijuana use by employees (medical or recreational) is still supported by federal law and does not violate the Americans with Disabilities Act (ADA)
- Levels of marijuana in the urine or saliva do not correlate with the level of impairment (unlike blood or breath alcohol levels) and so there is no "safe or acceptable" level
- Dronabinol and Nabilone (both FDA approved drugs) would still constitute legitimate use, and would result in an Medical Review Officer (MRO) negative drug test, but safety concerns would still need to be considered by the employer

Implications for Drug Testing Programs – Should Employers Consider Allowing Employees to Use Medical Marijuana?

- Employers will probably face increasing pressure from employees to allow medical marijuana use for non-federally regulated jobs
- Ongoing legal challenges to workplace drug testing policies may force changes to employer drug testing protocols
- Consideration for medical marijuana use by workers must address critical considerations:
  - Safety sensitive vs. non-safety sensitive jobs
  - Underlying diagnoses
  - Frequency of use and route of administration (inhalation vs. ingestion)
  - Duration of use (short-term vs. long-term)
  - Necessary work accommodations or restrictions
  - Worker would have to notify the employer of any changes to dose, frequency, or route of administration
  - In most cases, medical marijuana should not be administered while the employee is at work
  - Fitness-for-duty evaluations including consultation with an Occupational Health physician and neuro-cognitive testing should be available as needed

Implications for Drug Testing Programs – Should Employers Stop Testing for Marijuana if not Federally Mandated?

- Some companies have stopped testing for marijuana
- Companies might consider raising the screening and confirmation levels for a marijuana test to be considered positive
- Create a more flexible employment policy for employee's who test positive for marijuana
- In some states where marijuana is "legal", a blood marijuana (THC) level of 5 ng/mL is generally accepted as the legal limit for motor vehicle operation. Could this model be used in the workplace instead of zero tolerance? Would be similar to alcohol monitoring
- Refocus drug testing programs to address other drugs of abuse that are not currently screened

Conclusion

- Medical marijuana has been in use throughout the centuries
- Although marijuana is not a first line therapy for any medical condition, it does have proven efficacy for a number of difficult to treat chronic medical illnesses
- Medical marijuana has both benefits and risks
- The increasing use of medical marijuana by employees will pose a threat with regard to workplace safety, and will create challenges for current drug testing program policies
- Should a company decide to allow the use of medical marijuana by an employee, strict safeguards will need to be implemented to address safety sensitive work, any necessary job accommodations or restrictions, as well as ongoing fitness-for-duty issues
- **The bottom line: Medical marijuana is <u>neither</u> a miracle drug nor a safety nightmare**

Follow-up

- For questions please contact:

- Beth Gilley MSN, BCC
  - bagilley@lytleeap.com
  - 703-444-2254