STIMULANTS & MARIJUANA

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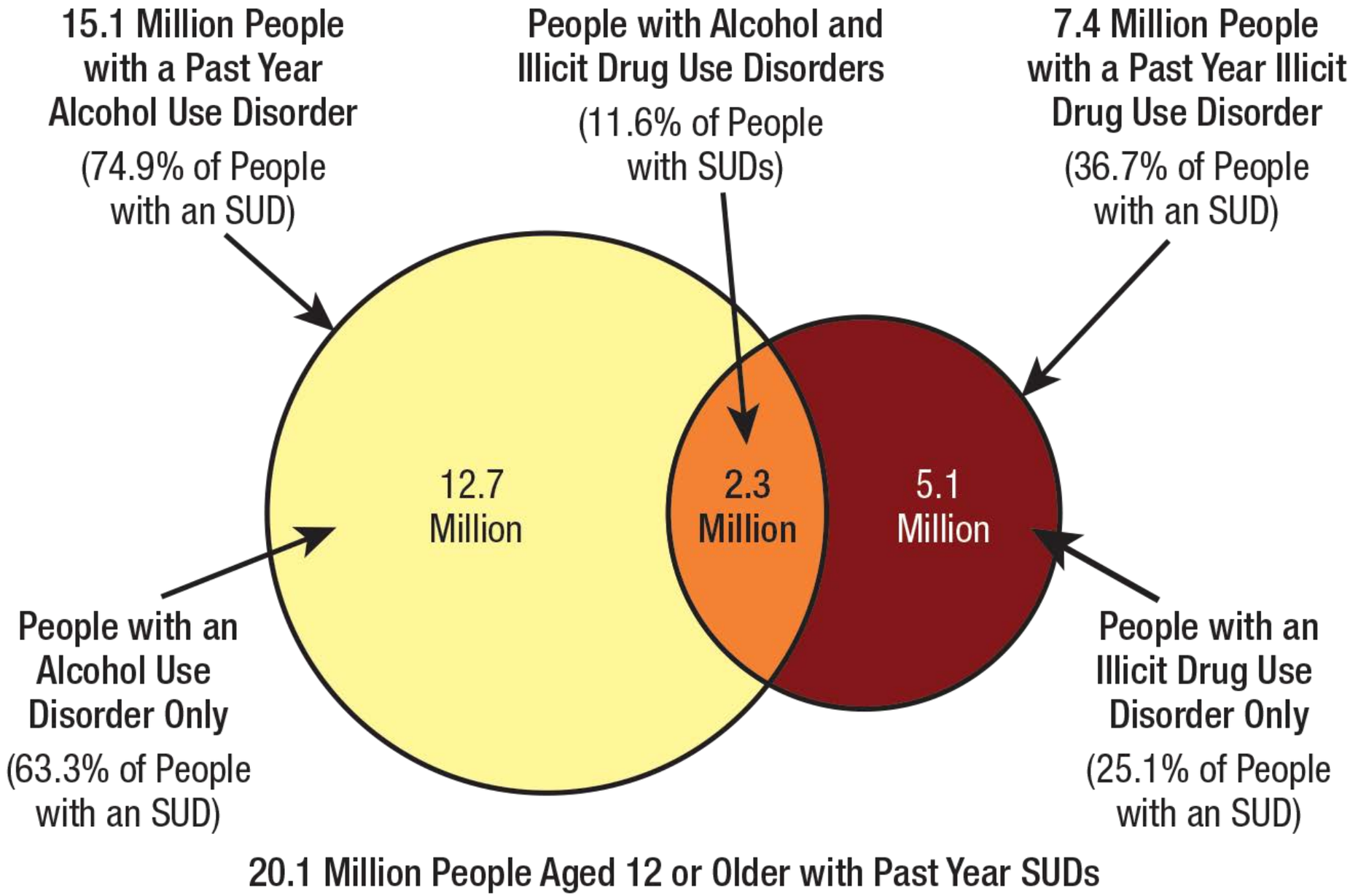
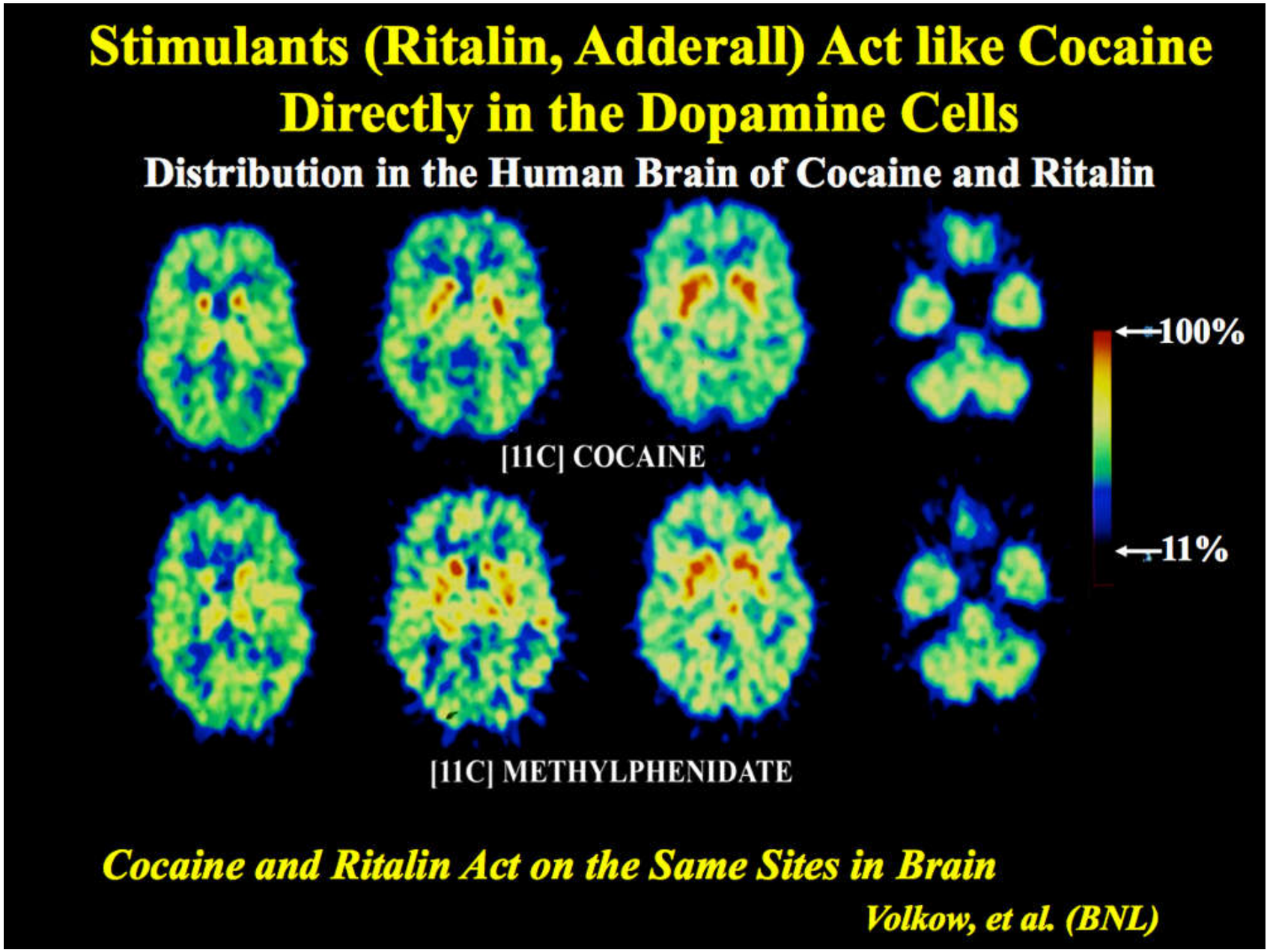
PART 1: STIMULANTS



Substance Abuse and Mental Health Services Administration. (2017). *Key substance use and mental health indicators in the United States: Results from the 2016 National Survey on Drug Use and Health* (HHS Publication No. SMA 17-5044, NSDUH Series H-52). Rockville, MD: Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration. Retrieved from https://www.samhsa.gov/data/

STIMULANT ABUSE IN THE U.S.

- 1.6 Million current users of amphetamine type drugs
- 36% current meth users
- 64% current non-medical use of Rx stimulants
- 1.5 Million current users of cocaine



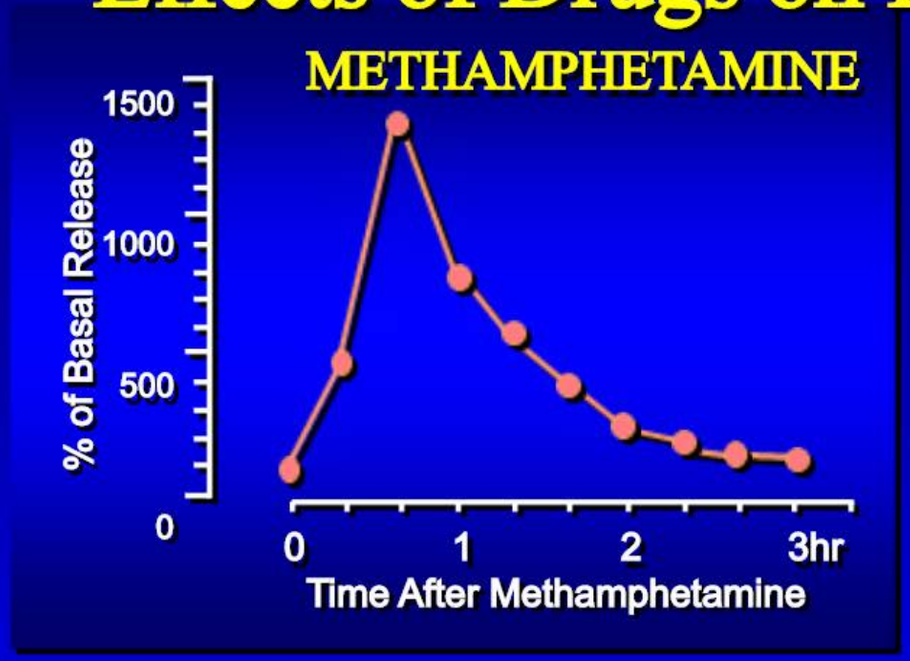
Cocaine and Ritalin Act on the Same Sites in Brain (Volkow, et al. , BNL)

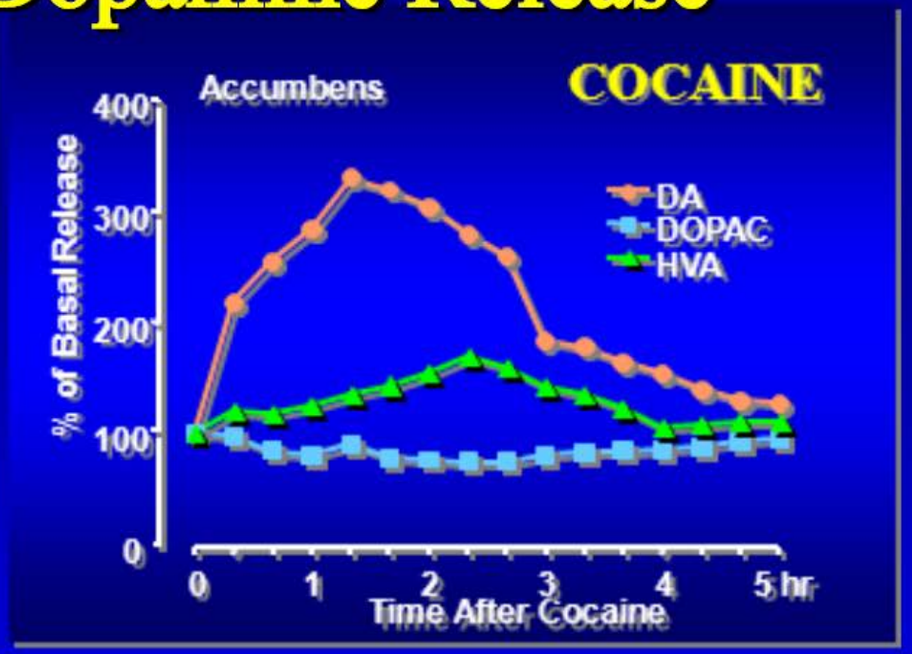
https://archives.drugabuse.gov/about-nida/legislative-activities/testimony-to-congress/2018/prescription-drug-abuse

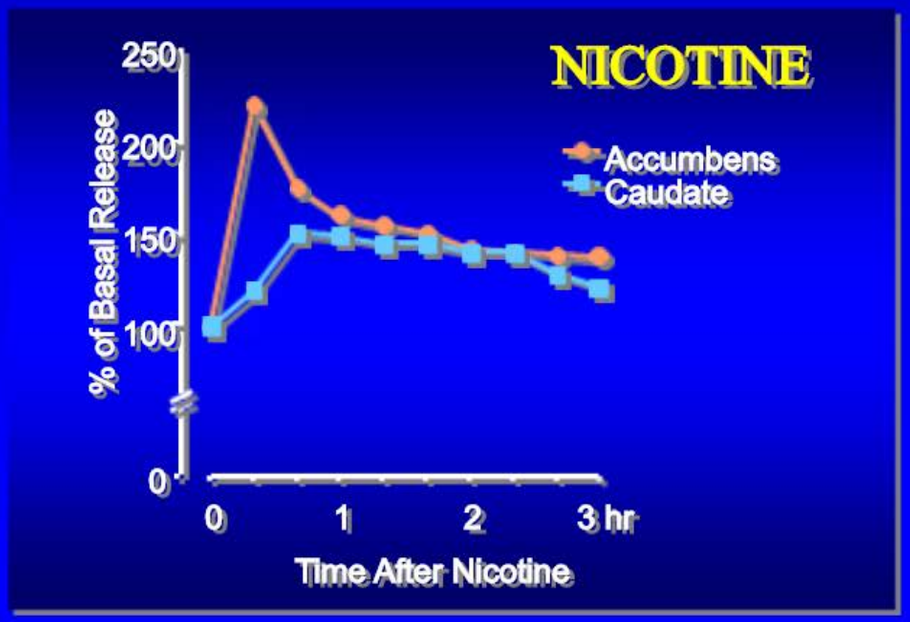
STIMULANT SUB-DRUGS

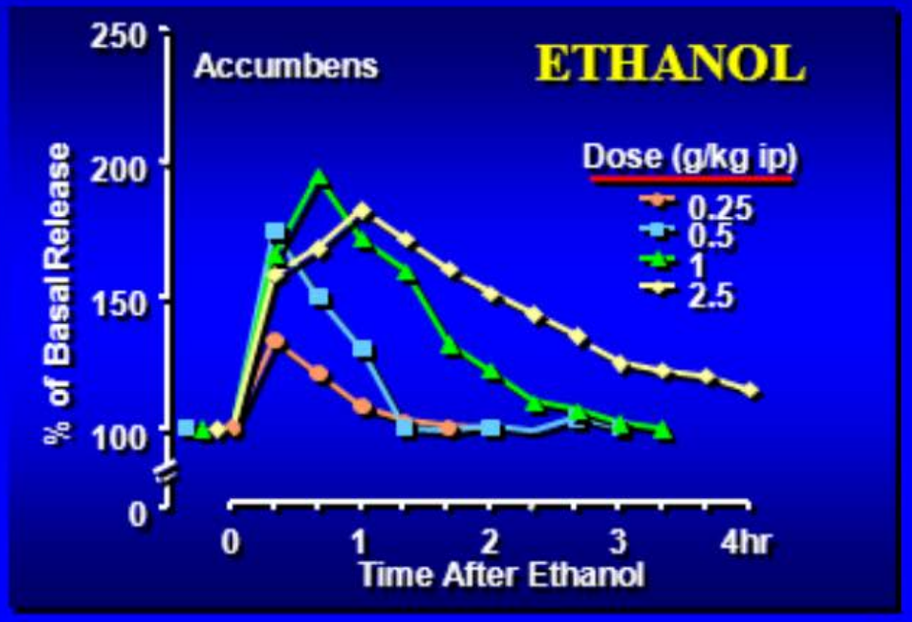
- Cocaine: 1980's
- Ecstasy: 1990's
- Methamphetamine: 2000's
- Bath Salts: 2010's
- Molly: at present
- Rx stimulants: methylphenidate, amphetamine salts, etc.

Effects of Drugs on Dopamine Release









NIDA

Source: Shoblock and Sullivan; Di Chiara and Imperato

STIMULANTS

Effects: incl. focus/concentration, wakefulness/energy, incl. libido, euphoria, decreased appetite, incl. BP & heart rate, sweating, hyperthermia, seizures

Acute intoxication management: see table

Withdrawal: hypersomnia, depression, increased appetite, vivid dreams, restlessness, craving

CLINICAL PROBLEM	MODERATE SYNDROME	SEVERE SYNDROME
Anxiety; agitation	Provide reassurance; place in a quiet, nonthreatening environment.	Diazepam (10–30 mg PO, 2–10 mg IM, IV) or lorazepam (2–4 mg PO, IM, IV); may repeat every 1–3 h
Paranoia; psychosis	Place in a quiet, nonthreatening environment; benzodiazepines for sedation	High-potency antipsychotic (e.g., haloperidol) or second-generation antipsychotic
Hyperthermia	Monitor body temperature; place in a cool room.	If temperature >102°F (oral), use external cooling with cold water, ice packs, hypothermic blanket; if >106°F, use internal cooling; epigastric lavage with iced saline
Seizures	Diazepam (2–20 mg IV, <5 mg/min) or lorazepam (2–8 mg)	For status epilepticus: IV diazepam or phenytoin (15–20 mg/kg IV, <150 mg/min) or phenobarbital (25–50 mg IV)
Hypertension	Monitor blood pressure closely; benzodiazepines for sedation	If diastolic >120 for 15 min, give phentolamine (2–10 mg IV over 10 min).
Cardiac arrhythmia	Monitor electrocardiogram, vital signs; benzodiazepines for sedation	As appropriate for specific rhythm, based on advanced cardiac life support criteria
Myocardial infarction	Benzodiazepines for sedation; supplemental oxygen; sublingual nitroglycerin for vasodilation; aspirin for anticlotting; morphine for pain	Give nitrates IV for coronary artery dilation; phentolamine (2–10 mg IV) to control blood pressure; thrombolysis, angioplasty (if clot confirmed and no hemorrhage)
Rhabdomyolysis	IV hydration to maintain urine output >2 mL/kg/h	Force diuresis with aggressive intravenous hydration
Increased urinary drug excretion	Cranberry juice (8 oz TID) or ammonium chloride (500 mg PO every 3–4 h) until urine pH < 6.6 (if renal and hepatic function are normal)	Same as for moderate intoxication
Recent (few hours) oral drug ingestion	Activated charcoal orally or gastric lavage via nasogastric tube (if patient is awake and cooperative)	Gastric lavage via nasogastric tube after endotracheal intubation (if patient is unconscious)

STIMULANTS (CONT'D)

Long term effects: anxiety, confusion, insomnia, mood problems, violent behavior, paranoia/hallucinations/delusions, weight loss, severe dental problems ("meth mouth"), skin picking due to formication and tactile hallucinations

Health risks: blood borne infections, HTN, arrhythmias, AMI, cardiomyopathy, stroke, placenta previa, premature birth, low birth weight infants with behavioral problems

TREATMENT

There are **no** FDA-approved medications.

- TCA's (desipramine)
- Topirimate
- Disulfram
- Bupropion
- Gabapentin
- N-acetyl cysteine: 1,200 mg oral bid

BEHAVIORAL THERAPIES

- Cognitive-behavioral therapy (CBT)
- Contingency management, or motivational incentives
- The Matrix Model
- 12-Step facilitation therapy

URINE DRUG TESTING

- Cocaine → Benzoylecgonine
  remains in urine 1 – 3 days after single use
- May be present up to 7 – 12 days after repeated high doses
- Very low likelihood of false positives
- Methamphetamine → methamphetamines (l,d-isomers) → amphetamines
- Tests positive up to 72 hours after last use, up to one week for chronic use
- False positives: Vicks vapor rub, selegiline, bupropion

PRESCRIPTION STIMULANTS

- Adderall → amphetamines (only)
- Methylphenidate → will not show up on point of care testing, only on GC/MS

TREATMENT OF ADHD IN STIMULANT USE DISORDER

- Be certain of ADHD Dx
  - Consult with mental health expert
- **Assess** Risk/Benefits (diversion / misuse / exacerbate SUD)
- Start with Non-stimulant Rx
- Next ➡ Sustained-release stimulant Rx
- Other elements:
  - Psycho-education
  - Literature
  - CBT
  - Structured Skills Training
  - Coaching

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TREATMENT OF ADHD IN STIMULANT USE DISORDER

Rx Choices:

- Bupropion (Wellbutrin®)
  - Maneeton, et. al. Bupropion for adults with ADHD: meta-analysis of randomized, placebo controlled trials. Psychiatry and Clin Neuro, 2011
- Atomoxetine (Strattera®)
  - Wilens, Adler, et. al. Atomoxetine treatment of adults with ADHD and comorbid alcohol use disorders. Drug and Alc Dep, 2008
- Methylphenidate (Concerta®)
  - Schubiner, et. al. Double-blind placebo-controlled trial of methylphenidate in treatment of adult ADHD patients with comorbid cocaine dependence. Exp Clin Psychopharmacol, 2002
- Lisdexamfetamine (Vyvanse®)
  - Jasinski, Krishnan. Abuse liability and safety of oral lisdexamfetamine in individuals with a history of stimulant abuse. J Psychopharm, 2009.
- Rx with Stimulant ➡ Signed Tx Agreement (like LT opioids)

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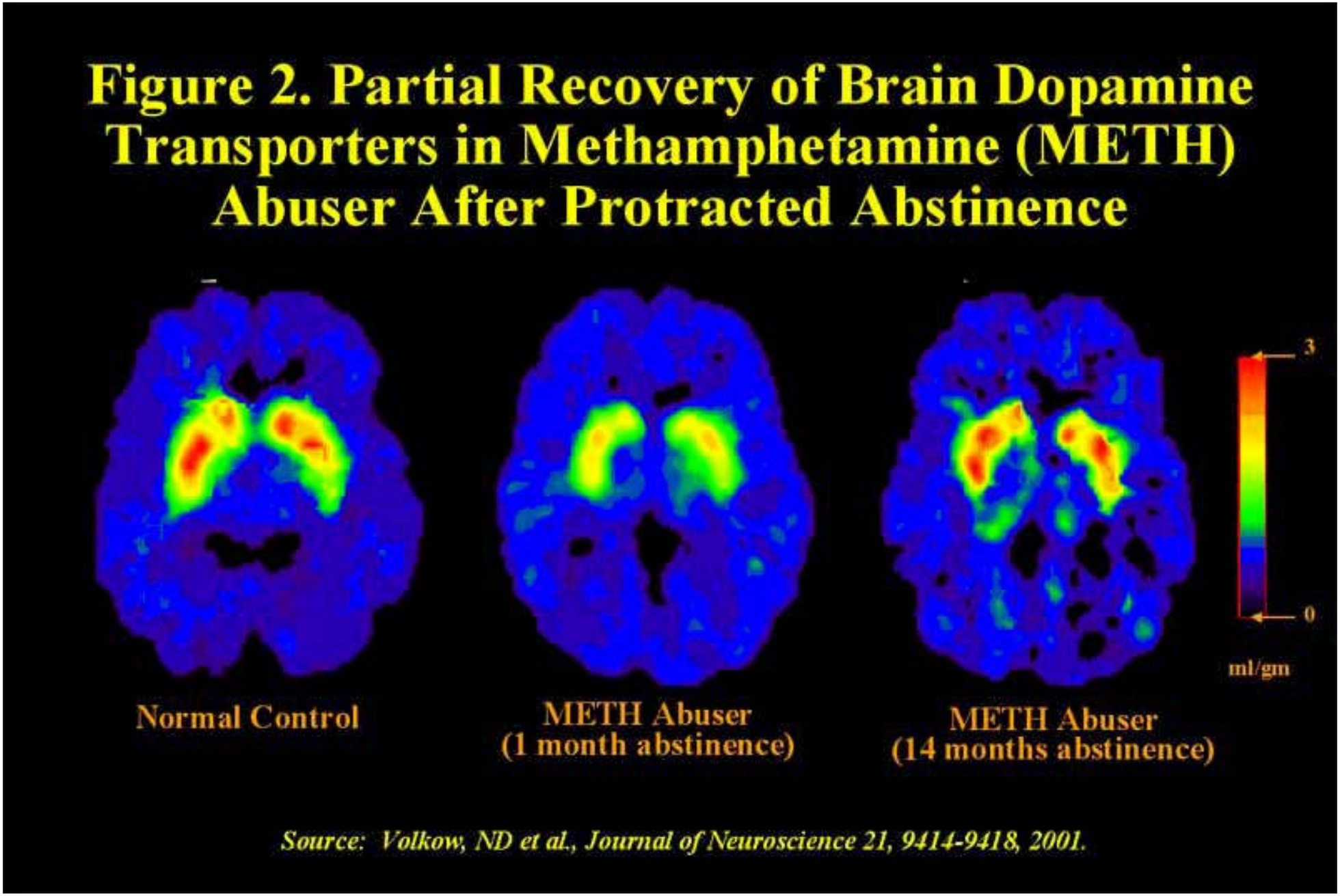
Figure 2. Partial Recovery of Brain Dopamine Transporters in Methamphetamine (METH) Abuser After Protracted Abstinence



Source: Volkow, ND et al., Journal of Neuroscience 21, 9414-9418, 2001.

https://archives.drugabuse.gov/about-nida/legislative-activities/testimony-to-congress/2018/availability-effectiveness-programs-to-treat-methamphetamine-abuse

THE pain SOURCE

False Positives in Immunoassay Urine Drug Screens

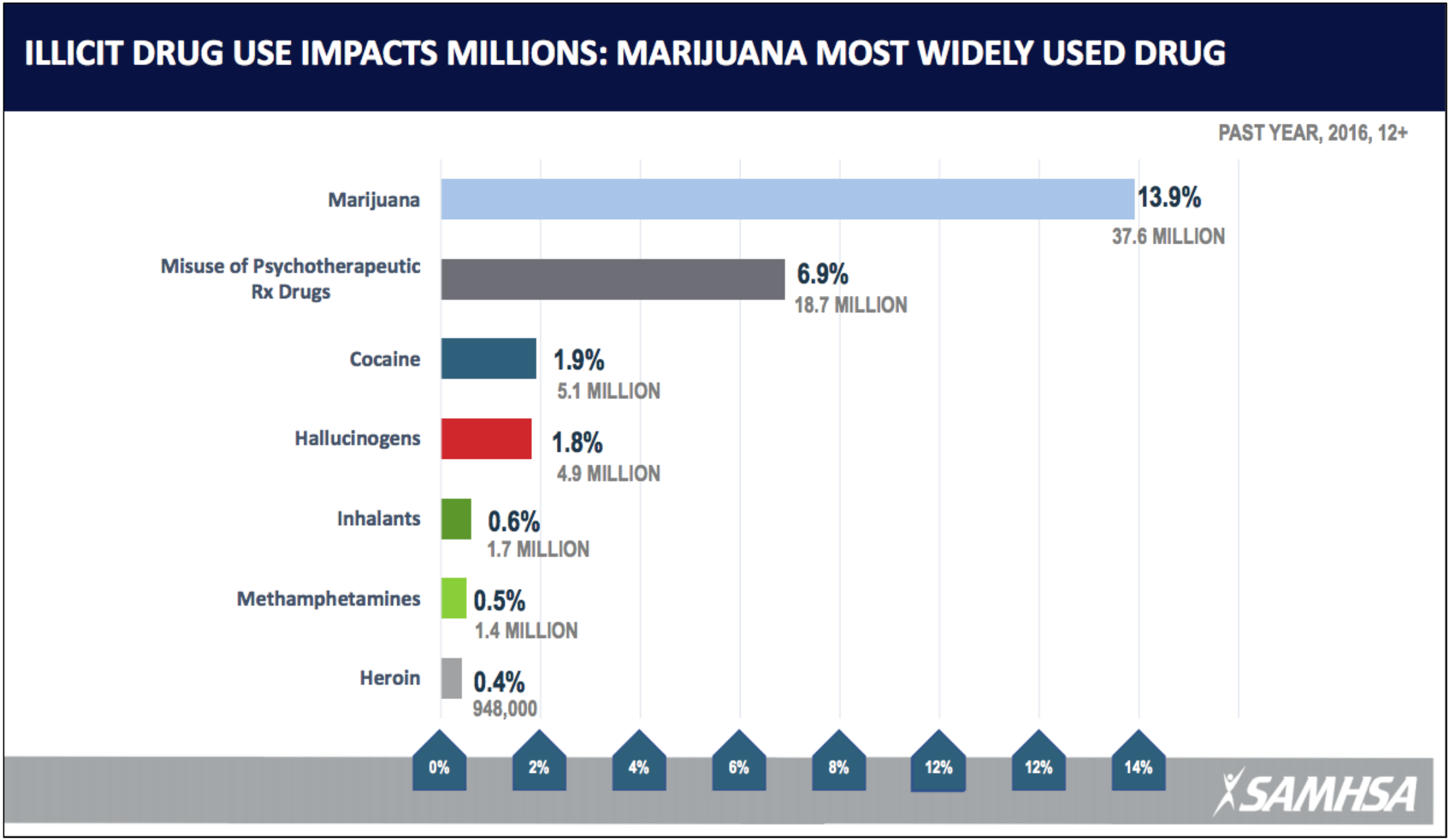
AMPHETAMINES	BARBITURATES	METHADONE	PHENCYCLIDINE (PCP)
Amantadine (Symmetrel) [Parkinson's dz]	Ibuprofen, Naproxen [Anti-inflammatories]	Chlorpromazine (Thorazine) [Antipsychotic]	Dextroamphetamine (Dexedrine) [ADHD; Stimulant]
Bupropion (Wellbutrin, Zyban) [Antidepressant; Smoking cessation]	Phenytoin (Dilantin) [Seizures]	Clomipramine (Anafranil) [Antidepressant]	Dextromethorphan (Delsym, Robitussin) [Anti-tussive]
Chloroquine (Aralen) [Anti-malarial]	Primidone (Mysoline) [Seizures]	Diphenhydramine (Benadryl) [Antihistamine]	Diphenhydramine (Benadryl) [Antihistamine]
Chlorpromazine (Thorazine) [Antipsychotic]	**BENZODIAZEPINES**	Doxylamine (Unisom) [Insomnia]	Doxylamine (Unisom) [Insomnia]
Desipramine (Norpramine) [Antidepressant]	Oxaprozin (Daypro) [Arthritis]	Ibuprofen (Advil) [Anti-inflammatory]	Ibuprofen (Advil) [Anti-inflammatory]
Dextroamphetamine (Dexedrine) [ADHD; Stimulant]	Sertraline (Zoloft) [Antidepressant]	Quetiapine (Seroquel) [Antipsychotic]	Imipramine (Tofranil) [TCA antidepressant]
Ephedrine (Ephedra, Ma Huang) [Stimulant]	**CANNABINOIDS**	Thioridazine (Mellaril) [Antipsychotic]	Ketamine [General anesthetic]
Labetalol (Trandate) [Hypertension]	Dronabinol (Marinol) [Nausea; Appetite stimulant]	Verapamil [HTN; Anti-arrhythmic]	Meperidine (Demerol) [Pain]
Mexiletine [Anti-arrhythmic]	Efavirenz (Sustiva) [HIV]	**OPIATES / OPIOIDS**	Tramadol (Ultram) [Pain]
Procainamide [Anti-arrhythmic]	Hemp seed oil, Cannabis seed, Hemp oil, Hemp food	Dextromethorphan (Delsym, Robitussin) [Anti-tussive]	Venlafaxine (Effexor) [SNRI Antidepressant]
Phentermine (Adipex, Suprenza) [Obesity]	NSAIDs (ibuprofen, naproxen, ketoprofen, piroxicam, etc)	Diphenhydramine (Benadryl) [Antihistamine]	**LSD**
Promethazine (Phenergan) [Nausea]	Pantoprazole (Protonix) [GERD; Peptic ulcer dz]	Fluoroquinolones (Levaquin, Avelox, Cipro, Floxin)	Amitriptyline (Elavil) [TCA antidepressant]
Propranolol (Inderal) [HTN; Migraines; Anti-arrhythmic; Essential tremor; Stage fright]	Promethazine (Phenergan) [Nausea]	Poppy seeds and oil [Yummy bagels and bread]	Dicyclomine (Bentyl) [Anticholineric for IBS]
Pseudoephedrine (Sudafed) [Nasal decongestant]	**COCAINE**	Quinine [Antimalarial]	Ergotamine [Migraines]
Ranitidine (Zantac) [GERD; Peptic ulcers]	Amoxicillin (Amoxil) [Antibiotics]	Rifampin [Tuberculosis]	Promethazine (Phenergan) [Nausea/Vomiting]
Selegiline (Zelapar, Eldepryl) [Parkinson's disease]	Coca leaf teas	**OXYCODONE**	Sumatriptan (Imitrex) [Migraines]
Trazodone (Desyrel) [Antidepressant; Insomnia; Migraines]	Tonic water	Hydrocodone, Oxymorphone Hydromorphone, Codeine,	
Vick's inhaler [Congestion]			

Link to view online:

http://thepainsource.com/wp-content/uploads/2012/12/False-Positives-in-Immunoassay-Urine-Drug-Screens.pdf

PART 2: CANNABIS (AKA Marijuana)

EPIDEMIOLOGY OF CANNABIS USE: NSDUH, 2016



https://www.samhsa.gov/sites/default/files/topics/data_outcomes_quality/nsduh-ppt-09-2017.pdf
https://www.samhsa.gov/data/sites/default/files/NSDUH-FFR1-2016/NSDUH-FFR1-2016.htm

EPIDEMIOLOGY OF CANNABIS USE

- Most commonly used illegal substance in the US and world
- Lifetime prevalence in US: 42-46%
- Past year use highest in age 18-25 group
- Past year Cannabis Use Disorder (CUD) highest in ages 21-26
- CUD (old abuse/dependence):
  - 2001: 1.5%
  - 2012: 2.9%
  - Psychiatric samples: 15-50%
- Greater increases in use and CUD in US states with Medical Marijuana Laws

https://jamanetwork.com/journals/jamapsychiatry/article-abstract/2619522

TRENDS IN MARIJUANA USE PATTERNS, DISORDERS AND PERCEIVED RISK OF HARM

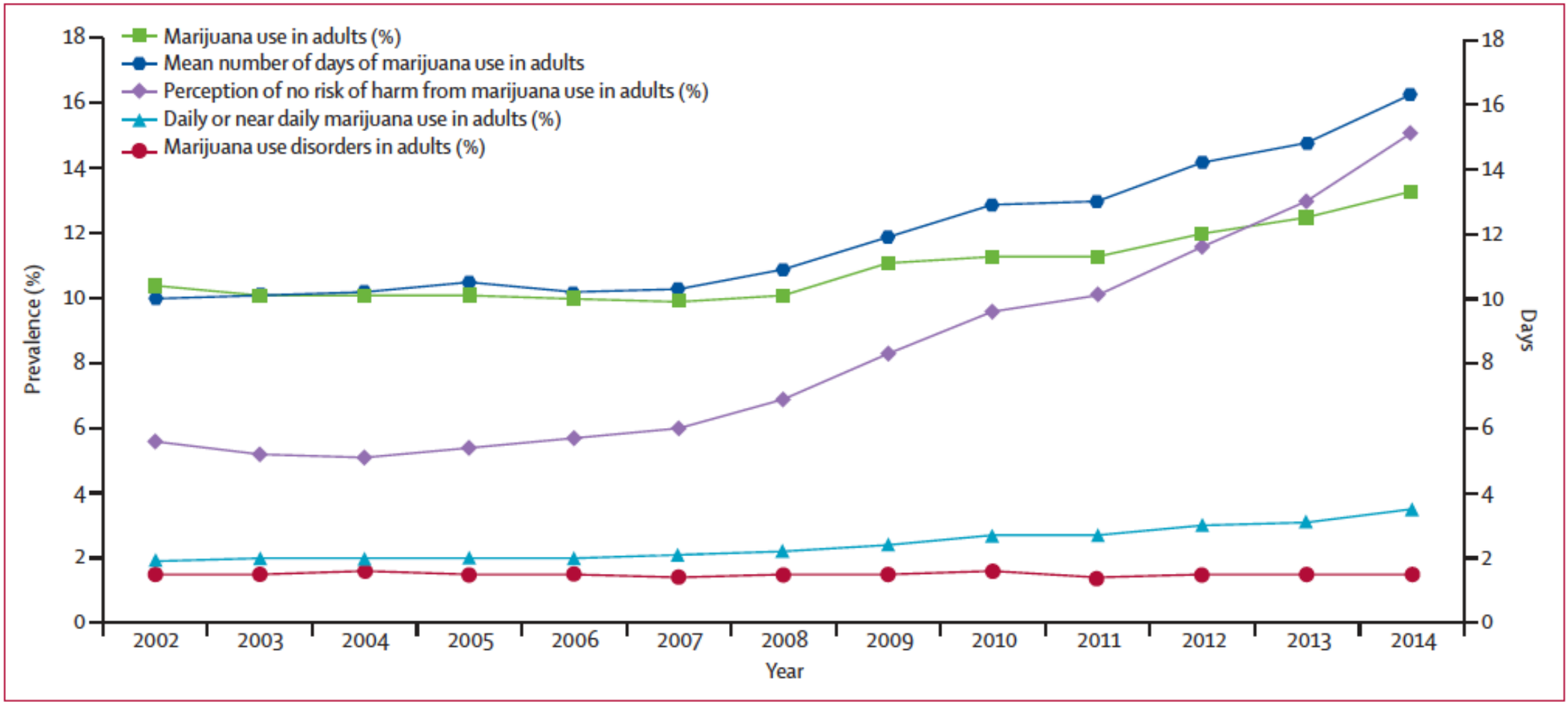


***Figure*: Trends in marijuana use patterns, marijuana use disorders, and perceived risk of harm**
Annual prevalence and trends in any marijuana use, daily or near daily marijuana use, marijuana use disorders, mean number of days of marijuana use, and perception of no risk of harm from marijuana use in adults in the USA. *Joinpoints indicate significant changes in non-linear trends.

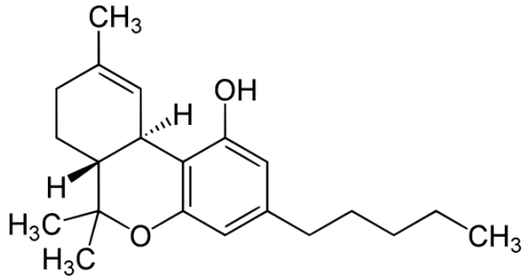
www.thelancet.com/psychiatry Vol 3 October 2016

Compton W et al, 2016

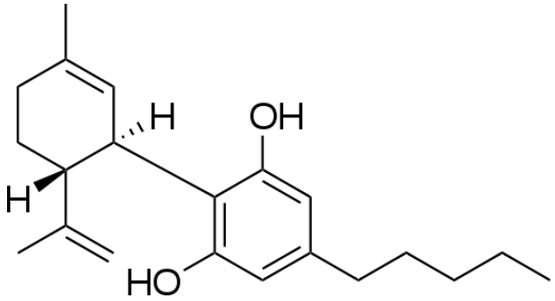
CANNABINOIDS

- **Cannabis plant** (C.sativa, C. indica)
  - Contains >400 chemical compounds
  - 60 identified cannabinoids thus far

- **Tetrahydrocannabinol** (THC)
  - Primary compound to produce psychoactive effects or the "high"
  - Acts on CB1 receptor
  - Can cause anxiety



- **Cannabidiol**
  - Not psychoactive
  - Relieves anxiety



COMMON CANNABIS PREPARATIONS

Table 2. Common Cannabis Preparations

Preparations	Description
Marijuana[a]	Dried plant product consisting of leaves, stems, and flowers; typically smoked or vaporized
Hashish	Concentrated resin cake that can be ingested or smoked
Tincture[a]	Cannabinoid liquid extracted from plant; consumed sublingually
Hashish oil	Oil obtained from cannabis plant by solvent extraction; usually smoked or inhaled; butane hash oil (sometimes referred to as "dabs"), for example
Infusion[a]	Plant material mixed with nonvolatile solvents such as butter or cooking oil and ingested

[a] These preparations are available from state-approved medical marijuana dispensaries.

JAMA. 2015;313(24):2474-2483. doi:10.1001/jama.2015.6199

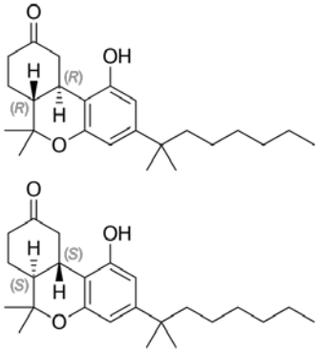
THC CONTENT OF CANNABIS PRODUCTS

- **THC content of cannabis products**
  - Whole plant: 1-5% THC
    - However, many hybrid strains with names like Girl Scout Cookies, King Tut, Blissful Wizard have THC concentrations up to 35% THC
  - Unfertilized flowers: 7-15% THC
  - Hashish or resin: 10-20% THC
  - Hash oil: 20-60% THC

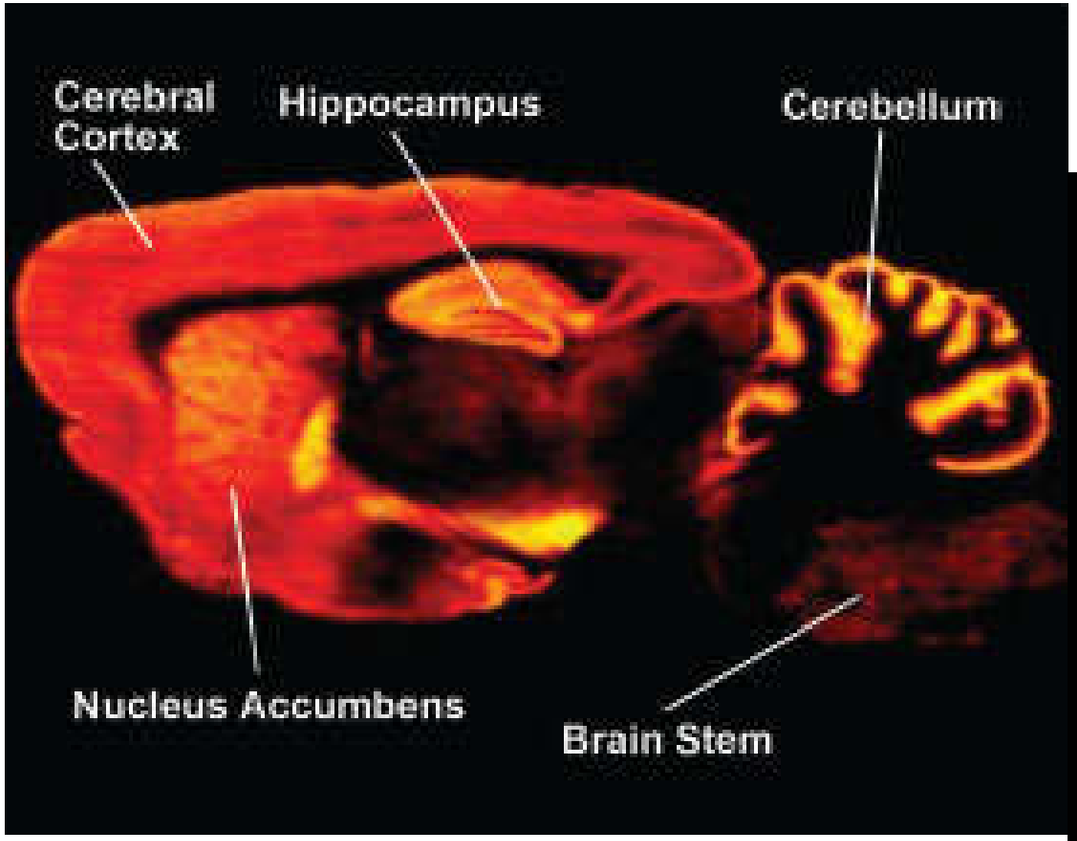
- **Route of Use**
  - Smoking, vaporizing: onset 1 min, high lasts 4 hrs
  - Ingesting: onset 30 mins, high lasts 12 hrs
  - Topical (oils)

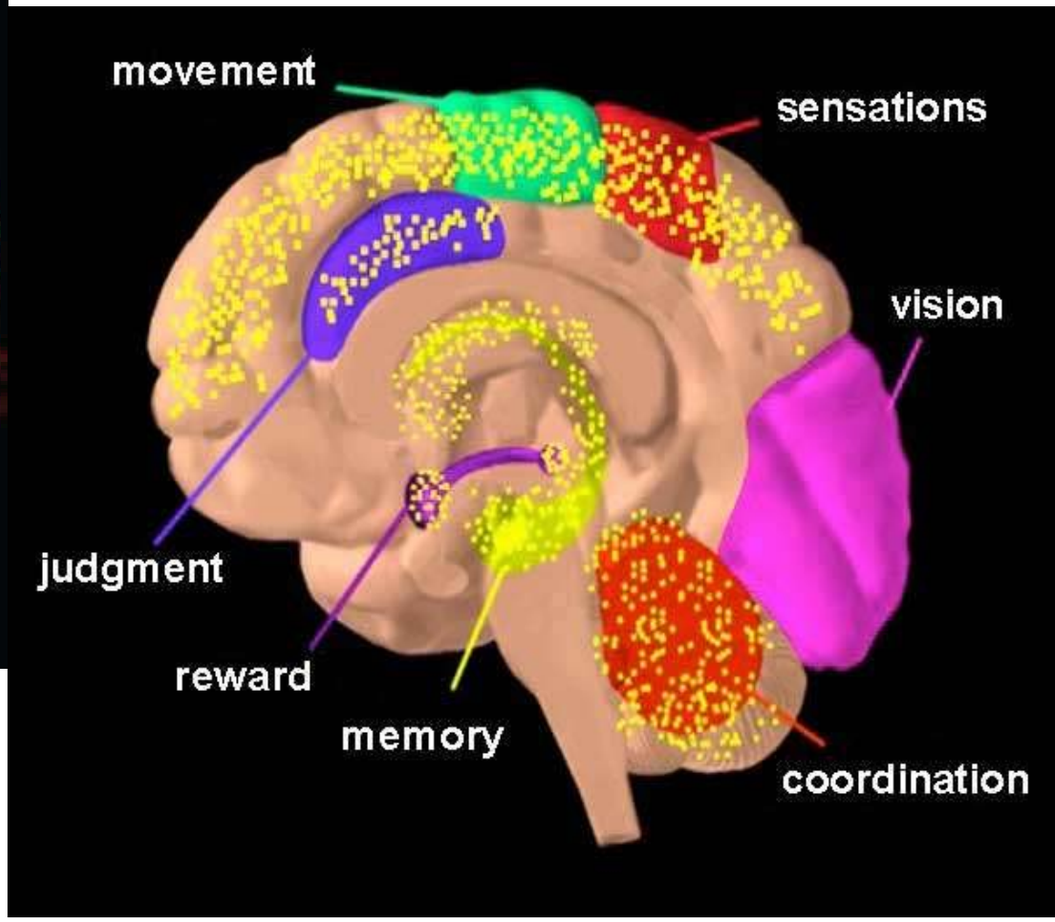
PHARMACEUTICAL GRADE CANNABINOIDS

- **FDA-approved cannabinoids**
  - Dronabinol (Marinol ®, THC) oral
    - Anorexia in people with HIV/AIDS
    - Refractory nausea and vomiting in people undergoing chemotherapy (CINV)
  - Nabilone (Cesamet ®)
    - For severe nausea and vomiting caused by cancer chemotherapy (CINV)
  - Cannabidiol (Epidiolex®) oral (CBD)
    - Treatment resistant seizures
    - Approved, not yet available
- **Approved in UK and other countries, not US**
  - Nabiximols (Sativex®) oral mucosal spray
    - ~50/50 mixture THC and CBD
    - Spasticity in MS

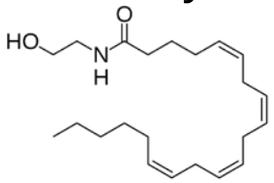
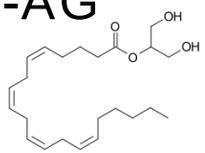


CANNABINOID RECEPTOR 1 (CB1) DISTRIBUTION IN THE BRAIN





Endogenous cannabinoids:

- Normally produced by the brain
- Anandamide 
- 2-AG 

https://www.nimh.nih.gov/labs-at-nimh/research-areas/clinics-and-labs/lcmr/sfn/past-research.shtml
https://www.drugabuse.gov/publications/drugfacts/marijuana

CANNABINOID RECEPTOR 1 (CB1)

CB1 receptor location	Clinical manifestations of THC activity
Cerebral cortex	Altered consciousness, perceptual distortions, memory impairment, hallucinations
Hypothalamus	Increased appetite
Brain stem	Antiemetic, tachycardia, reduced BP, drowsiness, pain reduction, reduced spasticity, reduced tremor
Basal ganglia	Slowed reaction time
Cerebellum	Reduced spasticity, impaired coordination
Hippocampus	Memory impairment
Nucleus accumbens	Motivation and reward
Amygdala	Increased or decreased anxiety; Increased or decreased panic
Spinal cord	Altered pain sensitivity

Levounis et al: Pocket Guide to Addiction Assessment and Treatment, 2016

DSM-5 DISORDERS

- Cannabis Use Disorder (CUD) criteria consistent with other Use DO's
- Cannabis Intoxication
- Cannabis Withdrawal

Intoxication:

- Clinically significant problematic behavioral or psychological changes: impaired motor coordination, euphoria, anxiety, sensation of slowed time, impaired judgment, social withdrawal
- Two (or more) within 2 hours of use:
  - Conjunctival injection.
  - Increased appetite.
  - Dry mouth.
  - Tachycardia.

Withdrawal:

- Cessation of cannabis use that has been heavy and prolonged
- (Three (or more) of the following develop within approximately 1 week:
  - Irritability, anger, or aggression.
  - Nervousness or anxiety.
  - Sleep difficulty (e.g., insomnia, disturbing dreams).
  - Decreased appetite or weight loss.
  - Restlessness.
  - Depressed mood.
  - At least one of the following physical symptoms causing significant discomfort: abdominal pain, shakiness/tremors, sweating, fever, chills, or headache.

ADDICTIVE POTENTIAL OF CANNABIS

- All users → 9% addicted/CUD
- Adolescent users → 17% addicted/CUD
- Daily users → 25-50% addicted/CUD

NIDA Drug Facts

SCREENING FOR CANNABIS USE DISORDERS

- CUDIT-R
- Cannabis Use Disorders Identification Test—Revised
- 8 questions, scored 0-4 points each
- Cutoffs:
  - Score ≥ 8 = hazardous Cannabis Use
  - Score ≥ 12 = Possible CUD, see an expert

The Cannabis Use Disorder Identification Test - Revised (CUDIT-R)

Have you used any cannabis over the past six months? YES / NO

If YES, please answer the following questions about your cannabis use. Circle the response that is most correct for you in relation to your cannabis use *over the past six months*

1. How often do you use cannabis?

Never	Monthly or less	2-4 times a month	2-3 times a week	4 or more times a week
0	1	2	3	4

2. **How many hours were you "stoned" on a typical day when you had been using cannabis?**

Less than 1	1 or 2	3 or 4	5 or 6	7 or more
0	1	2	3	4

3. How often during the past 6 months did you find that you were not able to stop using cannabis once you had started?

Never	Less than monthly	Monthly	Weekly	Daily or almost daily
0	1	2	3	4

4. **How often during the past 6 months did you fail to do what was normally expected from you because of using cannabis?**

Never	Less than monthly	Monthly	Weekly	Daily or almost daily
0	1	2	3	4

5. How often in the past 6 months have you devoted a great deal of your time to getting, using, or recovering from cannabis?

Never	Less than monthly	Monthly	Weekly	Daily or almost daily
0	1	2	3	4

6. **How often in the past 6 months have you had a problem with your memory or concentration after using cannabis?**

Never	Less than monthly	Monthly	Weekly	Daily or almost daily
0	1	2	3	4

7. How often do you use cannabis in situations that could be physically hazardous, such as driving, operating machinery, or caring for children:

Never	Less than monthly	Monthly	Weekly	Daily or almost daily
0	1	2	3	4

8. **Have you ever thought about cutting down, or stopping, your use of cannabis?**

Never	Yes, but not in the past 6 months	Yes, during the past 6 months
0	2	4

This scale is in the public domain and is free to use with appropriate citation:

Adamson SJ, Kay-Lambkin FJ, Baker AL, Lewin TJ, Thornton L, Kelly BJ, and Sellman JD. (2010). An Improved Brief Measure of Cannabis Misuse: The Cannabis Use Disorders Identification Test – Revised (CUDIT-R). *Drug and Alcohol Dependence* 110:137-143.

This questionnaire was designed for self administration and is scored by adding each of the 8 items:
- Question 1-7 are scored on a 0-4 scale
- Question 8 is scored 0, 2 or 4.

Scores of 8 or more indicate hazardous cannabis use, while scores of 12 or more indicate a possible cannabis use disorder for which further intervention may be required.

https://alcohol.dasa.ncsu.edu/assess-yourself/cudit-r/
https://www.ncbi.nlm.nih.gov/pubmed/20347232

DRUG TESTING ISSUES

- THC is detectable in urine drug screens (UDS) for up to 4 weeks in regular or heavy users
  - Long half-life metabolites, fat storage, enterohepatic recirculation

- Threshold of 50 ng/ml for initial screening
  - Passive inhalation studies not above 20 ng/ml

- False positives:
  - Marinol (because it is THC)
  - Efavirenz
  - Unlikely NSAIDs, Hemp foods

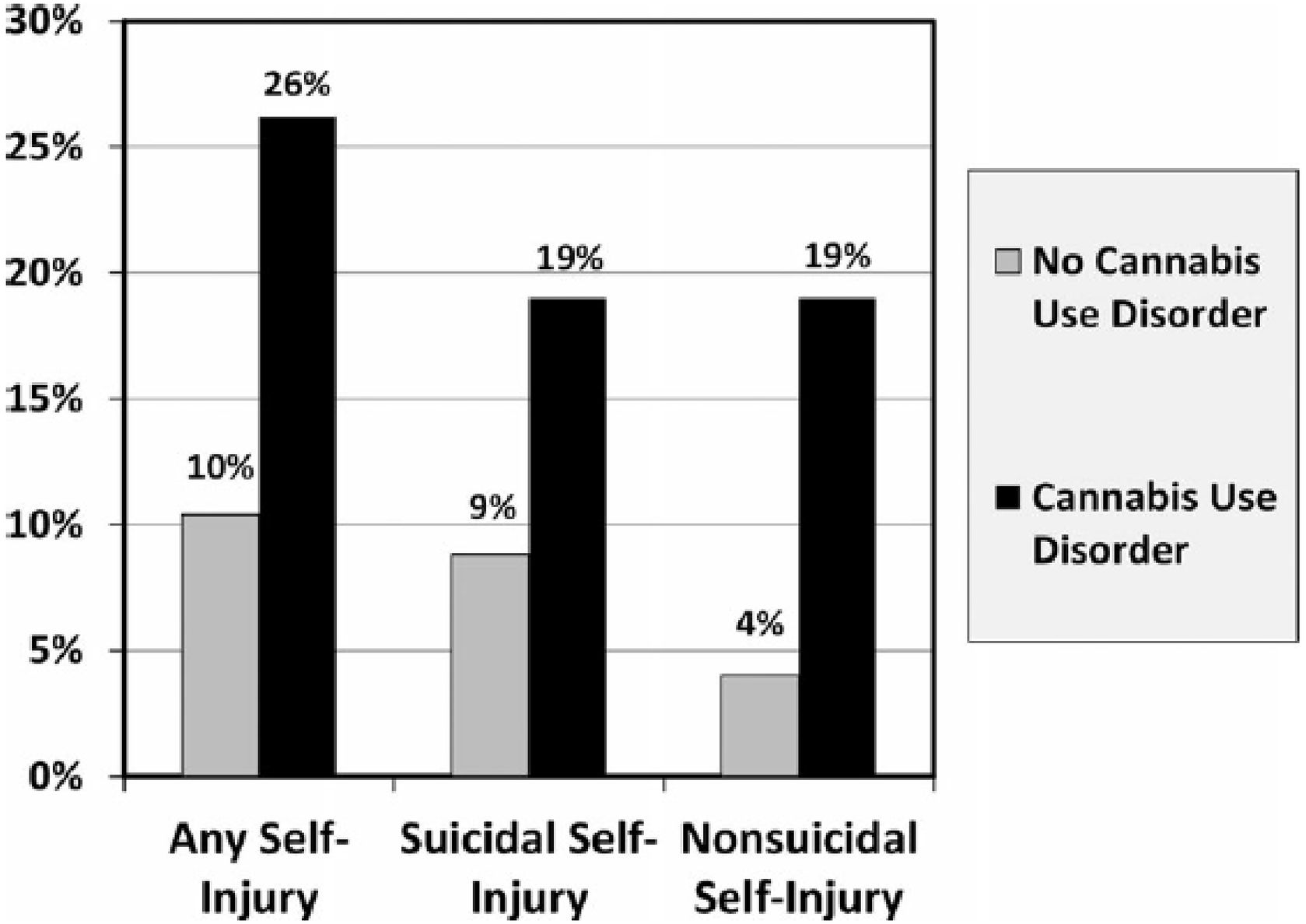
Therapeutic Evidence for Cannabis Use

	Medical Disorders	Psychiatric Disorders
Rating 3: Strong Evidence	Spasticity in Multiple Sclerosis Neuropathic Pain	**NONE**
Rating 2: Equivocal or Modest Evidence	Chemotherapy-Induced Nausea/Vomiting HIV Wasting Syndrome	Depressive Disorders Panic Disorders Generalized Anxiety Disorder PTSD SUDs
Rating 1: Minimal or No Evidence	Glaucoma	NONE
CLEAR HARMS	--	**Schizophrenia** **Bipolar Disorders**

George, T.P. et al., 2017, under review

George, TP, 2017 AAAP meeting

CANNABIS USE DISORDER/SELF-INJURY

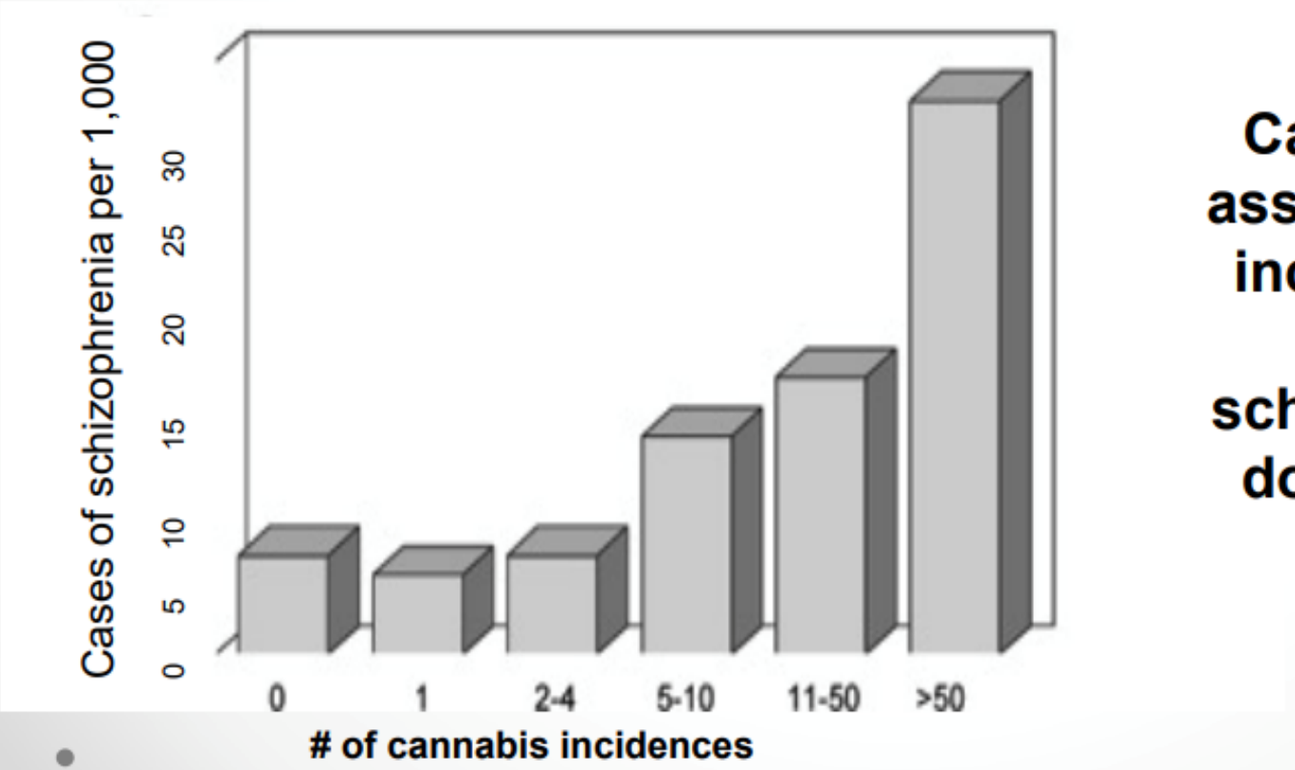


Kimbrel, N. A., Meyer, E. C., DeBeer, B. B., Gulliver, S. B. and Morissette, S. B. (2017), The Impact of Cannabis Use Disorder on Suicidal and Nonsuicidal Self-Injury in Iraq/Afghanistan-Era Veterans with and without Mental Health Disorders. Suicide and Life-Threat Behaviors.

Schizophrenia & Cannabis: Dose Effects

- Specificity to schizophrenia
- Dose-response relationship

Swedish Conscript Sample (N=50,053)



Cannabis use is associated with an increased risk of developing schizophrenia in a dose dependent fashion

Andreassen et al. Acta Psych Scand 1989

PHARMACOLOGIC TREATMENTS FOR CUD

- None FDA approved
- Evidence positive for:
  - N-acetyl cysteine 1200 mg BID, OTC reduced use and +UDS compared to placebo (Gray K, 2012)
  - Gabapentin 1800 mg daily decreased use, +UDS and withdrawal symptoms (Mason B, 2012)
  - Dronabinol 20 mg BID reduced withdrawal, not relapse; higher retention (Levin F, 2011)
  - Nabiximols reduced withdrawal; higher retention (Allsop D, 2014)
- Negative or high dropout studies:
  - Nefazodone, bupropion, buspirone
  - Rimonabant (CB1 partial agonist) not approved in US, removed from market in Europe due to increased SI

Mason B, 2012
Gray K, 2012

BEHAVIORAL TREATMENTS FOR CUD

- Cognitive Behavioral Therapy
- Motivational Interviewing
- Contingency Management
- Group Therapy

- Cannabis Youth Treatment (CYT) study
  - Motivational Enhancement Therapy
  - Cognitive Behavioral Therapy
  - Adolescent Community Reinforcement Approach
  - Multidimensional Family Therapy

https://www.ncbi.nlm.nih.gov/pubmed/15501373

HEALTH
UNIVERSITY OF UTAH

ADDITIONAL INFORMATION

NATIONAL ACADEMIES OF SCIENCES (NAS) REPORT ON HEALTH EFFECTS OF CANNABIS AND CANNABINOIDS, 2017

- Benefits
  - Substantial evidence- chronic pain, CINV, patient-reported spasticity in MS
  - Moderate evidence- sleep disturbance
  - Limited evidence- weight loss in HIV/AIDS, clinically reported spasticity in MS, Tourette syndrome, social anxiety, PTSD, better outcomes in TBI
  - No meaningful evidence- cancer, cancer-related anorexia, anorexia nervosa, IBS, epilepsy, spasticity in spinal cord injury, ALS, Huntington's disease, Parkinson's disease, dystonia, addiction, schizophrenia

http://nationalacademies.org/hmd/reports/2017/health-effects-of-cannabis-and-cannabinoids.aspx

Summary Courtesy of Penny Ziegler, MD

NATIONAL ACADEMIES OF SCIENCES (NAS) REPORT ON HEALTH EFFECTS OF CANNABIS AND CANNABINOIDS, 2017

- Negative Effects
  - Substantial evidence- increased risk of MVA, low birth wt., increased risk of psychosis in adolescents, worsened negative symptoms of schizophrenia in adults
  - Moderate evidence- acute cognitive impairment during use, increased risk of mania or hypomania in bipolar patients, increased suicidal ideation and attempts, increased completed suicide, increased social anxiety
  - Limited evidence- complications of pregnancy, likelihood neonate will go to NICU, impaired academic performance, unemployment, impaired social skills, impaired cognition despite sustained abstinence, increased severity of positive symptoms in schizophrenia, worsening of bipolar disorder, anxiety, PTSD, non seminoma testicular cancer
  - No meaningful evidence- New onset PTSD, increase or decrease in depression, increase or decrease in most cancers, increased risk of cancer in children of cannabis using mothers, MI, CVA, MS, diabetes

http://nationalacademies.org/hmd/reports/2017/health-effects-of-cannabis-and-cannabinoids.aspx

Summary Courtesy of Penny Ziegler, MD

NAS RECOMMENDATIONS RE: CANNABIS

#1- To develop a comprehensive evidence base on the short- and long-term health effects, public agencies, philanthropic and professional organizations, private companies and clinical and public health research groups should provide funding and support for a national cannabis research agenda.

#2- To promote the development of conclusive evidence on short- and long-term health effects of cannabis use, agencies of the USDHHS, including NIH and CDC, should jointly fund a workshop to develop a set of research standards and benchmarks to guide and ensure the production of high-quality cannabis research.

#3- To ensure that sufficient data are available to inform research on the short- and long-term health effects of cannabis use, the CDC, SAMHSA, ASTHO, state and local public health departments should fund and support improvements to federal public health surveillance systems and state-based public health surveillance efforts.

#4- CDC, NIH, FDS, industry groups and nongovernmental organizations should fund convening a committee of experts tasked to produce an objective and evidence-based report that fully characterizes the impacts of regulatory barriers to cannabis research and that proposes strategies for supporting development of resources and infrastructure necessary to conduct a comprehensive research agenda.

http://nationalacademies.org/hmd/reports/2017/health-effects-of-cannabis-and-cannabinoids.aspx

Courtesy of Penny Ziegler, MD