Methamphetamine Use Disorder

Substance Use Disorders in Hospital Care ECHO

DATE: February, 26 2020 PRESENTED BY: Jessica Gregg, MD, PhD and Ximena Levander MD
OHSU Addiction Medicine Section

Disclosures

- **Speakers:** Jessica Gregg and Ximena Levander have nothing to disclose

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Objectives:

- Review the scope of the problem
- Describe two evidence-based behavioral interventions that can be implemented in the hospital: contingency management and harm reduction
- Discuss research (past and present) on medications to treat methamphetamine use disorder

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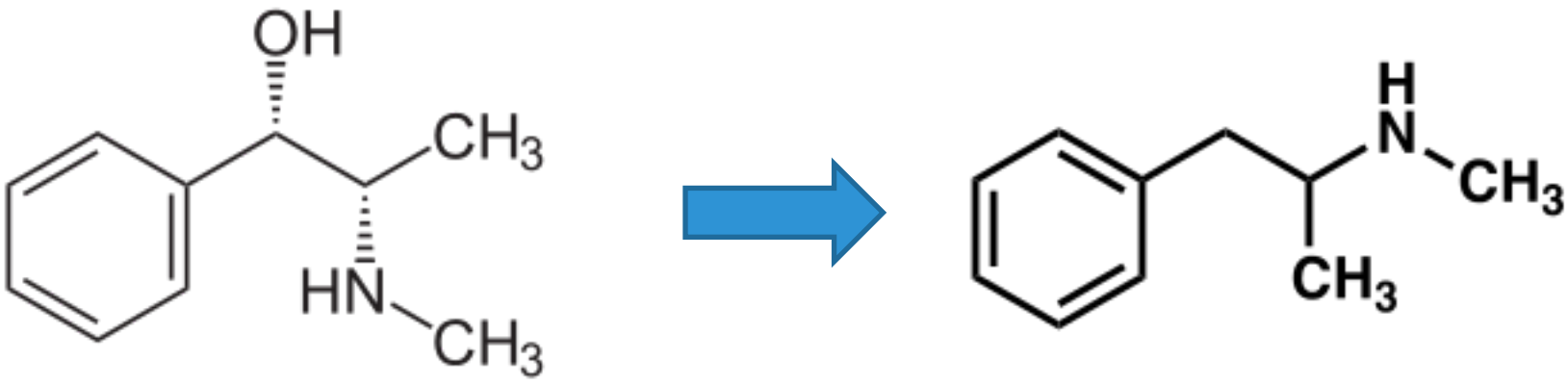
Crystal methamphetamine

- Form of d-methamphetamine
- Closely related to amphetamine
- Longer lasting and more toxic to the CNS


asy-Touch™ USE U-100 INSULIN ONLY


OH
CH3
HN
CH3
H
N
CH3
CH3

Materials:

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1 2 Liter Bottle (with cap)
1 1 Liter Bottle (get 2 caps for it)
1 20 oz. Bottle (with cap)
1 Quart Jar
2 ft. 1/4in. diameter rubber/plastic hose (aquarium hose works good)
Coffee Filters
1 Funnel
1 Tubing Cutter (go to Home Depot)
2 Plyers
1 Roll of Ductape or Electrical Tape 1 Blender or Food Processor

200 60mg Pseudophedrine HCL pills (Actifed, Sudafed, Suphedrine, etc.)
1 1/2 cups Ammonium Nitrate fertilizer (33-0-0)
3 cans starting fluid
3 AA Energizer Lithuim Batteries
1 bottle Red Devil brand Lye
2 caps of water (use the top off the 2 liter)
1 box Iodized Salt
1 bottle Liquid Fire brand drain opener

Procedure:

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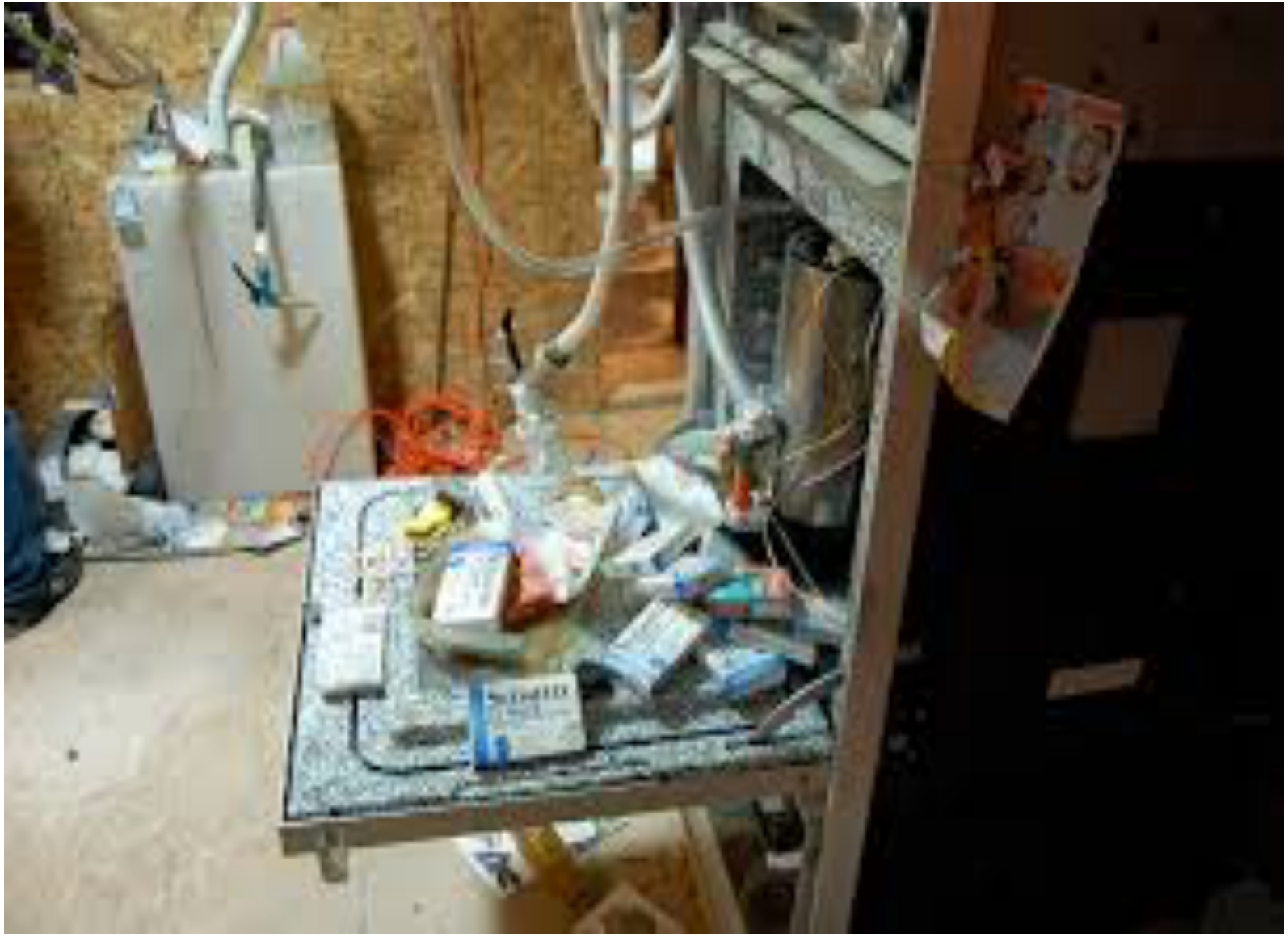
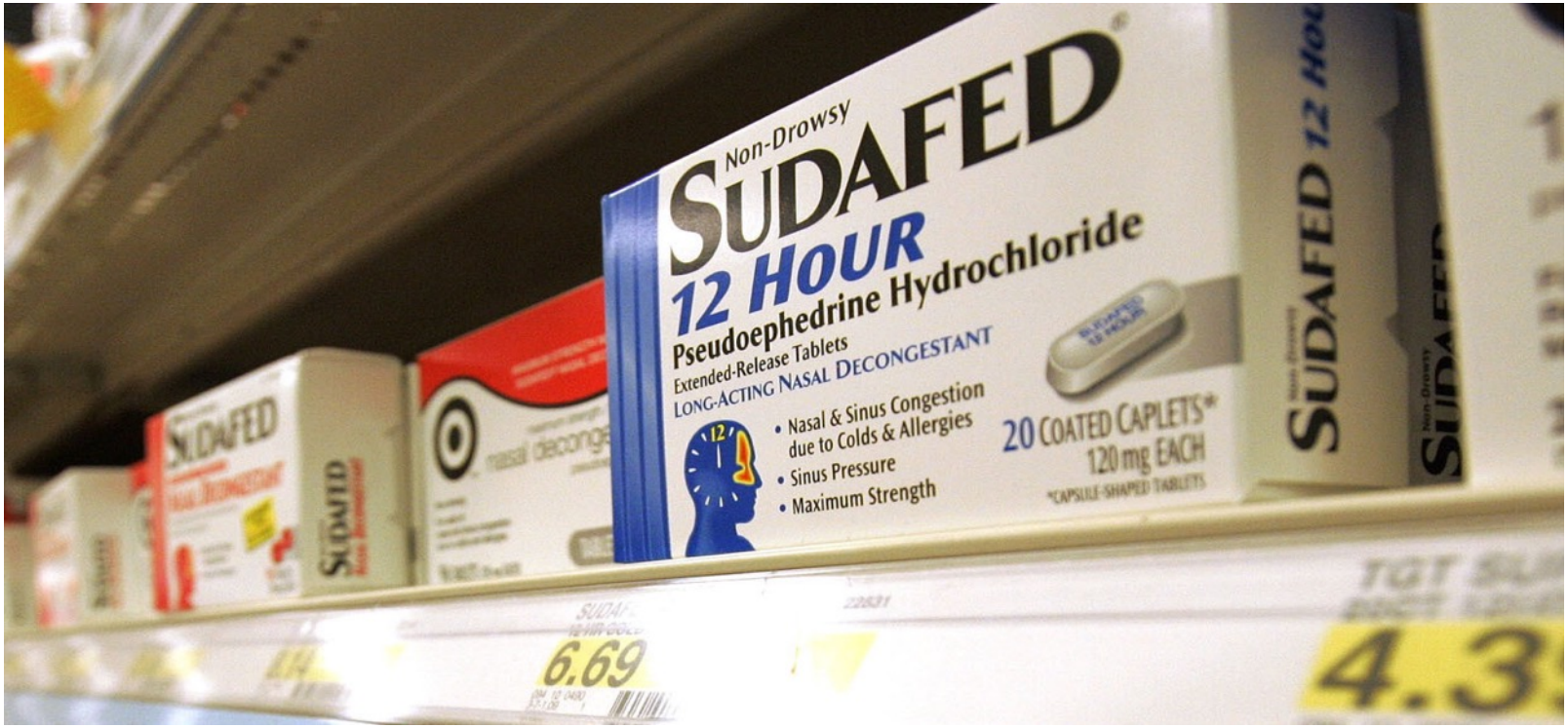
1) Rinse and dry out all of your bottles. Be sure to get ALL of the moisture out. Don't go any further until they are completely dry.
2) Put your pills into the blender or food processor and grind them into powder. Mix them in with the 1 1/2 cups of Ammoniun Nitrate fertilizer. Use the funnel to pour the mixture into the 2 liter bottle



2005: CMEA
(Combat Methamphetamine Epidemic Act)



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Result?

In Oregon, from 2004 to 2011, methamphetamine lab incidents decreased from an average of 24 per month to less than one per month

http://www.oregondec.org/pse.htm

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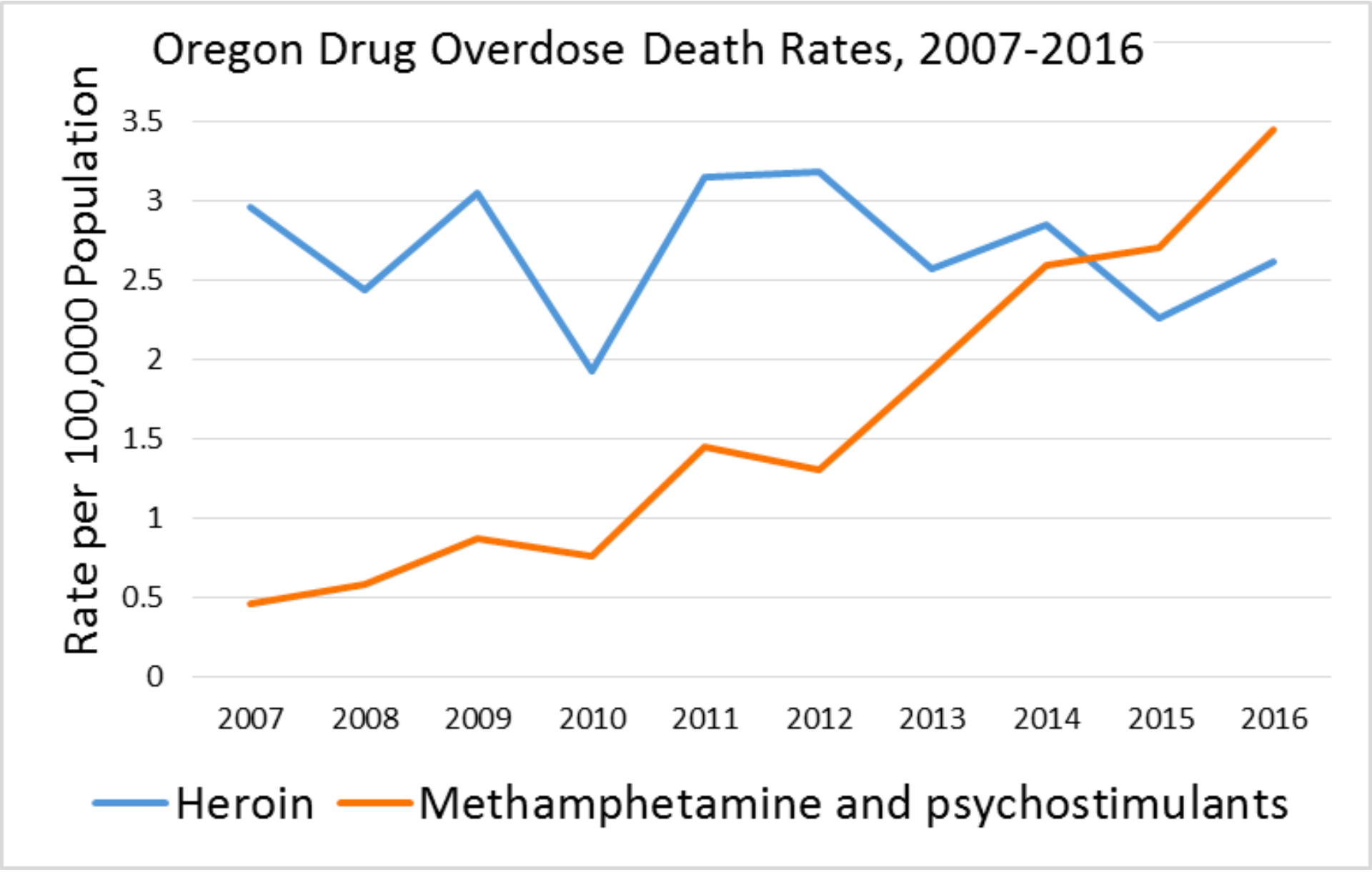
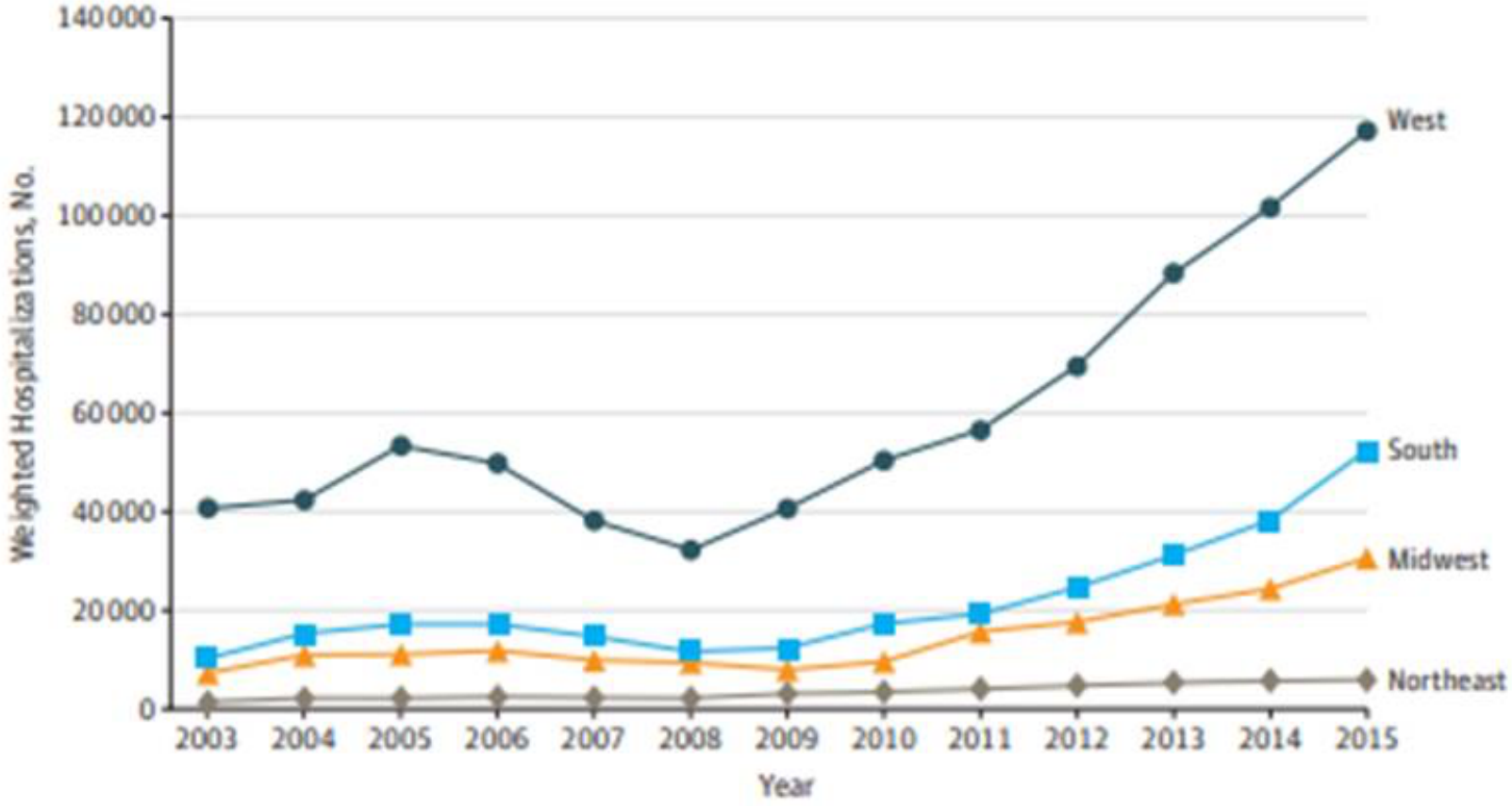
And Yet…


Oregon Drug Overdose Death Rates, 2007-2016
Rate per 100,000 Population
3.5
3
2.5
2
1.5
1
0.5
0
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
Heroin
Methamphetamine and psychostimulants

Increasing Hospitalizations

Figure 2. Amphetamine-Related Hospitalizations by US Census Region, 2003 to 2015



Winkelman, T et al JAMA 2018

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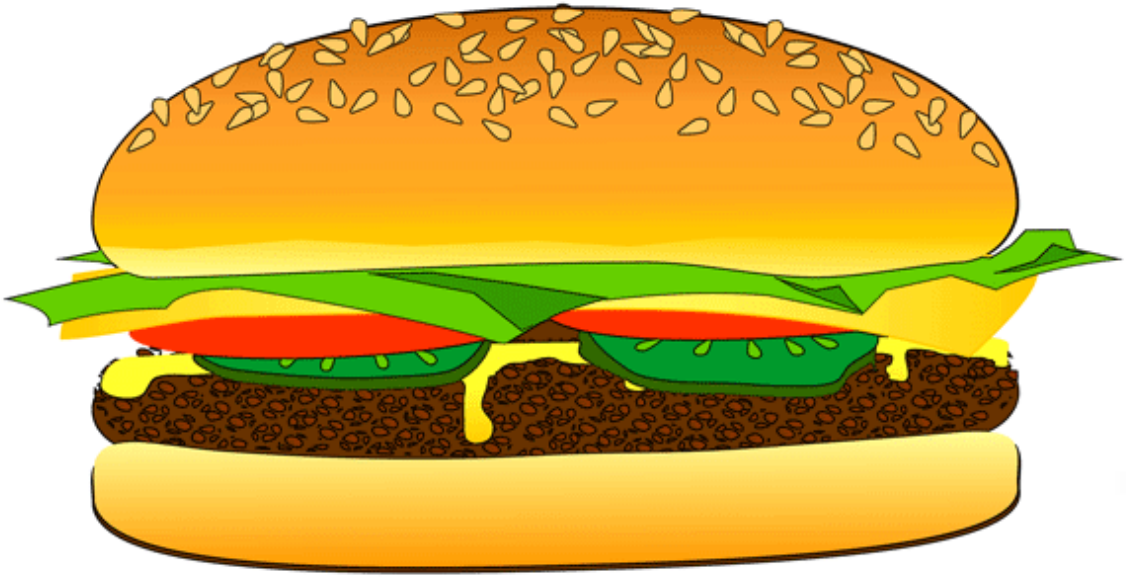
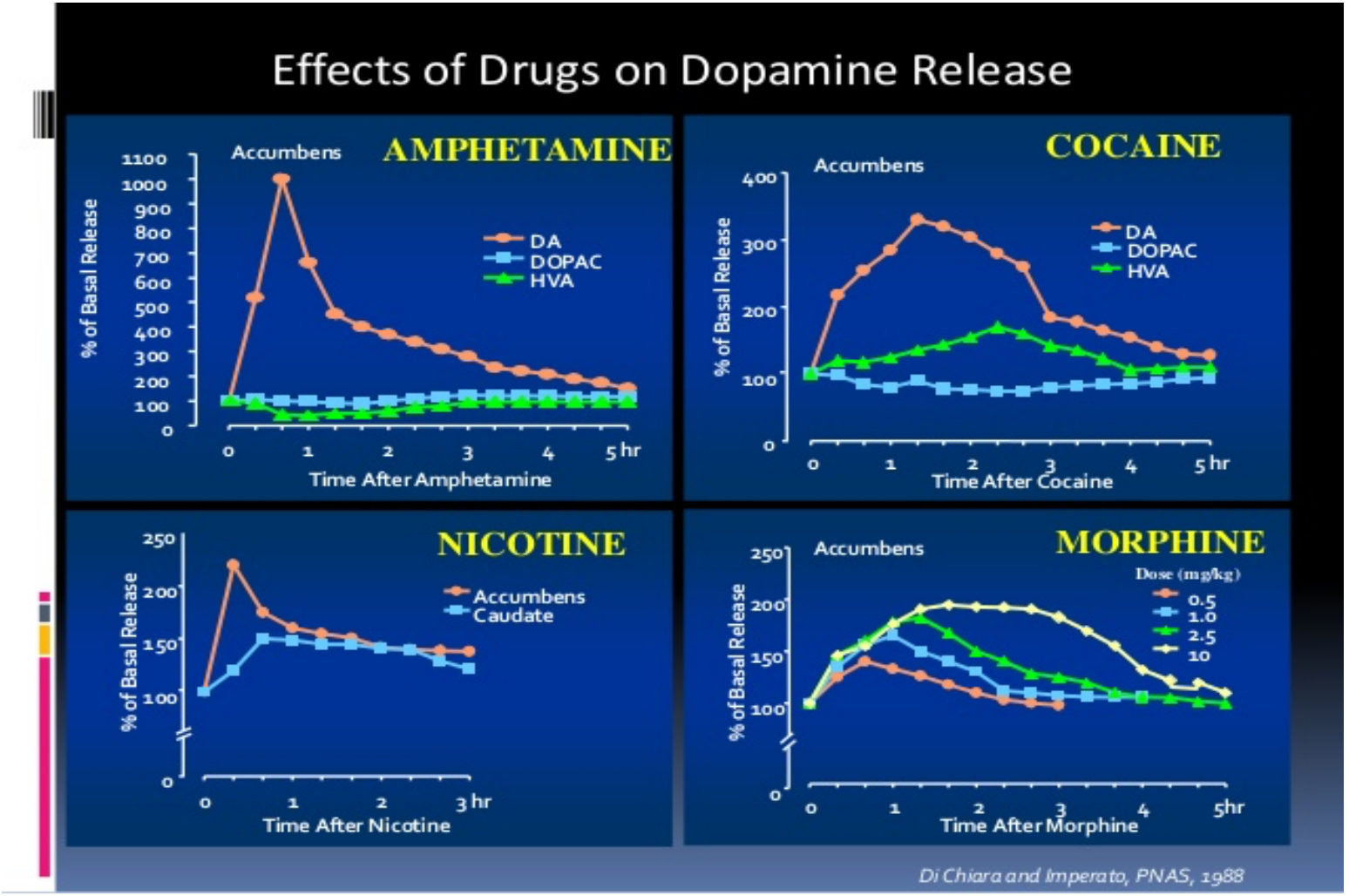
Increase dopamine to +/- 200 times basal output





Di Chiara and Imperato, 1988

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Medical Effects (not exhaustive)

- MA-induced sympathetic nervous system stimulation
  - Tachycardia, hypertension, arrhythmia, aortic dissection, anxiety, psychosis
- Organ pathology from excess circulating catecholamines
  - cardiotoxicity
- Direct toxicity to tissues
  - cardiotoxicity
- Chemical and street drug contaminants
  - Opioid overdose
- General health consequences of drug-using
  - Delayed health care seeking
- Lifestyles (needle sharing, malnutrition)
  - Abscesses, HIV, hep C

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Evidenced-based behavioral interventions: **Contingency Management**

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Contingency Management

Photo courtesy of
John Mahan MD

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Contingency Management: Theory

- Addiction is sustained through reinforced learning
- We cannot simply unlearn habits – we must learn new and competing habits
- CM entrains new behaviors that support the process of recovery
- Breaks recovery process down into a series of concrete, attainable goals
- > 100 RCTs affirm the effectiveness of CM in treating addiction

Roll JM et al. Am Jnl Psych 2006
Roll JM et al. Addict Behav 2013
Rawson, RA et al. Addiction 2016

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Contingency Management: Practice

1. Identify a target behavior that can be objectively measured, attainable, and reinforced in real time.

2. Reward that behavior immediately when it occurs, using rewards that are valuable to participants (but not necessarily expensive).

3. Use an escalating schedule of reinforcement.

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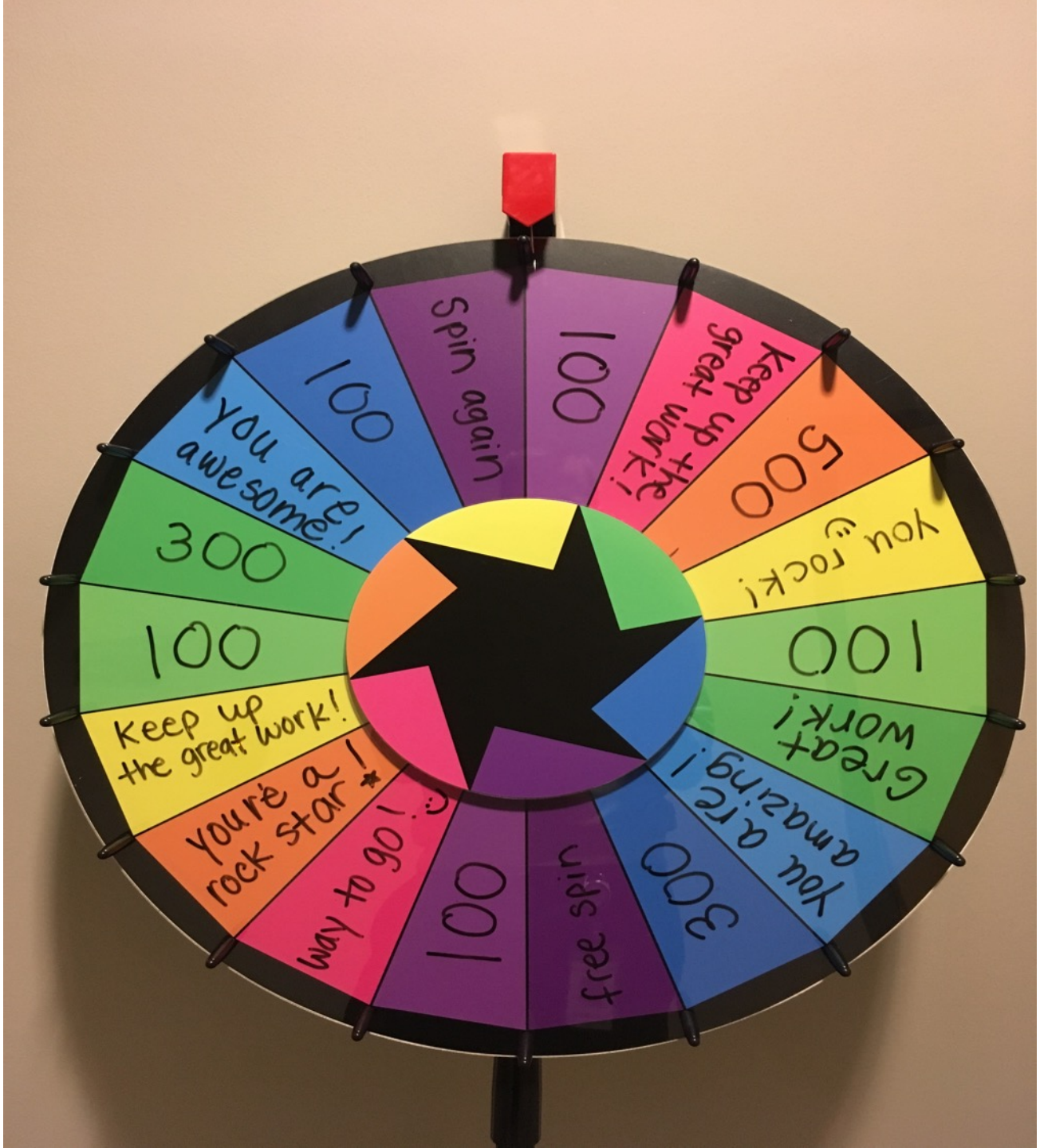
Spin again
100
Keep up the great work!
500
You rock!
100
Great work!
300
You are amazing!
100
free spin
100
Way to go!
You're a rock star!
Keep up the great work!
100
300
You are awesome!
100

Example

Patient on long term IV antibiotics who is often not in her room when it is time for her antibiotics. She likes chocolate and Starbuck's Frappuccinos

Target behavior: be in the room 8:00 am, noon, and 5 pm

Reward: Hershey's kiss each time she is in the room when the nurse arrives with antibiotics

Escalating schedule: $5 Starbuck's card after she has accumulated 10 Hershey's kisses

Center for Substance Abuse Treatment. *Substance Abuse: Clinical Issues in Intensive Outpatient Treatment.* Treatment Improvement Protocol (TIP) Series 47.

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Evidenced-based behavioral interventions:
Harm Reduction

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Harm Reduction

A set of practical strategies and ideas aimed at reducing negative consequences associated with drug use. Harm Reduction is also a movement for social justice built on a belief in, and respect for, the rights of people who use drugs.

Harm reduction coalition https://harmreduction.org/about-us/principles-of-harm-reduction/

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Harm reduction is also

- Part of the continuum of care
- Relationship building
- Treatment

Harm reduction is not

- What we do when nothing else works

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Harm reduction practices: methamphetamines

1. Safe injecting:

   - Clean needles/rigs (including don't share filters, cookers)
   - Don't use alone
   - Use needles bevel up
   - Use a filter whenever possible
   - Test for fentanyl
   - Clean water

Collins S et al. Intl Jnl of Drug Policy 2019
Thakarar K, Weinstein ZM, Walley AY. *Postgrad Med J*. 2016;92(1088):356–363.

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Harm reduction practices: methamphetamines

2. Hydration

3. Toothbrushes

4. Condoms

5. Naloxone

6. **Patient Centered**: Ask the patient/client: what harms most concern you?

Collins S et al. Intl Jnl of Drug Policy 2019
Thakarar K, Weinstein ZM, Walley AY. *Postgrad Med J*. 2016;92(1088):356–363.

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Research on Medications to Treat Methamphetamine Use Disorder

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MAT for Methamphetamine Use Disorder

- No FDA-approved treatment for MA use disorder
- Lots of research looking into possible treatments, ongoing clinical trials.

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Mirtazapine

- Mixed monoamine agonist-antagonist
- Approved for major depression
- Replication trial – RCT of 120 U.S. cisgender men and transgender women who have sex with men
- Randomized to placebo or mirtazapine 15mg/day x 7days then 30mg/day for 24 weeks.
- Reduction in + UDS compared to placebo despite low adherence in both study arms at 12, 24, and 36 weeks
- Improved sleep and depression scores
- Reduction in some high-risk sexual behaviors at 24 weeks

Coffin PO et al. JAMA Psychiatry 2019

Psychostimulants

- Dextroamphetamine (narcolepsy), methylphenidate (ADHD, narcolepsy), modafinil (narcolepsy, shift work sleep disorder)
- Dopamine agonists
- All have abuse/dependency potential
- Systematic review of 17 studies found no effect for sustained abstinence or treatment retention.
- 2 methylphenidate RCTs had low strength evidence of reduced use during the trial

Bhatt M et al. Systematic Review 2016

Meds with no effect/insufficient evidence

- Varenicline
- Antipsychotics – aripiprazole (could increase harm)
- Antidepressants – bupropion, sertraline
- Anticonvulsants

Briones M et al. Drug Alcohol Depend 2018

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In the pipeline?

- Lots of interest for treatments for MA use disorder
- Bupropion 450 daily + Naltrexone IM every 3 weeks (trial completed enrollment summer 2019)
- Monoclonal antibody (study currently enrolling)
- Transcranial Magnetic Stimulation

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Summary

- Methamphetamine use and use disorders are escalating in Oregon
- There are effective behavioral interventions
- Harm reduction is treatment
- Medications are being investigated.

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Thank You

Jessica Gregg, MD
Associate Professor of Medicine
Addiction Medicine ECHO Program Director
OHSU
greggj@ohsu.edu

Ximena Levander, MD
Samuel Wise General Internal Medicine & Addiction Medicine Fellow
Division of General Internal Medicine
OHSU
levander@ohsu.edu

Questions?

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Atomoxetine

- Selective Norepinephrine Transporter Inhibitor
- Approved for ADHD
- Small pilot RCT in Malaysian men w/ combo opiate & amphetamine use disorders
- Suboxone + randomized to placebo or Atomoxetine 40mg/day x 7days then 80mg/day.
- Small effect size for neg UDS compared to placebo (moderate effect size in high adherence group)
- Similar proportion of reported days abstinent

Schottenfeld RS et al. Drug Alcohol Depend 2018

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Topiramate

- Anticonvulsant, migraine (prevention)
- Mechanism of Action for Stimulants:
  - Binds to GABA receptor – increasing GABA
  - Inhibiting glutamate activity
- Placebo-controlled, double-blind, randomized multi-center trial of 140 U.S. adults with MA UD
- Titrated up to 200mg/day
- Did not decrease abstinence (UDS results)
- Did reduce amount used & relapse rates in abstinent adults

Elkashef A et al. Addiction 2012