



UW PACC

Psychiatry and Addictions Case Conference

UW Medicine | Psychiatry and Behavioral Sciences

METHAMPHETAMINE ADDICTION

UNIVERSITY OF WASHINGTON VA
PUGET SOUND HEALTH CARE
SYSTEM



GENERAL DISCLOSURES

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GENERAL DISCLOSURES

UW PACC is also supported by Coordinated Care
of Washington

SPEAKER DISCLOSURES

- ✓ Any conflicts of interest?

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- ✓ No conflicts of interest

PLANNER DISCLOSURES

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OBJECTIVES

Goal is to attain better understanding of methamphetamine addiction in regards to:

- Epidemiology and clinical manifestations of methamphetamine addiction
- Available and potential treatment strategies

METHAMPHETAMINE

What color is pure “meth”?

- a. Yellow
- b. Blue
- c. Orange
- d. Colorless
- e. Pink



© 2014 / 2015 Drug Identification Bible

Available Strengths

Item 4 of 5



Desoxyn 5mg Tablet
Recordati Rare Diseases
Pill Identification: OV | 12



METHAMPHETAMINE

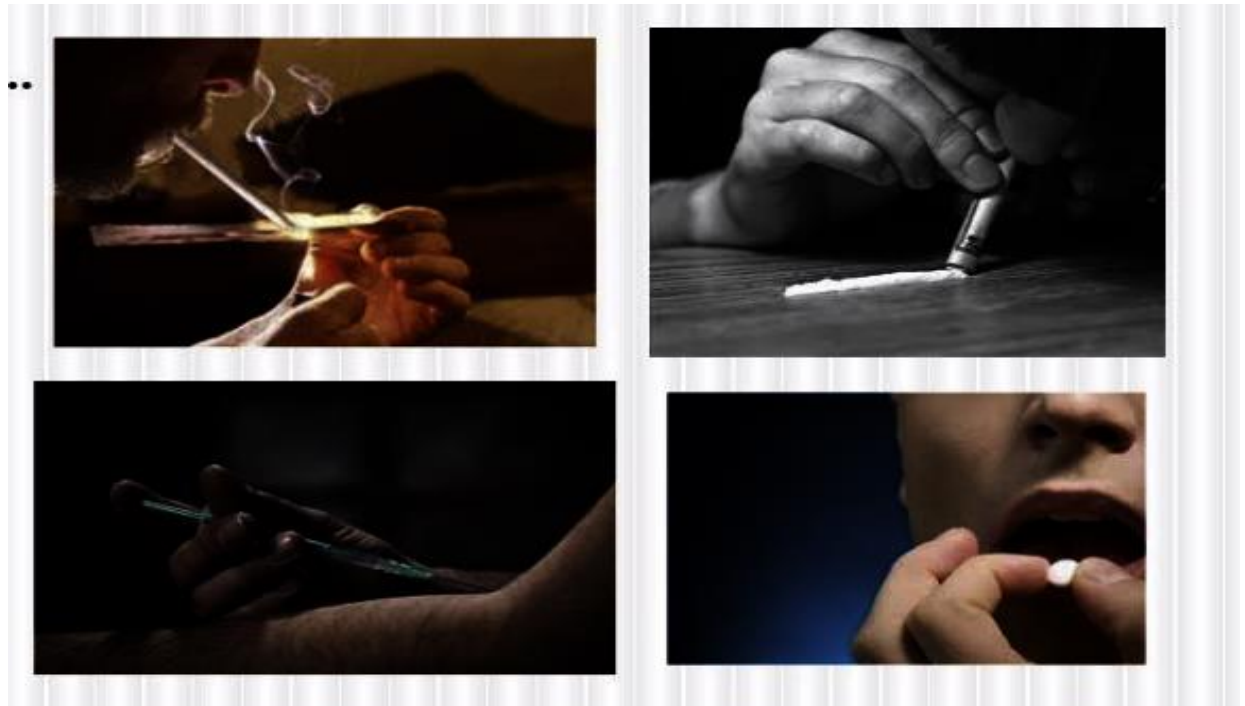
- **Crystal methamphetamine is a stimulant like amphetamine**
- **Commonly made from ephedrine, pseudoephedrine and phenylpropanolamine**
- **Common names: Blue, crystal, ice, meth or speed**
- **Forms:**
 - **Shard**
 - **Powdered**
 - **Pills**
 - **Waxy gooey oil**
 - **Liquid**
- **Taste- usually bitter**
- **Odor – pure meth is odorless**

- **Crystal meth: any form > 80% in purity**
- **Purity of “meth” varies with location i.e. New York (50.9%), Arizona (97.5%).**
- **Desoxyn- prescription form of methamphetamine**

PREVALENCE

- One of the most misused stimulant drugs in the world
- 1.86 million Americans used methamphetamine in 2018
- 12-month prevalence of individuals >12 yrs reporting Methamphetamine use increased 195% from 2010 to 2018.
- Higher odds of use among:
 - Men
 - Those with lower education attainment
 - Annual household income <\$50,000
 - Living in small metro or non-metro counties
 - Co-occurring substance use and co-occurring mental illness
- From 2011 through 2016: drug overdose deaths involving methamphetamine more than tripled.

- **Methods of use**
 - **Smoking (most common)**
 - **Snorting**
 - **Swallowing**
 - **Injecting**



MOLECULAR MECHANISMS

- 1. Rapid release of Dopamine in central & peripheral nervous system**
- 2. Release of serotonin, noradrenaline, adrenaline**
- 3. In addition: oxidative stress, neurotoxic & excitotoxic effects, neuroinflammation**
- 4. Altered brain state consistent with degenerative CNS diseases:**
 - Quick but less efficient availability of energy**
 - Increased rate of biosynthesis**
 - Acidification of microenvironment**
 - Altered cell signaling promoting oncogenic & degenerative cell environment**

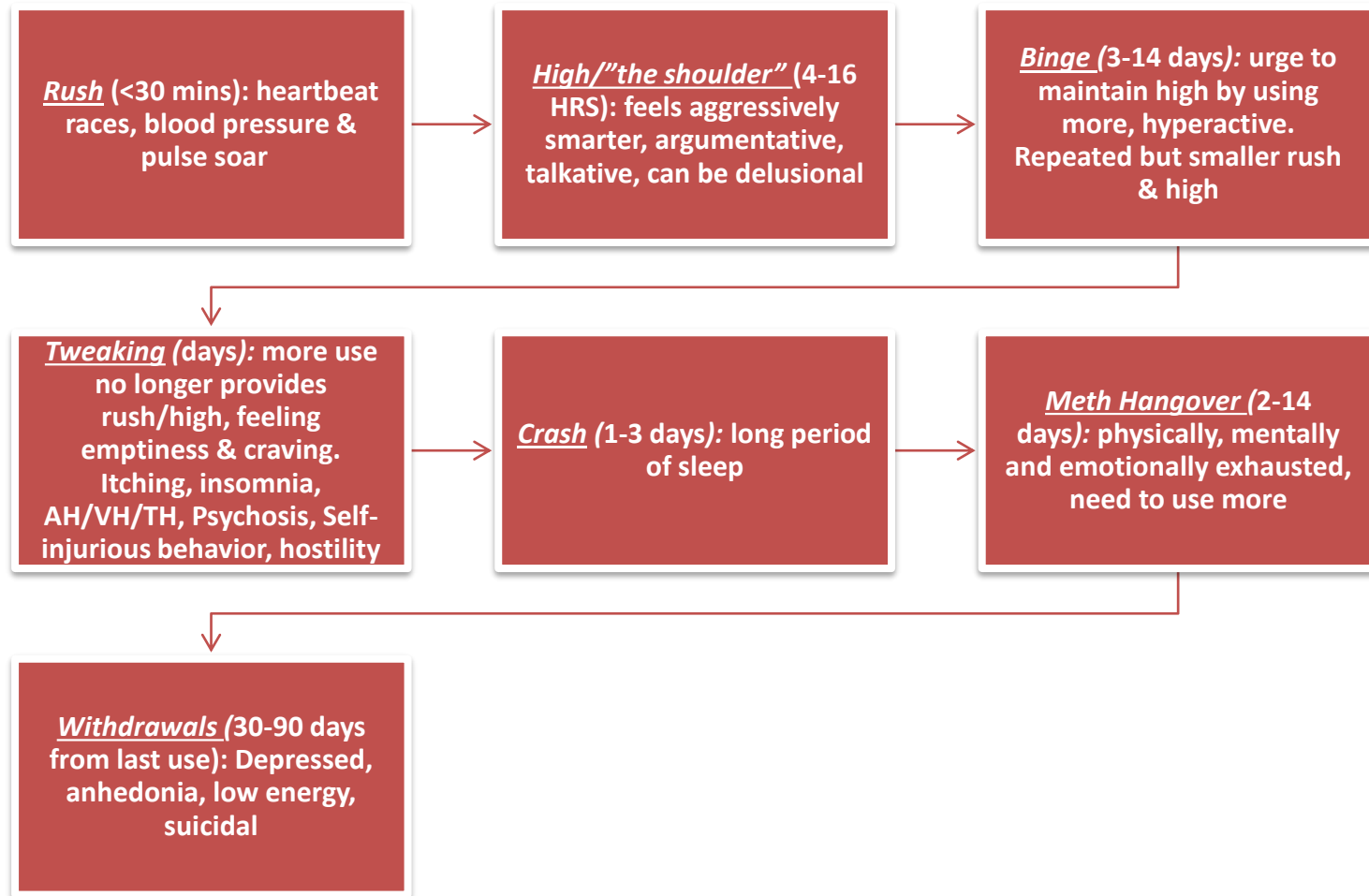
How much dopamine does an activity release?

Various activities cause the brain to release more dopamine than usual. Enjoying food brings a 50 percent boost to dopamine levels in the brain, for instance. Video games and sex also increase dopamine significantly. It's not reasonable to equate the brain response to drug use with that of video games.



Chart: The Conversation, CC-BY-ND • Source: [National Institute on Drug Abuse](#) • [Get the data](#)

HOW THEY EXPERIENCE METHAMPHETAMINE:



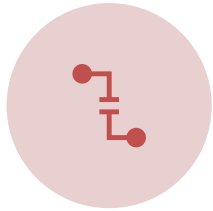
SHORT TERM EFFECTS OF USE

- **Increased wakefulness & Decreased need for sleep**
- **Increased energy & excessive talking**
- **Euphoria & increased sexuality**
- **Decreased appetite**
- **Dilated pupil, faster breathing, rapid heartbeat, increased blood pressure and body temperature**

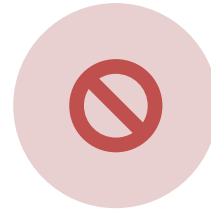
SHORT TERM EFFECTS OF USE

- **Psychosis & hallucinations**
- **Distractibility & motor hyperactivity**
- **Irritability, aggression**
- **Jaw muscle tightness & teeth grinding**
- **Intense itching**

LONG TERM EFFECTS OF USE



Impulsivity & violent behavior



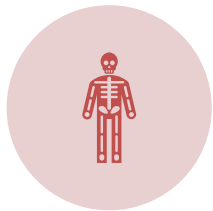
Risky sexual behaviors



Psychiatric issues- anxiety, Psychosis (paranoia, persecutory delusions), sleep disturbance, hallucinations (AH/TH), depression



Severe dental problems



Skin sores related to itching



Self-neglect

LONG TERM EFFECTS OF USE

- **More than two third of individuals MUD have cognitive impairment (some literature debates this)**
- **Even after early & prolonged abstinence, poor performance**
 - **Executive functions**
 - **Episodic memory**
 - **Visual-spatial processing**
 - **Language**
 - **Motor skills**
 - **Learning efficiency**
- **Medical problems**
 - **Methamphetamine associated hemorrhagic stroke**
 - **Cardiovascular: arrhythmia, cardiomyopathy, EKG changes (prolonged QTc), pulmonary hypertension, atherosclerotic plaque formation, MI**
 - **Risk of Infections: HIV, Hepatitis C & Hepatitis B**

WITHDRAWAL SYMPTOMS (1-4 WEEKS)

- Irritability
- Anhedonia
- Insomnia/hypersomnia
- Hyperphagia
- Psychomotor agitation/retardation
- Difficulty concentrating

TREATMENT

- **Effective Behavioral therapies:**
 - **Cognitive behavioral therapy**
 - **Matrix model**
 - **Contingency management**
 - **12-Step facilitation therapy**
 - **Behavioral activation**
 - **Some benefits of exercise**

TREATMENT: MEDICATIONS STUDIED

- **Dexamphetamine:** Improved withdrawals and cravings, no difference in use
- **Methylphenidate:** Mixed results, may help with cravings and reduced use
- **Naltrexone (oral or IM or SC):** Mixed results, reduced craving & use with oral or SC form
- **Topiramate:** May decrease use severity, no difference in abstinence

TREATMENT: MEDICATIONS STUDIED

- **Bupropion:** Reduction in use, increased abstinence in low use participants
- **Mirtazapine (in men having sex with men):** Reduced use, reduced high risk sexual behaviors, no change in depression
- **Buprenorphine:** Reduced cravings, improved abstinence
- **Buprenorphine vs methadone:** Reduced cravings in buprenorphine > methadone group

TREATMENT: MEDICATIONS STUDIED

- **N-Acetyl Cysteine + therapy:** reduced cravings
- **N-Acetyl cysteine:** no difference in cravings or use
- **Riluzole:** reduced cravings, withdrawals, decreased use
- **Pexacerfont (CRF1 antagonist):** reduced cravings, no difference in abstinence

TREATMENT: MEDICATIONS STUDIED



Sertraline: Inferior to placebo



Atomoxetine: Small reduction in use



Medications with no significant effects:

Imipramine

Modafinil

Aripiprazole

Baclofen and Gabapentin

Combination (Flumazenil, gabapentin, Hydroxyzine)

Ondansetron

Varenicline

TREATMENT: MEDICATIONS STUDIED

Medications may help (weak evidence):

- **Dexamphetamine & methylphenidate**
- **Naltrexone**
- **Topiramate**
- **Riluzole**
- **Bupropion**
- **Mirtazapine**

Ongoing studies:

- **Lisdexamphetamine**
- **Naltrexone (IM) + Bupropion**
- **N-acetyl cysteine**
- **Pomaglumetad**
- **Monoclonal antibody (IXT-m200)**

ISSUES WITH ABOVE MEDICATION STUDIES

- **Small sample size, issues with retention and adherence.**
- **Exclusion of individuals with comorbid mental health diagnosis & substance use.**
- **Limited focus on ADHD and methamphetamine use.**
- **Under representation of woman users**

OTHER POTENTIAL USEFUL INTERVENTIONS

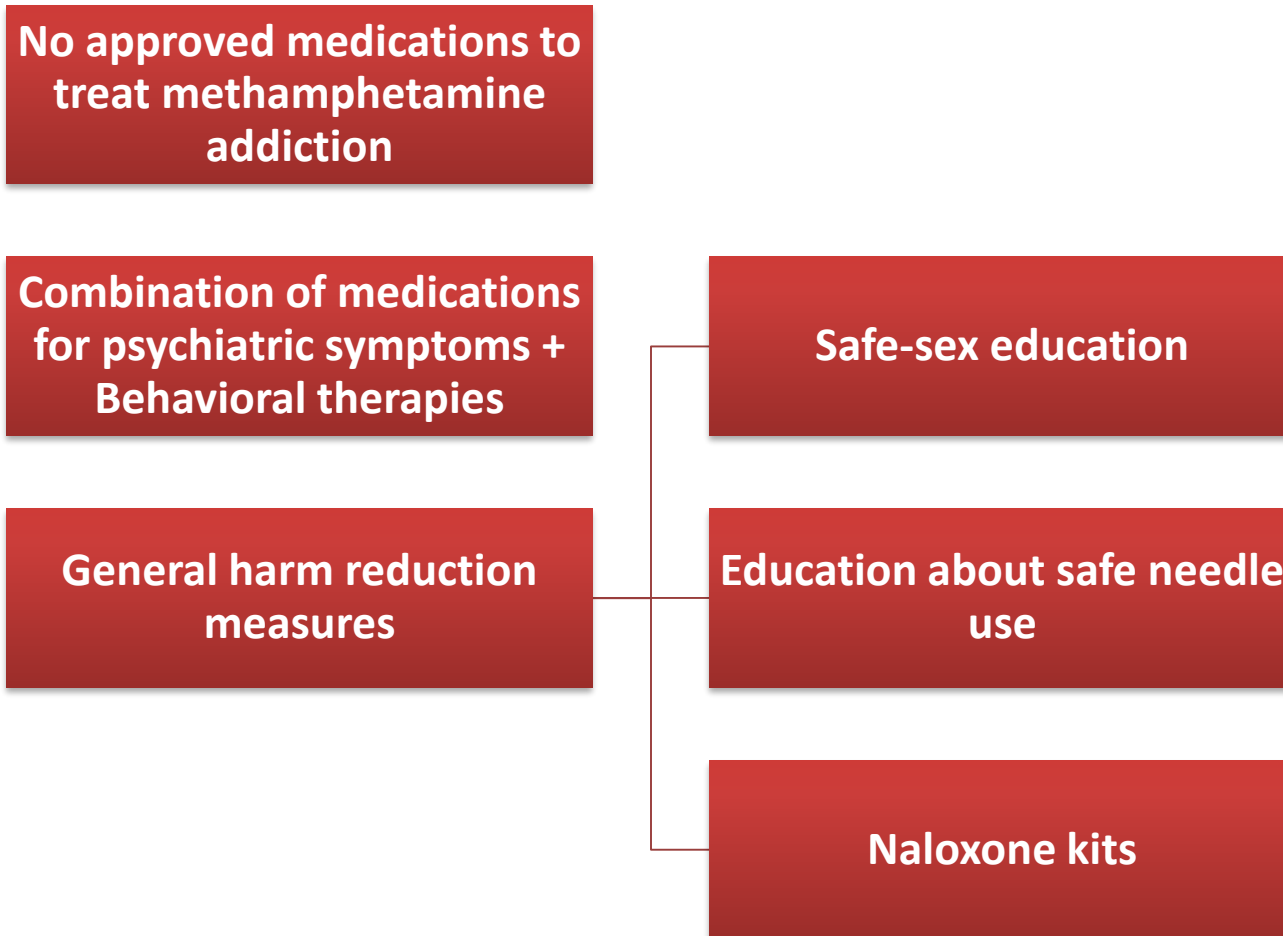


Use of neuropsychological assessment



TMS: reduced cravings & increased cognitive-emotional function

TREATMENT SUMMARY



Which of the following medications will you consider for methamphetamine withdrawals?

- a. Diazepam
- b. Olanzapine
- c. Dexamphetamine
- d. Pexacerfont
- e. Riluzole

REFERENCES

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