The Impact of Marijuana Use on Adolescents

Mary A. Fristad, PhD, ABPP
Natalie Powell, MS Ed, LPCC-S, LICDC-CS

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Conflicts of Interest

Ms. Powell-None; Dr. Fristad-see below

- *Royalties:*
- Guilford Press
- American Psychiatric Press
- Child & Family Psychological Services
- *Research:*
- Janssen

Learning Objectives

- ***Recognize changes in potency and availability of marijuana in 2020***
- Increase familiarity with marijuana usage and associated risk in adolescence
- Name 3 clinical strategies for addressing usage
- List initial interventions for adolescents using marijuana

Current Legalization Status

- *October, 2009*: US Attorney General distributed guidelines for federal prosecution of possession and use of marijuana, ceding jurisdiction of marijuana law enforcement to state governments
- *33 states*: medical marijuana is legal
  - beginning in 1996 (California)
  - 33% since 2014
- *11 states*: recreational marijuana is legal
  - Beginning in 2012 (Colorado, Washington)
  - 82% since 2014

Biology of Cannabis

Chandra et al *European Archives of Psychiatry and Clinical Neuroscience (2019) 269:5–15*

Cannabis plants bio-synthesize at least 144 cannabinoids

- the most abundant are Δ9-tetrahydrocannabinoid (THC) and cannabidiol (CBD)
- THC can→memory impairment, anxiety, and transient psychotic-like symptoms in a dose-dependent manner
- CBD is nonintoxicating and has been found to offset several, harmful effects of THC
- Both the THC dose and the THC:CBD ratio matters

It's Not Your Dad's/Mom's Marijuana

Chandra et al (2019)

- NIDA has tested >18,000 confiscated samples from 2008→2017
  - ↑ mean THC concentration, 8.9%→17.1%
  - ↑ mean THC:CBD ratio, 23→104
  - ↑ Hash oil THC concentration, 6.7→55.7%
- Similar increases have been reported in the Netherlands, U.K., France, Italy, E.U., Norway, Turkey
- Naturalistic studies indicate that cannabis users only partially adapt their smoking behavior to variation in THC concentrations
- (Some products are >80%, NIDA provides <4% samples for research)

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Biology of the Adolescent/Emerging Adult (AEA) Brain & Marijuana

Wright et al, PLoS ONE, 2016, 11 (11)

- The primary brain cannabinoid receptor, CB1, has significantly greater binding in adolescence than in adulthood
- This binding modulates the reward system within the ventral tegmental area (VTA) of the brain, increasing release of dopamine
- Repeated CB1 binding due to exogenous cannabis (THC) exposure results in downregulation of the endogenous CB (eCB) system, particularly in limbic regions, such as the hippocampus
- The endogenous eCB system is implicated in mood symptomatology and executive functioning deficits, perhaps due to its concentration of CB1 receptors in prefrontal and limbic regions
- AEAs typically experience changes in frontal/limbic neuroanatomy and the eCB system
- Thus, marijuana use is implicated in ↑ executive dysfunction, anxiety, depressive symptoms, impulsivity, especially in AEAs
- Can lead to persistent, enduring changes in brain function

More About Developing Brains

Volkow et al, 2014, NEJM, 371: 878-79

Short-term use- associated with

- ↓ short-term memory
- ↓ motor coordination
- altered judgment (↑ risk of risky sexual behavior)

Long-term/heavy use- associated with

- altered brain development*
- ↓ educational outcome
- cognitive impairment (↓ IQ)
- ↓ life satisfaction
- ↓ achievement
- addiction
- chronic bronchitis
- chronic psychosis (in high-risk individuals)

Developmental Impact: THC Exposure

Volkow et al, 2014

Prenatal:

- interferes with cytoskeletal dynamics, which are critical for the establishment of axonal connections between neurons
- Alters developmental regulation of the mesolimbic dopamine system of affected offspring

Youth: THC can recalibrate sensitivity of the reward system to other drugs

Adults w/ regular use in adolescence: ↓ neural connectivity

- Precuneus: alertness, self-conscious awareness
- Fimbria (hippocampus): learning and memory
- Prefrontal networks: executive functioning (inhibitory control)
- Subcortical networks: process habits and routines

Adults w/ regular use:

- ↓ activity in prefrontal regions, ↓ hippocampal volume

Addiction & Withdrawal

Volkow et al, 2014

Addiction

- 9% of those who experiment
- 17% of those with adolescent onset of use
- 25-50% of daily users
- 2012: 2.7 million with dependence

Withdrawal

- Mood-irritable/dysphoric/anxious
- Sleep disturbance
- Cravings

Statistics on Adolescent Marijuana Use

Lifetime use:

- 44.4%, 12th graders
- >57.5%, young adults

First use: usually during adolescence

Peak use: 18–25

Decline in perceived risk

From 2008→2011:

- lifetime use rates ↑ by 21%
- past-year use ↑ by 31%
- 9% of 9-12 graders use daily/nearly every day, ↑ 80%
- Past year use has doubled in 18-29 year olds

What Are the Benefits?

National Academy of Science, Engineering, & Medicine, (NASEM) 2017

Substantial Evidence

- Chronic pain in adults
- Anti-emetic: chemotherapy induced nausea/vomiting (oral CBD)
- Multiple sclerosis (MS): patient-reported spasticity (oral CBD)

Moderate Evidence

- Short-term sleep for patients w/ obstructive sleep apnea, fibromyalgia, chronic pain, MS (THC+CBD-nabiximols)

What Are the Benefits? (Cont'd, NASEM)

Limited Evidence

- HIV/AIDS: ↑ appetite (cannabis, oral CBD)
- Tourette (THC capsule)
- Social Anxiety Disorder: ↓ anxiety in a public speaking test (CBD)
- PTSD: (synthetic CBD)
- TBI/intracranial hemorrhage: ↓ mortality/disability

What Are the Mental Health Risks?

NASEM, 2017

Substantial risk: develop schizophrenia or psychoses

Moderate evidence: regular use→ ↑

social anxiety disorder, suicidal ideation, attempts, completions

manic/depressive symptoms in patients w/ bipolar d/o

risk of depression

Limited evidence: near daily use→ ↑

+ symptoms in psychosis

development of bipolar and anxiety disorders

PTSD severity

What Are Other Risks?

NASEM, 2017

Cognitive

- transient deficits in short-term memory
- Impaired judgment
- ↓ motor coordination

"Driving while high"

- delayed reaction times
- ↓ hand-eye coordination
- altered time perception
- ↑ crashes

Use in pregnancy →↓ birth weight

Risk Factors for Problematic Use

NASEM, 2017

NOT A RISK	RISK
Adolescent ADHD	Depression, child anxiety
Stimulant tx for ADHD	Males and smoking cigarettes are risks for use→problematic use
Anxiety, personality, & bipolar disorder-adults	Use at a younger age→problematic use
	Male→severity of use
	In teens, ODD/CD sxs, younger alcohol use, nicotine use, parental substance use, ↓ school performance, sex abuse

Unknown Risks

Levy, JAMA Pediatrics, 2013, 167(7): 600-601

No biomarker to measure driving under the influence

No safety thresholds for second-hand smoke

No longitudinal outcome data

Tobacco use:

- Declined since 1996
- Anecdotally, many teens in treatment (*Boston Children's Adolescent Substance Abuse Program*) wish to quit, aware of health risk (unlike their attitude toward marijuana)

Marijuana: The Colorado Experiment

Monte et al, JAMA. 2015 January 20; 313(3): 241–242

Smoking marijuana→clinical effects ≤10 minutes, peak blood concentration, 30-90 minutes; clearance within 4 hours of inhalation

Oral THC→significant blood concentration ≥30 minutes, peak, ≈ 3 hours; clearance ≈ 12 hours after ingestion

Intoxication, 10-30mg THC: ingestible packages have 100mg THC (and manufacturing practices are not standardized, 0-146mg have been reported)

Symptoms of overdose: anxiety, hallucinations, panic episodes, dyspnea, chest pain, nausea, vomiting, dizziness, somnolence, central nervous system depression, respiratory depression, coma

New/increased medical issues: burns, cyclic vomiting, edible overdoses

Drug and Alcohol Use in LAMS Youth

Horwitz et al 2017, JAACAP, 56(2): 149-156.

- 685 youth from 4 Midwestern sites, most w/ “elevated symptoms of mania” ESM
- Assessed every 6 months for up to 6 years
- 68% male; 65% white, 26% Black, 9% other
- Alcohol/drug risk assessment began at age 10

Age at Baseline	Age at Follow-up	Any Alcohol	Regular Alcohol	Any Drug	Regular Drug
6-8	11-14	8.8%	0.8%	9.1%	2.8%
10-12	15-18	34.9%	11.9%	30.1%	16.2%

Drug and Alcohol Use in LAMS Youth

Horwitz et al 2017, JAACAP, 56(2): 149-156.

Predictors of drug/alcohol use in those 10-12 yrs at baseline (15-18 years at follow-up):

- *35% used alcohol ≥ 1X; predictors—parental marital status, older age, primary dx of baseline DBD, more stressful child life events (ScLEs)*
- *12% regular alcohol users; predictors-parental marital status, age, sustained ESM over 24 mos*
- *30% used drugs ≥ 1X; predictors—single parent, parental substance use, more ScLEs*
- *16% regular drug users; predictors-parental marital status, ScLEs, baseline DBD; baseline medications → ↓ risk of regular drug use*

Association between Cannabis Use, Self-Harm, and Mortality Risk among Youth with Mood Disorders *Fontanella et al, in press, JAMA:Peds*

- 204,780 OH youth (age 10-24 yrs) with mood disorders (2010-2017)
- > 10% also had Cannabis Use Disorder (CUD) dx'd 6 mos before through 1 year follow-up
- Mood+CUD: associated with:
- Older age, male, Black, bipolar/dysthymic/unspecified d/o, prior self-harm, prior MH service (inpt, ED visits)
- CUD associated w/ ↑:
- Non-fatal self-harm
- Overall mortality
- Death by unintentional overdose and homicide (suicide)

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Three Clinical Strategies

- *Evidence-based assessment*
- Screening: considerations
- Screening: available tool

- *Evidence-based approach*
- Motivational interviewing

- *Evidence-based treatment*
- Cognitive-behavioral therapy
- Family therapy

Screening for Marijuana Use

There is overlap between the risk factors for problematic substance use and the presenting problem/s for many of the youth seen in Behavioral Health.

General Guidelines

- Word choice matters
- Use gentle assumption
- Simultaneous genuineness & mistrust

Screening Tool – CRAFFT 2.0

Part 1: During the PAST 12 MONTHS, on how many days did you:

- Drink more than a few sips of beer, wine, or any drink containing alcohol? Say “0” if none.
- Use any marijuana (pot, weed, hash, or in foods) or synthetic marijuana? Say “0” if none.
- Use anything else to get high? (like other illegal drugs, prescription or over-the-counter medications, and things that you sniff or “huff”) Say “0” if none.

If the above is “0”, ask CAR questions, then stop. If “1” or greater, ask all six CRAFFT questions.

CRAFFT 2.0

Have you ever ridden in a CAR driven by someone (including yourself) who was "high" or had been using alcohol or drugs?

Do you ever use alcohol or drugs to RELAX, feel better about yourself, or fit in?

Do you ever use alcohol/drugs while you are by yourself, ALONE?

Do you ever FORGET things you did while using alcohol or drugs?

Do your family or FRIENDS ever tell you that you should cut down on your drinking or drug use?

Have you gotten into TROUBLE while you were using alcohol or drugs?

Evidence-Based Approach to Treatment

According to the National Institute on Drug Abuse, the most effective and evidence-based treatment components for substance use and addiction are Motivational Interviewing, Cognitive Behavioral Therapy, & Family Therapy

In order to:

- Understand how thoughts and feelings influence using behavior
- Be realistic about risks, choices, and consequences
- Enhance motivation for behavior change
- Engage the family in supporting their adolescent

Evidence-Based Approach: Motivational Interviewing

"MI is about arranging conversations so that people talk themselves into change, based on their own values and interests."

(*Miller & Rollnick, 2013, pg. 4*)

- Motivational Interviewing was developed for the treatment of alcohol and substance use concerns
- Focus is on personal choice

Cognitive Behavioral Therapy

"Cognitive-behavioral strategies are based on the theory that in the development of maladaptive behavioral patterns like substance abuse, learning processes play a critical role. Individuals in CBT learn to identify and correct problematic behaviors by applying a range of different skills that can be used to stop drug abuse and to address a range of other problems that often co-occur with it." (*NIDA, 2020*)

- Self-reflective
- Increases understanding of ability to make choices
- Focuses on present day issues

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Initial Interventions

- Use the spirit and skills of Motivational Interviewing (MI)
- Cognitive-Behavioral Therapy (CBT)
- Family Therapy
- Referrals as needed

Motivational Interviewing

Spirit

- Partnership - active collaboration
- Acceptance – suspend judgement, display accurate empathy
- Compassion – for the challenges that youth face
- Evocation – draw out a youth's motivations for using, as well as the hesitations and concerns they have about changing that behavior

Motivational Interviewing

Open ended questions – “What are the good things about marijuana use for you?” “What are the not-so-good things?”

Affirmations – “Thinking about and talking through the pros and cons of this shows maturity.”

Reflections – “You feel that marijuana helps your anxiety, but there’s also a lot of worry about getting caught.”

Summaries – “Though there are things you really like about vaping, it’s damaged the trust you’ve worked so hard to build with your parents and jeopardized your spot on the track team.”

Motivational Interviewing

Techniques

- Elicit & explore
- Draw out the pro and cons of using/ not using
- Consistently attend to change talk
- Develop discrepancy

Cognitive Behavioral Therapy (CBT)

- Psychoeducation
- Functional Analysis
- Standard Interventions
- Substance Use Specific Interventions

Psychoeducation

- Convey information about substances, use, and risks in an age-appropriate manner.

- Psychoeducation may be given in family sessions or to youth and caregiver separately.

- If and when information is given, ask permission to do so.

  "I attended a training a couple weeks ago on some research about marijuana. Can I tell you about it?"

Psychoeducation

Assist youth to apply this information to their own life and situation.

"Marijuana has negative effects on memory, which could make it harder to study and bring up your grades."

"During your first session, your mom talked about a family member who has schizophrenia. Using marijuana increases your own risk for developing psychosis."

Provide references & educate about information sources.

Functional Analysis

Goal: to identify factors which cause or maintain substance use behavior

The 5 W's of a youth's substance use

- When?
- Where?
- Why?
- With/ from whom?
- What happened?

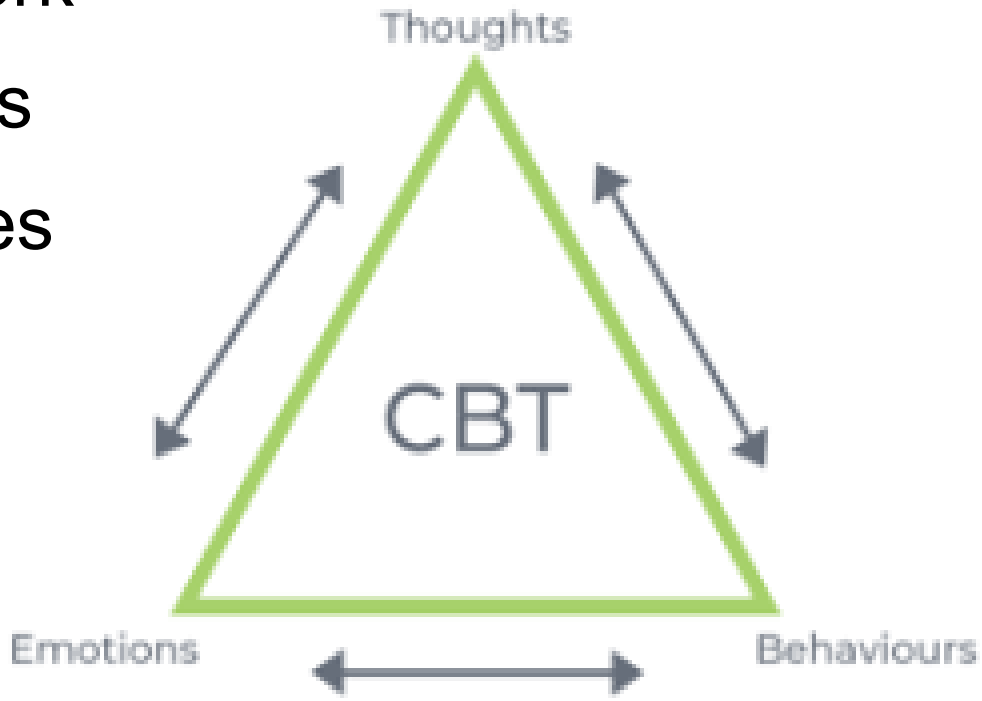
Standard CBT Interventions

Identifying, labeling, & managing emotions

Cognitive triangle work

Problem solving skills

Relaxation techniques



Specific Substance Use CBT Interventions

Activity substitution

Identify situations which are high risk for using

Develop plans for coping with high risk situations

Skill rehearsal

Family Therapy

Family involvement is a particularly important component of treatment for youth with substance use concerns.

Session topics may include:

- Improving communication skills and patterns
- Clarifying expectations and consequences
- Providing education about substances, substance use disorders, and related risks
- Supportive changes to the environment

Referring to a Specialized Program

When?

- Substance use concerns have become a primary focus of treatment
- Mental health and substance use symptoms are interacting/ exacerbating one another
- Inability to make progress at the current level of care
- Risk and safety concerns

Treatment for Healthy Alternatives

Substance Abuse Treatment Programming at Nationwide Children's Hospital

Outpatient treatment

- Focus is to reduce substance use and the symptoms of any related mental health disorders.
- Weekly or biweekly sessions at the Close to Home Center at 399 E. Main St.

Integrated Co-occurring Treatment (ICT) Program

- Intensive Home Based Treatment model
- Sessions take place in the family's home, school, or community and occur 2 to 4 times a week for 4 to 6 months.
- Must live in Franklin County and have both a substance use & a mental health disorder.

Questions?

Thank you for your attention!

Contact info:

mary.fristad@nationwidechildrens.org

614-722-6872

natalie.powell@nationwidechildrens.org

614-355-8532

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CE POSTING

Series Name:
- 2020 Child and Adolescent Psychiatry and Behavioral Health Grand Rounds

Date & Time:
- September 9, 2020 - 12:00 PM

Presentation Title:
- 2020 Child and Adolescent Psychiatry and Behavioral Health Grand Rounds

Speakers & Planners Information:

Name of individual	Individual's role in activity	Name of commercial interest/Nature of relationship
Anna Kerlek, MD	Course Director	Nothing to disclose
David Axelson,	Other Planning Committee Member	Royalty-Wolters Kluwer
Allison Depoy, LISW-S	Other Planning Committee Member	Nothing to disclose
Sherry Fletcher, None	Other Planning Committee Member	Nothing to disclose
Mary Fristad, PhD	Other Planning Committee Member, Faculty	Royalty-American Psychiatric Publishing|Royalty-Child & Family Psychological Services|Royalty-Guilford Press|Contracted Research-Janssen
Haley Johnson, None	Other Planning Committee Member	Nothing to disclose
Gina Mcdowell, LPCC-S	Other Planning Committee Member	Nothing to disclose
Nancy Noyes, APRN	Other Planning Committee Member	Nothing to disclose
Susan Orme,	Other Planning Committee Member	Nothing to disclose
Jennifer Reese, PsyD	Other Planning Committee Member	Nothing to disclose
Natalie Powell, LPCC-S	Faculty	Nothing to disclose

Series (Session) Objectives:

1 Recognize changes in potency and availability of marijuana in 2020.
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3 Name three clinical strategies for addressing usage.

CE POSTING

In support of improving patient care, Nationwide Children's Hospital is jointly accredited by the American Nurses Credentialing Center (ANCC), the Accreditation Council for Pharmacy Education (ACPE), and the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for the healthcare team. (1.0 ANCC contact hours; 1.0 ACPE hours; 1.0 CME hours)

Nationwide Children's Hospital has been authorized by the American Academy of PAs (AAPA) to award AAPA Category 1 CME credit for activities planned in accordance with AAPA CME Criteria. This activity is designated for 1.0 AAPA Category 1 CME credits. Approval is valid for 2 years from the date of the activity. PAs should only claim credit commensurate with the extent of their participation.

As a Jointly Accredited Organization, Nationwide Children's Hospital is approved to offer social work continuing education by the Association of Social Work Boards (ASWB) Approved Continuing Education (ACE) program. Organizations, not individual courses, are approved under this program. State and provincial regulatory boards have the final authority to determine whether an individual course may be accepted for continuing education credit. Nationwide Children's Hospital maintains responsibility for this course. Social workers completing this course receive 1.0 continuing education credits.

Continuing Education (CE) credits for psychologists are provided through the co-sponsorship of the American Psychological Association (APA) Office of Continuing Education in Psychology (CEP). The APA CEP Office maintains responsibly for the content of the programs.

Disclosure of Relevant Financial Relationships and Unapproved Uses of Products

It is policy at Nationwide Children's Hospital Office of Continuing Medical and Interprofessional Education for individuals who are in a position to control the content of an educational activity to disclose to the learners all relevant financial relationships that they have with any commercial interest that provide products or services that may be relevant to the content of this continuing education activity. For this purpose, we consider relationships of the person involved to include financial relationships of a spouse or partner.

The intent of this policy is to ensure that Nationwide Children's Hospital CME/CE certified activities promote quality and safety, are effective in improving medical practice, are based on valid content, and are independent of control from commercial interests and free of commercial bias. Peer review of all content was conducted for all faculty presentations whose disclosure information was found to contain relationships that created a conflict of interest relevant to the topic of their presentation. In addition, all faculty were instructed to provide balanced, scientifically rigorous and evidence-based presentations.

IPCE Program DOCUMENT Vers. 1; 4.3.2020