Marijuana – what workplaces need to know

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Today’s agenda

• What I’ll cover
  – Some “big picture” observations
  – Cannabis pharmacology
  – Impairment vs. intoxication
  – Effects relevant to Safety Sensitive worksite
  – How to deal with cannabis in the worksite
  – Some final societal observations, and “futurizing”
Overall message

• “It’s complicated!”

• https://clra.org/p/marijuana+and+the+safety+sensitive+worker
Big Picture

• Why are we confused?
• Today’s cannabis situation is unparalleled:
  – Is it because a reward-causing drug has been released for public use?
  – Is it because it has been alleged to have newly discovered medical effects?
  – Is it because it is available by prescription?

“Those who do not learn from history are doomed to repeat it.”

(George Santayana)
Nope.

- Not the first “therapeutic” drug with reward dynamics to be introduced directly to public.
Cocaine

- Ernest Shackleton Antarctica in 1909, and Captain Scott in 1910
- Used in World War I, also.
- "Bolivian Marching Powder"
Cocaine and Alcohol
(Cocaethylene)

- The ethanol in the wine extracted the cocaine from the coca leaf, altering the drink's effect. The Vin Mariani contained 6 mg of cocaine per fluid ounce, (0.028 l) but the exported drink contained 7.2 mg per ounce to compete with the similar drinks in the United States.
UpJohn & Co. listed 30 different cannabis entries in its medical catalog, while Parke Davis came in at 27. Eli Lilly sold 23 different versions and Abbott Laboratories sold 4 in 1935.

Abbot is the only company that is still associated with medical marijuana. Its research arm Abbvie Pharmaceuticals was recently spun off as a separate company and it manufactures the synthetic marijuana pill Marinol.

Source: Forbes April 8, 2015
Is it because it has been alleged to have useful medical effects? Nope.

- Other conditions for which cannabis drugs were often prescribed in the late 19th century were loss of appetite, inability to sleep, migraine headache, pain, involuntary twitching, excessive coughing, and treatment of withdrawal symptoms from morphine and alcohol addiction. At least 100 major articles were published in scientific journals between 1840 and 1900 recommending cannabis as a therapeutic agent for various health conditions. Reports in the literature described its effectiveness over a wide range of ailments, including gynecological disorders, such as excessive menstrual cramps and bleeding, treatment and prophylaxis of migraine headaches, alleviation of withdrawal symptoms of opium and chloral hydrate addiction, tetanus, insomnia, delerium tremens, muscle spasms, strychnine poisoning, asthma, cholera, dysentery, labor pain, psychosis, spasmodic cough, excess anxiety, gastrointestinal cramps, depression, nervous tremors, bladder irritation, and psychosomatic illness.

- By 1896 several useful new resin derivatives were developed. In a cooperative venture, Eli Lilly and Parke Davis developed a very potent domesticated indica strain called Cannabis Americana.
1. This is the first time this (well worn) phenomenon has occurred post internet.
   - Knowledge (both fake and real) is now in the hands of the people
   - “Echochambers”

2. Medicine is being practiced by the legal profession, and government edict
   - On August 11, 2016, Health Canada announced the new *Access to Cannabis for Medical Purposes Regulations* (ACMPR). These new regulations will replace the *Marihuana for Medical Purposes Regulations* (MMPR) when they come into force on August 24, 2016, and are being implemented as a result of the Federal Court ruling in the case of *Allard v. Canada*. These new regulations will allow for reasonable access to cannabis for medical purposes for Canadians who have been authorized to use cannabis for medical purposes by their health care practitioner.
   - *R. v. Smith, 2015 SCC 34* (next slide)
Medical marijuana products are available for those who need them, but not in dry form. The practical effect is that the marijuana must be smoked, not taken orally or applied topically. On the evidence, the Court held, the restriction “subjects the person to the risk of cancer and bronchial infections associated with smoking dry marihuana, and precludes the possibility of choosing a more effective treatment”, thereby also “forcing a person to choose between a legal but inadequate treatment and an illegal but more effective choice” (at para. 18).

“One difficulty is that it places enormous power in the hands of first-instance judges, power they have not necessarily been trained to wield. An old joke has it that lawyers are smart people unable to cope with blood or numbers. There is a lot of blood and a lot of numbers in these cases”

First Major Point

- Alcohol and Marijuana are **TOTALLY DIFFERENT DRUGS!!**
Marijuana

- Complex mixture of > 420 chemicals; 66-113 are cannabinoids; psychoactive ingredient is delta 9 tetrahydrocannabinol: “THC”
- Cannabidiol – not psychoactive
  - Interacts with THC in complex fashion
- MJ in 60’s typically 3-5%, now typically 10%, can be 40% (hash oil, BC bud), or 95% plus – “dab”, “shatter” or “budder”
- Fat soluble (vs. EtOH)
- THC to CBD ratio critical
Receptor sites

• CB1 receptors
  – GPR55; GPR18; TRPV1

• Endocannabinoid system

• Anandamide
  – Anandamide, also known as N-arachidonoylethanolamine or AEA, is an endogenous cannabinoid neurotransmitter. The name is taken from the Sanskrit word ananda, which means "bliss, delight", and amide.
Alcohol effects – gated ion channels
Drug Administration, Distribution and Elimination

• pharm·aco·ki·net·ics
  •ˌfärməkōkəˈnetɪks/
  • *noun*
  • the branch of pharmacology concerned with the movement of drugs within the body.
Route of Administration
Same dose, different route

Blood Levels of THC & Metabolite

- (A) THC (Smoked)
- (B) THC-COOH (Smoked)
- (C) THC (Oral)

ng/ml in plasma vs. Hours
Alcohol

- Sedative/hypnotic
- Rapidly absorbed, slowed by food, water soluble
- No receptor sites (ion channels)
- Eliminated by zero order kinetics, (slower in women), 10 gm/hr
- Converted to acetaldehyde then to acetate
- One drink in North America = 13.6 grams EtOH
THC

- Elimination non-linear!
So how long does marijuana last?

- It depends

- Occasional and recreational users have lower plasma THC concentrations than regular and frequent users

- The bioavailability of $\Delta^9$-THC varies according to the depth of inhalation, puff duration and breath-hold. The systemic bioavailability of THC is $\sim 23\text{-}27\%$ for heavy users and $10\text{-}14\%$ for occasional users

- In comparison to smoking and inhalation, after oral ingestion, systemic absorption is relatively slow resulting in maximum $\Delta^9$-THC plasma concentration within 1-2 hours which could be delayed by few hours in certain cases. In some subjects, more than one plasma peak was observed

- The half-life for an infrequent user is 1.3 days and for frequent users 5-13 days.

- After smoking a cigarette containing 16-34 mg of $\Delta^9$-THC, THC-COOH is detectable in plasma for 2-7 days. A clinical study carried out among 52 volunteers showed that THC-COOH was detectable in serum from 3.5 to 74.3 hours. Initial concentration was between 14-49 ng/mL. This was considerably less than the THC-COOH detection time of 25 days in a single chronic user.
But....... 

• I am now being asked to estimate how long the drug might be detectable after using the newer formulations containing 80-95% THC
• There are no data!
Drug testing

• A topic unto itself – but generally poorly understood by Corporate.
Drug testing (in one slide!)

- MUST be GCMS confirmed
- Detects THC-COOH – not THC. Will NOT detect CBD
  (NB no such thing as pure CBD available now)
- Does NOT measure impairment, just use
- NO science connects THC blood levels and impairment
Research Letter

November 7, 2017

Labeling Accuracy of Cannabidiol Extracts Sold Online

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There is growing consumer demand for cannabidiol (CBD), a constituent of the cannabis plant, due to its purported medicinal benefits for myriad health conditions.¹ Viscous plant-derived extracts, suspended in oil, alcohol (tincture), or vaporization liquid, represent most of the retail market for CBD. Discrepancies between federal and state cannabis laws have resulted in inadequate regulation and oversight, leading to inaccurate labeling of some products.² To maximize sampling and ensure representativeness of available products, we examined the label accuracy of CBD products sold online, including identification of present but unlabeled cannabinooids.
Roadside testing?

• “Potalyzers”
• Acute impairment $\geq$ 5 ng/ml blood THC?
  – Controversial
  – Ignores subacute and chronic impairment
  – Ignores drug-drug interactions
  – Ignores non-linear excretion
Budder

- Pink Kush Weed Budder
- Pink Kush weed budder is a new product McChronalds has made available. It comes in 1 gram packages for $100.

- **Type:** Indica  
  **Strength:** 10 out of 10  
  **High:** Heavy Duty High “Wheelchair Grade”  
  **Taste:** Ultra smooth taste with that pungent Pink Kush aroma  
  **Amount Per Package:** 1 Gram
“Wheelchair Weed?”

• Urban Dictionary:
• “Marijuana of such intense potency that it typically incapacitates its users, sending them into a state of mind-bending delirium.”
• “John smoked some of that wheelchair weed and sat in his beanbag chair listening to Thermo surf rap for like three hours.”
Drug concentration
Impairment

• But what employers care most about is impairment (affecting workplace safety)

• “Impairment is any decrement in task performance” CLRA paper
Concept of Impairment vs. Intoxication

• “What I do on my own time is my own business”
• Impairment:
  – Acute vs. Withdrawal (Subacute) vs. Chronic
  – Older concepts too crude
  – Psychological
    • Mood
    • Perception
    • Cognitive skills
  – Physical
    • Gross motor
    • Fine motor
    • Special senses
KEY Point...remember??

• Alcohol and Marijuana are **TOTALLY DIFFERENT DRUGS!!**
Acute impairment

• It is well known that exposure to such substances impairs psychomotor performance and patients must be warned not to drive or operate complex machinery after smoking or eating cannabis or consuming psychoactive cannabinoid medications (HC 2013)

• A recent systematic review and meta-analysis concluded that, after adjusting for study quality, cannabis use was associated with a seven-fold estimated risk of being involved in a fatal accident, benzodiazepine use was associated with a two-fold estimated risk of a fatal accident, and opiate use with a three-fold estimated risk of a fatal accident. (HC 2013)
Marijuana Impairment - how long?

• Covered extensively in CLRA paper:

  • “marijuana use impairs critical cognitive functions, both during acute intoxication and for days after use”.
  

  • After about a month of discontinued use, chronic cannabis users have demonstrated performance deficits in psychomotor speed, attention, memory, and executive functioning as compared to non-using controls Grant, Gonzalez, Carey, Natarajan & Wolfson, 2003; Medina et al., 2007
Chronic Impairment

- Crean’s paper is the best to review:
- *Cannabis appears to continue to exert impairing effects in executive functions even after 3 weeks of abstinence and beyond.* While basic attentional and working memory abilities are largely restored, the most enduring and detectable deficits are seen in decision-making, concept formation and planning. Verbal fluency impairments are somewhat mixed at this stage. Similar to the residual effects of cannabis use, those studies with subjects having chronic, heavy cannabis use show the most enduring deficits.”
WHO paper, 2015:

• "There is ample evidence indicating that neurocognitive impairment from cannabis persists from hours to weeks.

• A return to a non-intoxicated state does not ensure a full return of neurocognitive function in the workplace. In a summary of the dilemmas that cannabis for medical use has created for the workplace, it was pointed out that ensuring safety of workers who are under the influence or who recently consumed cannabis is not possible."
From a marijuana clinic in Calgary:

discussed the risk and benefit of the cannabis and alternative measures
co addiction assessment done
counselled and educated about the medical cannabis
And follow the rules of starting low and slow
and for patients under 25 the risk of psychosis discussed
other recommendations:
Do not stop any of your current medications unless you first talk to your prescribing physician
Do not smoke either as a cigarette, pipe or inhale any combusted products.
Use a vaporizer or use an oil base product to ingest.
Store your marihuana in a secure manner in order to prevent others accessing it or stealing it.
Do not under any circumstances share.
Do not cut with tobacco.
Never use “Shatter”
You may travel in Canada with your prescription card and approved packaging. Your prescription is not valid anywhere outside of Canada.
Do not use dispensaries. None in Canada are legal and they all have unlicensed product.
You must F/U at a minimum every 3 months: sooner if SE or other issues
please record usage / LP / strain used / and effects

A. Discussed potential benefits, but noted the paucity of good clinical evidence for effectiveness and
From a marijuana clinic in Calgary:

safety (but LD50 is 1:20000-1:40000)

B. Reviewed possible side effect as describe in Health Canada's "Consumer Information - Cannabis"

C. Potential risks, including the following:

Precipitation of psychotic symptoms, especially if there is a family history of psychotic illness.

Impairment to lung function from marihuana smoke inhalation, including risk of cancer and obstructive lung disease. There is contradictory evidence in the literature about these risks and is mitigated by vaporizing the product.

Impairment in cognitive function that may impact fitness to engage in activities and/or responsibilities:

Marihuana can impair cognition and can impair the ability to drive or operate equipment. Do not drive, or operate equipment while under the influence of marihuana. Evidence for diminution of the effects of marihuana on ability to drive is limited. Minimum 4 hours if vaped, 6 hours if ingested or 8 hours if euphoria with either vaporization or ingestion.

It may impact safety-sensitive occupations, potentially necessitating work restrictions or limitations.

Counselled about using marihuana for medical purposes with respect to workplace safety concerns. Individuals who serve in positions where public safety is a factor (e.g., railway and aviation industries) may not be able to continue in their occupation while using marihuana. I am obligated to notify the relevant regulatory authority if appropriate, as outlined in Legislated Reporting and Release of Medical Information.

It may impact your insurance or benefits coverage, including the your existing life, disability and automobile insurance policies. Please check with your insurance policy holder.

General appearance: well, no pallor no jaundice no distress alert oriented calm and no cyanosis cooperative well groomed good eye contact, dressed appropriately

Respiratory normal goor equal air entry

CNS. NORMAL no neuro deficit
And remember.....

• Humans Don’t Just Use One Drug!
Q. What is the fastest way to induce temporary insanity in Canadian citizen?

A. Put the word “medical” in front of marijuana
“Skepticism about the health benefits of marijuana have been bolstered by a recent meta-analysis in the Journal of the American Medical Association commissioned by the Swiss Federal Office of Public Health. After reviewing 79 randomized trials, with 6,462 patients, researchers found evidence of moderate quality to suggest marijuana helps for chronic nerve pain, nausea due to chemotherapy, and spasticity due to MS—but that was it.”

“For many other diseases, including glaucoma, insomnia and anxiety, researchers found no evidence, or low-quality evidence, to support its use. Robert Wolff, the study’s co-author, points out that if marijuana were a new medication, the lack of evidence means it would not be approved by the FDA or Health Canada.”
• Medical marijuana prescription rate soaring in Canada
• Nearly 130,000 Canadians signed up with country’s 38 licensed cannabis producers, a 32 per cent jump since September
  • The Canadian Press
  • February 23, 2017

Marijuana is pictured in a vending machine at the BC Pain Society in Vancouver, B.C., on Friday August 29, 2014. (Ben Nelms/CP)
The Marijuana Industry

- As “big pharma” enters the field, research/communication will be skewed as we’ve grown to expect
- Negative studies don’t get published
- “Off label use”
% is not a dose!
To get you thinking...

- For negligence-based crimes, the mental element of the offence (*mens rea*) will be attributable to corporations and other organizations through the aggregate fault of the organization’s “senior officers” (which will include those members of management with operational, as well as policy-making, authority).

- For crimes of intent or recklessness, criminal intent will be attributable to a corporation or other organization where a senior officer is a party to the offence, or where a senior officer has knowledge of the commission of the offence by other members of the organization and fails to take all reasonable steps to prevent or stop the commission of the offence.

- Special rules of criminal liability for corporate executives will be rejected.

- An explicit legal duty will be established on the part of those with responsibility for directing the work of others, requiring such individuals to take reasonable steps to prevent bodily harm arising from such work.

Managing the Medical Marijuana Employee

• Do proper performance management
  – Why does this “problem employee” have an HR file 1 page long?

• Keep good, written records
  – If it isn’t written it didn’t happen

• Do act. If an employee comes forward with a permit to possess, respond!

• You respond as per your policy, and its associated process
  – You do have a policy and process document, don’t you?

• Train your supervisors – don’t say/be STOOPID!
Practicalities (con’t.)

• Do test – but know why, how and for what reason.
  – Testing does not substitute for performance management

• Get good advice, follow best practices for disability management
  – Do not just accept the word of the prescribing entity

• Don’t freak out! This is no different than any other impairing prescription drug.
The legal wild card

• This conflict will undoubtedly lead to one or more landmark human rights court decisions, which, judging by past performance, will not be based on science or medically rational.

• Nova Scotia board says insurance must cover man’s marijuana prescription
  MIKE HAGER
  VANCOUVER — The Globe and Mail
  Published Thursday, Feb. 02, 2017

• Assembly line worker fights to use medical marijuana at work - Cannabis oil no more effective than 'candy,' says addictions expert
  CBC News Posted: Jan 31, 2017 11:04 AM ET

• Elk Valley Coal Case
  – See Baker Law
• ATS/Unifor case
Summary points

• Marijuana is a complex set of chemicals, with complex actions
• It is pretty safe, pharmacologically speaking
• Its dangers come from impairment (and likely some impaired brain development and psychosis esp. in youth)
• It is addictive to 10-15% of users
• Some of its constituent chemicals will likely have medical applications
• Smoking/vaping is not an appropriate mechanism of drug delivery
• We have little experience with some of the high potency forms now emerging
Discussion