

Bending the HIV Epidemic Among Men Who Have Sex with Men Who Use Amphetamine-Type Substances

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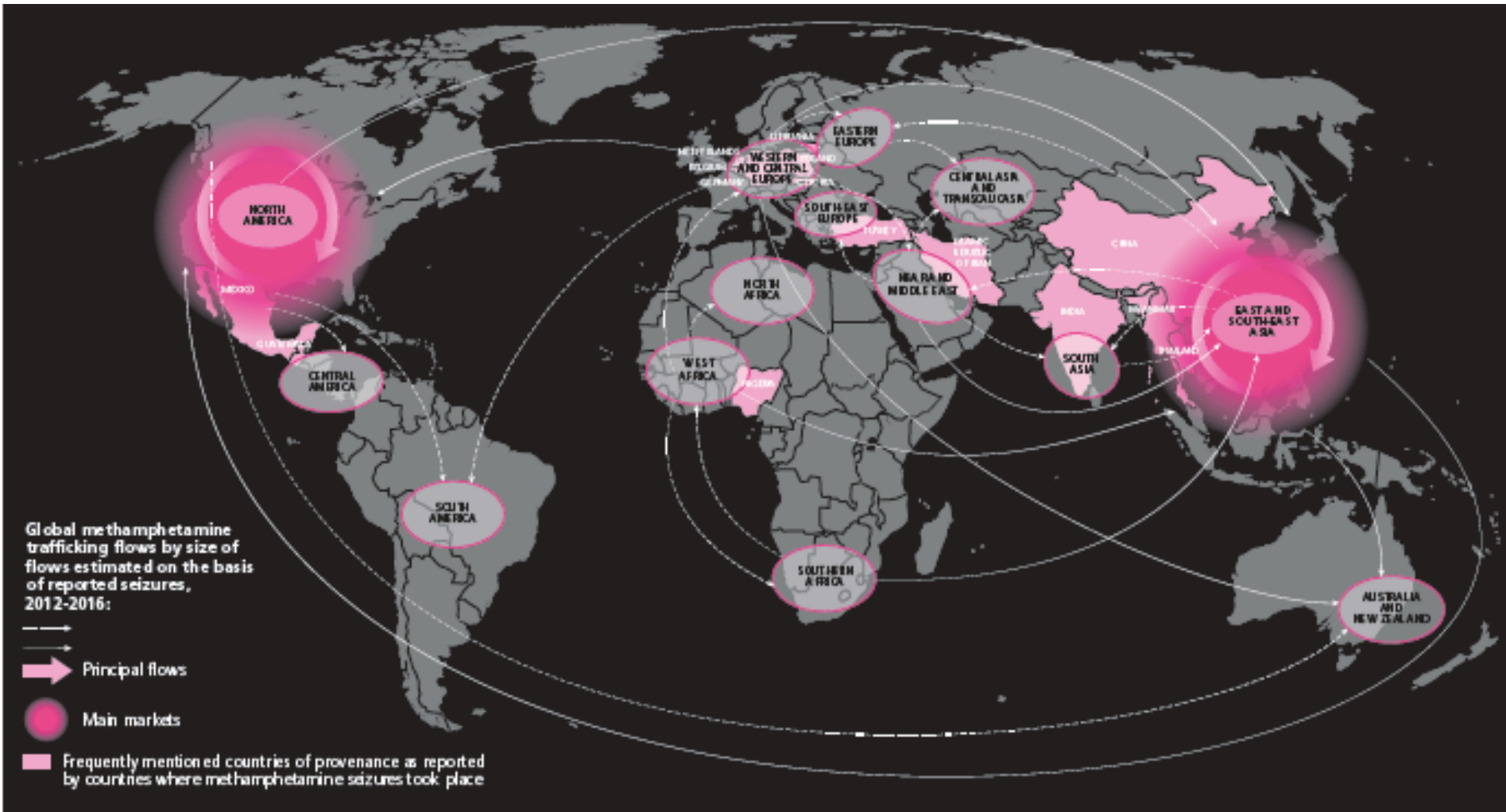
Acknowledgements

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Epidemiology of Methamphetamine Use

- Worldwide 34.2 million amphetamine users
 - Increased mortality (6.8-fold) from suicide, overdose, CVD, accidental injuries, homicide
 - Increased psychiatric disorders, injuries, NCI, CJI
- Use in MSM is 20-fold greater than the general population
- Meth use (sexualized drug use) is associated with increased HIV risk in MSM
 - More sexual partners
 - More condomless sex
 - Higher prevalence of HIV in meth users
 - Higher HIV incidence

Global Trafficking Routes of Amphetamine-Type Substances



Sexualized Drug Use (“ChemSex”, “ChemFun”)

- Often occurs in the context of polysubstance use
 - Methamphetamine (Ice, Tina, Crystal, Crystal meth, Fire, Glass, Crank, Speed, etc)
 - Inhaled, Sniffed, Injected, “bootie bumped”
 - MDMA (X, Ecstasy, pil kuda)
 - Gamma hydroxy-butyrate (“G”)
 - Ketamine (Special K, K, black hole)
 - Alcohol
 - Cocaine
 - Amyl nitrate (Poppers)
 - Erectile dysfunction medications (Viagra)

Gamma Hydroxy Butyrate (GHB) Survey

UK survey of over 5000 participants – 2700 were MSM

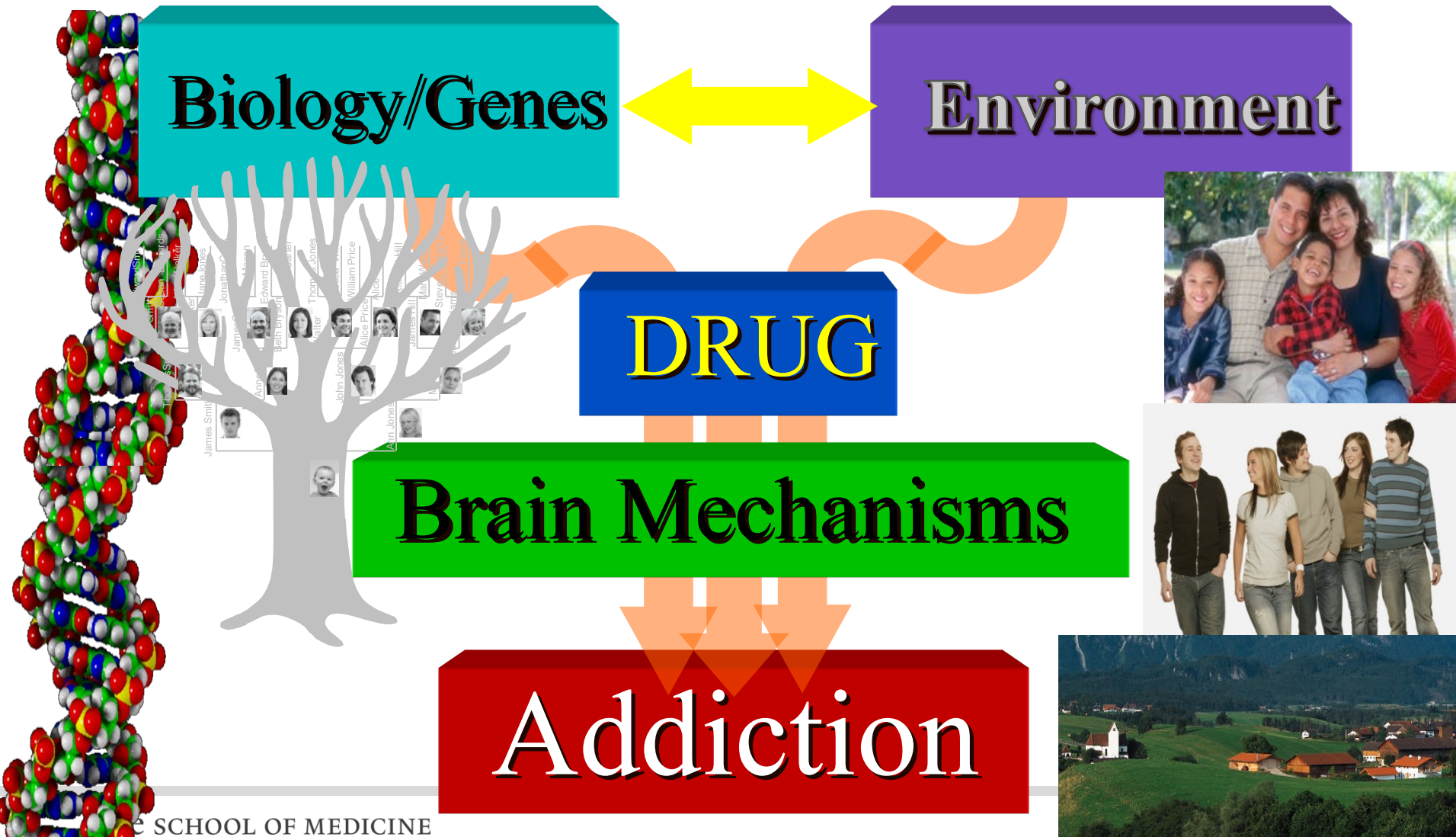
	Percent
Serious problems (loss of consciousness, addiction, hospitalization, and sexual assault)	63%
Non-fatal overdose	51%
Sexually assaulted while under the influence	28%
Met criteria for severe GHB dependence	14%
Knew someone that had died from using GHB	27%

WHY THE BRAIN PREFERS “ICE” OVER VEGEMITE?

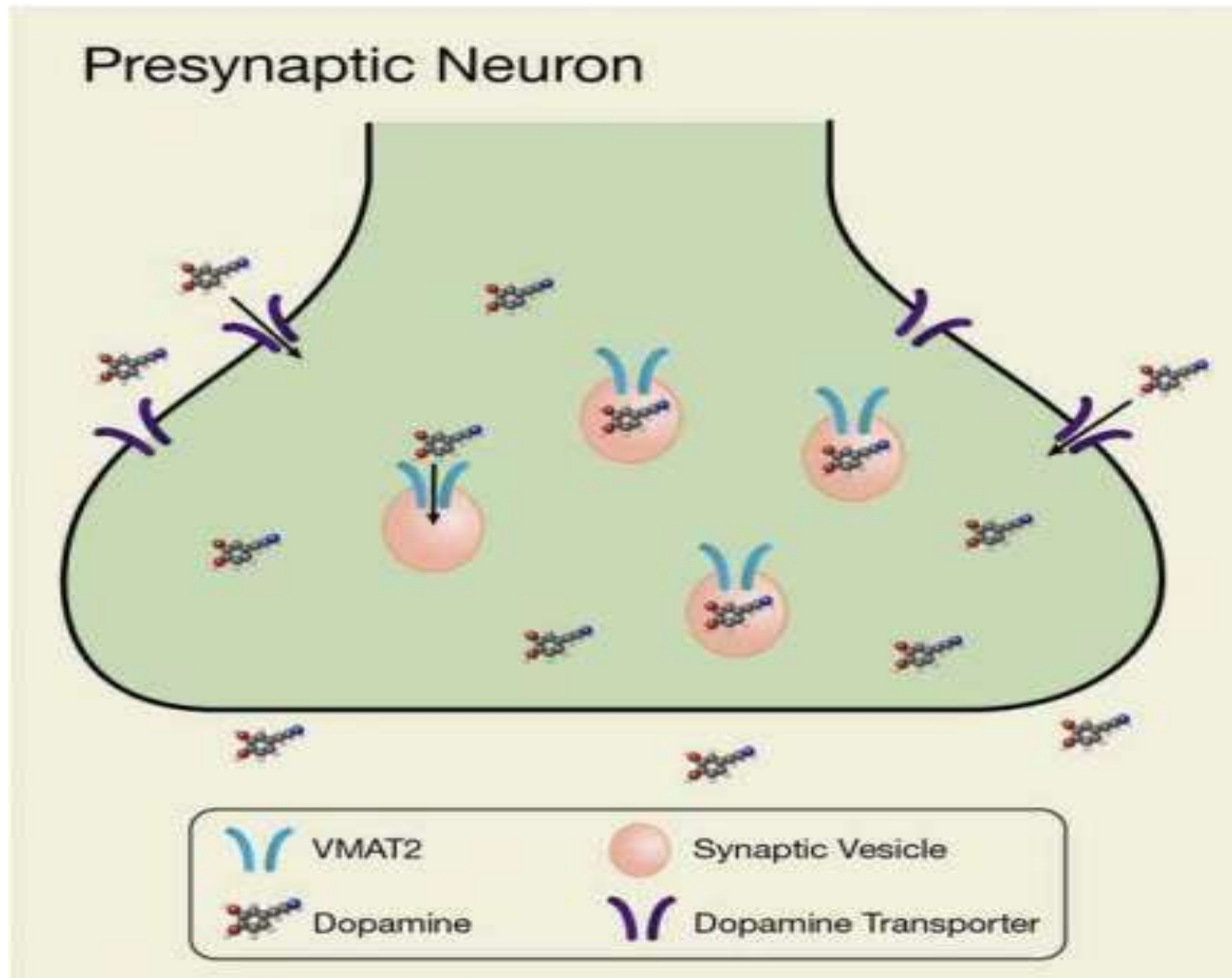
It feels REALLY good!



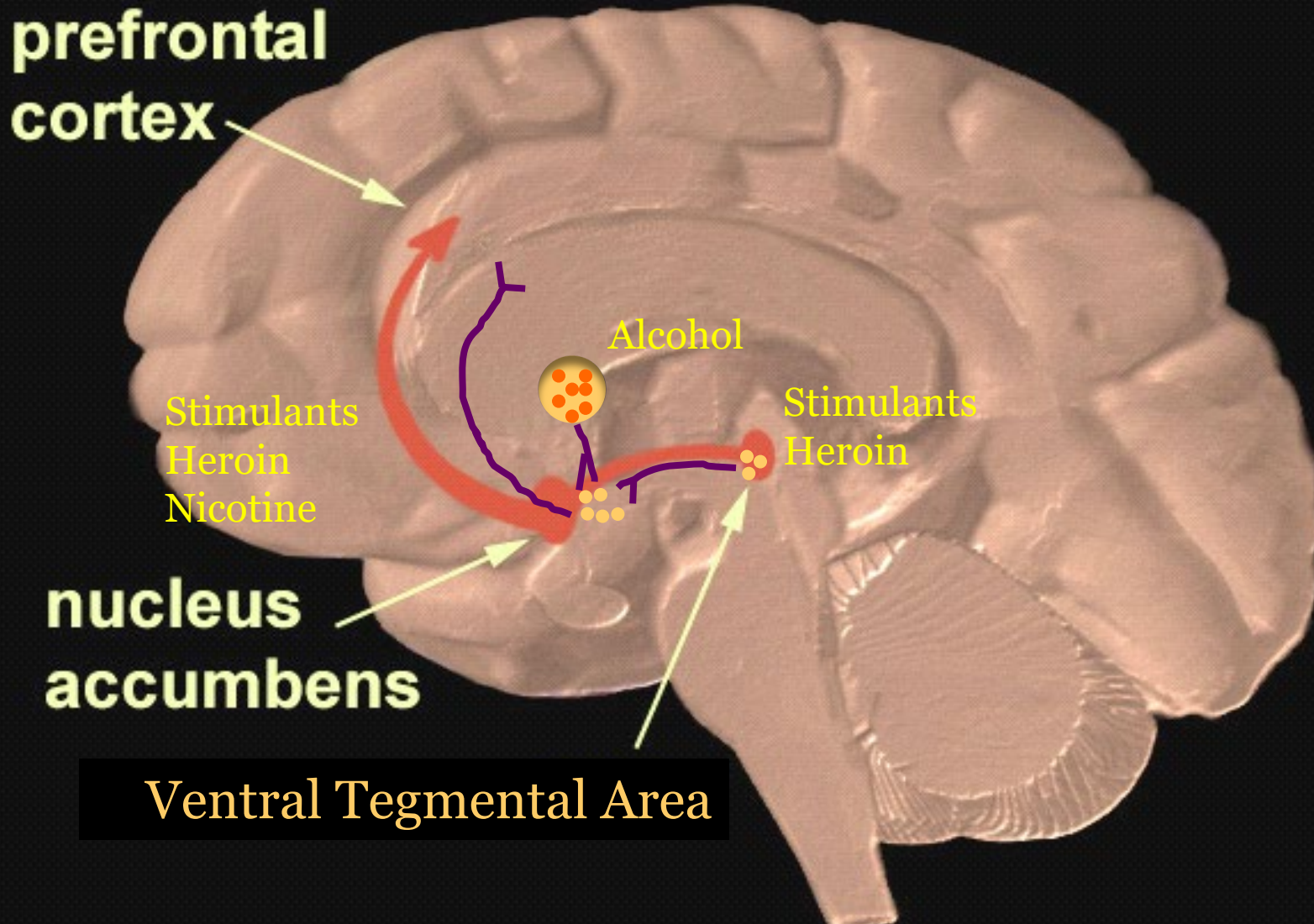
MULTIPLE PATHWAYS TO ADDICTION



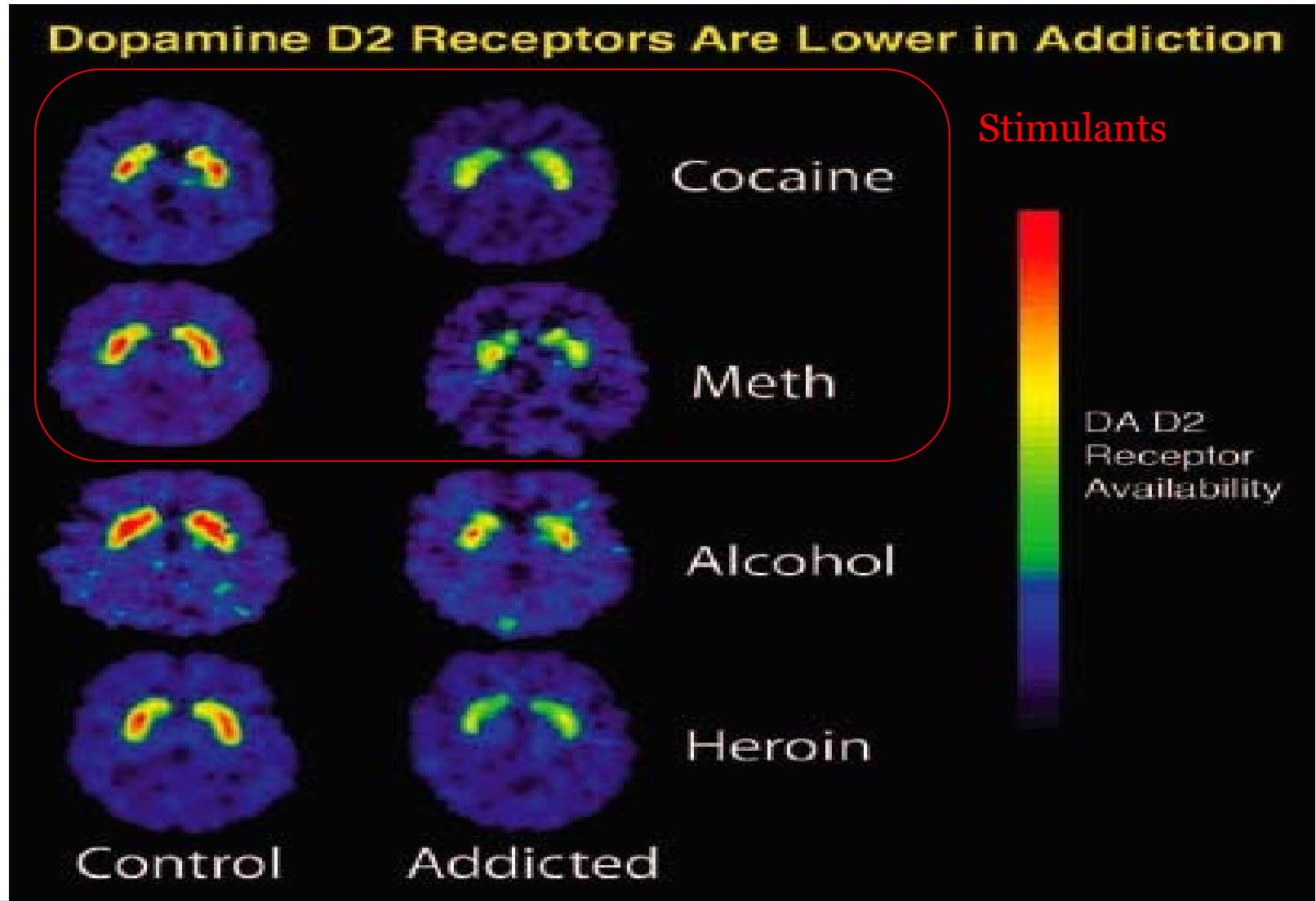
Dopamine and Vesicular Monoamine Transporter 2 (VMAT2)



Reward (Pleasure) Pathway



Similarities in Addiction Between Various Substance Use Disorders



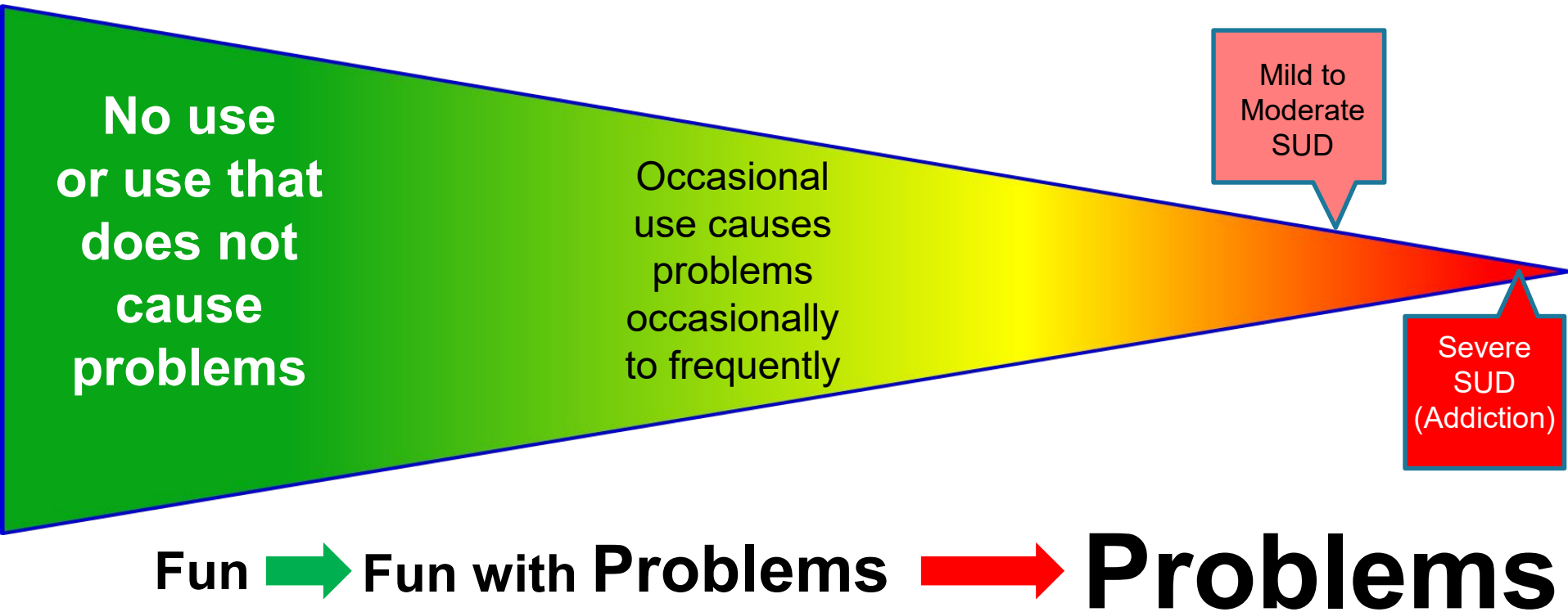
DSM-5 Definition: Substance Use Disorder

Maladaptive pattern of use, *clinically significant impairment or distress* and 2+ of the following within a 12-month period:

- Tolerance
- Withdrawal (Psychological or physical)
- Used for longer periods than intended
- Can't cut down or quit
- Time spent getting, using or recovering
- Give up social, work or fun activities
- Craving or a strong desire or urge to use a substance
- Continued use despite knowledge of negative consequences
- Failure to fulfill major role obligations
- Use in physically hazardous situations
- Continued use despite social and interpersonal problems

Mild = 2-3 criteria; Moderate = 4-5 criteria; Severe = 6+ criteria

The Spectrum of Substance Use Disorders



Adverse Consequences of Methamphetamine Use

Psychological

- Insomnia
- Aggressive behavior
- Paranoia
- Incessant conversations
- Decreased appetite
- Increased alertness
- Irritability
- Slurred speech
- Dizziness
- Confusion
- Hallucinations
- Obsessive behaviors
- Depression
- Panic attacks

Systemic

- Hyperthermia
- Malnutrition
- Impaired immune system

Circulatory

- High blood pressure
- Vessel damage in brain
- Clotting and stroke

Heart

- Chest pain
- Rapid heart rate
- Heart attack

Liver

- Damage

Eyes

- Dilated pupils

Mouth

- Grinding of teeth

Skin

- Sweating
- Numbness

Respiratory

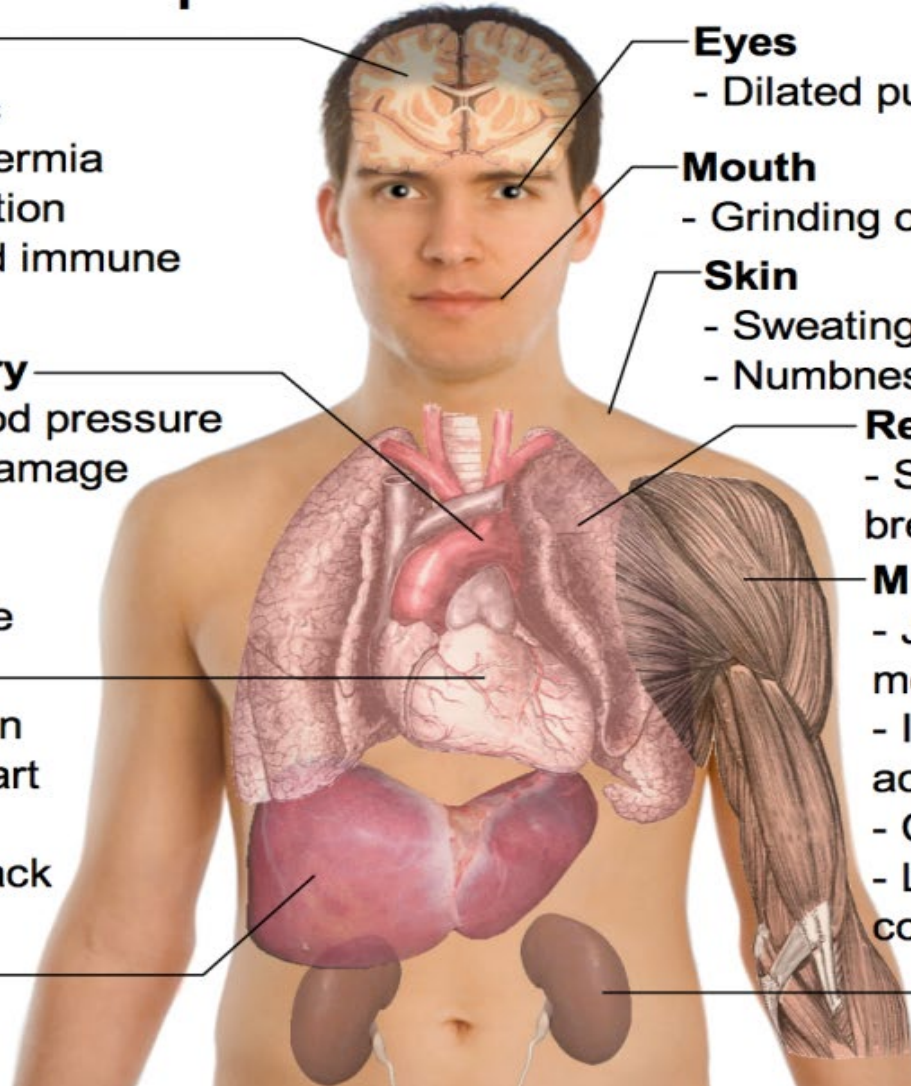
- Shortness of breath

Muscular

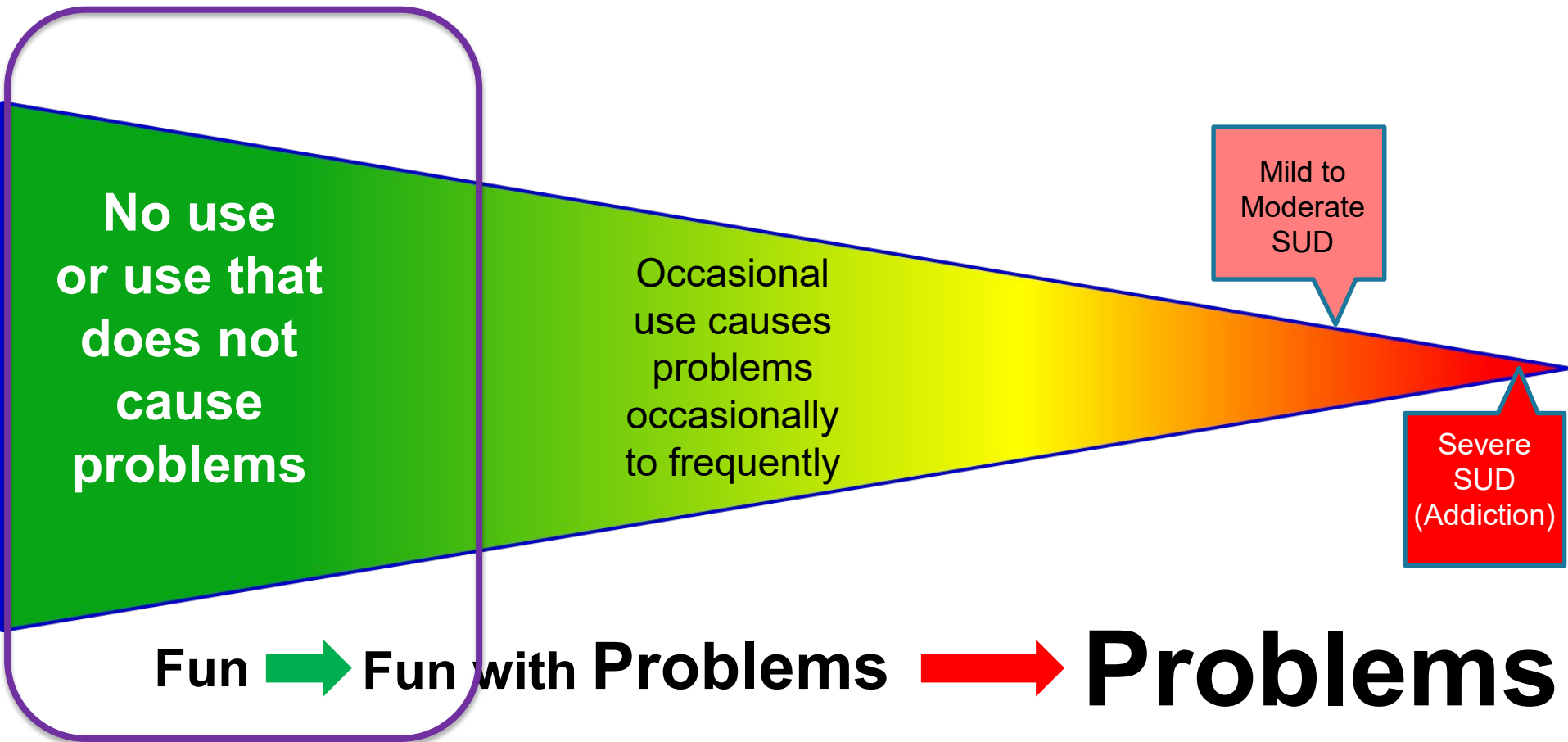
- Jerky movements
- Increased activity
- Convulsions
- Loss of coordination

Kidneys

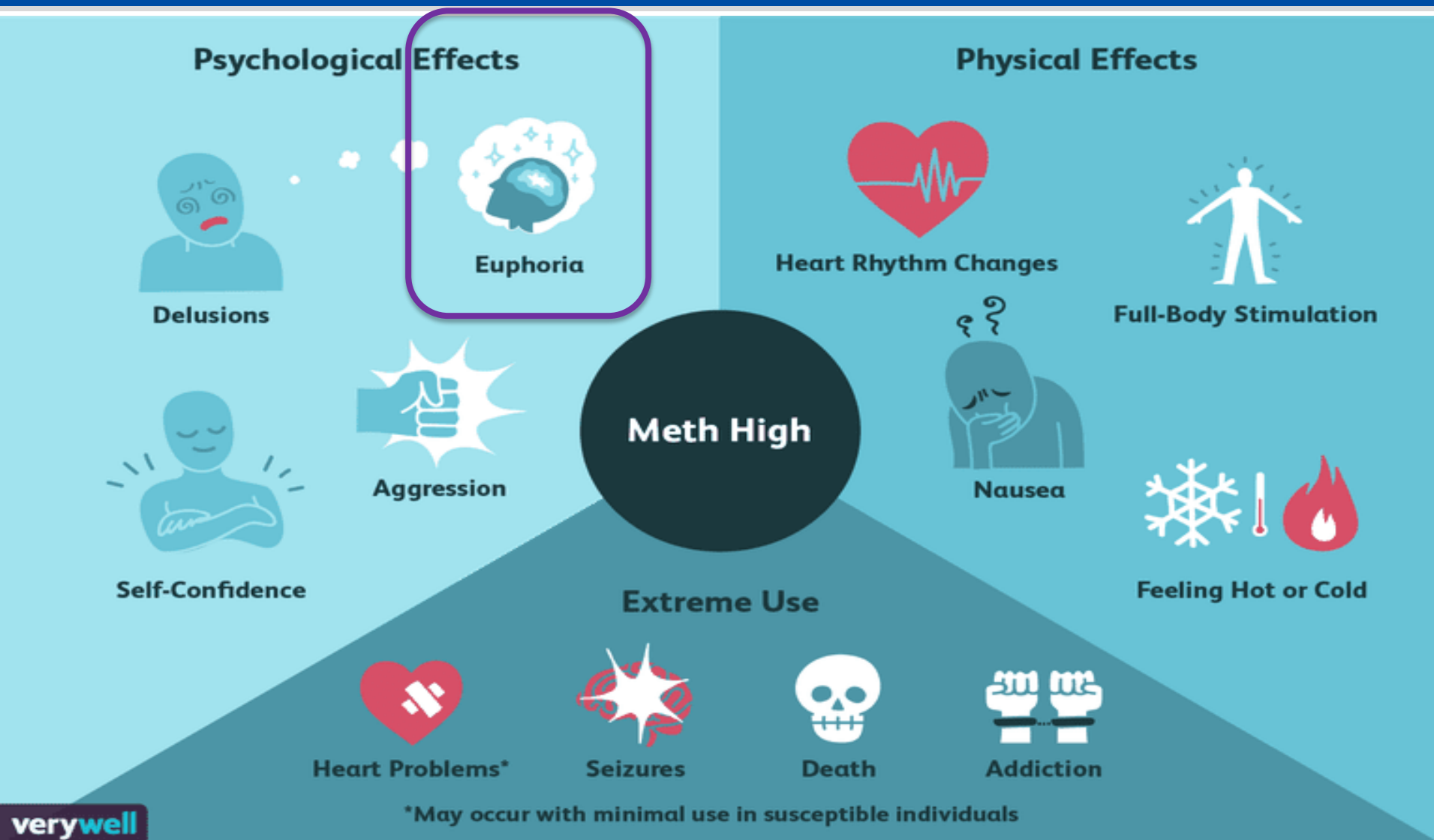
- Damage



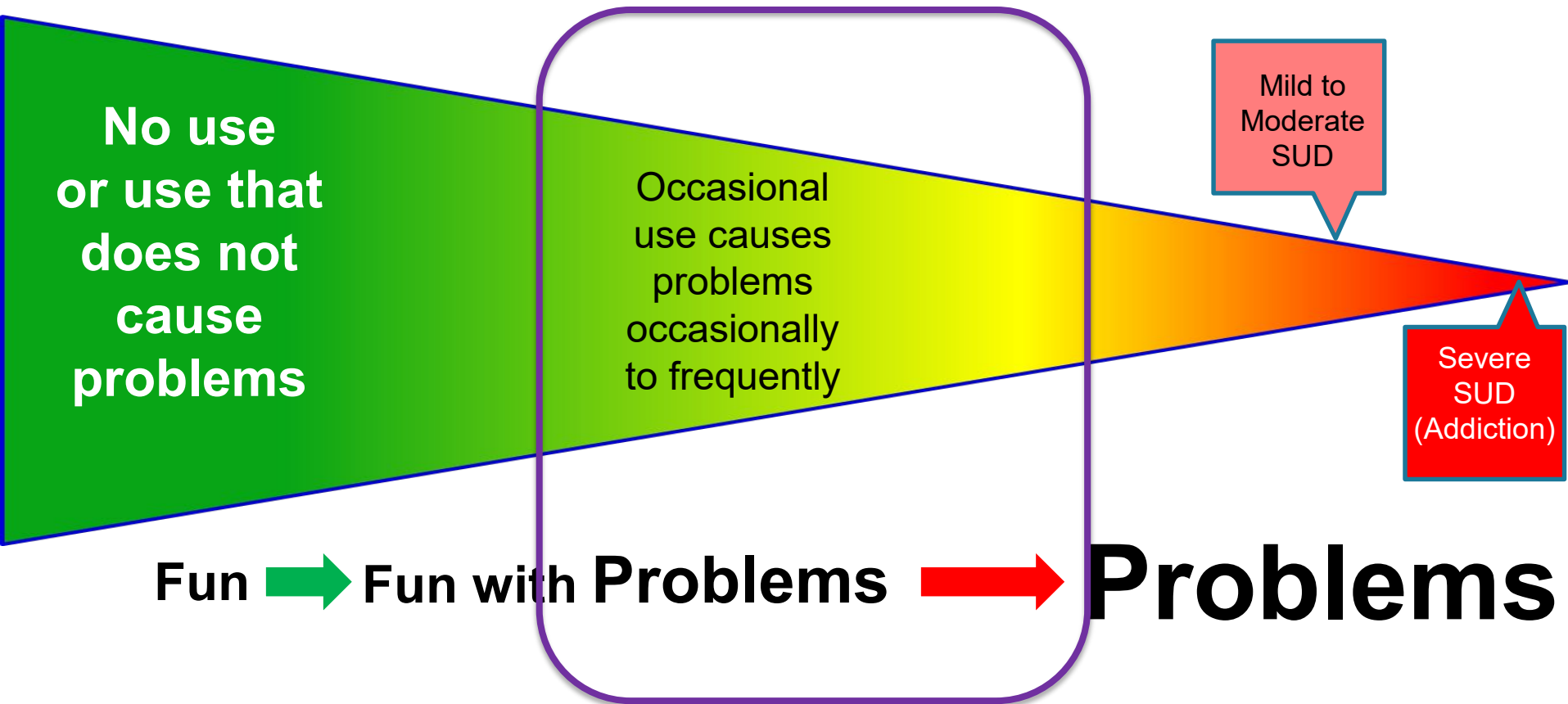
The Spectrum of Amphetamine Use



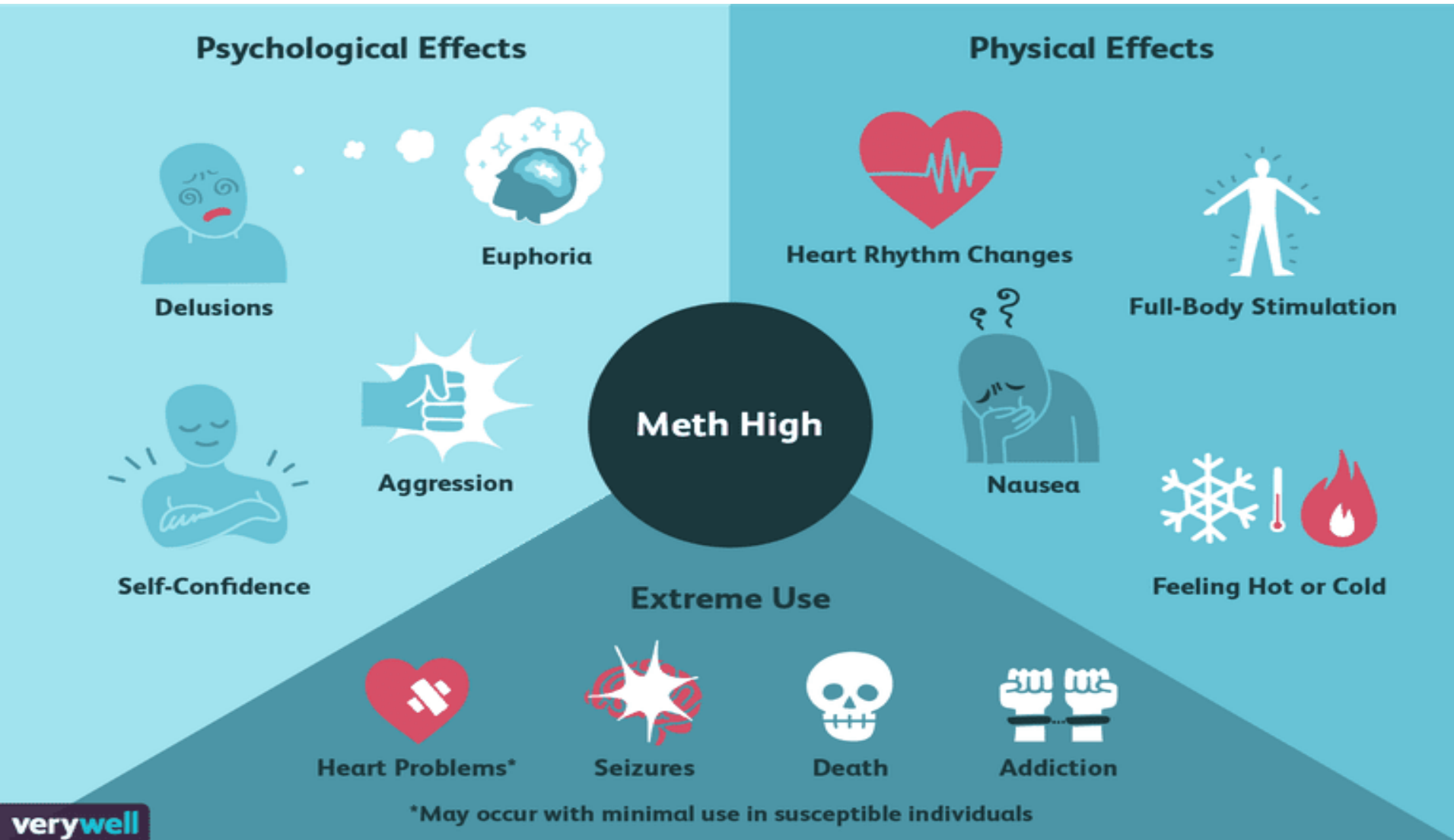
Consequences of Amphetamine Use



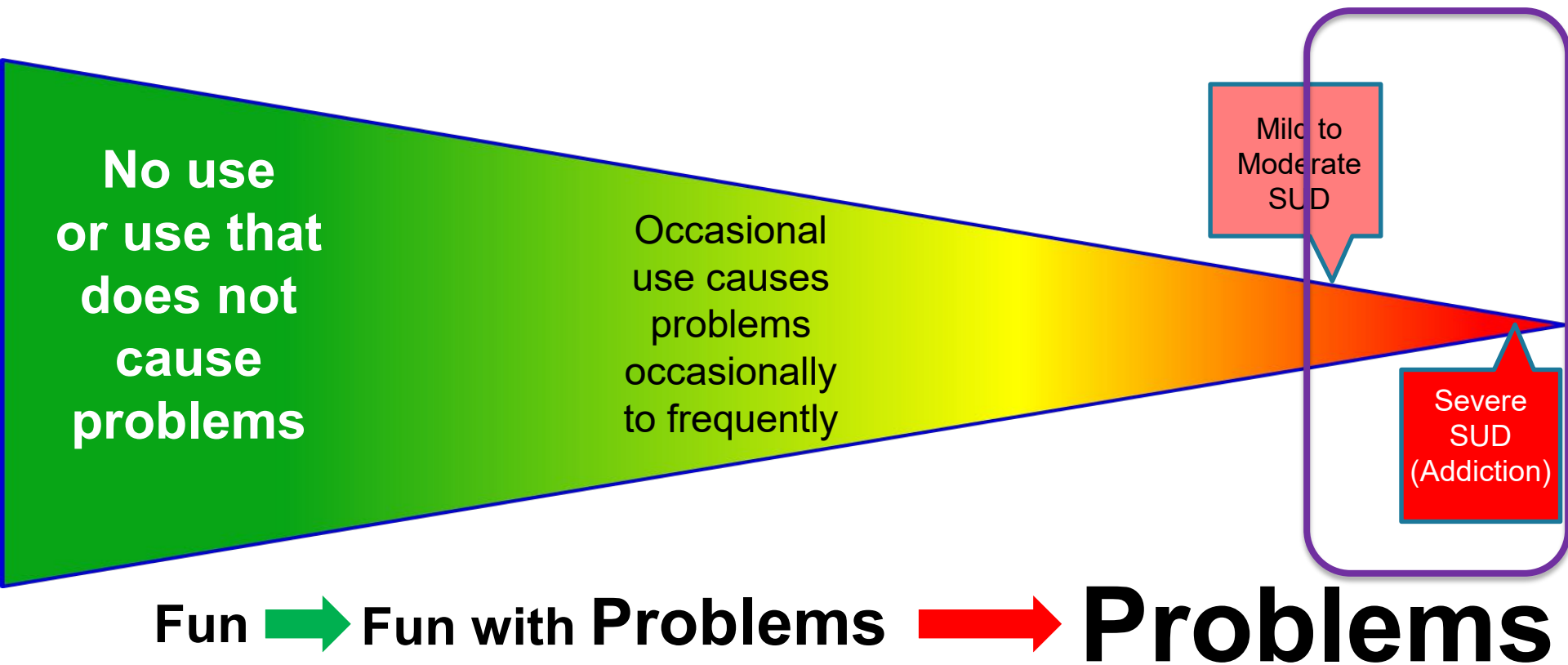
The Spectrum of Substance Use Disorders



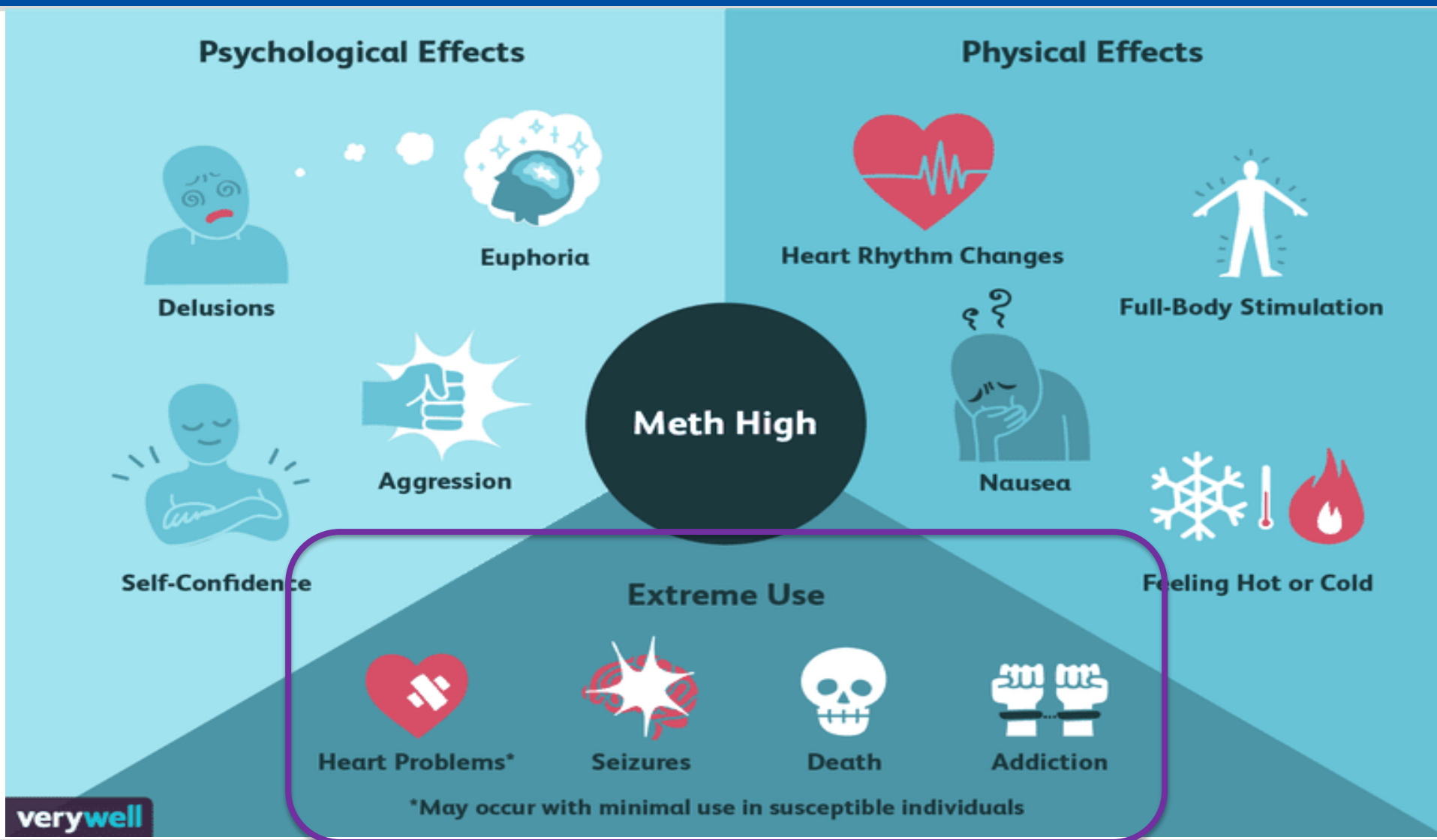
Consequences of Amphetamine Use



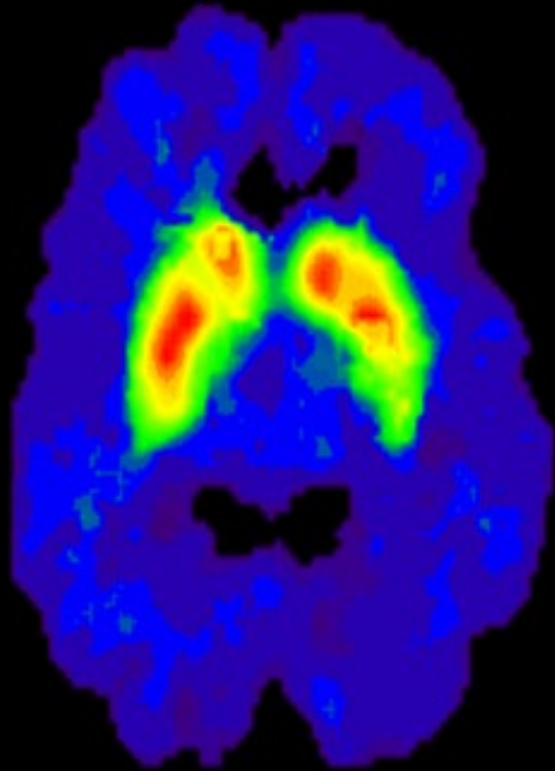
The Spectrum of Substance Use Disorders



Consequences of Amphetamine Use



Dopamine Recovery After Methamphetamine Use Discontinuation



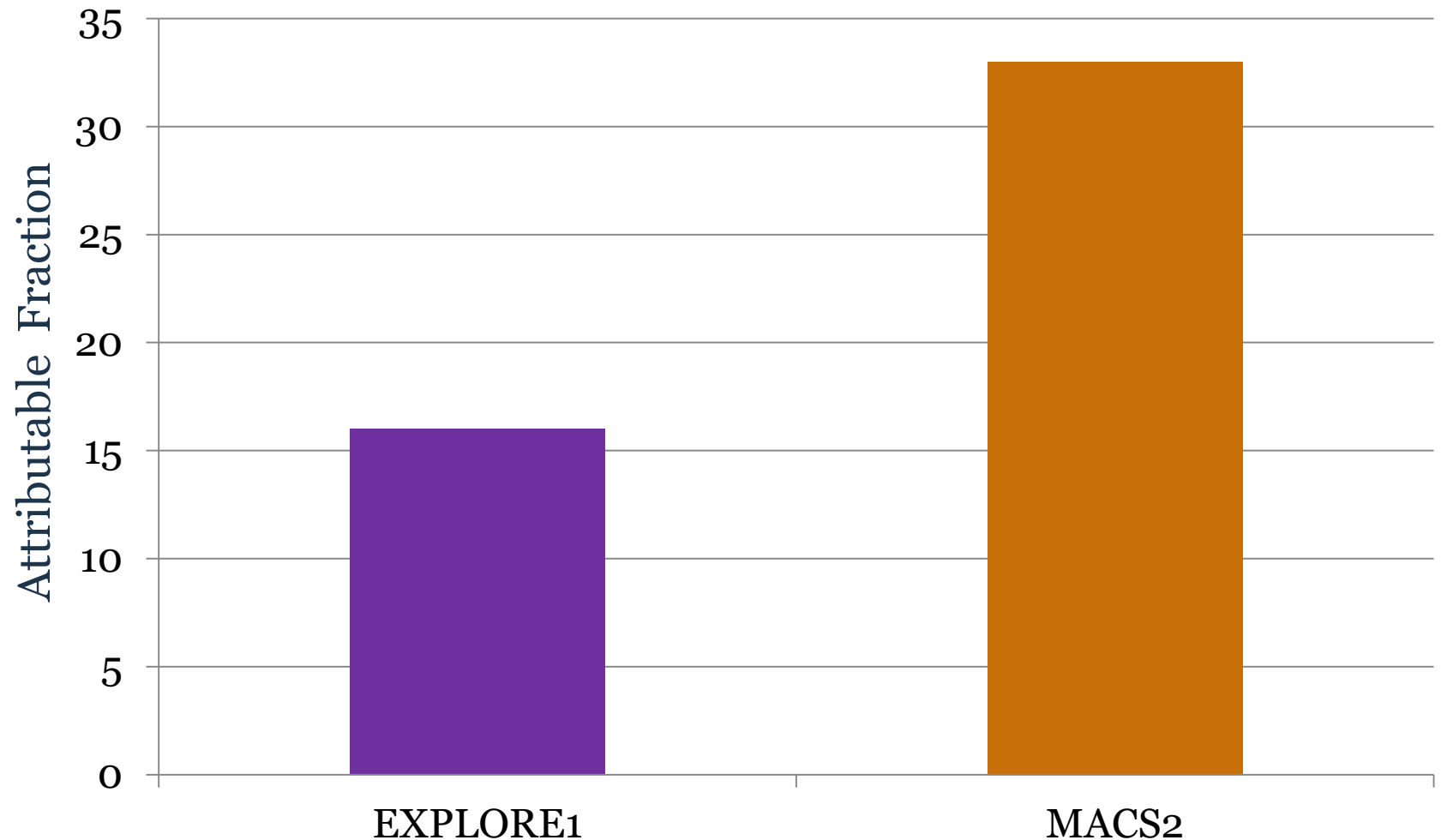
Normal Control

Volkow ND, J Neuroscience, 2001

Methamphetamine and HIV



Methamphetamine Use, HIV Incidence in MSM: *Attributable Fraction*



¹ Koblin et al., 2006, AIDS, 20: 731-739

² Ostrow et al., 2009, JAIDS, 51: 349-355

Micro-Ecological Study of ATS and Sex Concurrency

N=50 x 60 days (events for 2790 days)

58% (N=403) of
days where ATS
occurred involved
sex

ATS Use
699 (25%)

80% (N=474) of
days where sex
occurred was
without condoms

Sex
596 (21%)

Micro-Ecological Study of ATS and Sex Concurrency N=50 x 60 days (events for 2790 days)



High Concurrency Correlation
Weekend Predominance
Three Seroconversions Over 60 days
HIV incidence: 24%

Sexual Ecology: *Triad of Risk*

PrEP



MOVEMENT

ATS increases:

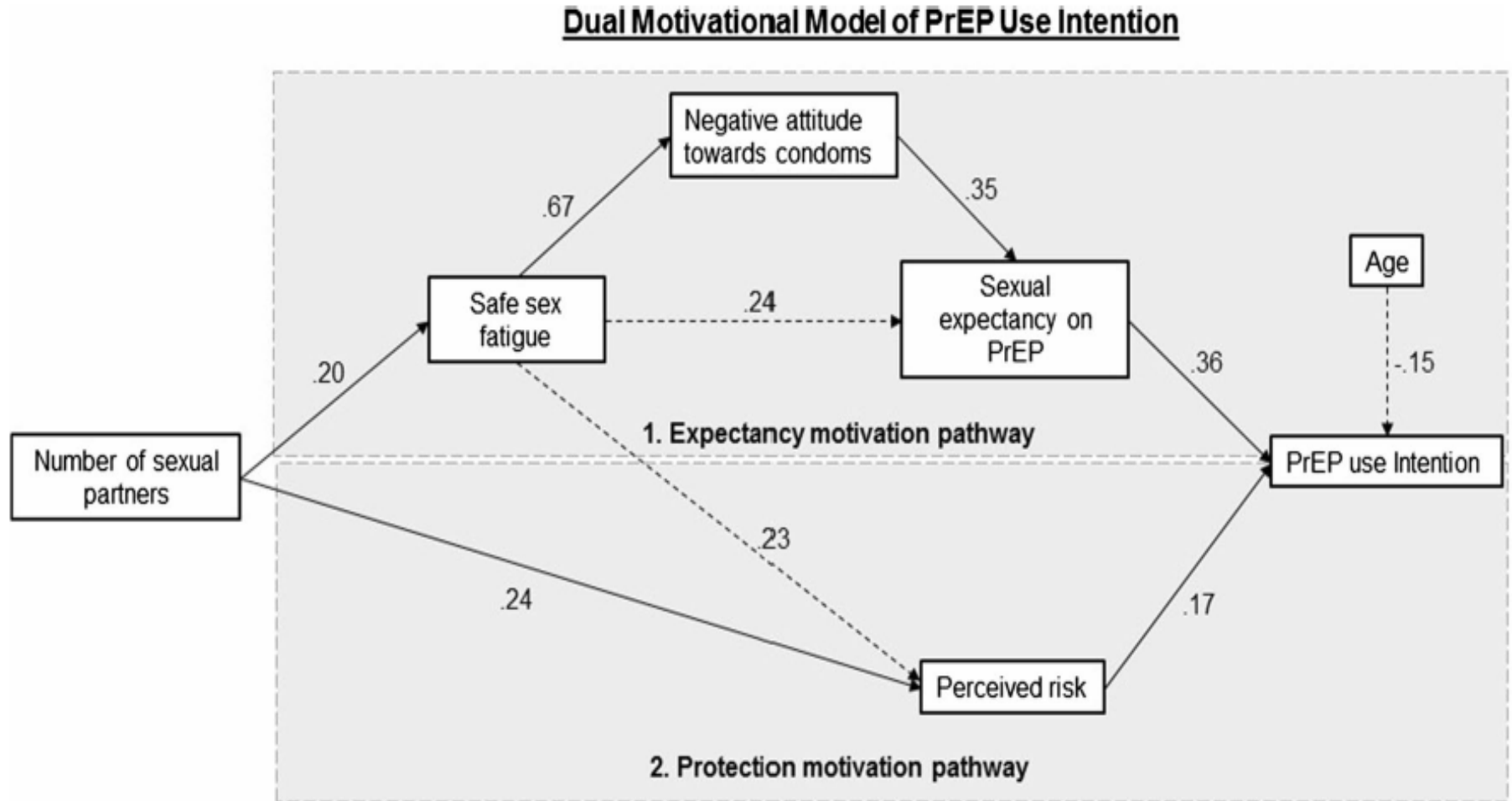
- Sexual disinhibition
- Number of sexual partners
- Entry of new individuals into sexual networks

Infectivity by
route of
transmission



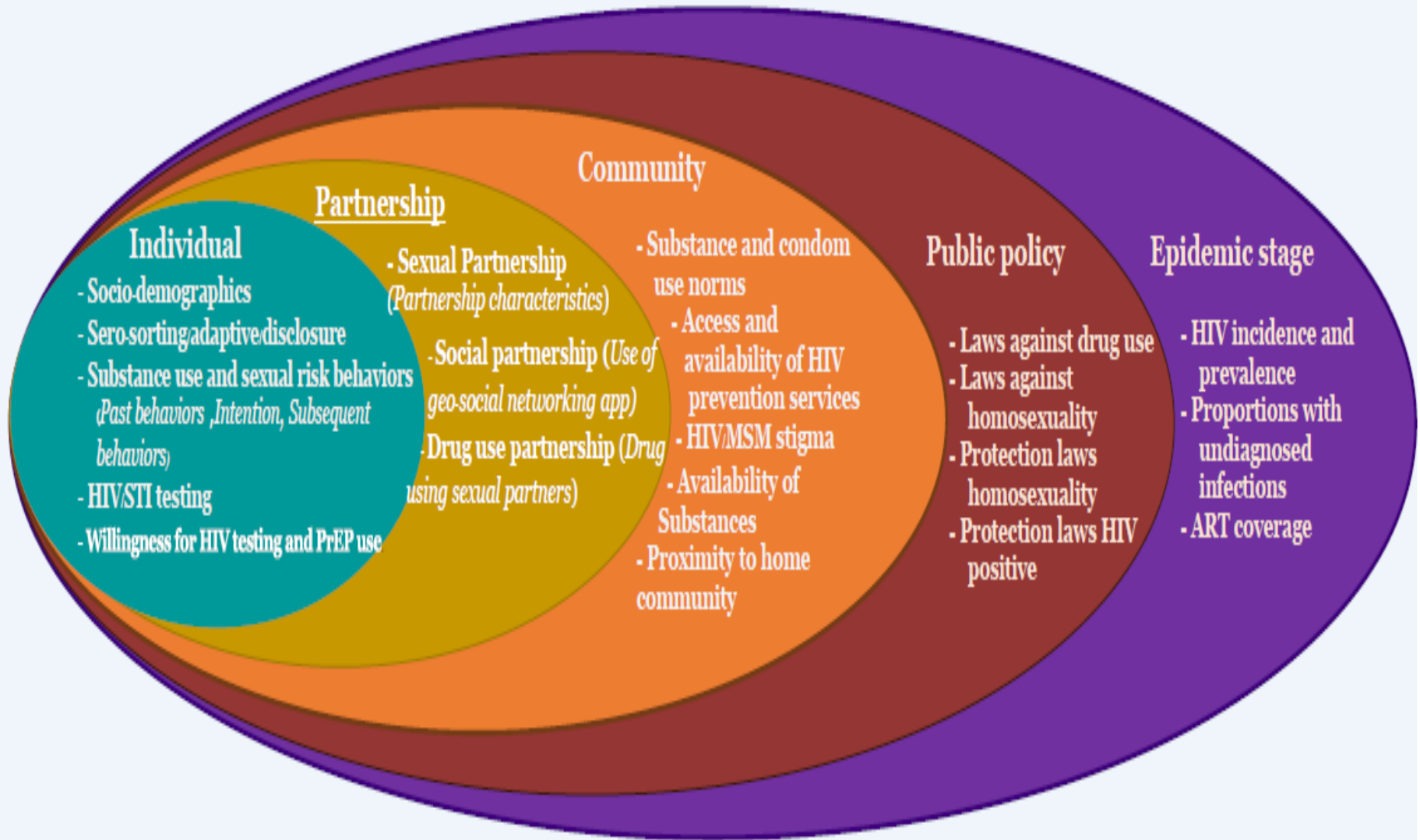
Prevalence in a
key population

Dual Motivation Model of PrEP Use Intention



Ranjit Y, AIDS Behav 2018

Modified Socio-Ecological Framework



Geography of Circuit Parties



Circuit Party Contexts

- High risk setting for sexualized drug use
- Mixing of international sexual networks – often people from dozens of countries attend
- Pre- and post-event “parties”
 - Social networks – friends meeting friends
 - Sauna (bathhouse) parties
 - Private parties (e.g., private house, hotel)
- Considerable peripheral geospatial networking apps (Grindr, Hornet, Blued, Scruff)
 - Advertising **use** and **sales** of ATS, G, cocaine, Special K, ED meds, poppers
- Exchange of sex for money (“money boys”)
- High rate of mixing between high risk travelers and locals – “Willy Wonka and Chocolate Factory” phenomena

Venue-Based Screening and Treatment (Pulse Clinic)

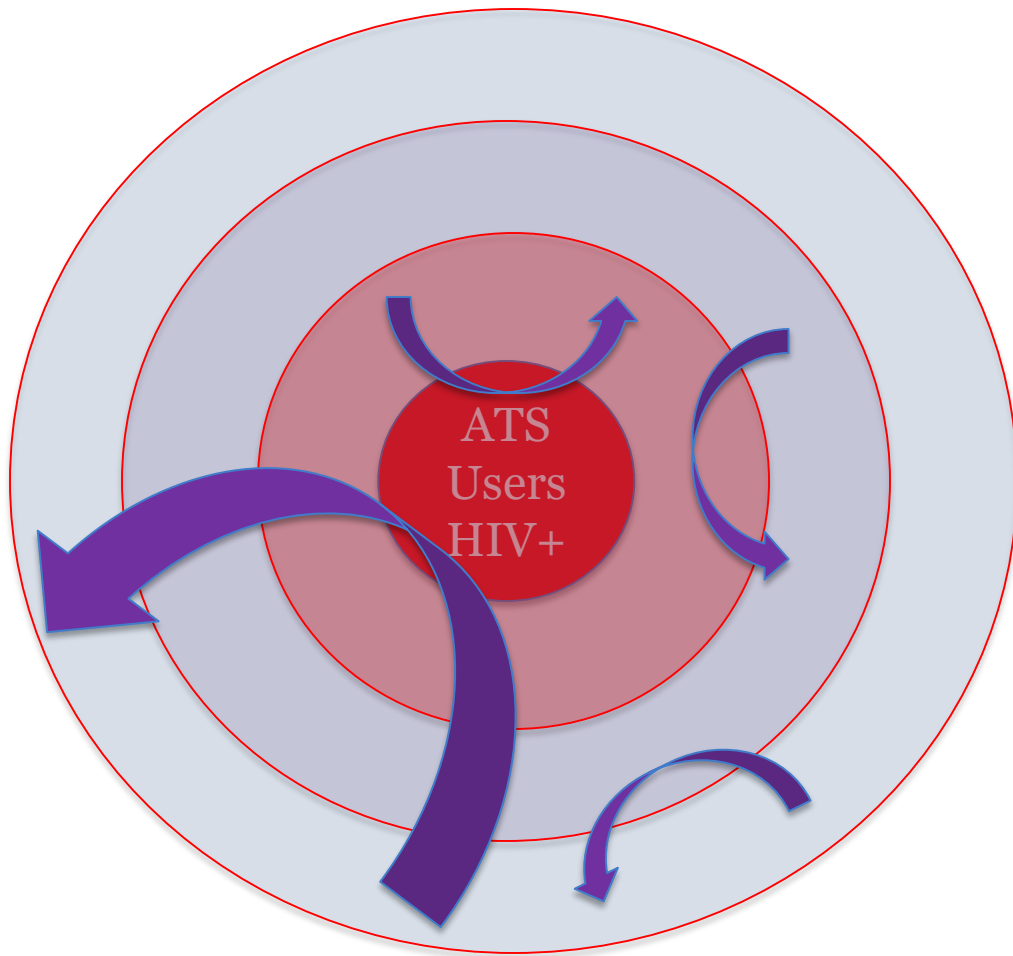


Online support, video tutorials, healthy drug use education and tools

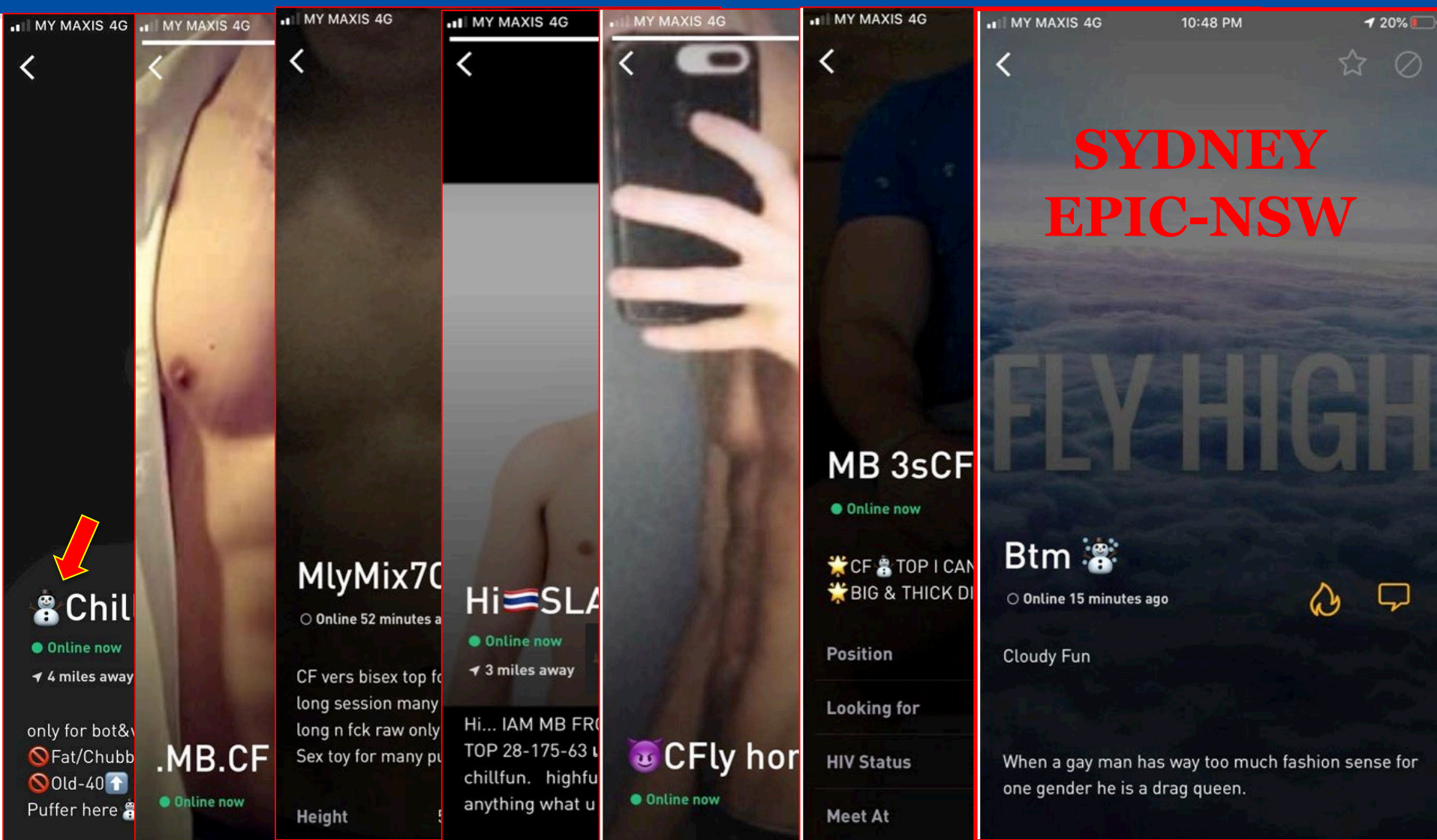
POC HIV & STI Testing
with FOLLOW-UP self-HIV
TESTING (mail)

On Demand PrEP or PEP
(Condoms, lube, lolly pops)

Potential Model for ATS and Sexual Transmission



ATS and the Ecological Environment



Deane Street Clinic Response to Grindr

- HnH (High and Horny) **First Aid** kit – a passive approach
- Approach to addressing sexualized drug use ... What to do:
 - in the event of an overdose
 - if crystal meth triggers psychosis,
 - to avoid infection or death from injecting a drug
 - in the event of a sexual assault
- Do we need to be more proactive?



Behavioral Strategies

Contingency Management



Contingency Management and Substance Use Disorders

- Operant conditioning (Skinner, 1938)
 - Grandma's Rule (positive & negative consequences)
- Meta-analysis suggests a moderate effect in ATS use and in some cases sustained
- Three key elements:
 - Rate of reinforcement (amount of reinforcement per behavior)
 - Immediacy of the reinforcer (timeliness)
 - Magnitude of the reinforcement
- It has been adapted to simultaneously address co-occurring psychiatric disorders & polysubstance use
- Effective in diverse communities (rural, race, income level)

Petry, N. 2005; McPherson SM, Subst Ab Rehab, 2018

Contingency Management and Substance Use Disorders

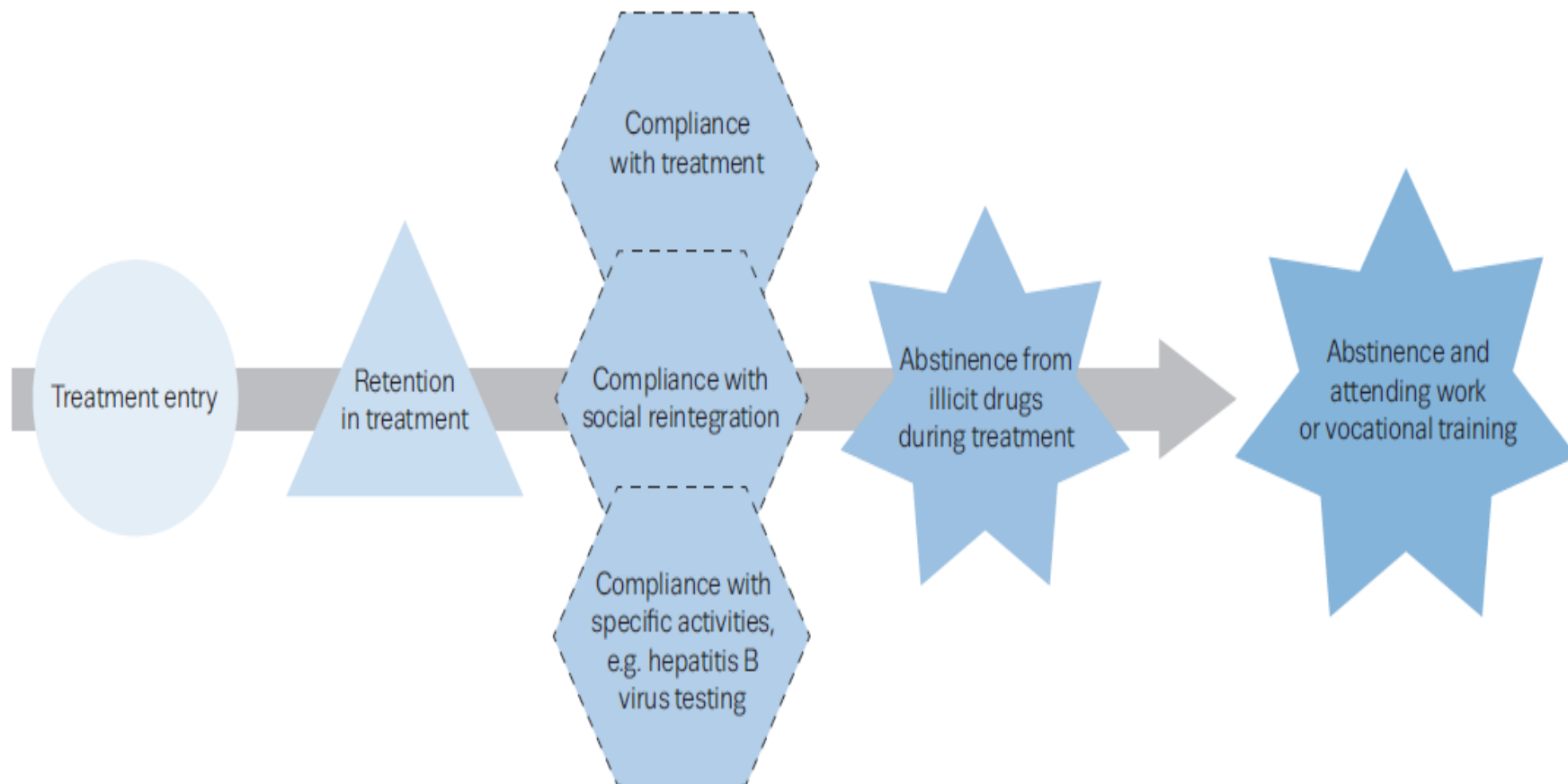
- Relatively new experiences with CM and technology-based interventions
 - Challenges with transportation, delivery of rewards in real-time, etc
 - Challenges with technology (e.g., breathalyzer for alcohol, CO monitoring for nicotine, etc)
- Early data supporting personalized assessment and rewards
 - Monitoring medication adherence and delivering prizes
- There are virtually NO adverse consequences from CM except when the punishment level is problematic – increased substance use!
- Politically, it has been mostly unpalatable for funders though some governments (VA in US and MoH in UK) have begun to support some projects

McPherson SM, Subst Ab Rehab, 2018

The Potential “Place” for Contingency Management

FIGURE 1

Targets and possible use of contingency management along the treatment journey



European Monitoring Center for Drugs and Drug Addiction, 2016

Behavioral Strategies

Cognitive Behavioral Therapy (CBT)

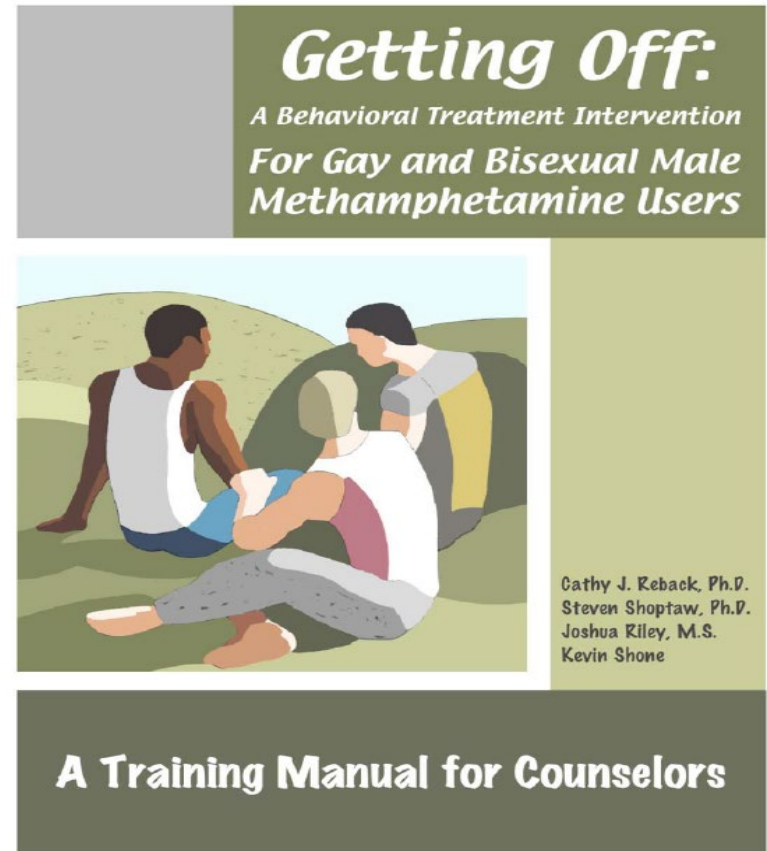
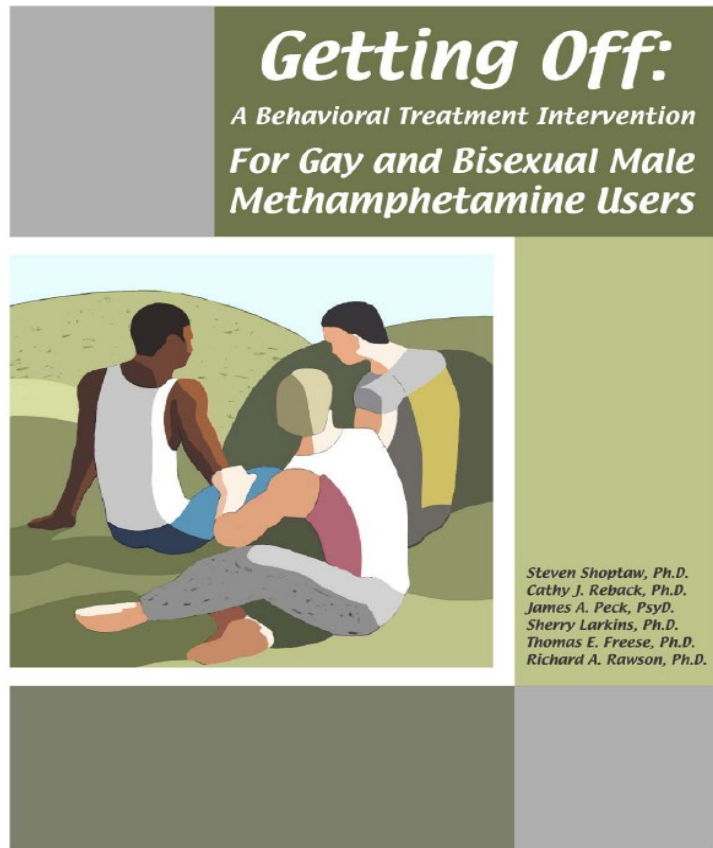


Cognitive Behavioral Therapy - Matrix Model

- 16-week comprehensive and integrative behavioral treatment strategy – may be extended
- Effective for a number of stimulant disorders and polysubstance use
- Multi-dimensional by combining:
 - Behavioral therapy
 - Family education
 - Individual counseling
 - 12-step support
 - drug testing
 - Encouragement for non-drug-related activities
- Has not been adapted for the virtual community

Rawson, R.A., *Addiction* 99:708–717, 2003; Huber, A., *J Addict Dis* 199

MATRIX Model Adapted for MSM



www.friendscommunitycenter.org/resources

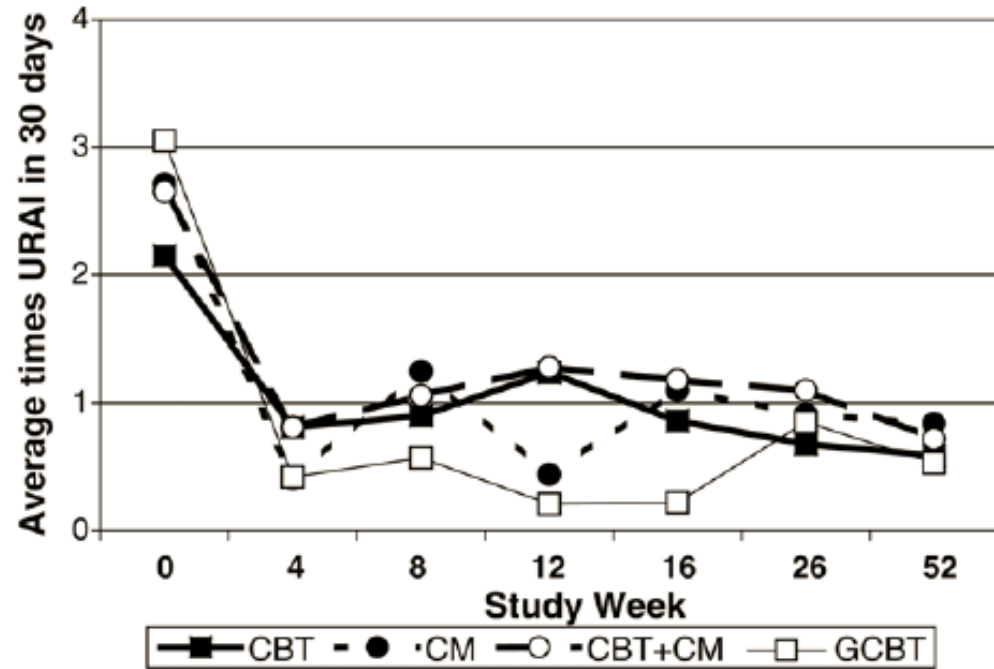
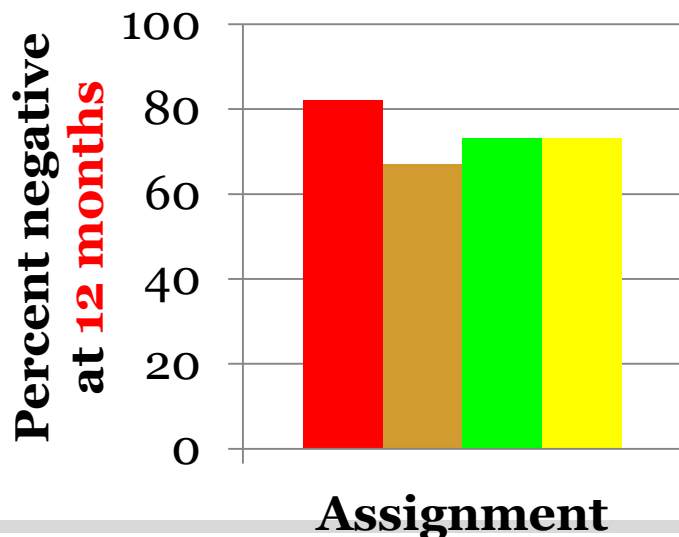
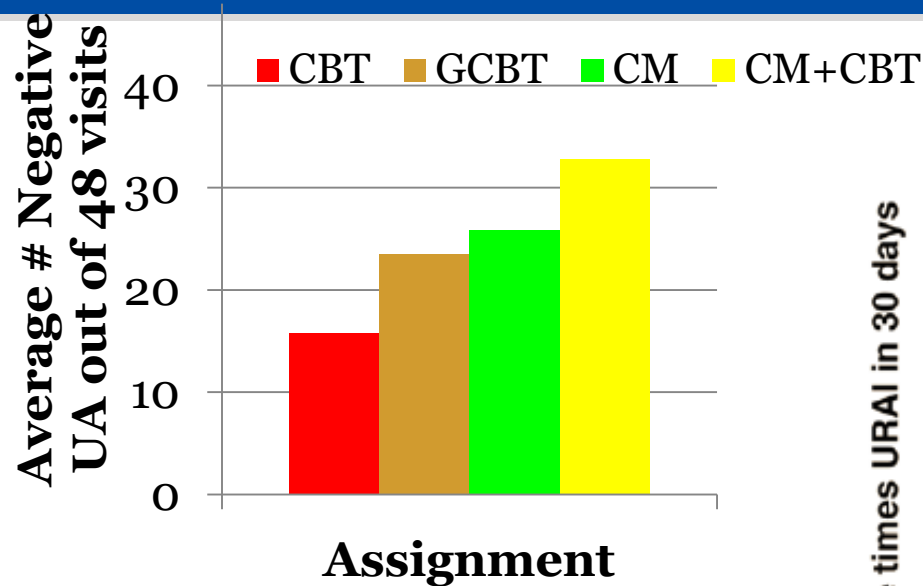
Methamphetamine Treatment in MSM

Full trial: 162 methamphetamine dependent MSM
in West Hollywood, CA

Cognitive Behavioral Therapy (n=40)	Gay/Bisexual Cognitive Behavioral Therapy (n=40)	Contingency Management (n=42)	Cognitive Behavioral Therapy Plus Contingency Management (n=40)
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Duration: 16 weeks; 1 year follow-up evaluations

Early Trial: CBT, CM, CM+CBT, GCBT in MA-Dependent MSM at risk for HIV



Shoptaw Reback et al. *Drug and Alcohol Dependence*, 2005. 78(2): 125-34.

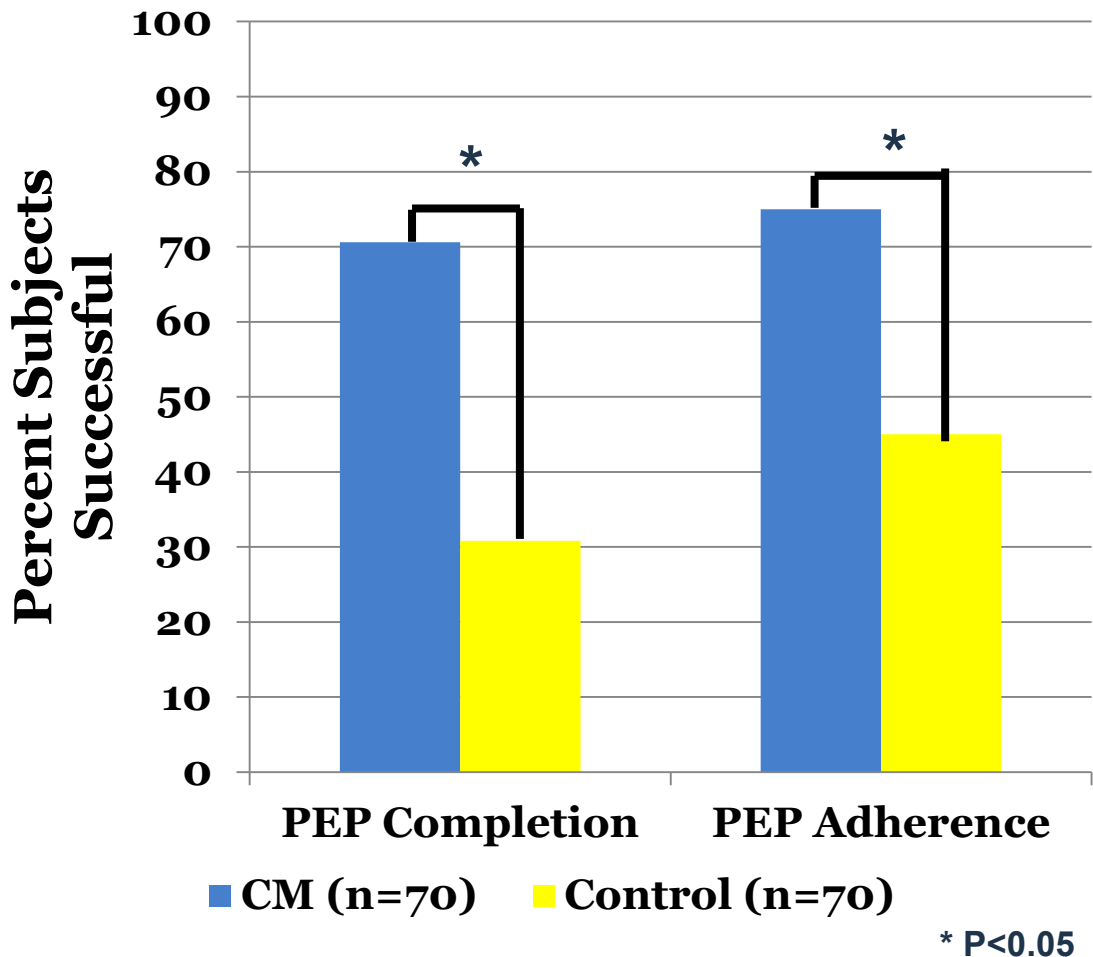
Contingency Management (CM) Boosts nPEP Outcomes in at-risk Stimulant Using MSM

Design:

- Escalating 8-week CM schedule with thrice-weekly visits based on drug-free urine samples
- \$430 maximum
- n=140

Methamphetamine Outcomes:

- CM = 8.9 (SD=9)
- Control = 6.1 (SD=6) *



Landovitz R et al. *Open Forum Infectious Disease*. 2014.

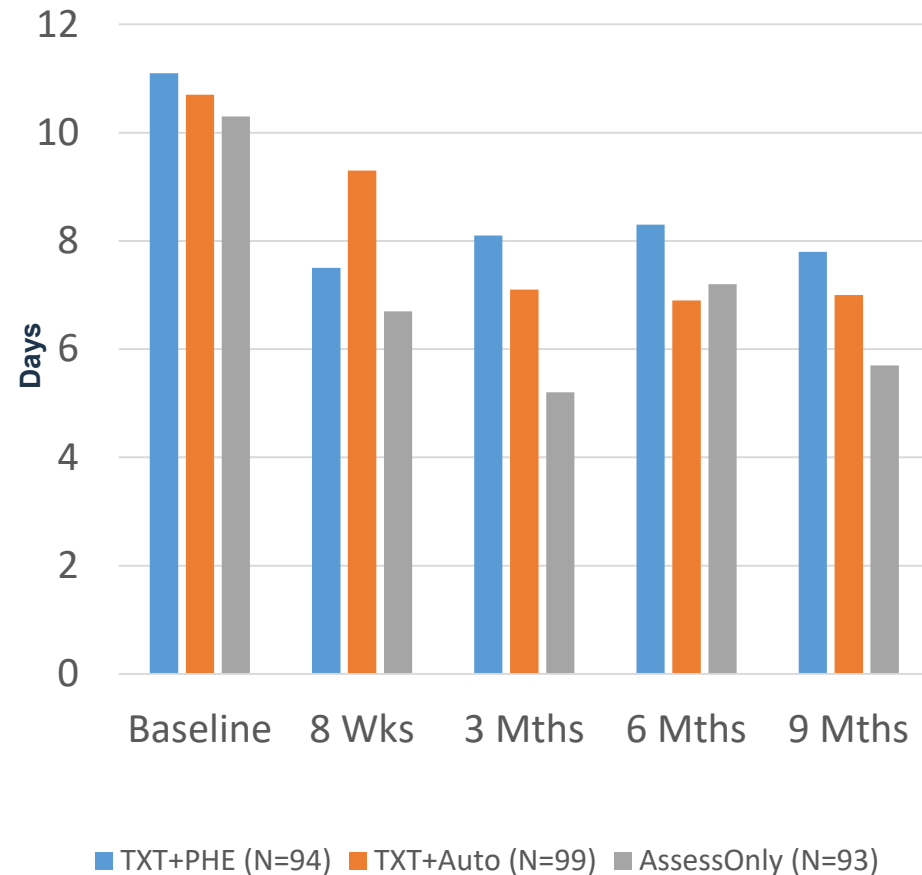
Theory-based Text Messages for Stimulant Use - SCT

Social Support	Informational Support	“Did he give you a bug? Here’s where to go.”
		“Take care of your body, get vaccinated for hep A and B.”
	Emotional Support	“Screw your partner, not your life.”
		“You’re worth a new needle.”
	Instrumental Support	“Meth brings you down, meds bring you up.”
		“Pack your socks with condoms and lube.”
Health Belief	Health Threat	“Is that precum or do you have a STD drip?”
		“Meth can take your teeth.”
	Health Behaviors to Reduce Risk	“Dip it, don’t stick it.”
		“Inject clean, an abscess is a hot mess.”
	Awareness of Health Risks	“50% of men with Chlamydia have no symptoms.”
		“Using meth in public can be risky.”
Social Cognition	Self-regulation Skills	“Weekends getting longer and longer?”
		“Don’t have an open sores relationship.”
	Self-Efficacy	“Say 1 st thing your poz, like you did last time. You can do it.”
		“You can take your meds, even when you party.”

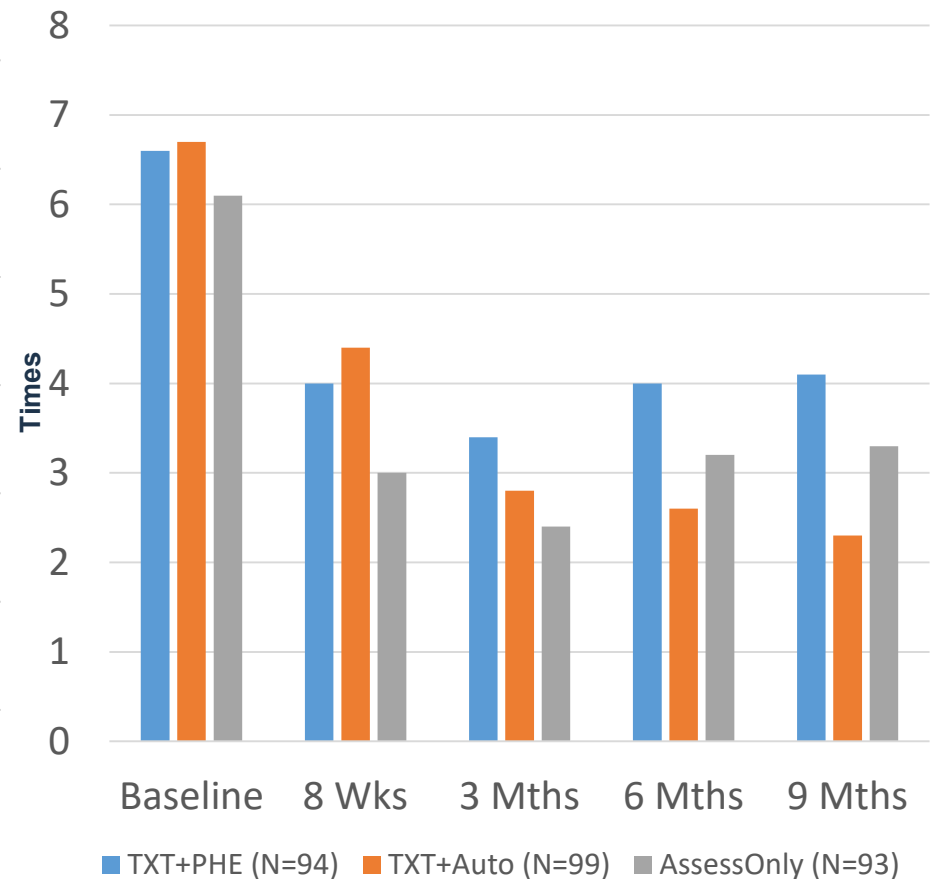
Reback et al., (2010). *Open AIDS Journal*. 4: 116-122

Text Message Outcomes: Meth and Sex

Meth Use Past 30 Days

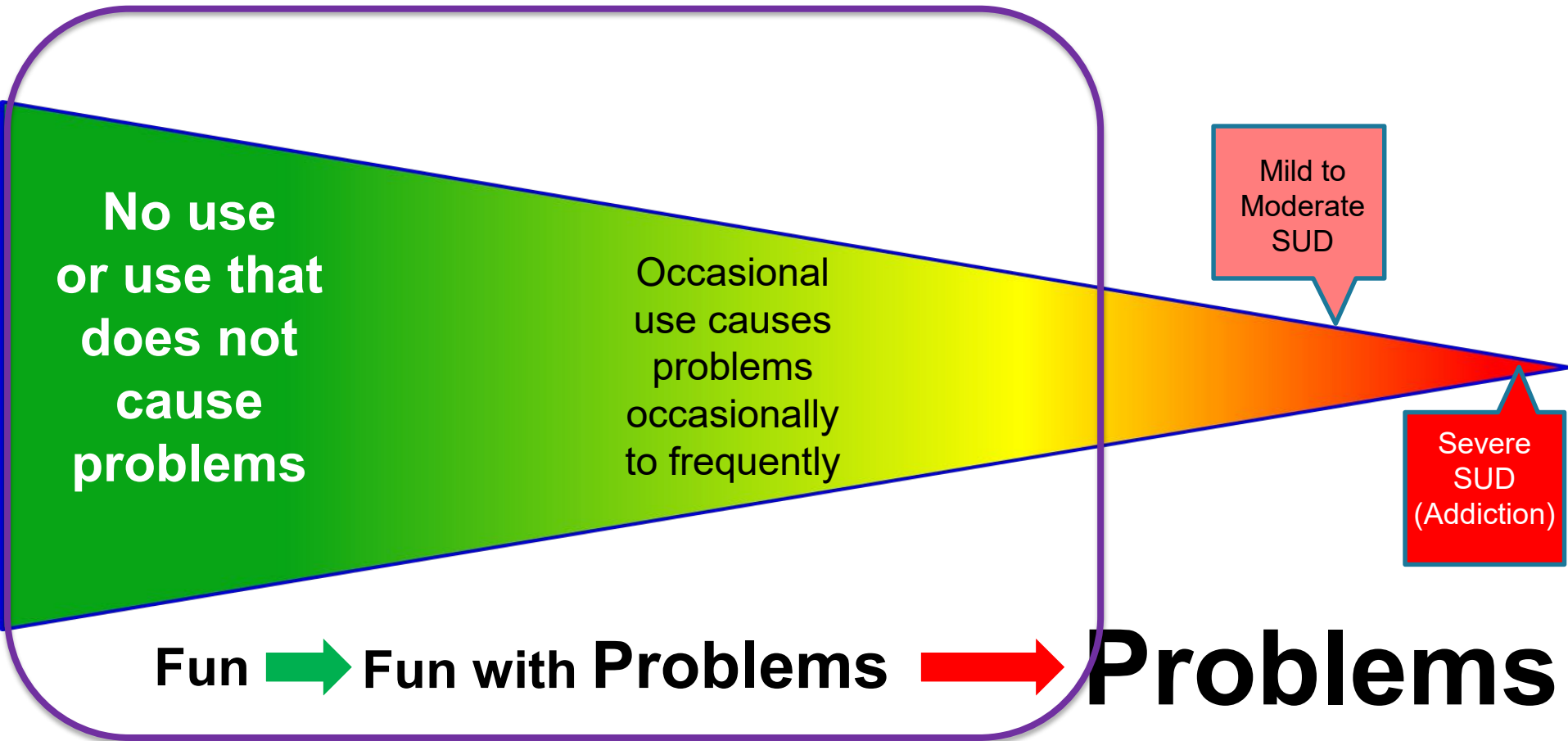


Sex on Meth, Past 30 Days

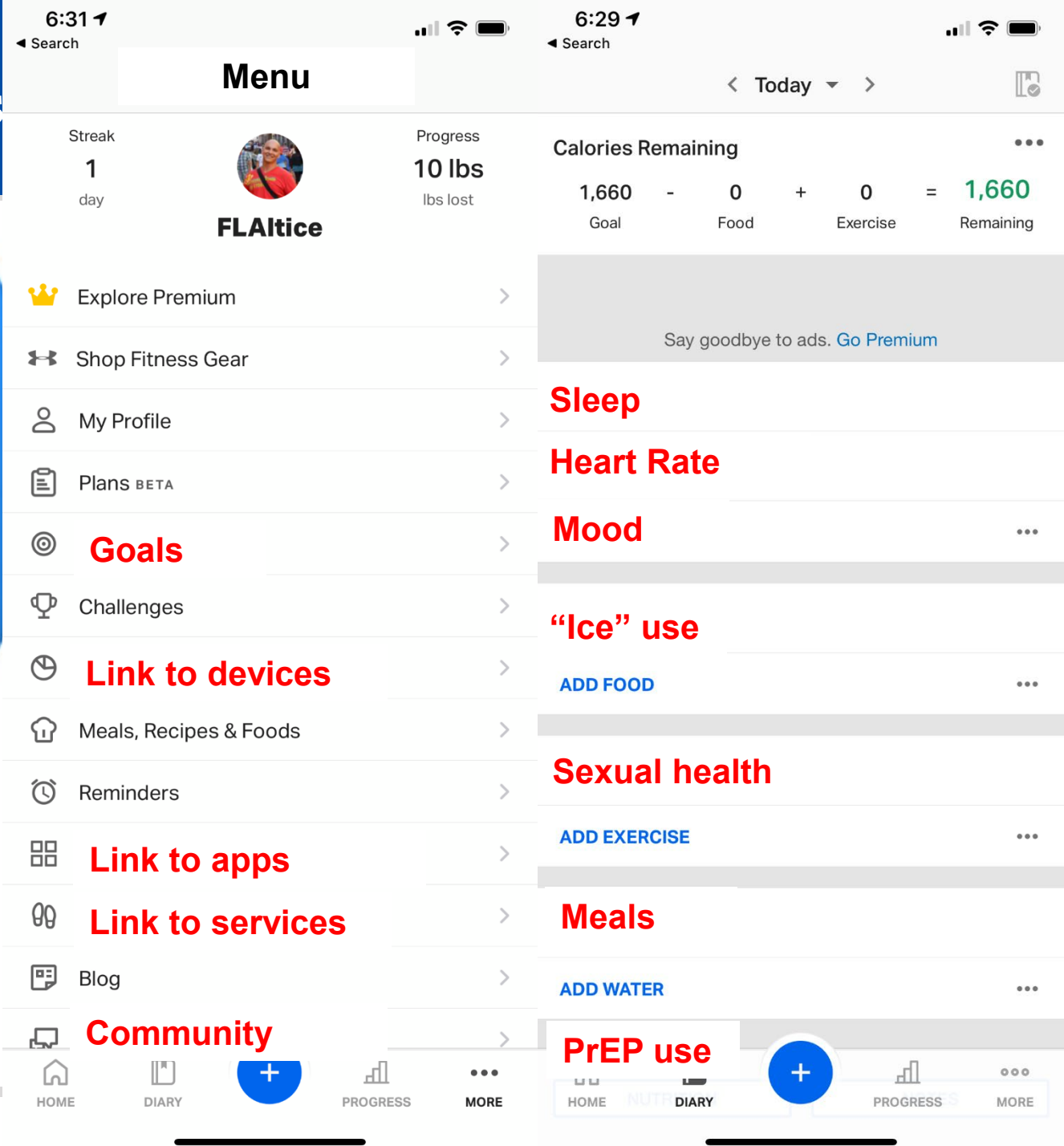


Reback CJ et al., *AIDS Behav.* 2019, 23:37-47

The Spectrum of Amphetamine Use



Considerations



Pharmacological Studies



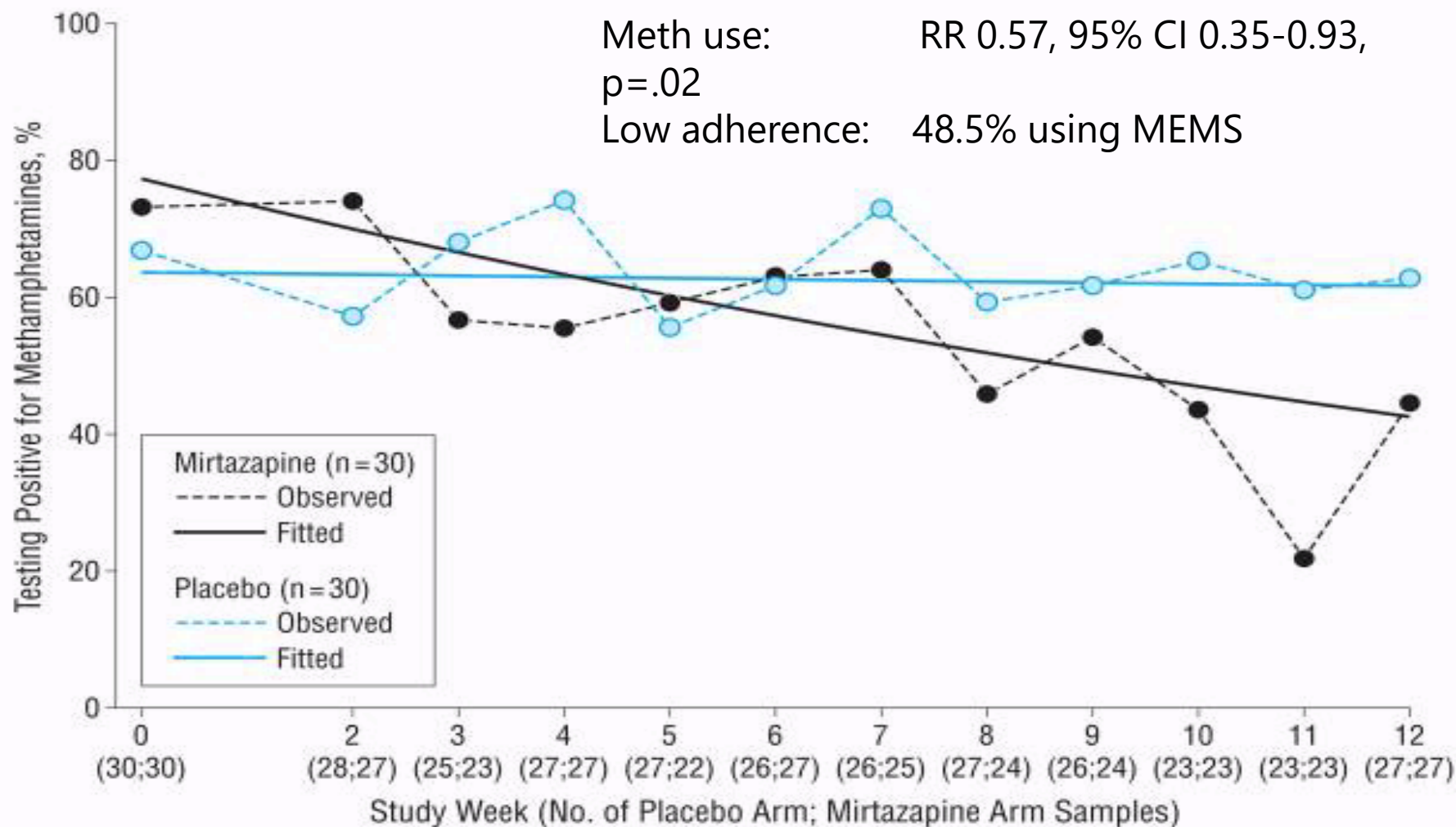
QUERI Systematic Review of Pharmacological Therapies

- 14 RCTs and 1 systematic review
- Studies included: bupropion, mirtazapine, sertraline, aripiprazole, modafinil, dexamphetamine, methylphenidate, topiramate, baclofen, gabapentin, and naltrexone
- Outcomes examined:
 - Sustained abstinence (NOT reduction in use)
 - Study retention
 - Serious adverse events
- Major study variability
 - POLYPHARMACY
 - Combine amphetamines with methamphetamine users
 - Very low retention (~50-60%) in studies (measurement bias)
 - Variability between medication dosing in studies (dose-finding needed)

Chan B, 2018

Mirtazapine: Placebo-Controlled Controlled Trial

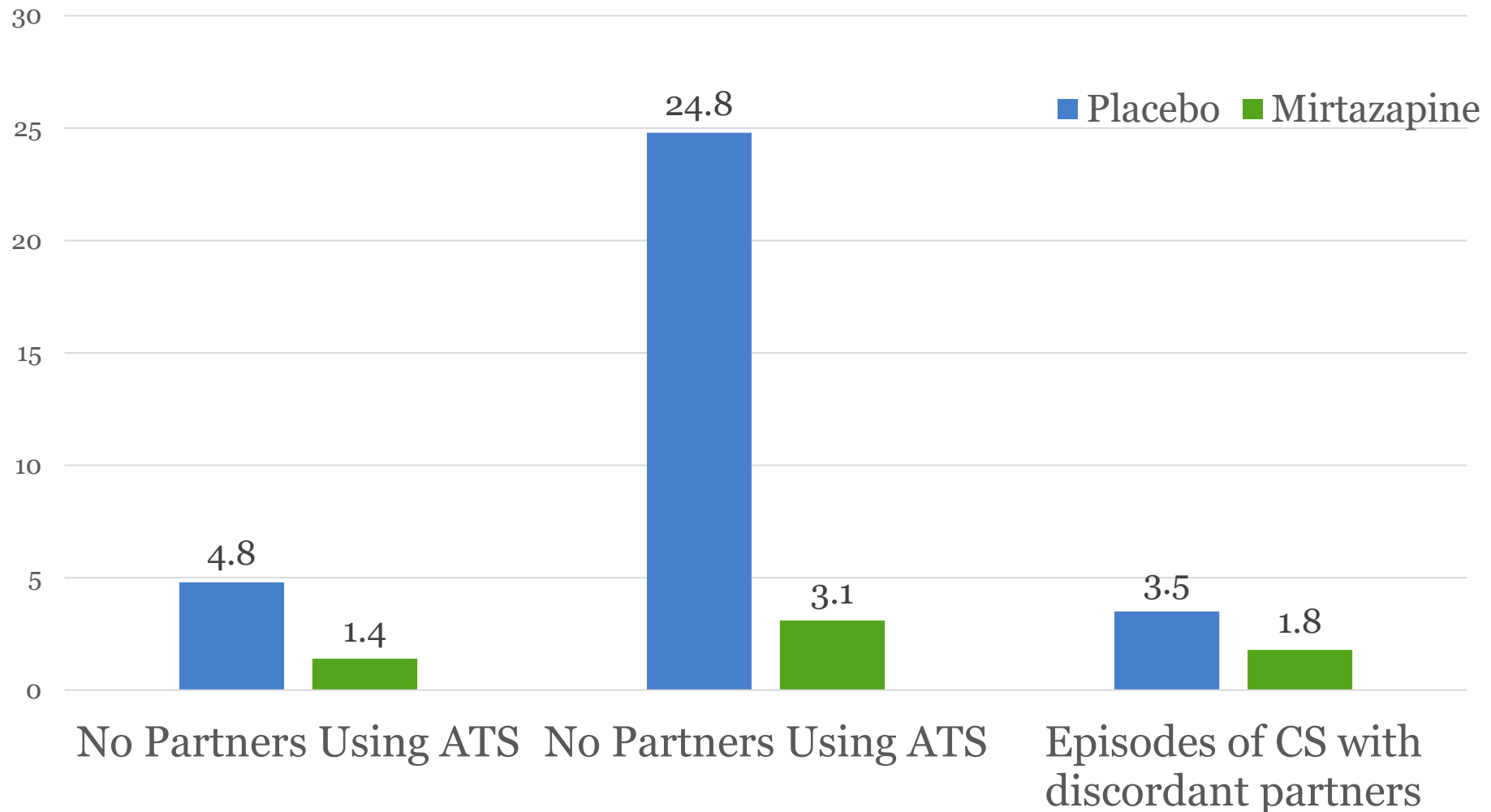
Urine Drug Testing Results



Colfax G, Arch Gen Psych, 2011

Mirtazapine: Placebo-Controlled Controlled Trial

12-Week HIV Risk-Taking Results

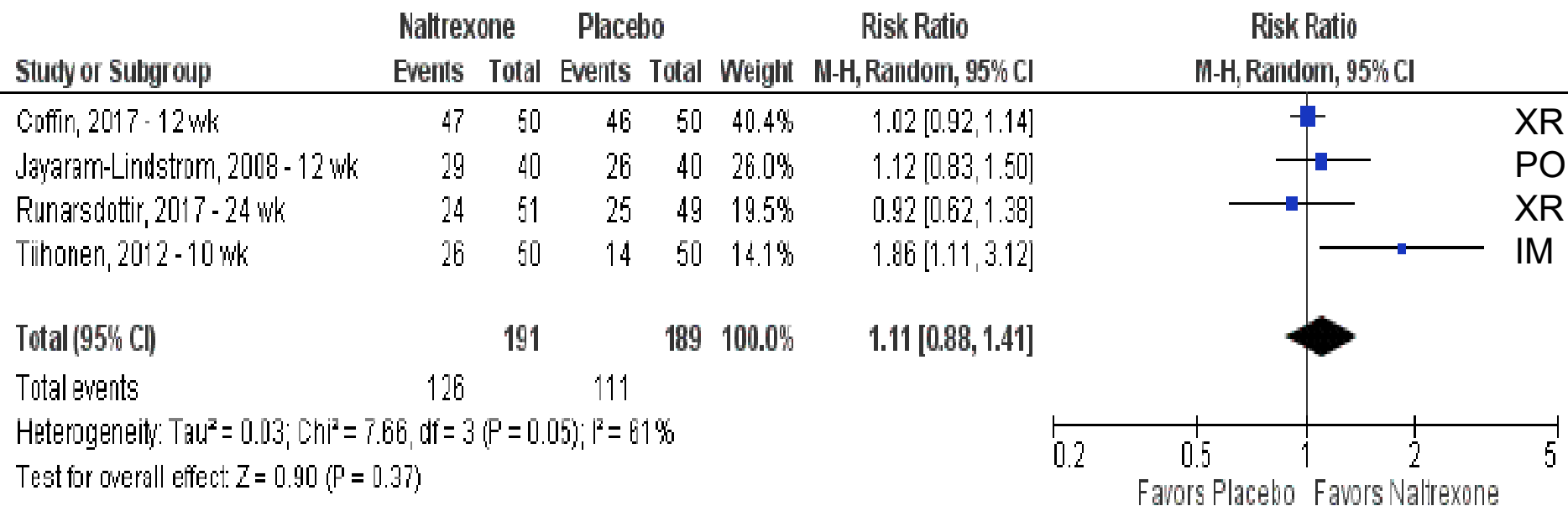


Pharmacological Studies

Naltrexone



Studies of Naltrexone on Retention

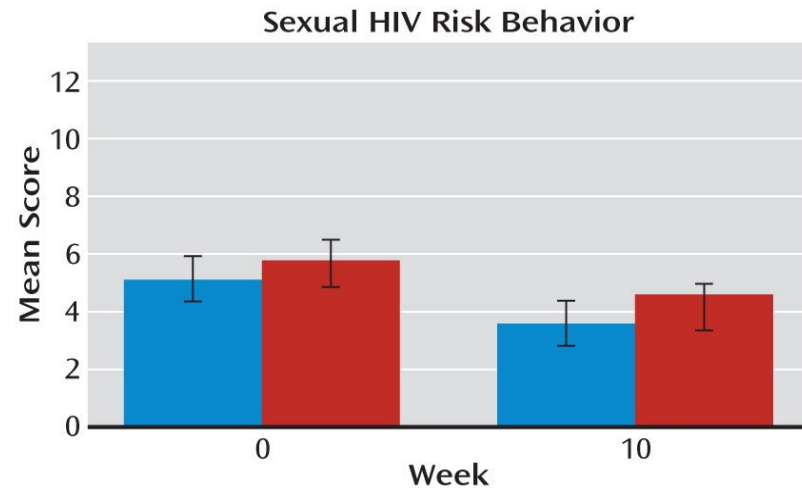
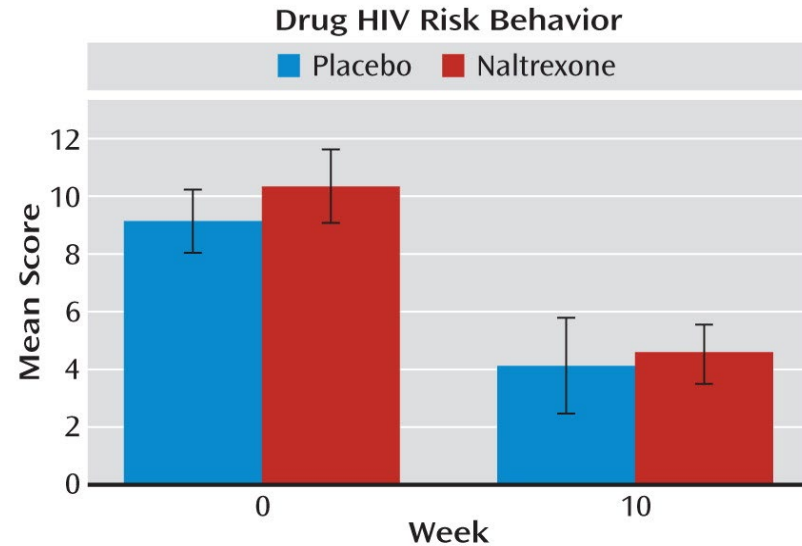


Chan B, Kondo K, Ayers C, Freeman M, Montgomery J, Paynter R, and Kansagara D. Pharmacotherapy for Stimulant Use Disorders: A Systematic Review of the Evidence. VA ESP Project #05-225; 2018.

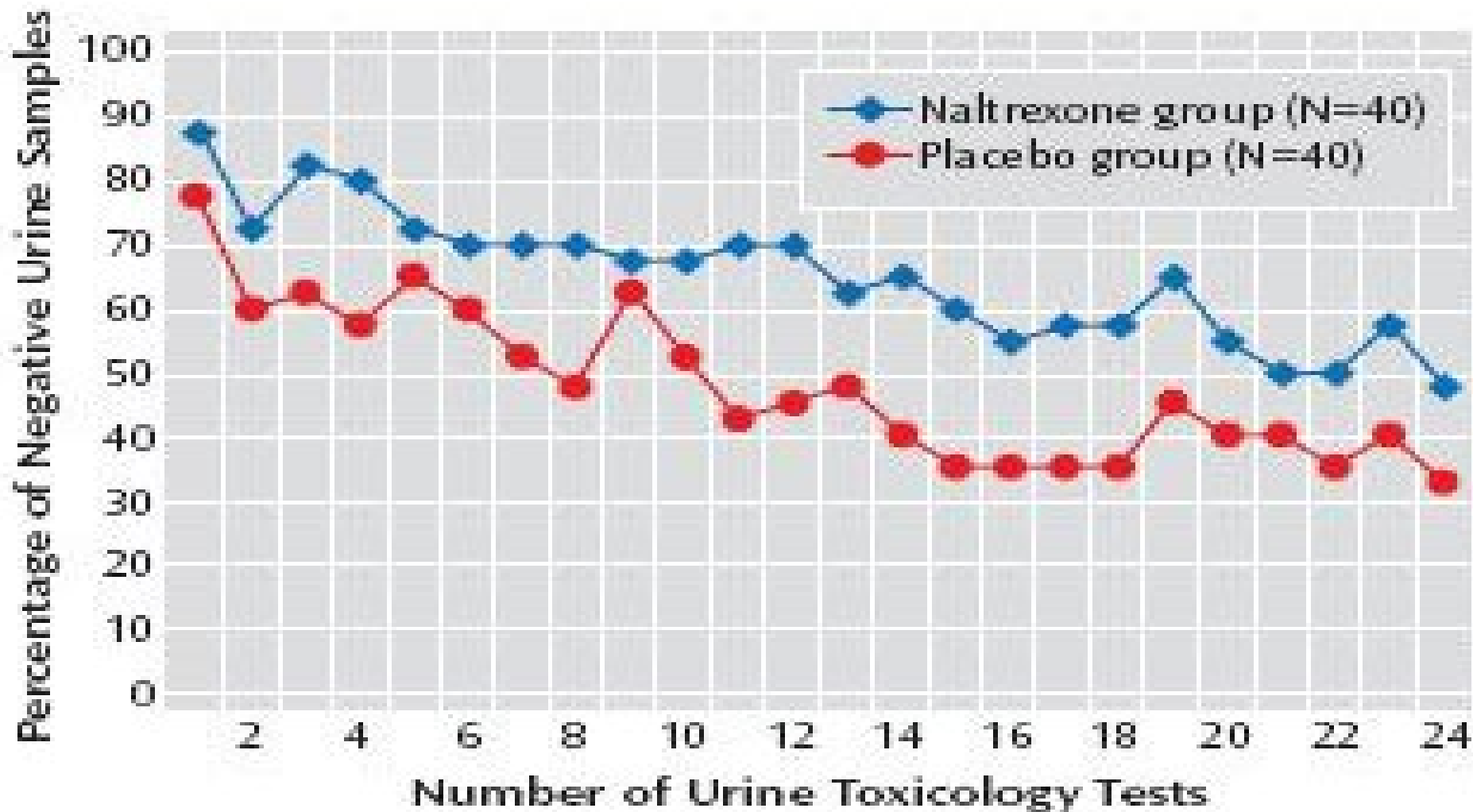
Implantable Naltrexone in Patients with Opioid and ATS Use Disorder - Russia

- Double-blind, placebo controlled trial of 100 patients
- Used Prodetoxon (12-weeks implant)
- Retention: 52% vs 28%, $p < 0.05$
- Improvements in:
 - Opioid-free UDT: 52% vs 22%; $p < 0.001$
 - **ATS-free UDT: 40% vs 24%; $p = 0.09$**
 - Global functioning

Tiihonen J, Am J Psych, 2012

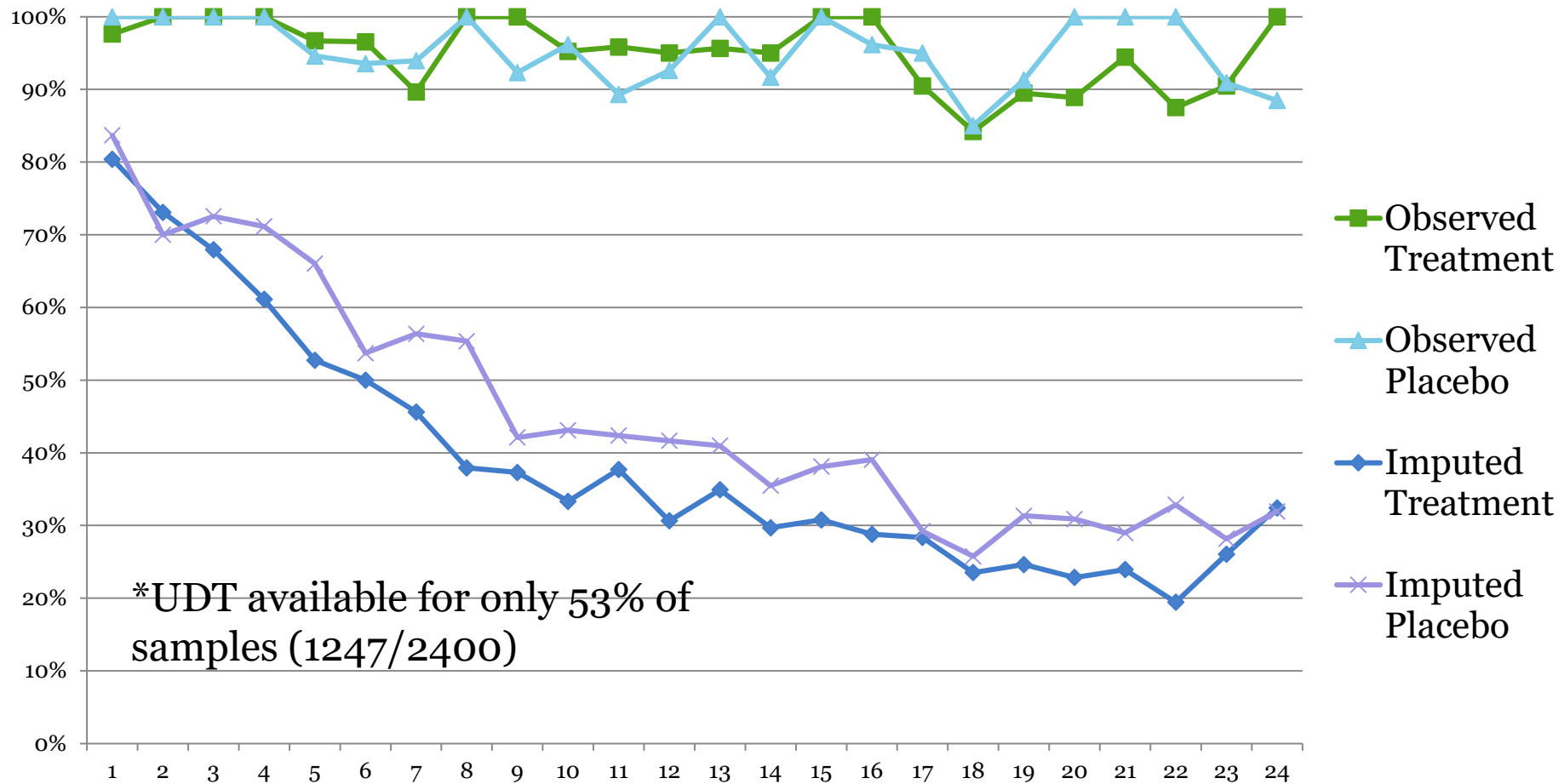


Placebo-Controlled Trial of Oral Naltrexone to Treat ATS Use Disorder (N=80) – Swedish Experience



Jayaram-Lindstrom et al Am.J. Psychiatry, 2008

Urine Drug Testing Results



Why the difference in the two RCTs?

- Iceland study had patients with
 - **More polysubstance use disorders**
 - Alcohol (75%)
 - Cannabis (69%)
 - Cocaine (26%)
 - Sedatives (30%)
 - **Higher rates of addiction severity**
 - **Higher rates of drop-out and missing data in the NTX arms**

Summary

- Contingency Management is THE most effective tool on the shelf for reducing meth use among MSM
- PrEP keeps MSM protected until they change ATS use
- Reducing meth use (by any means):
 - Reduces HIV transmission behaviors
 - Improves HIV-prevention medication adherence
- Interventions must move into the virtual space
 - When and How are not yet resolved – earlier intervention?
 - Should address issues beyond drug use and HIV risk
- Brief motivational interviewing sessions reduce HIV sexual risk behaviors in MSM using methamphetamine
 - Reinforce Screen, Briefly Intervene and Refer to Treatment (SBIRT) – must have access to treatment services!
- Personalized texting may have an impact on HIV risk