Marijuana and the Teenage Brain: Public Health Impact

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TEENAGERS AND MARIJUANA: PUBLIC HEALTH IMPACT

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Mentors: Elizabeth Cote, Whitney Calkins, M.D. (preceptor)
Problem identification (2a)

New marijuana legislation in Vermont¹:

• Will take effect on July 1, 2018

• Allows possession of 1oz of marijuana/person, personal cultivation of 2 mature pants or 4 immature plants

• Protections included with legislation:
  • Anyone who gives marijuana to person under 21yo (or enables consumption) can be imprisoned up to 2 years and fined $2,000. Penalties raise to 5 years and $10,000 if underage person causes death/serious injury while driving after receiving marijuana
  • Will be misdemeanor to use marijuana in a car with a child (penalties starting at $500 and 2 points on license).

Despite protections, this legislation will allow much wider/easier access to marijuana for teens in VT. What are the implications of this?
Problem identification (2b)

Legalization leads to increased use among adolescents:

• Studies show that in several states where marijuana has been legalized, marijuana use among teens has increased and risk perception has decreased³.

• A survey of 9,945 high school seniors showed that 10% of non-cannabis-using students reported intent to initiate use if legal, and 18% of cannabis users reported intent to use more often if legalized².

• Data from 18 states that had legalized marijuana as of 2014 showed that living a short distance from a marijuana dispensary was associated with increased use among middle schoolers⁴.

• In the face of this new legislation, teens need more information about the specific risks of marijuana use for the developing adolescent brain.
Public health cost: teenage marijuana use

From the American Academy of Pediatrics⁵:
• Negative effects on short-term memory
• Decreased concentration, attention span, motivation
• Decreased coordination, judgement, reaction time (contribute to deaths and injuries)
• Deleterious health effects similar to those of tobacco

From Substance Abuse (journal)³:
• Higher school dropout rates
• Elevated risk of developing psychotic illnesses
• Weekly marijuana use under age 18yo → 8 point drop in intelligence among those who develop persistent dependence (not true for those that start after age 18)
• Cognitive capacity may not recover after stopping marijuana use
Community perspective (4a)

Dr. Jill Rinehart, M.D. (pediatrics)

• “The impact [of marijuana] on the developing adolescent brain is concerning for impairment, as executive function is still forming at this time of life.”

• “A teen starts using pot early in high school and has goals for herself to become a neuroscientist, and by senior year they’ve given up on applying to college altogether...The use of marijuana is associated with a decline in achieving goals, and that is sad to watch.”

• Helpful safety measures: child-resistant packaging, storing marijuana in locked boxes, prohibition of “edible” sales, more robust after-school programming, regulation of THC concentration, raising legal age to 25.

Dr. Jon Porter, M.D. (family medicine)

• “The primary concerns are related to the negative impacts on neurocognitive development...The literature raises concerns about blunted IQ, but beyond this, early and regular use is associated with impairments in executive functioning.”

• Advice to teens: “The notion in the collective societal consciousness is that cannabis is safe, ‘organic’, and that doctors prescribe it so it must be ok. It’s true that many people use it without difficulty, but many people struggle for years.”
Community perspective (4b)

Chris Pearson: VT state representative

- Ideal situation for VT when it comes to marijuana: taxed and regulated system where marijuana is treated similarly to alcohol
- Major issue: federally-funded research on marijuana has been blocked, prohibiting acquisition of helpful data concerning driving impairment, risks/benefits of use and THC dosing
- Potential benefits of legalization/taxation: more $ available for substance use education (particularly essential in the context of the opiate crisis in VT)

Dr. David Rettew, M.D. (psychiatry)

- Main risk of legalization: increased adolescent use → teens are at much higher risk when they use cannabis than adults: psychosis, decreased memory and attention, suicide & traffic crashes
- “From working in outpatient, inpatient and emergency room settings, I’ve seen countless numbers of adolescents completely derail their life because of marijuana. I’ve seen productive and bright teens lose the motivation to engage in life. I’ve also witnessed profound personality changes that lead adolescents to become paranoid and violent.”
Intervention/methodology

• Interviews were conducted with four community members: a pediatrician, psychiatrist, family physician and local VT state representative. The purpose of these interviews was to gain a wider perspective on the impact of both marijuana use and potential legalization in VT.

• Educational handout was created to help educate teenage patients about marijuana use, particularly use that starts before age 18. Information included in materials was taken from evidence-based research (see references).

• Included in this material: mechanism by which marijuana works in the brain, the course of teenage brain development, how brain development is permanently affected by drug use, particularly marijuana use before age 18.

• This pamphlet also includes helpful online resources for learning about marijuana use (some meant for teens, others for parents/families).
Results

• Educational materials were made available for physicians to include in after-visit summaries (printed material that patients take home). This will allow teens to review the information on their own time, and will hopefully spur conversations between teens and families about marijuana use.

• Materials were distributed to two health teachers at Essex High School, so that the information could be provided to students and incorporated into classroom discussions about substance use.
Evaluation of effectiveness, limitations

Evaluating effectiveness:

• Tracking (over time) how many times the handout is incorporated by physicians into patient after-visit summaries, to assess for physician perceptions of utility.

• Could provide surveys to students at Essex High school (before and after distribution of materials) to see how opinions on early marijuana use changes with education.

Limitations:

• Teens may not be forthcoming to their doctors about their marijuana use, especially if they are accompanied by a parent during the visit.

• The success of the intervention will depend on the physicians’ perception of usefulness (as they can choose to include the handout in after-visit summaries).

• Written information may not be the best way to deliver facts to teenagers; it is possible that an interactive module or video would garner more attention/interest.
Recommendations for future

- Development of guidelines for physicians to help identify teen marijuana users considered to be “at-risk.” This could be similar to the USPSTF-recommended screening for at-risk alcohol users (AUDIT-C screening tool).

- Formal marijuana-specific education for high school students (evidence-based). This could be paid for by eventual marijuana taxation (as has been done with cigarette tax).

- Vermont should preemptively ban advertisements for commercial marijuana products, with the hope that less media exposure would lead to fewer teenage users.

- If eventually fully legalized and taxed, marijuana products should include child-proof packaging, and adult users should be urged to keep marijuana in locked containers, as is the current recommended practice for opiates and firearms.
References


Interview consent

“Thank you for agreeing to be interviewed. This project is a requirement for the Family Medicine clerkship. It will be stored on the Dana Library ScholarWorks website. Your name will be attached to your interview and you may be cited directly or indirectly in subsequent unpublished or published work. The interviewer affirms that he/she has explained the nature and purpose of this project. The interviewee affirms that he/she has consented to this interview. Yes __X__ / No _____”

Interviewer: Katie Warther

Interviewee: Chris Pearson: VT State Representative

Interviewee: David Rettew, M.D.

Interviewee: Jill Rinehart, M.D.

Interviewee: Jon Porter, M. D.