TTC Technology Transfer Centers

Funded by Substance Abuse and Mental Health Services Administration

Psychotropic Medications and Interactions with Commonly Used Drugs

Presented by: Hayden D. Center, Jr, Ph.D., LPC

SAMHSA Substance Abuse and Mental Health Services Administration

BHDDH Department of Behavioral Healthcare Developmental Disabilities & Hospitals

The use of affirming language inspires hope.

LANGUAGE MATTERS.

Words have power.

PEOPLE FIRST.

The PTTC Network uses affirming language to promote the application of evidence-based and culturally informed practices.

Purpose

The purpose of the Technology Transfer Centers (TTC) program is to ***develop and strengthen*** the ***specialized behavioral healthcare and primary healthcare workforce*** that provides substance use disorder (SUD) and mental health prevention, treatment, and recovery support services.

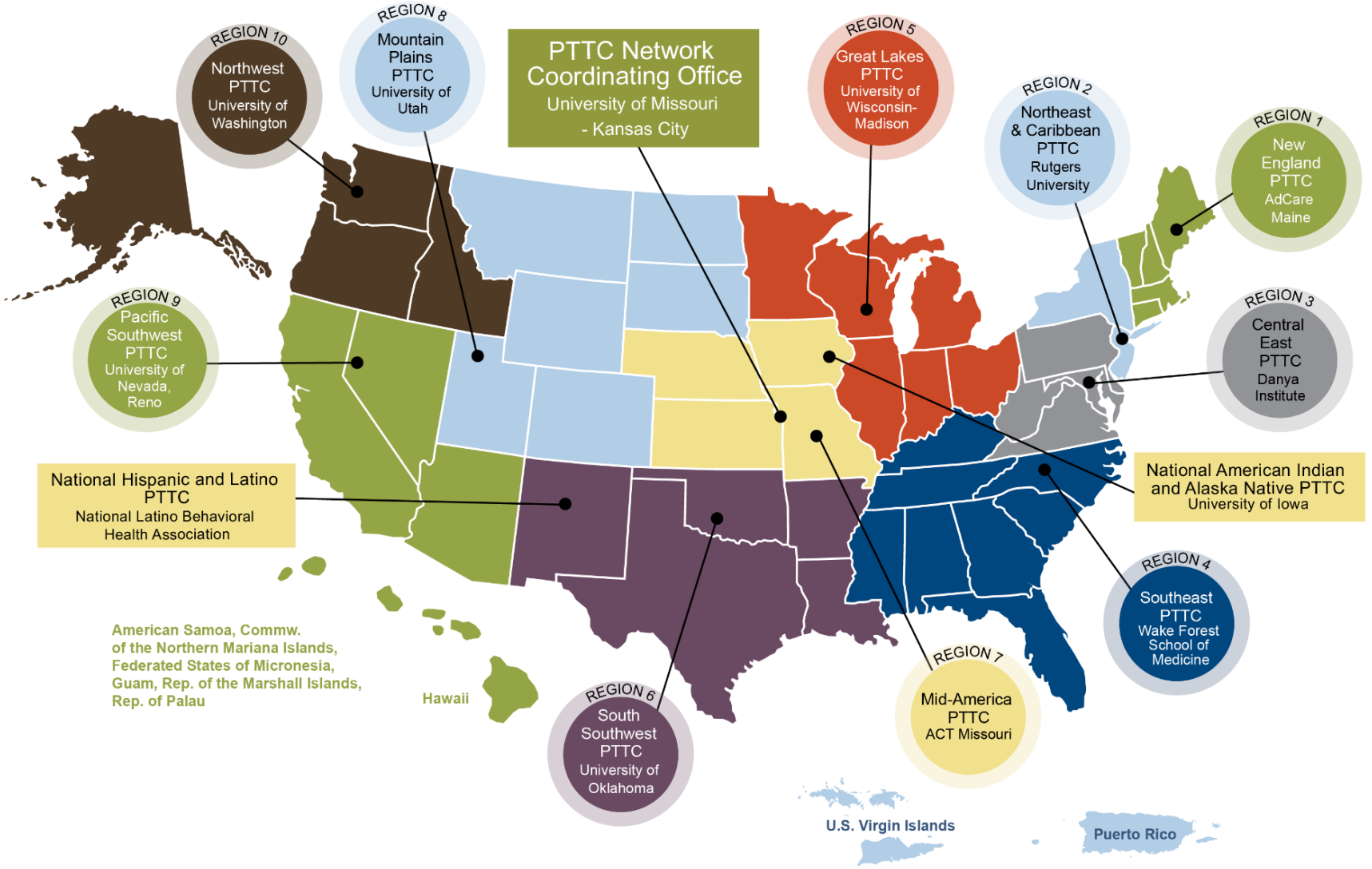
Help people and organizations incorporate ***effective practices*** into substance use and mental health disorder prevention, treatment and recovery services.

PTTC

Prevention Technology Transfer Center Network

Funded by Substance Abuse and Mental Health Services Administration

PTTC Network



Cannabis Risk Workgroup

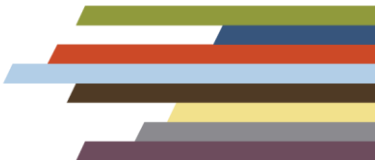
- **Develop** training and technical assistance tools, products, and services on cannabis risk education and prevention
- **Disseminate** these across the PTTC network
- **Increase the capacity** of prevention coalitions and collaborators
- **Reduce cannabis** misuse

Course Instructor

- Dr. Hayden Center is a licensed professional counselor and consultant in the area of substance abuse prevention and treatment. He has worked as a consultant in alcohol, tobacco and other drug abuse prevention since 1987. He also has taught in several academic settings including teaching psychopharmacology to graduate students.

Agenda/Roadmap

1) Learn about the most frequently prescribed psychotropic medications used with older children and adolescents.
2) Become aware of the importance of understanding the pharmacokinetics of how medications affect neurobiology.
3) Gain an understanding of the interaction effects of certain psychotropic medications and substances used and misused among older children and adolescents.



Poll

- What class of psychotropic medications are the most used for treating child and adolescent mental health disorders
  - Antidepressants
  - Anxiolytics
  - Antipsychotics
  - Stimulants
  - Mood stabilizers

Psychotropic Medications - Adolescents

- During a 1-year period, 7.0% of adolescents used at least one psychotropic medication
- these medications were most commonly antidepressants (3.9%),
- followed by stimulants (2.8%),
- anxiolytics (0.8%),
- antipsychotics (0.5%),
- and mood stabilizers (0.4%).

Mood Stabilizers

- **Mood Stabilizers and Anticonvulsant Medications:** These medications may be helpful in treating bipolar disorder, severe mood symptoms and mood swings (manic and depressive), aggressive behavior, and impulse control disorders. Examples include Lithium (lithium carbonate, Eskalith, Lithobid), Valproic Acid (Depakote, Depakene), Carbamazepine (Tegretol), Lamotrigine (Lamictall), and Oxcarbazepine (Trileptal).

ADHD Medications

- **ADHD Medications:** Stimulant and non-stimulant medications may be helpful as part of the treatment for attention-deficit/hyperactive disorder (ADHD). They come in several different forms, such as pills, patches, and liquid forms. Examples of stimulants include Dextroamphetamine (Dexedrine, Adderall, Vyvanse, Procentra), Methylphenidate (Concerta, Daytrana, Metadate, Ritalin), and Dexmethylphenidate (Focalin). Non-stimulant medications include Atomoxetine (Strattera), Guanfacine (Tenex, Intuniv), and Clonidine (Kapvay).

Antidepressants

- **Antidepressant Medications:** Antidepressant medications may be helpful in the treatment of depression, school phobias, panic attacks and other anxiety disorders, bedwetting, eating disorders, obsessive-compulsive disorder, posttraumatic stress disorder, and attention-deficit/hyperactive disorder. There are several types of antidepressant medications. Examples of **selective serotonin reuptake inhibitors** (SSRIs) include: Fluoxetine (Prozac), Sertraline (Zoloft), Paroxetine (Paxil), Fluvoxamine (Luvox), Citalopram (Celexa), and Escitalopram (Lexapro).

Antidepressants

- Examples of **serotonin norepinephrine reuptake inhibitors** (SNRIs) include Venlafaxine (Effexor), Desvenlafaxine (Pristiq), and Duloxetine (Cymbalta). Examples of atypical antidepressants include Bupropion (Wellbutrin), Nefazodone (Serzone), Trazodone (Desyrel), and Mirtazapine (Remeron). Examples of **tricyclic antidepressants** (TCAs) include Amitriptyline (Elavil), Clomipramine (Anafranil), Imipramine (Tofranil), and Nortriptyline (Pamelor). Examples of **monoamine oxidase inhibitors** (MAOIs) include Phenelzine (Nardil) and Tranylcypromine (Parnate)

Antianxiety Agents

- **Anti-Anxiety Medications:** Selective serotonin reuptake inhibitors (SSRIs) are used to treat anxiety in children and adolescents and are described above in the Antidepressant section. There are also other medications used to treat anxiety in adults. These medications are rarely used in children and adolescents but may be helpful for brief treatment of severe anxiety

Antianxiety Agents

- These include benzodiazepines, antihistamines, and atypical antipsychotics. Examples of benzodiazepines include Alprazolam (Xanax), lorazepam (Ativan), Diazepam (Valium), and Clonazepam (Klonopin). Examples of antihistamines include Diphenhydramine (Benadryl) and Hydroxyzine (Vistaril). Examples of atypical anti-anxiety medications include Buspirone (BuSpar) and Zolpidem (Ambien).

Antipsychotic Medications

- **Antipsychotic Medications:** These medications can be helpful in controlling psychotic symptoms (delusions, hallucinations) or disorganized thinking. They are also used to treat irritability in autism. These medications may also help muscle twitches ("tics") or verbal outbursts as seen in Tourette's disorder. They are occasionally used to treat severe anxiety and may help in reducing very aggressive behavior

Antipsychotics

- Examples of **first generation antipsychotic medications** include Chlorpromazine (Thorazine), Thioridazine (Mellaril), Fluphenazine (Prolixin), Trifluoperazine (Stelazine), Thiothixene (Navane), and Haloperidol (Haldol). **Second generation antipsychotic medications** (also known as atypical or novel) include Aripiprazole (Abilify), Clozapine (Clozaril), Risperidone (Risperdal), Olanzapine (Zyprexa), Paliperidone (Invega), Quetiapine (Seroquel), Ziprasidone (Geodon), Iloperidone (Fanapt), Lurasidone (Latuda), and Asenapine (Saphris).

Pharmacokinetics

Pharmacokinetics is a term that encompasses :

- how we take in a substances,
- where the substance is stored in our bodies,
- how we metabolize or break down the substance; and,
- how we get rid of the substance.

Chat

- What happens when an adolescent is taking a psychotropic medication and misuses other substances?

Types of marijuana products

Edibles:

- Foods: Brownies, Gummies, Lollipops
- Tinctures: Drops
- Beverages: Canned Hemp Drinks

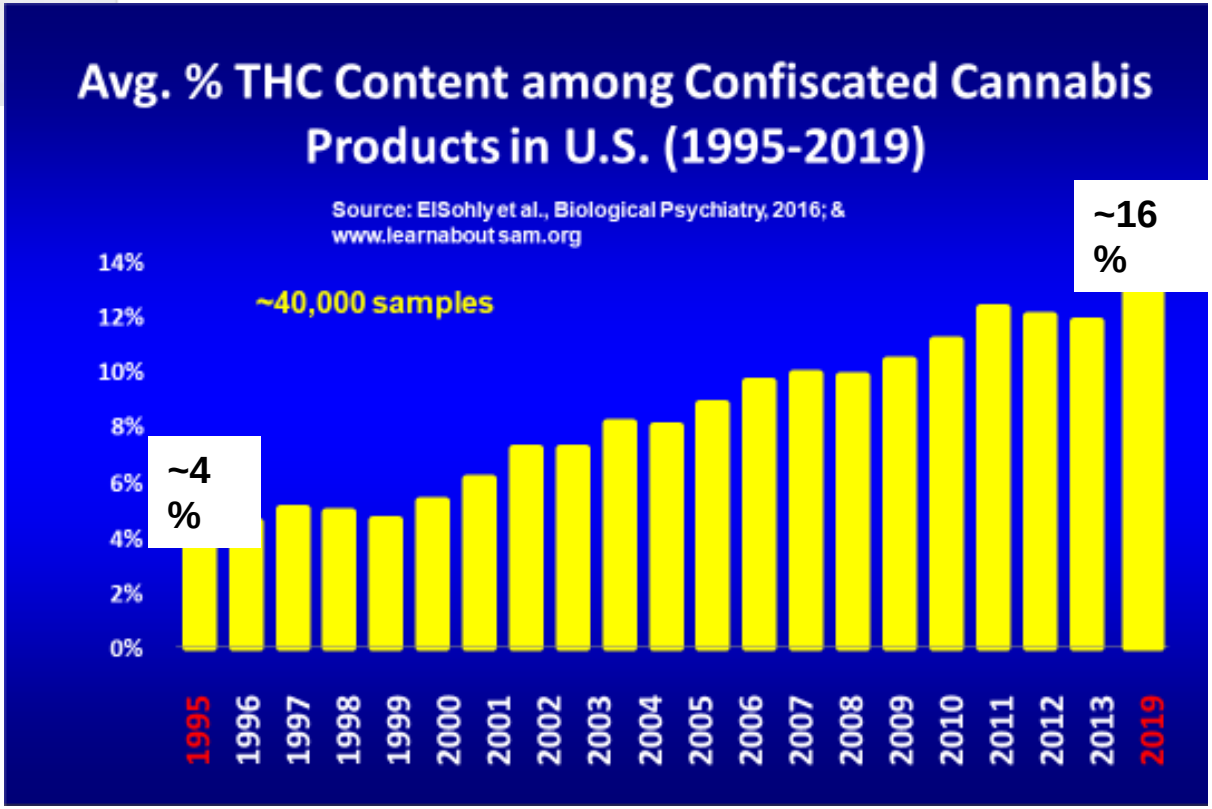
Trans-Mucosal:

- Sublingual: Cheeking it
- Intranasal: Nose Spray
- Ophthalmic: Eye drops

Transdermal Patches

Rectal Suppositories

Intravenous


Avg. % THC Content among Confiscated Cannabis Products in U.S. (1995-2019)
Source: ElSohly et al., Biological Psychiatry, 2016; & www.learnaboutsam.org
~40,000 samples
~4 %
~16 %
14%
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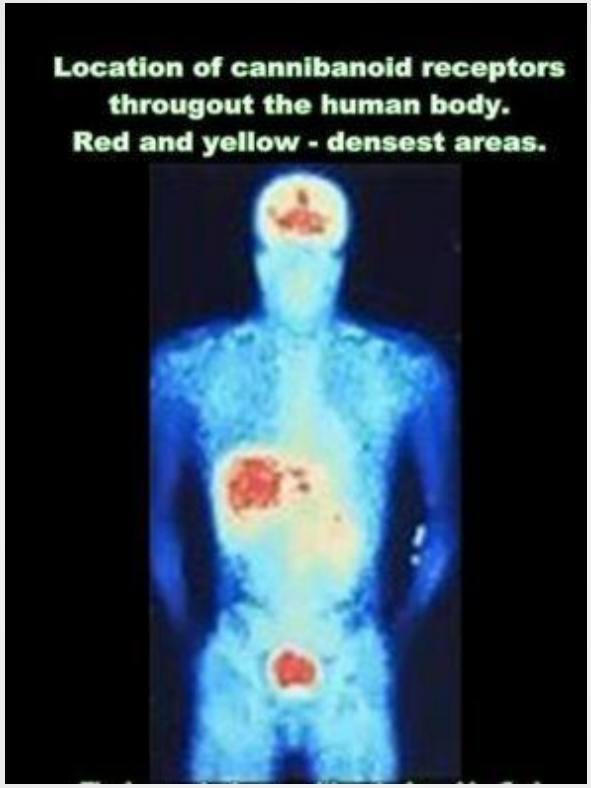
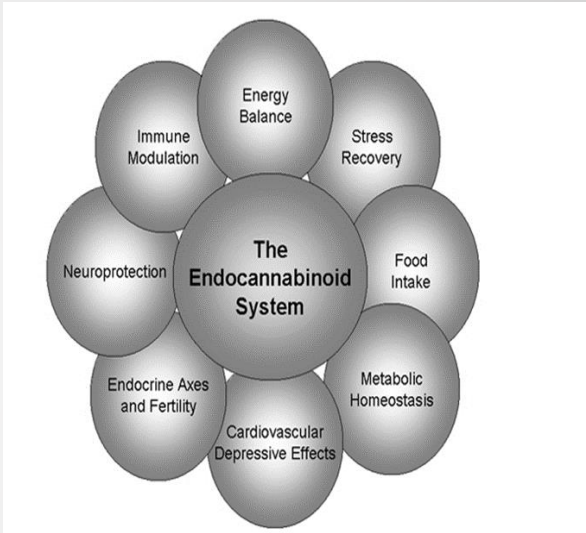
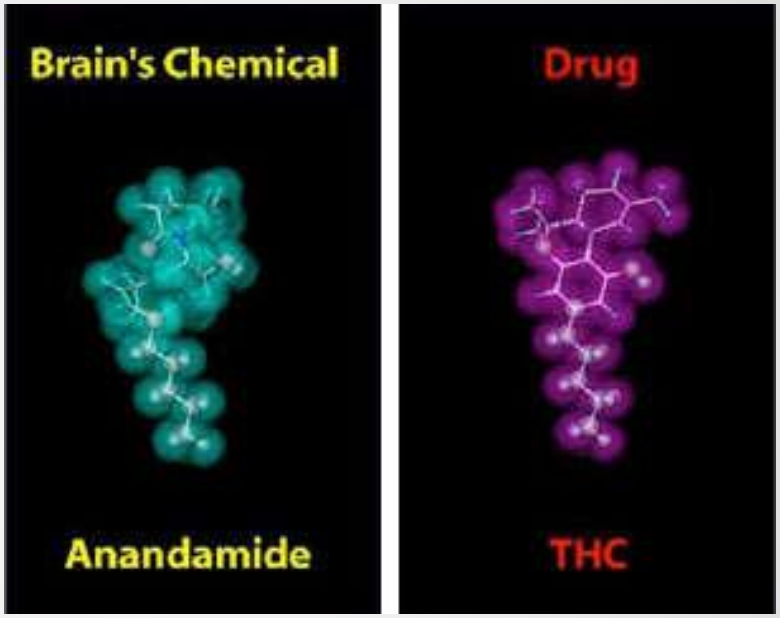
Made in the Brain:
Endogenous
Endocannabinoids



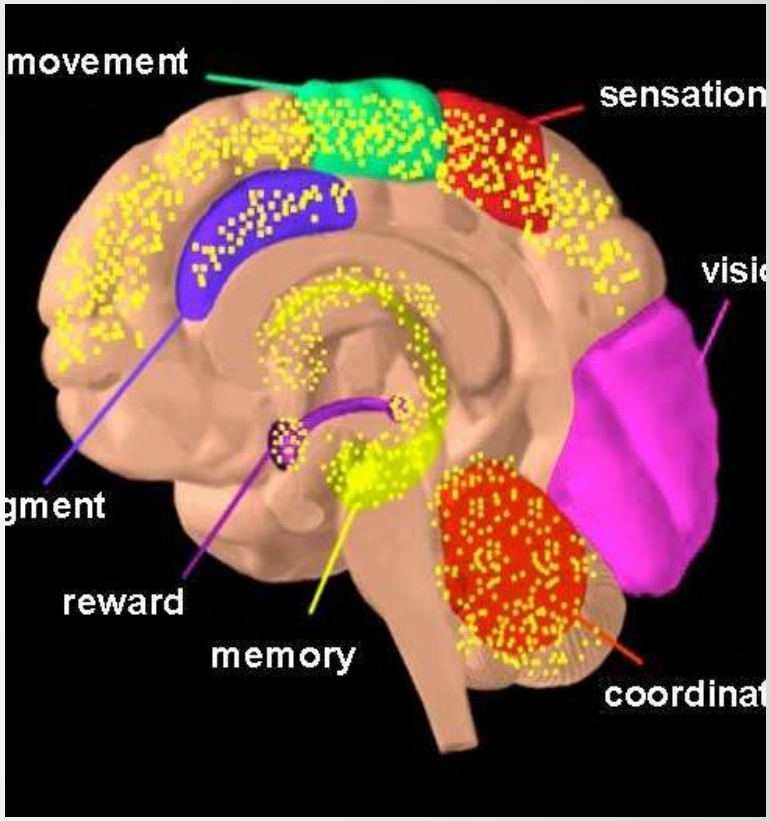


Endocannabinoids and THC



Brain Cannabinoid Receptor Sites

- Nucleus Accumbens
- Hippocampus
- Amygdala
- Hypothalamus
- Medulla
- Cerebellum



Chat

- What are some of the dangers of mixing cannabis with psychotropic medications?

Cannabis and Antidepressants

- **SSRIs and Marijuana: Cannabidiol, or CBD, in marijuana can increase the levels of SSRIs in your bloodstream because CBD blocks your body from clearing the antidepressant as quickly as normal. Having increased levels of serotonin in your body from SSRI use can cause a potentially fatal condition called serotonin syndrome.**
- **Tricyclic antidepressants and CBD: The CBD in marijuana can increase the level of TCAs in your body. This can cause increased side effects like high blood pressure, dry mouth and constipation.**
- **SNRIs and THC: The THC in marijuana can decrease the level of the SNRI Cymbalta in your body. This can lead to the Cymbalta being less effective**

Cannabis and Interactions with Medications

- THC and CBD — chemicals found in marijuana and cannabis products, such as gummies and other edibles — can interact with prescription medications and lead to serious side effects.
- These side effects can include bleeding complications, increased drowsiness, reduced heart rate and breathing rate, extreme confusion and memory loss, poor judgement, and aggression. THC, the psychoactive ingredient in cannabis, interacts with nearly 400 prescription medications, and CBD (cannabidiol) interacts with more than 540.

Cannabis and Antianxiety Agents

- **Marijuana is known to intensify the central nervous system depressant effects of benzodiazepines like Xanax. Cannabidiol, or CBD, can increase the level of benzodiazepines in your body because it makes it harder for your body to break them down.**
- **This increases the amount of Xanax in your bloodstream. In turn, the side effects of Xanax may be heightened. For example, you may experience severe drowsiness or memory issues. In extreme cases, the risk of a Xanax overdose is possible.**

Cannabis and Antipsychotics

- Studies have shown that medical marijuana may have the ability to speed up **metabolic processes**. With this, when you consume an antipsychotic, a sped-up metabolism may cause the medication to break down quicker. This breakdown may cause the drug's effects to be less potent and less long-lasting than usual. For those with severe mental illness, this can be detrimental to daily functioning.

Poll

- Alcohol increases the effectiveness of antidepressants
  - Agree
  - Disagree
  - Alcohol has no effect on antidepressants

Alcohol and Antidepressants

- **Increased Depression Symptoms**
- Although alcohol may appear to provide depression symptoms, it can eventually worsen addition, alcohol may cause the SSRI to be less interfere with treatment goals.

Alcohol and Antidepressants

- **Potential interactions between alcohol and SSRIs include:**
- worsened symptoms of anxiety or depression
- increased risk of negative side effects from other drugs taken
- slowed motor skills or cognitive abilities
- sudden personality changes or memory loss

Alcohol and Antianxiety Agents

- Alcohol and benzodiazepines have a synergistic depressant effect on the central nervous system. Perhaps more worrisome is the fact that memory impairment is far more likely when these substances are combined.

Alcohol and Antidepressants

- Symptoms of depression may include feeling hopeless and losing interest in activities. People with severe depression may experience thoughts or actions related to self-harm and suicide.
- Alcohol can lower inhibitions and increase impulse behavior, which may increase the risk of self-harm or suicidal actions. In fact, more than half of all people who commit suicide are found with alcohol in their system.

Alcohol and Antidepressants

- **Serotonin Syndrome**
- Both alcohol and SSRIs can increase serotonin levels in the brain. When too much serotonin accumulates, it can cause a dangerous condition known as serotonin syndrome.

Caffeine and Antidepressants

- Too much caffeine can cause irregular heartbeat and an increase in blood pressure if you're taking **MAOI** medications. Caffeine can also increase anxiety and restlessness in people taking **SSRIs** and decrease the effectiveness of **tricyclic antidepressants (TCAs)."**

Caffeine and ADHD Medications

- Combining stimulants like Concerta and caffeine can have an additive effect, increasing your risk for side effects like high blood pressure or an irregular heartbeat, according to UC Davis. It may also intensify side effects like a racing heart, jitteriness or difficulty sleeping.

Nicotine and Psychotropic Medications

- Psychiatric medications such as antipsychotics, antidepressants, hypnotics, and anxiolytics are widely affected by cigarette smoking. For these classes, the drug concentration in the blood can be decreased with smoking, and reduction in efficacy may lead to inappropriate higher dosage adjustments.

Alcohol Interactions with Cannabis

- *Enhanced effects of THC*:
- Alcohol causes drugs to remain in a person's system longer than it normally would.

Alcohol Interactions with Cannabis

- This is because alcohol is metabolized first by the liver. The liver assigns priority to metabolizing alcohol despite any other substances being taken at the same time. The liver can metabolize about one ounce of pure alcohol per hour. This means that until the levels of alcohol in the system have been metabolized, other substances remain relatively unchanged.

Alcohol Interactions with Cannabis

- The THC in a person's system remains in their system, and the effects continue to accrue until it can be metabolized properly.

Alcohol Interaction with Cannabis

- There is an increased potential to overdose. Overdose on THC can be harmful in younger people. The overdose effects associated with alcohol are far more dangerous. Combining cannabis products and alcohol can result in an increased potential for developing alcohol poisoning. An overdose on alcohol is very serious and can obviously be fatal.

Caffeine Interaction with Cannabis

- These researchers propose that the interaction between cannabis and caffeine may occur in the hippocampus, where receptors for both the adenosine and cannabinoid systems are located. These receptors regulate cognition and memory.

Caffeine Interaction with Cannabis

- Caffeine may promote cognitive impairment caused by THC found in cannabis. This mechanism may explain the risks of combining cannabis and caffeine. However, further studies are required to confirm these negative effects.

Nicotine Interaction with Cannabis

- "…we found that marijuana use individually and combined with tobacco had smaller hippocampal volumes compared to tobacco users and non-using controls."

Nicotine Interaction with Cannabis

- Marijuana use was associated with greater reported nicotine addiction among adolescent smokers. The findings suggest a role of marijuana in potentiating nicotine addiction and underscore the need for treatments that address both smoked substances

Nicotine Interaction with Cannabis

- Possible mechanisms of action include common routes of administration (e.g., smoking being the most common route for both); hence, one behavior may reinforce the other. Furthermore, both nicotine and cannabis affect similar pathways within the mesolimbic addiction pathways, suggesting similar and overlapping mechanisms for addiction

Nicotine Interaction with Cannabis

- Notably, among adolescent tobacco smokers who also smoked marijuana, the frequency of marijuana use was associated with greater levels of nicotine addiction

Alcohol Interaction with Cannabis

- *Decreased judgment*:
- Both alcohol and cannabis products can reduce one's ability to think rationally. Because these drugs have synergistic effects, combining them can result in an increased potential to act impulsivity, have poor judgment, or engage in behaviors that can lead to accidents and serious consequences.

Alcohol Interaction with Cannabis

- *Potential issues with elimination*:
- Cannabis products are known to be antiemetic, indicating that cannabis use makes it more difficult for an individual to vomit. This could potentially lead to serious effects when combined with alcohol that could increase the potential for overdose and/or alcohol poisoning due to a disruption in an individual's ability to rid excess alcohol from their system via vomiting.

Alcohol Interaction with Cannabis

- *Intensified side effects*:
- Cannabis side effects can be numerous, including anxiety, hallucinations, and other issues mentioned above. Combining alcohol with cannabis products can result in increased potential for deleterious effects associated with cannabis, including a potential increase in allergic reactions

Caffeine Interaction with Cannabis

- Researchers have little experience studying the combined effects of cannabis and caffeine together. Researchers suggest mixing these substances may have significant effects due to the interaction of the adenosine and cannabinoid systems, where caffeine and cannabis act in the body.

Common Questions & Challenges

What are some common challenges you are facing?

References

Ait-Daoud Tiouririne, N. (n.d.). *A review on medical marijuana* [PowerPoint slides]. Virginia Summer Institute for Addiction Studies, Williamsburg, VA. Retrieved from http://www.vsias.org/wp-content/uploads/2015/07/VSIAS_July-14-2015_AitDaoud_Review-of-Medical-Marijuana.pptx

Al-Zouabi, I., Stogner, J., Miller, B., and Lane, E. (2018). Butane hash oil and dabbing: insights into use, amateur production techniques, and potential harm mitigation *Substance Abuse and Rehabilitation*. 9: 91–101. Retrieved from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6220730/pdf/sar-9-091.pdf

Centers for Disease Control (2019). CDC Health Advisory. *Severe Pulmonary Disease Associated with Using E-Cigarette Products.* 68(36); 787–790. Retrieved from: https://www.cdc.gov/mmwr/volumes/68/wr/mm6836e2.htm

Chandra S, et al (2019) New trends in cannabis potency in USA and Europe during the last decade (2008-2017) Eur Arch Psychiatry Clin Neurosci. 2019 Feb;269(1):5-15. doi: 10.1007/s00406-019-00983-5. Epub 2019 Jan 22.

Colorado marijuana study finds legal weed contains potent THC levels. (2015, March 23). *NBC News*. Retrieved from http://www.nbcnews.com/storyline/legal-pot/legal-weed-surprisingly-strong-dirty-tests-find-n327811

Drug Enforcement Administration (DEA) (2019). *Get the Facts About Drugs; Just Think Twice – The Facts About Marijuana Concentrates* Retrieved from: https://www.justthinktwice.gov/facts-about-marijuana-concentrates

Drug Enforcement Administration (DEA) (2019) Get Smart About Drugs *What You Should Know About Marijuana Concentrates/ Honey Butane Oil* Retrieved from: https://www.getsmartaboutdrugs.gov/content/what-you-should-know-about-marijuana-concentrates-honey-butane-oil

References

Englund, A., Stone, J. M., & Morrison, P. D. (2012). Cannabis in the arm: What can we learn from intravenous cannabinoid studies? *Current Pharmaceutical Design*, 18(32), 4906-4914.

Francis, M. (2016). The different methods of cannabis ingestion. *Crescolabs.* Retrieved from http://www.crescolabs.com/cannabis-ingestion-methods/

Galli J., Sawaya R., Friedenberg F. (2011). Cannabinoid Hyperemesis Syndrome. *Current Drug Abuse Reviews*. 4(4):241-249. Retrieved from: https://doi.org/10.2174/1874473711104040241

Gaston, T. E., & Friedman, D. (2017). Pharmacology of cannabinoids in the treatment of epilepsy. *Epilepsy & Behavior, 70,* 313-318

Huestis, M. S. (2007). Human cannabinoid pharmacokinetics. *Chemistry & Biodiversity, 4*(8), 1770-1804. doi: 10.1002/cbdv.200790152

Inaba, D. S., & Cohen, W. E. (2014*). Uppers, downers, all arounders: Physical and mental effects of psychoactive drugs* (8th ed., pp. 6.28-6.29). Medford, OR: CNS Productions, Inc

Kintz, P., Cirimele, V., & Ludes, B. (2000). Detection of cannabis in oral fluid (saliva) and forehead wipes (sweat) from impaired drivers. *Journal of Analytical Toxicology, 24, 557-561.*

References

Koob, G. F. & Le Moal, M. (2006). *Neurobiology of addiction*. Boston, MA: Elsevier Inc

Lowe, R. H., Abraham, T. T., Darwin, W. D., Herning, R., Lud Cadet, J., & Huestis, M. A. (2009). Extended urinary Δ9-Tetrahydrocannabinol excretion in chronic cannabis users precludes use as a biomarker of new drug exposure. *Drug & Alcohol Dependence, 105*(1-2), 24-32. doi: 10.1016/j.drugalcdep.2009.05.027

Mehmedic Z., Chandra, S., Slade, Desmond, Denham, H., Foster, S., Patel, A., Ross, S., Khan, I., and ElSohly, M. (2010). *Potency Trends of r9-THC and Other Cannabinoids in Confiscated Cannabis Preparations from 1993 to 2008.* Journal of Forensic Science, 55(5):1209-17. Retrieve from: https://doi:10.1111/j.1556-4029.2010.01441.x

Mittleman M., Lewis R., Maclure M., Sherwood, J. and Muller, J. (2001) Triggering myocardial infarction by marijuana. *Circulation,* 103(23) 2805–2809. Retrieved from: https://www.ahajournals.org/doi/10.1161/01.CIR.103.23.2805

Musshoff, F., & Madea, B. (2006). Review of biologic matrices (urine, blood, hair) as indicators of recent or ongoing cannabis use. *Therapeutic Drug Monitoring, 28*(2)*,* 155-163.

National Academies of Sciences, Engineering, and Medicine. 2017. *The Health Effects of Cannabis and Cannabinoids: The Current State of Evidence and Recommendations for Research*. Washington, DC: The National Academies Press. https://doi.org/10.17226/24625.

National Institute on Drug Abuse (NIH) (2019) *What is Marijuana? A Rise in Marijuana's THC Levels.* Retrieved from: https://www.drugabuse.gov/publications/drugfacts/marijuana

References

Ortega-Welch, M. (2018). Are There Risks From Secondhand Marijuana Smoke? Early Science Says Yes. *Houston Public Media: A Service of the University of Houston.* Retrieved from: https://www.houstonpublicmedia.org/articles/news/2018/03/19/273923/are-there-risks-from-secondhand-marijuana-smoke-early-science-says-yes/

Priyamvada Sharma, Pratima Murthy, M.M. Srinivas Bharath (2012). *Chemistry, Metabolism, and Toxicology of Cannabis: Clinical Implications.* Iranian Journal of Psychiatry. 2012 Fall; 7(4): 149–156. Retrieved from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3570572/

Richtel, M., and Kaplan, S. (2018). Did Juul Lure Teenagers and Get 'Customers for Life'? The E-Cigarette Company Says It Never Sought Teenage Users, But the F.D.A. is Investigating Whether Juul Intentionally Marketed Its Devices to Youth. *The New York Times.* August 27. Retrieved from: https://www.nytimes.com/2018/08/27/science/juul-vaping-teen-marketing.html

Rosenthal, E., and Downs, D. (2014). *Beyond Buds: Marijuana Extracts – Hash, Vaping, Dabbing, Edibles and Medicine.* Piedmont, CA: Quick American.

Schachter, S. (2016). Mary's medicinals review: Transdermal patch, CBD capsules & more. Retrieved from http://blog.getnugg.com/marys-medicinals-review-transdermal-patch/

Sorenson, C. J., DeSanto, K., Borgelt, L., Phillips, K. T., & Monte, A. A. (2017). Cannabinoid hyperemesis syndrome: Diagnosis, pathophysiology, and treatment – A systematic review. *Journal of Medical Toxicology, 13,* 71-87

Tomar, R., Beaumount, J., Hsieh, J.,(2009). *Evidence on the Carcinogenicity of Marijuana Smoke*. California Environmental Protection Agency. Retrieved from: https://oehha.ca.gov/media/downloads/proposition-65/chemicals/finalmjsmokehid.pdf

U.S. Surgeon General. (2018). U.S. Surgeon General's Advisory on E-cigarette Use Among Youth. https://e-cigarettes.surgeongeneral.gov/documents/surgeon-generals-advisory-on-e-cigarette-use-among-youth-2018.pdf

Wang, G., Le Lait, M., Deakyne, S., Bronstein, A., Bajaj, L., and Roosevelt, G. (2016). Unintentional Pediatric Exposures to Marijuana in Colorado, 2009-2015. JAMA Pediatrics Journal. 170 (9):e160971. Retrieved from: https://doi:10.1001/jamapediatrics.2016.0971

Zhang, H. Y., et al. (2014). Cannabinoid CB2 receptors modulate midbrain dopamine neuronal activity and dopamine-related behavior in mice. *Proceeding of the National Academy of Sciences, 111*(46), E5007-15. doi: 10.1073/pnas.1413210111.Epub 2014 Nov 3.

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