Medical Marijuana: A Critical Look at Medicine, Politics, Policy, and Profits

Aaron Weiner, PhD
October 4, 2018

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Themes for Today

- Facts vs. Alternate Facts
  - Specificity is important!
  - Where does your data come from?
  - Why is science important for public health?
- Experiences from Illinois, and how it may inform Ohio
- When an industry defines the narrative about a product, what happens?
What is marijuana?

- Plant with 500 chemical compounds, and 100 cannabinoids
- THC & CBD
- THC binds to CB1 receptors
Concentrations of CB₁ receptors

- Basal Ganglia¹
  Movement

- Cerebellum¹
  Movement

- Cerebral Cortex¹
  Higher cognitive function

- Hypothalamus²
  Appetite

- Hippocampus¹
  Learning, memory, stress

- Medulla³,⁴
  Nausea/vomiting, chemoreceptor trigger zone (CTZ)

- Spinal Cord¹
  Peripheral sensation including pain

References:
What is marijuana?

- Plant with 500 chemical compounds, and 100 cannabinoids
- THC & CBD
- THC binds to CB1 receptors
- Most-used substance behind alcohol & tobacco
- Number of routes of administration

(CDC, 2017)
What is marijuana?

- Plant with 500 chemical compounds, and 100 cannabinoids
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- THC binds to CB1 receptors
- Most-used substance behind alcohol & tobacco
- Number of routes of administration
- High variability of concentration

(CDC, 2017)
A Potency of THC

THC in Marijuana Samples (%)


(Volkow et al., 2014)
What is marijuana?

- Plant with 500 chemical compounds, and 100 cannabinoids
- THC & CBD
- THC binds to CB1 receptors
- Most-used substance behind alcohol & tobacco
- Number of routes of administration
- High variability of concentration
- Addictive substance
  - Approximately 30% of active users have a SUD
  - 1:10 adults, 1:6 adolescents
- Well-studied detrimental impact on behavioral health and functioning

(CDC, 2017)
Is this medicine?

- In Illinois since 2013
- Not approved by the FDA, nor prescribed/dispensed like medicine
  - **Medicine**: Marinol, Sativex, and Epidiolex
Is this medicine?

- In Illinois since 2013
- Not approved by the FDA, nor prescribed/dispensed like medicine
  - **Medicine**: Marinol, Sativex, and Epidiolex
  - **Not medicine**: Buying whatever you like from a dispensary, using it however you want
- Consider: physicians are not pushing for this
  - …then who is?
Therapeutic Uses for Marijuana

- What does quality research show it is good for?
  - Appetite stimulation
  - Nausea suppression
  - MS spasticity (cannabinoids only)
  - Short-term sleep outcomes (cannabinoids only)
  - Good reference: National Academy of Sciences

- In Illinois, it is approved (by the legislature) for 40 conditions…starting at age 18
- Agitation of Alzheimer’s disease
- HIV/AIDS
- Amyotrophic lateral sclerosis (ALS)
- Arnold-Chiari malformation
- Cancer
- Causalgia
- Chronic inflammatory demyelinating polyneuropathy
- Crohn’s disease
- CRPS (complex regional pain syndrome Type II)
- Dystonia
- Fibrous Dysplasia
- Glaucoma
- Hepatitis C
- Hydrocephalus
- Hydromyelia
- Interstitial cystitis
- Lupus
- Multiple Sclerosis
- Muscular Dystrophy
- Myasthenia Gravis
- Myoclonus
- Nail-patella syndrome
- Neurofibromatosis
- Parkinson’s disease
- Post-Concussion Syndrome
- Post-Traumatic Stress Disorder (PTSD)
- Reflex sympathetic dystrophy
- Residual limb pain
- Rheumatoid arthritis
- Seizures (including those characteristic of Epilepsy)
- Severe fibromyalgia
- Sjogren’s syndrome
- Spinal cord disease (including but not limited to arachnoiditis)
- Spinal cord injury is damage to the nervous tissue of the spinal cord with objective neurological indication of intractable spasticity
- Spinocerebellar ataxia
- Syringomyelia
- Tarlov cysts
- Tourette syndrome
- Traumatic brain injury
- Cachexia/wasting syndrome
Qualifying Conditions

- AIDS
- Amyotrophic Lateral Sclerosis (ALS)
- Alzheimer’s disease
- Cancer
- Chronic Traumatic Encephalopathy
- Crohn’s Disease
- Epilepsy or another seizure disorder
- Fibromyalgia
- Glaucoma
- Hepatitis C
- Inflammatory Bowel Disease,

- Multiple Sclerosis
- Pain that is either chronic and severe or intractable
- Parkinson’s Disease
- Positive status for HIV
- Post-Traumatic Stress Disorder
- Sickle Cell Anemia
- Spinal Cord Disease or injury
- Tourette’s Syndrome
- Traumatic Brain Injury
- Ulcerative Colitis.
Endogenous Cannabinoids vs. Exogenous Manipulation

- **Theory**
  - Endocannabinoid system impacts many different diseases
  - Manipulate the same receptors, get the desired effect

- **Reality**
  - Hit & Miss

(Nature, 2012)
Medical Marijuana

- What does research show it is good for?
  - Appetite stimulation
  - Nausea suppression
  - MS spasticity (cannabinoids only)
  - Short-term sleep outcomes (cannabinoids only)
  - Good reference: National Academy of Sciences

- In Illinois, it is approved (by the legislature) for 40 conditions…starting at age 18
  - Evidence?
Narrative review of the safety and efficacy of marijuana for the treatment of commonly state-approved medical and psychiatric disorders

Katherine A Belendiuk¹, Lisa L Baldini² and Marcel O Bonn-Miller³,⁴,⁵*

Abstract

The present investigation aimed to provide an objective narrative review of the existing literature pertaining to the benefits and harms of marijuana use for the treatment of the most common medical and psychological conditions for which it has been allowed at the state level. Common medical conditions for which marijuana is allowed (i.e., those conditions shared by at least 80 percent of medical marijuana states) were identified as: Alzheimer's disease, amyotrophic lateral sclerosis, cachexia/wasting syndrome, cancer, Crohn's disease, epilepsy and seizures, glaucoma, hepatitis C virus, human immunodeficiency virus/acquired immunodeficiency syndrome, multiple sclerosis and muscle spasticity, severe and chronic pain, and severe nausea. Post-traumatic stress disorder was also included in the review, as it is the sole psychological disorder for which medical marijuana has been allowed. Studies for this narrative review were included based on a literature search in PsycINFO, MEDLINE, and Google Scholar. Findings indicate that, for the majority of these conditions, there is insufficient evidence to support the recommendation of medical marijuana at this time. A significant amount of rigorous research is needed to definitively ascertain the potential implications of marijuana for these conditions. It is important for such work to not only examine the effects of smoked marijuana preparations, but also to compare its safety, tolerability, and efficacy in relation to existing pharmacological treatments.

Keywords: Cannabis, Medical marijuana, Marijuana, Medicine, Treatment, Alzheimer's disease, ALS, Cachexia, Cancer, Crohn's disease, Epilepsy, Seizures, Glaucoma, Hepatitis C virus, HCV, HIV, AIDS, Multiple sclerosis, MS, Pain, Nausea, Vomiting, Post-traumatic stress disorder, PTSD
Medical Marijuana

There is no or insufficient evidence to support or refute the conclusion that cannabis or cannabinoids are an effective treatment for:

- Cancers, including glioma (cannabinoids) (4-2)
  - Cancer-associated anorexia cachexia syndrome and anorexia nervosa (cannabinoids) (4-4b)
- Symptoms of irritable bowel syndrome (dronabinol) (4-5)
  - Epilepsy (cannabinoids) (4-6)
- Spasticity in patients with paralysis due to spinal cord injury (cannabinoids) (4-7b)
- Symptoms associated with amyotrophic lateral sclerosis (cannabinoids) (4-9)
  - Chorea and certain neuropsychiatric symptoms associated with Huntington’s disease (oral cannabinoids) (4-10)
- Motor system symptoms associated with Parkinson’s disease or the levodopa-induced dyskinesia (cannabinoids) (4-11)
  - Dystonia (nabilone and dronabinol) (4-12)
  - Achieving abstinence in the use of addictive substances (cannabinoids) (4-16)
  - Mental health outcomes in individuals with schizophrenia or schizophreniform psychosis (cannabidiol) (4-21)

- What about glaucoma?

Summary: Although marijuana can lower the intraocular pressure (IOP), its side effects and short duration of action, coupled with a lack of evidence that it use alters the course of glaucoma, preclude recommending this drug in any form for the treatment of glaucoma at the present time.

- PTSD...
Medicine via politics, not physicians
- Should lawmakers really be deciding what society calls “medicine?”
  - Public health implications? Perceived risk?
  - Could you imagine a pharma company doing this?
- Why are we doing an end-around the FDA?
  - And what are the consequences?
  - Illinois: Medical Cannabis Advisory Board
    - Met 3 times
“I don’t think we have the time to wait for those beautiful trials to come out in ten or twenty years. We have people dying now.”

Leslie Mendoza-Temple, MD

Former Chair, Illinois Medical Cannabis Advisory Board
Why do clinical trials matter?

THE THALIDOMIDE TRAGEDY: LESSONS FOR DRUG SAFETY AND REGULATION

By: Bara Fintel, Athena T. Samaras, Edson Carias
Jul 28, 2009

Many children in the 1960’s, like the kindergartner pictured above, were born with phocomelia as a side effect of the drug thalidomide, resulting in the shortening or absence of limbs. (Photo by Leonard McCombe/Time Life Pictures/Getty Images)
FIGURE 1. Level of Wave 1 Cannabis Use and Incident Wave 2 Prescription Opioid Use Disorder in the NESARC\textsuperscript{a}

\[\text{Wave 2 Opioid Use Disorder (\%)}\]

\[\text{Level of Wave 1 Cannabis Use}\]

\text{No use} \quad \text{Occasional use} \quad \text{Frequent use} \quad \text{Very frequent use}

\text{NESARC=National Epidemiological Survey on Alcohol and Related Conditions; wave 1 was conducted in 2001 and 2002, and wave 2 in 2004 and 2005.}
Percentage of heroin/prescription painkiller users who first used another addictive drug in previous years

Source: National Survey on Drug Use and Health (NSDUH, 2013 & 2014)
Opioid Substitute?

**Effect of cannabis use in people with chronic non-cancer pain prescribed opioids: findings from a 4-year prospective cohort study**

Gabrielle Campbell, Wayne D Hall, Amy Peacock, Nicholas Lintzeris, Raimondo Bruno, Briony Larance, Suzanne Nielsen, Milton Cohen, Gary Chan, Richard P Mattick, Fiona Blyth, Marian Shanahan, Timothy Dobbins, Michael Farrell, Louisa Degenhardt

*Lancet Public Health 2018; 3: e341-50*

**Interpretation** Cannabis use was common in people with chronic non-cancer pain who had been prescribed opioids, but we found no evidence that cannabis use improved patient outcomes. People who used cannabis had greater pain and lower self-efficacy in managing pain, and there was no evidence that cannabis use reduced pain severity or interference or exerted an opioid-sparing effect. As cannabis use for medicinal purposes increases globally, it is important that large well designed clinical trials, which include people with complex comorbidities, are conducted to determine the efficacy of cannabis for chronic non-cancer pain.

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Medical Marijuana Users are More Likely to Use Prescription Drugs Medically and Nonmedically

Theodore L. Caputi, BS and Keith Humphreys, PhD

*J Addict Med* • Volume 12, Number 4, July/August 2018
A little “dab” will do ya’ in: a case report of neuro-and cardiotoxicity following use of cannabis concentrates

Shannon S. Rickner\textsuperscript{a}, Dazhe Cao\textsuperscript{a}, Kurt Kleinschmidt\textsuperscript{a} and Steven Fleming\textsuperscript{b}

\textsuperscript{a}Division of Medical Toxicology, Department of Emergency Medicine, Parkland Memorial Health and Hospital System and University of Texas Southwestern Medical Center, Dallas, TX, USA; \textsuperscript{b}Gulfstream Diagnostics, Dallas, TX, USA

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Cannabis-induced psychosis associated with high potency “wax dabs”

Joseph M. Pierre\textsuperscript{a,b,*}, Michael Gandal\textsuperscript{a}, Maya Son\textsuperscript{c}

\textsuperscript{a} Department of Psychiatry and Biobehavioral Sciences, David Geffen School of Medicine at UCLA, Los Angeles, California
\textsuperscript{b} Department of Veterans Affairs, VA Greater Los Angeles Healthcare System, Los Angeles, CA
\textsuperscript{c} College of Medicine, University of Vermont, Burlington, VT
What messages are our patients receiving?

Marijuana shops recommend products to pregnant women, against doctors' warnings

By Michael Nedelman, CNN
① Updated 6:05 AM ET, Thu May 10, 2018

Recommendations From Cannabis Dispensaries About First-Trimester Cannabis Use

Betsy Dickson, MD, Chanel Mansfield, MPH, Maryam Guizahi, MD, MS, Amanda A. Allshouse, MS, Laura M. Borgell, PharmD, Joanne Sheeder, MD, Robert M. Silver, MD, and Torri D. Metz, MD, MS

Is cannabis safe to take during pregnancy?
• “Different people opinions, kind of like alcohol; I used to be a bartender and it is legal to serve someone who is pregnant because it is up to them so you know. I am not here to tell you you should or should not use, does that make sense. I do know a lot of people that do use cannabis during their pregnancy though and for what they have found, there has not been side effects that they can see,”
• “I know a lot of doctors are recommending marijuana nowadays.”
• “We have a girl that comes in and she is probably 6 months pregnant and she smokes bud but she does not smoke it as much as she did but she still does...she said her doctor said it was ok...she said the doctor said that but I am not a doctor...I know aspirin is ok for babies and that is pretty much what you are getting is an aspirin that is probably better.”
Drug Interactions

Drug Interaction Studies

- **Warfarin**
  - THC and CBD increase warfarin levels (Yamaori et al 2012).
  - Frequent cannabis use has been associated with increased INR.

- **Alcohol**
  - Alcohol may increase THC levels (Hartman 2015).

- **Theophylline**
  - Smoked cannabis can decrease theophylline levels (Stout and Cimino 2014).

- **Indinavir or nelfinavir**
  - Smoked cannabis had no effect (Abrams et al 2003).

- **Docetaxel or irinotecan**
  - Cannabis infusion (tea) had no effect (Engels et al 2007).

- **Clobazam**
  - In children treated with CBD for epilepsy, CBD increased clobazam levels (Geffrey et al 2015).

- Studies are few and far between
- Frequent anecdotal reports that it may have an impact on psychiatric medications
  - Or at least is a confound
Our experience in Illinois

- Strong lobbying push to expand because original condition list wouldn’t support business model
- Lawmakers say they were told
  - Product couldn’t get you high
  - Uneducated about THC levels and lack of commonsense caps
- Kids saying “isn’t it medical anyway”
- Physicians either largely uninformed or unsure about what to believe
- In two years, PTSD has almost double the next most-frequently endorsed condition
- Despite numerous flaws in Illinois law, no patient protections added before equivocating opioids
- Main bank pulled out, given risk at the federal level
Impressions From a Recent Conference Call

- State-wide committee to create Illinois guidelines for the new opioid/cannabis law
- Physicians trying as hard as they can to treat the medical cannabis system like medicine…but can’t
  - Different types of pain…but “cannabis” for everything?
  - Where is guidance for physicians and/or patients regarding what to buy?
    - There is no control once someone enters the system
  - Wanted to refer through pain medicine, but volume would be too great
    - PCPs don’t know the options
  - Low THC products aren’t even being sold at dispensaries
THC limits
- Tier 1 – 23% or less
  - 8oz every 3 months (~150 joints per month, 4-5 joints per day)
- Tier 2 – 23-35%
  - 5.3oz every 3 months (~100 joints per month, 3 joints per day)
- Extracts up to 70%
- Interesting that they acknowledge & condone concentrations

I like the physician CME requirement, but it’s still tricky

Encouraging vaping
- Is this actually a helpful idea?
- How do you enforce this?

Open-ended or non-verifiable diagnoses – PTSD, Pain, etc.

Not mimicking existing products or marketing at kids
- Good, but…
The JUUL Tactic – PR & Technicalities

JUUL e-cigarettes

Some e-cigarette critics are calling the JUUL e-cigarette the “Apple of vaping” or the “iPhone of vaping.” With its relatively low entry price, sleek portable design, ease of use, and nicotine head rush it generates for users, JUULs are catching on with younger people.

JUUL flavor pods
The juice-flavored pods contain 50 milligrams of nicotine, roughly equivalent to a pack of cigarettes.

Design
The design of the e-cigarette is about the same size as a cigarette and weighs a couple of grams.

USB charging dock
The battery is charged by dropping the body on a magnetic USB adapter. It takes an hour to fully charge and will last up to 200 puffs, a full day or regular use.

SOURCE: jualvapor.com

JAMES ABUNDIS / GLOBE STAFF
Juul Maker to Invest $30M to Combat Underage Vaping

The maker of the much-debated e-cigarette brand Juul says it will spend $30 million to try to keep its products from underage users.

April 25, 2018, at 6:11 a.m.
Implications for Treatment Centers

- Why not smoke pot? Some people do…
Transition drug?
Implications for Treatment Centers

- Why not smoke pot? Some people do…
  - Reasons why we generally recommend against:
    - Learning to cope without substances is a huge focus
    - Alignment with other patients / milieu issues
    - Triggering to other patients

- Does it actually work?
Transition drug?

- 27% less likely to stay sober (Majarrad et al., 2014)

Cannabis as harm reduction?
Examining cannabis use in a national, probability-based sample of U.S. adults who have resolved a substance use problem
Brandon G. Bergman, PhD & John F. Kelly, PhD

Cannabis

Distress
adj M difference = -2.22; SE = .72; t = -3.10; p = .002; d = .20

Happiness
adj M difference = .37; SE = .12; t = 2.9; p = .003; d = .19

Self-Esteem
adj M difference = .47; SE = .16; t = 3.00; p = .003; d = .19
Marijuana is a substance of misuse - we ask our patients to abstain from substance use while in program
  - Benefit of the patient
  - Benefit of other patients

They are in program to learn coping skills from us, not to self-medicate instead
  - Exposure is part of the healing process

If they have a card for a non-psychiatric condition, case-by-case
  - Have other options with a better risk/benefit been explored?
Marijuana - Health and Safety Impact

- Negative health impact
Table 1. Adverse Effects of Short-Term Use and Long-Term or Heavy Use of Marijuana.

<table>
<thead>
<tr>
<th>Effects of short-term use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impaired short-term memory, making it difficult to learn and to retain information</td>
</tr>
<tr>
<td>Impaired motor coordination, interfering with driving skills and increasing the risk of injuries</td>
</tr>
<tr>
<td>Altered judgment, increasing the risk of sexual behaviors that facilitate the transmission of sexually transmitted diseases</td>
</tr>
<tr>
<td>In high doses, paranoia and psychosis</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Effects of long-term or heavy use</th>
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</thead>
<tbody>
<tr>
<td>Addiction (in about 9% of users overall, 17% of those who begin use in adolescence, and 25 to 50% of those who are daily users)*</td>
</tr>
<tr>
<td>Altered brain development*</td>
</tr>
<tr>
<td>Poor educational outcome, with increased likelihood of dropping out of school*</td>
</tr>
<tr>
<td>Cognitive impairment, with lower IQ among those who were frequent users during adolescence*</td>
</tr>
<tr>
<td>Diminished life satisfaction and achievement (determined on the basis of subjective and objective measures as compared with such ratings in the general population)*</td>
</tr>
<tr>
<td>Symptoms of chronic bronchitis</td>
</tr>
<tr>
<td>Increased risk of chronic psychosis disorders (including schizophrenia) in persons with a predisposition to such disorders</td>
</tr>
</tbody>
</table>

* The effect is strongly associated with initial marijuana use early in adolescence.

(Volkow et al., 2014)
The Role of Cannabinoids in Neuroanatomic Alterations in Cannabis Users

Valentina Lorenzetti, Nadia Bolowij, and Murat Yücel

Figure 4. Percentage of studies reporting associations between regional neuroanatomy and cannabis use measures. Significant associations (red), nonsignificant associations (n.s.; blue), and associations unexamined (gray). Amyg, amygdala; Hipp, hippocampus; Para-hipp, parahippocampal gyrus; PFC, prefrontal cortex.
A Population-Based Analysis of the Relationship Between Substance Use and Adolescent Cognitive Development

Jean-François G. Morin, B.A., Mohammad H. Afzali, Ph.D., Josiane Bourque, M.Sc., Sherry H. Stewart, Ph.D., Jean R. Seguin, Ph.D., Marie O'Leary-Barrett, Ph.D., Patricia J. Conrod, Ph.D.

FIGURE 2. Between-Subject and Within-Subject (Concurrent and Lagged) Relationships Between Cannabis Use Frequency and Working Memory Errors, Perceptual Reasoning Performance, Delayed Memory Recall Performance, and Inhibitory Control Errors

A. Cannabis Use Frequency and Working Memory
   - Number of Errors on Working Memory Task
   - School Grade

B. Cannabis Use Frequency and Perceptual Reasoning
   - Score on Perceptual Reasoning Task
   - School Grade

C. Cannabis Use Frequency and Delayed Memory Recall
   - Performance on Delayed Recall Memory Task
   - School Grade

D. Cannabis Use Frequency and Inhibitory Control
   - Number of Errors on Inhibitory Control Task
   - School Grade

Legend:
- No use
- Any use
- Any use + concurrent use
- Any use + concurrent use + past year use
Marijuana - Health and Safety Impact

- Negative health impact
  - Poor learning
  - Time out of work
  - Less productivity

- Impaired motor function
  - Traffic safety concerns
THC, 11-OH-THC & THCCOOH Plasma Concentrations After Smoking Cannabis

3.55% THC

THC detected 3 - 27 h
THCCOOH 2 – 7 days
LOQ 0.5 µg/L

Huestis et al
*J Anal Toxicol* 1992
Mean Blood THC Concentrations in Occasional Smokers After 50.6 mg THC by 3 Administration Routes

N=9, LOQ=0.5
Walk And Turn Clues & Observations

**Clues**

- Starts too Soon
- Loses Balance
- Stops
- Misses Heel-Toe
- Steps off Line
- Arms to Balance
- Incorrect # Steps

**Observations**

- Improper Turn
- Tremors

**Percent of Cases (%)**

- Cases
- Controls
Number of WAT Clues ≥2 considered “Impaired”

Median = 0

Median = 3

Cases
Controls

p < 0.001

p > 0.05, THC ≥5 vs. <5 μg/L
Number of Finger To Nose Misses

Median = 0

Cases Controls

p < 0.0001

p > 0.05, THC \geq 5 vs. < 5 \mu g/L

Percent of Cases (%)

Number of Misses

Median = 5
Increase in MVA Claims

Estimated effects of recreational marijuana sales in 3 states
Change in claim frequency for vehicles up to 33 years old, 2012-16

- Colorado
- Washington
- Oregon
- combined

(HLDI, 2017)
The percentage of DUI cases relating to driving while high has risen considerably in Washington State since legalization.

Percentage of all traffic fatalities in CO where the operator tested positive for marijuana.


Source: Fatality Analysis Reporting System and Colorado Department of Transportation (CDOT), as reported in Rocky Mountain HIDTA report #4 (September 2016)
The overall number of traffic deaths related to marijuana has also risen sharply in CO.

Note: only 49% of operators involved in traffic deaths were tested for drug impairment in 2015, consistent with past practices.

Source: Fatality Analysis Reporting System and Colorado Department of Transportation (CDOT), as reported in Rocky Mountain HIDTA report #4 (September 2016)
Marijuana - Health and Safety Impact

- Negative health impact
  - Poor learning
  - Time out of work
  - Less productivity

- Impaired motor function
  - Traffic safety concerns
  - Detection concerns
  - Variable metabolism, no .08 equivalent
Marijuana – Workplace Considerations

**TOP 5 CONCERNS OF IMPACT ON WORKFORCE**

1. EMPLOYEES OPERATING MOTOR VEHICLES
2. DISCIPLINARY PROCEDURES
3. DECREASED WORK PERFORMANCE
4. EMPLOYEES USING HEAVY MACHINERY
5. ATTENDANCE

(HRPA, 2017)
If marijuana goes recreational, data suggests use rates will increase significantly in 18+ demographic.

Disciplinary procedures
- If testing positive...
  - Discriminating against employee if medical marijuana?
  - Discriminating against employee if medical condition (addiction)?
  - Were they impaired at work?
    - Can we even tell when they used in the first place?
    - We have no firm biomarkers for impairment
- Zero tolerance vs. Per se limit
  - Is abstinence a bonafide occupational qualification (BFOQ)?
  - We have no good data on a per se limit
Marijuana has been linked to...
- Less dedication to work
- Increased worker’s compensation cases
- Job turnover

Employees who test positive versus negative at pre-employment have...
- 55% more industrial accidents
- 85% more injuries
- 75% higher absenteeism rates

Also consider impact on memory, processing time, mental health

Legal Weed Could Mean a Worker Shortage in Canada

By Jen Skerritt and Kevin Orland
January 31, 2018, 6:00 AM CST

→ No way to tell if joint smoked before work or over the weekend
→ Safety concern for Canada industry with lots of dangerous jobs

Ohio factory owner: I need sober workers

Thomas Gnau - Staff Writer
2:33 p.m Tuesday, Aug. 1, 2017 Filed in Business
Delivery System

- How is medicine approved for the public?
  - Replicated science, multi-phase FDA trials

- How is medicine prescribed?
  - Dose, frequency, type, concentration

- How is medicine produced?
  - Uniform, standardized

- Do we smoke any medicine you’re aware of?
  - Or use bongs, butane torches, vape pens, etc.

- How many of those 40 conditions do you have at age 18?

- What demographic do the products appear to be marketed at?
Have you ever looked at what product is actually being sold?

– Local Example / Another Local Example
Past Month Use of Alcohol, Marijuana and Cigarettes by American High School Seniors, 1975-2015

- Alcohol
- Cigarettes
- Marijuana

Monitoring the Future
Gateway Drug?

Age, sex, and race/ethnicity adjusted past-month prevalence of cigarette, alcohol, and illicit drug other than marijuana use among youth aged 12-17 years, by marijuana use status
(n = 17,000*)

<table>
<thead>
<tr>
<th></th>
<th>Past-month adjusted prevalence</th>
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<tbody>
<tr>
<td>Cigarette use</td>
<td>2.7%</td>
</tr>
<tr>
<td>Illicit drug other than marijuana use</td>
<td>2.2%</td>
</tr>
<tr>
<td>Alcohol use</td>
<td>8.0%</td>
</tr>
<tr>
<td>Binge alcohol use</td>
<td>3.5%</td>
</tr>
<tr>
<td>Heavy alcohol use</td>
<td>0.4%</td>
</tr>
</tbody>
</table>

* Substance Abuse and Mental Health Services Administration (SAMHSA) requires that any description of overall sample sizes based on the restricted-use data files has to be rounded to the nearest 100 to minimize potential disclosure risk.

Gateway Drug?

Prevalence Of Heroin Use Among Marijuana Users in the US

SAMHSA's Center for Behavioral Health Statistics and Quality: NSDUH 2015
Gateway Drug?

Full length article

Historical trends in the grade of onset and sequence of cigarette, alcohol, and marijuana use among adolescents from 1976–2016: Implications for “Gateway” patterns in adolescence

Katherine M. Keyes\textsuperscript{a,b,*,}  Caroline Rutherford\textsuperscript{a}, Richard Miech\textsuperscript{c}

\textsuperscript{a} Department of Epidemiology, Mailman School of Public Health, Columbia University, New York, NY, USA  
\textsuperscript{b} Center for Research on Society and Health, Universidad Mayor, Santiago, Chile  
\textsuperscript{c} Institute for Social Research, University of Michigan, Ann Arbor, MI, USA

Conclusion: Marijuana is increasingly the first substance in the sequence of adolescent drug use. Reducing adolescent smoking has been a remarkable achievement of the past 20 years; those who continue to smoke are at higher risk for progression to marijuana use.
Additional Items of Note

- Eventually: Lobbying & Deregulation
  - Best business interest
  - Ex: PTSD and opioids in Illinois
  - And when things really get going…

**Politics > Colorado Legislature**

Hickenlooper vetoes first-in-the-nation bill that would have allowed marijuana “tasting rooms” in Colorado

House Bill 1258 would have allowed adults at current recreational marijuana retailers to consume small amounts of pot through edibles or by vaping.
Marijuana Scheduling

- Common question: why is it a Schedule 1 drug?
  - Short answer: heterogeneity & meeting criteria for medical use
- Common concern: Because it’s schedule 1 it’s harder to conduct research
  - Fair point, but just more regulatory hurdles
  - As noted, however: industry produces much stronger marijuana than the Mississippi grow
So what’s this all about then?

- To review…
  - Lack of quality evidence to support most medical claims
  - Dispensing system that is unspecific and promotes self-medication
  - Selling concentrates that have up to 70% (up to 93% seen in Illinois) THC
  - Low age for entry, products that can appeal to kids and young adults

- Do these ads look familiar?
Every doctor in private practice was asked:
—family physicians, surgeons, specialists...
doctors in every branch of medicine—
“What cigarette do you smoke?”

According to a recent Nationwide survey:

More Doctors Smoke Camels
than any other cigarette!

Not a guess, not just a trend…. but an actual fact based on the statements of doctors themselves to nationally known independent research organizations.

Yes, your doctor was asked… along with thousands and thousands of other doctors from Maine to California. And they named their choice—the brand that most doctors named as their smoke in Camel. Those nationally known independent research organizations found this to be a fact.

Nothing unusual about it. Doctors smoke for pleasure just like the rest of us. They appreciate, just as you, a mild, neat that’s cool and easy on the throat. They enjoy its full, rich flavor of expertly blended tobacco tobaccos. And they named Camels… more of them named Camel than any other brand. Next time you buy cigarettes, try Camel.
20,679* Physicians say “LUCKIES are less irritating”

“It’s toasted” Your Throat Protection against irritation against cough
The shock of facing what your figure may become.

Avoid that future shadow.

When tempted, reach for a LUCKY instead.

"It's toasted"
NOW...Scientific Evidence on Effects of Smoking!

A medical specialist is making regular bi-monthly examinations of a group of people from various walks of life. 45 percent of this group have smoked Chesterfield for an average of over ten years. After ten months, the medical specialist reports that he observed...

no adverse effects on the nose, throat and sinuses of the group from smoking Chesterfield.

MUCH Milder
CHESTERFIELD IS BEST FOR YOU

First and Only Premium Quality Cigarette in Both Regular and King-Size

CONTAINS TOBACCOS OF BETTER QUALITY AND HIGHER PRICE THAN ANY OTHER KING-SIZE CIGARETTE

Copyright 1933, Lorillard & More Tobacco Co.
Big Tobacco Model

- **Phase 1**
  - Associate an addictive substance with broad medical benefit, despite lack of evidence
  - Promote public misinformation and confusion
  - Market explicitly or implicitly to teenagers and young adults

- **Phase 2**
  - Commercialization
    - Bills to commercialize cannabis introduced in both Illinois house and senate

Take a guess: in Illinois, who has exclusive cannabis sale rights for the first 12 months after commercialization?
Summary

- Actual science-based therapeutic applications for cannabinoids are limited, but present
- The delivery system is not consistent with current models for medication, promoting speculative treatment, poor product choices, self-medication, and resale to youth
  - This is the biggest issue right now
- The medical industry is lobbying hard for full commercialization
  - This is a huge upcoming public health issue
- Our perspective has shifted on drugs before…
Summary

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- Our perspective has shifted on drugs before…
  …proceed carefully!
Thank You!