Marijuana Brain, Mind, Psyche

Highlights of the Latest Data

A presentation for RPP Grantees
January 7, 2019
Presented by Dean Whitlock
PreventionWorks! Vermont
Today’s Topics

• Cognition – More confirmation
• Potency – Much higher, much larger effects
• Addiction – More likely, more severe
• Treatment – Not very successful
• Psychosis – Definitely a cause
• Suicide – More confirmation
• CBD, Vaping, Edibles – All Trending
Affects on the Physical Brain

• No new breakthroughs
• No confirmations
• We don’t know enough about normal brain structure and functioning
• The technology is expensive, in short supply, and still of relatively low resolution
• The samples sizes are generally small
• The results are never solidly conclusive
THC causes Dopamine Release

• But heavy use and prolonged use can cause a reduction in dopamine production
• And a reduction in the number of dopamine receptors
  – A cause of depression?
• THC also modulates opioid receptors, which may provide additional indirect routes for altering dopamine transmission

THC Effects are Region-Specific

Effects on Cognition, Impulsivity

• Tracked 38,000 adolescents from 7th to 10th Grade
• Studied year-to-year changes in substance use and cognitive development in recall memory, perceptual reasoning, inhibition, and working memory
• Cannabis and alcohol use in adolescence was associated with generally lower performance on all cognitive domains
• Further increases in cannabis use, but not alcohol consumption, showed additional concurrent and lagged effects on cognitive functions
• “Of particular concern was the finding that cannabis use was associated with lasting effects on a measure of inhibitory control, which is a risk factor for other addictive behaviours, and might explain why early onset cannabis use is a risk factor for other addictions.”

Today’s Increased Potency

• Much more potent

THC THEN: Average less than 4% THC

THC NOW: Average more than 12% THC

CBD THEN: Average less than 3% CBD

CBD NOW: Average less than 1% CBD

• Higher THC potency + less CBD makes all effects more severe
Today’s Increased Potency

• Still climbing . . .

• Leaves, flowers, buds now over 20%
  – More than 4 times more potent than 1995
  – Potent strains are the biggest sellers in CO & WA

• Concentrates from 40% to 90%
  – Up from about 8% in 1995
  – 45% of legal sales in Colorado

• Meanwhile, CBD is down to almost nothing

Potency Monitoring Program, University of Mississippi, School of Pharmacy
Potency in the Upper Valley

• Valley News article about a potency testing event in WRJ in October 2018

• 18.1% THC: “...prefers to keep things mellow.”
  – “I don’t want to be a zombie. I look at it the same as wine or beer. If you start drinking some of these beers that are 11 percent alcohol, it’s like taking a shot of whiskey. One is OK. Two or more sometimes isn’t.”

• 23.5% THC was 2nd-highest of the day.
Potency Effect on Addiction

• Higher potency increases both risk for and severity of Cannabis Use Disorder (CUD)
• Doubles risk, with highest risk at lower ages
• “High-potency cannabis was clearly distinct from low-potency varieties by its marked effects on memory and paranoia. It also produced the best high, was preferred, and most available.”

Freeman and Winsock, Examining the profile of high-potency cannabis and its association with severity of cannabis dependence. Psychological Medicine, July 2015. doi:10.1017/S0033291715001178
Increased Treatment Admissions

- Treatment admissions for CUD in Netherlands increase and decrease in step with potency

Old Marijuana Addiction Rates

• 1 out of 11 people who try it, or 9%
• 1 out of 6 teenagers who try it, or 17%
• For heavy users (daily or near daily, any age):
  – 1 out of 4 users
  – Up to 1 out of 2 users – 50%

These rates are based on 1990s data, when potency was much lower.

Jonathan P. Caulkins, The Real Dangers of Marijuana, National Affairs, January 2016
Freeman T.P. and Winstock A.R., Examining the profile of high-potency cannabis and its association with severity of cannabis dependence. Psychological Medicine, July 2015. doi:10.1017/S0033291715001178
Today’s Addiction Rates

• 21% of *current* marijuana users meet the criteria for addiction (*2014 NSDUH*)
  – For alcohol, the addiction rate for current users is only 13%

• 30% of current users report some symptoms of CUD at mild, moderate, or severe levels (*2012 NESARC*)
  – Closer to 35% for 18-25 year olds
  – Withdrawal symptoms can occur in 60-70% of users who seek treatment

Jonathan P. Caulkins, The Real Dangers of Marijuana, National Affairs, January 2016
Hasin et al, 2015, via Budney presentation “Marijuana/Cannabis: What We Know and Don’t Know!” November, 2018
Marijuana Addiction Recovery Rates

• Only about one-half of adult marijuana users who enroll in treatment achieve an initial 2-week period of abstinence
• Among those who do, approximately one-half resume use within a year
• 29% is the best recovery rate reported for adults

Marijuana Addiction Recovery Rates

• The story for teens is similar:
• Abstinence rates at the end of treatment were only 11% to 15%
• Rates at 12 months post-treatment were 17% to 34%
• About the same as trying to quit tobacco

Suicide Link is Stronger

• Risk for suicidal thoughts/attempts is increased, particularly with high-potency marijuana.
  – Risk was doubled on average in long-term twin study
    • Even after correcting for a prior history of depression
  – Risk was more than doubled in study of 3,223 Iraq/Afghanistan-era veterans
    • Even after correcting for sex, PTSD, depression, history of childhood sexual abuse, combat exposure, and other substance use disorders

Arendt et al., 2006; Silins et al., 2014; Kvitland et al., 2016; Clarke et al., 2014
Agrawal et al, Major depressive disorder, suicidal thoughts and behaviours, and cannabis involvement in discordant twins: a retrospective cohort study. Lancet Psychiatry Volume 4, No. 9, 706–714, September 2017
Suicide Link is Stronger

13.8% of marijuana users attempted suicide
Only 6% of total student body attempted suicide

A Cause of Psychosis/Schizophrenia

• Both acute psychotic breaks and chronic psychosis
  – National Academies finds substantial evidence that “use increases the risk of developing schizophrenia and other psychoses”
  – Of all common drugs, marijuana use is the most likely to result in chronic psychosis
  – Depends on frequency of use and potency

Niemi-Pynttari et al., 2013; Arseneault et al., 2002; Henquet et al., 2005; Kuepper et al., 2011
Mental Health Risks: Psychosis

A Cause of Psychosis/Schizophrenia

- Population-wide risk due to all causes = 1.4%
- Marijuana causes a two-fold to six-fold increase in risk depending on heaviness of use and potency
- Risk for psychosis is ~ 8% of regular users of high-potency marijuana
- The conversion from psychosis to schizophrenia is 46% for marijuana-induced psychosis
- As many as 10% of schizophrenia cases could be due to marijuana

Di Forti et al, Proportion of patients in south London with first-episode psychosis attributable to use of high potency cannabis: a case-control study. Lancet Psychiatry 2015, Published Online February 18, 2015 http://dx.doi.org/10.1016/S2215-0366(14)00117-5
CBD

- Appears to moderate the effects of THC
- Shown to help alleviate symptoms of epilepsy in some patients (but not all): FDA approved!
  - Potential as an anti-psychotic?
- Many claims for other health effects – little evidence to support any of them
- Some evidence that it interferes with blood thinners; other side effects not studied
- Becoming very normalized: Christmas Cookies!
- To the General Public, it’s all marijuana
Edibles

• THC from edibles quickly processed by liver
  – Metabolizes THC to 11-OH-THC
  – 11-OH-THC is more potent and lasts longer than THC
  – Smoking produces far less 11-OH-THC

• 13.4% of sales in Colorado in 2017
  – Up to 25% of sales in some regions
  – Projected to grow by 25% per year
  – Gourmet marijuana chocolates are here!

Favrat B et al. Two cases of "cannabis acute psychosis" following the administration of oral cannabis. BMC Psychiatry. 2005;5:17.
Vaping

• Vaping appears to be a more effective delivery method than smoking

• MTF: Teen nicotine vaping nearly doubles in 1 year – highest substance use increase ever
  – Marijuana vaping also up, by 9.5%
  – Teens who vape nicotine are more likely to start vaping marijuana

• Altria now owns part of Juul and Cronos Group
Key Points to Remember

• THC potency is 3-5 times stronger than 1995
• Oils and concentrates are much, much stronger than the ’90s
• CBD levels are close to zero or zero
• It does affect cognition and impulse control
• CUD rates are higher than in the 1990s
• The data points to a causal link to suicide
• The causal link to psychosis is confirmed
• Public acceptance has never been higher
One last thought

"Are you just pissing and moaning, or can you verify what you’re saying with data?"
Questions?

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