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Methamphetamine use disorder (+ HIV): Trials, Trends and Tribulations

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*WHAT-IF? Learning Collaborative
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Outline

- Background
- Physiology and health effects
- Epidemiology
- Treatment

Why the fuss?

- Higher rates of meth use in populations at risk for HIV
 - Up to 20% of MSM may report meth use within past 6mo ¹
- Meth use is associated with an increased risk of contracting HIV
 - Higher rates of risky behaviours (high risk injection and/or sexual practices) ²
 - Impaired/altered immunity? ³
- Meth use is associated with worse HIV outcomes
 - Decreased ART adherence, slower rates of RNA suppression, decreased CD4 counts, poor overall health outcomes ^{3,4}

¹Shoptaw et al. *Addiction*, 2007. ²Degenhardt et al. *Int J Drug Policy*, 2009. ³Passaro et al. *J Neuroimmune Pharmacol*, 2015. ⁴Fairbairn et al. *Addict Behav*, 2011.



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Drug and Alcohol Dependence

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HIV prevalence among MSM who primarily injected meth was almost 50% higher than among MSM who primarily injected other drugs, and this association was mediated by sexual risk.

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Sharing

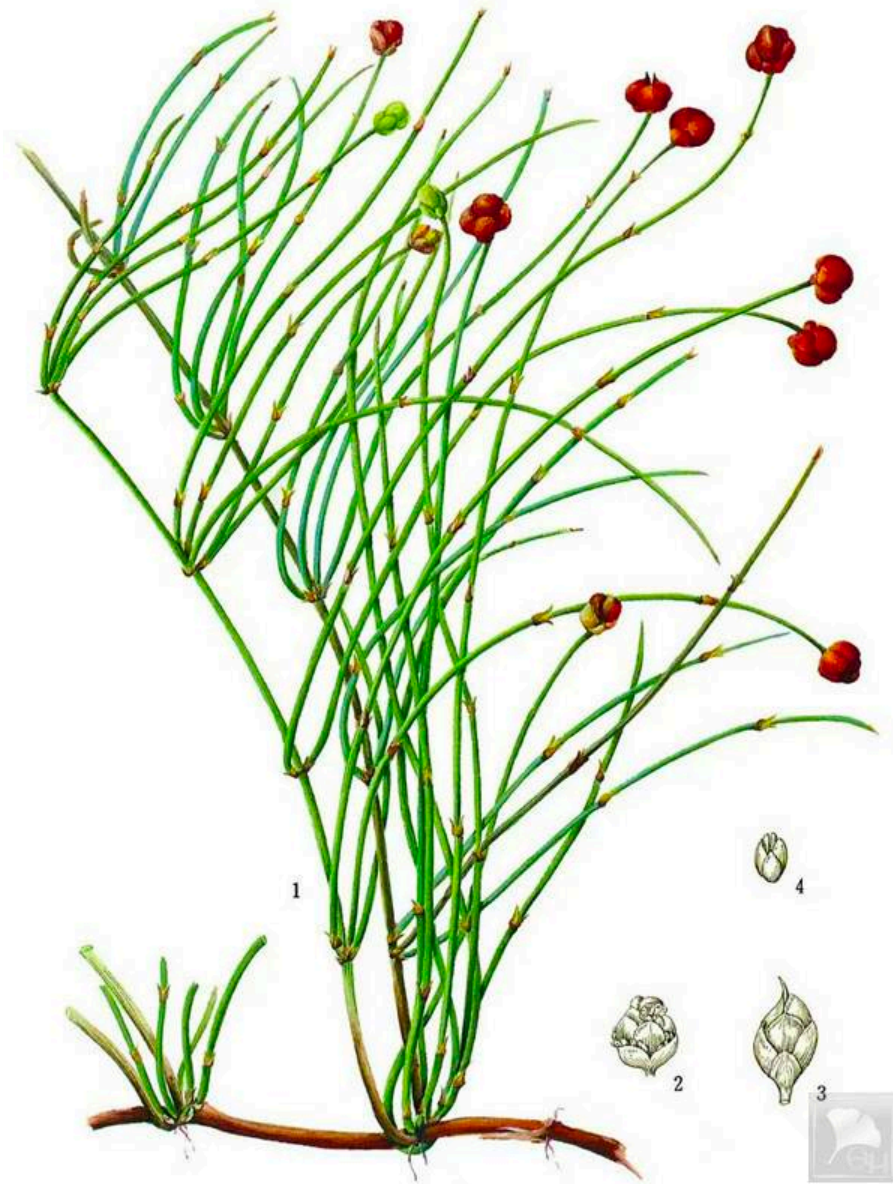
ABSTRACT

Background and Aims: Men who have sex with men (MSM) and inject drugs are at risk for HIV infection. Although research exists on non-injection methamphetamine (meth) use and sexual risk among MSM, less is known about meth injection and its association with HIV infection among MSM who inject drugs.

Methods: We analyzed data from men aged ≥ 18 years who reported injecting drugs and male-to-male sexual contact. Men were recruited using respondent-driven sampling, interviewed, and tested for HIV during the 2012 and 2015 cycles of National HIV Behavioral Surveillance among persons who inject drugs. We included data from 8 cities where ≥ 10 MSM reported meth as the primary drug injected. We assessed differences in demographic characteristics, past 12 months risk behaviors, and HIV infection between MSM who primarily injected meth and those who primarily injected another drug.

Results: Among 961 MSM, 33.7% reported meth as the drug they injected most often. Compared to MSM who primarily injected other drugs, MSM who primarily injected meth were more likely to have had ≥ 5 condomless anal sex partners, have been diagnosed with syphilis, and were less likely to report sharing syringes. In multi-

Background



Ephedra sinica

Methamphetamine



Methamphetamine powder
- PO or insufflated



Methamphetamine base
- PO or injected



Crystal methamphetamine
- Smoked, insufflated or injected

Half-life for all 3 close to ~10 hours!

*Ice, crystal, glass, speed, meth, jib, side, gak, chalk, crank, tina, go, geek, tweak, amp, P2P, zip, shards, goofball**

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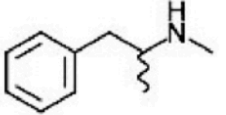
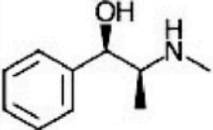
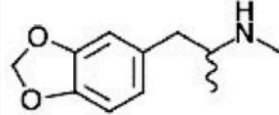
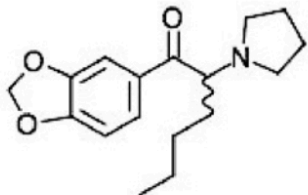
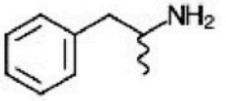
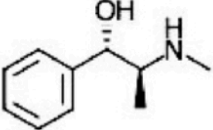
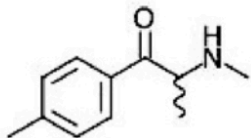
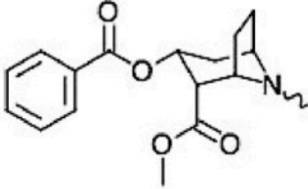
"Methedrine" dispels abnormal craving for food, subtly elevates the mood.

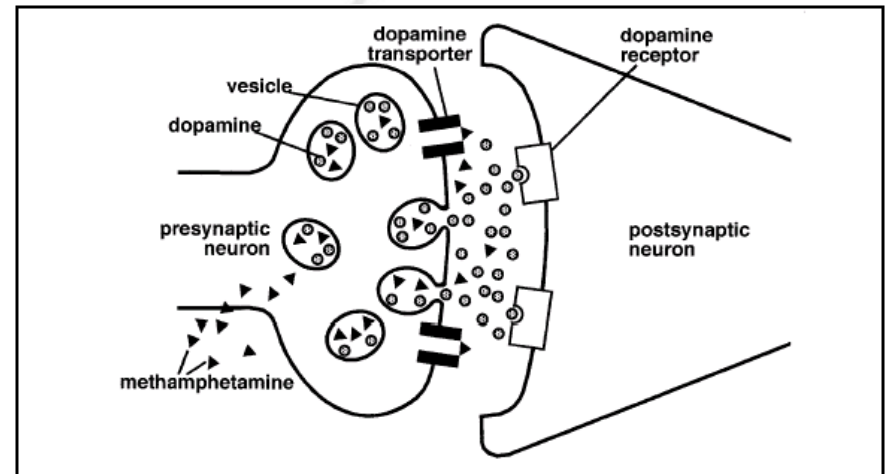
"Methedrine" brand Methamphetamine Hydrochloride Tablets 5 mg., scored

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Physiology and effects

Pharmacology

			
Methamphetamine	Ephedrine	MDMA	MDPV
			
Amphetamine	Pseudoephedrine	Mephedrone	Cocaine
All of the above compounds belong to the phenethylamine class of psychostimulants except cocaine; MDMA = methylenedioxymethamphetamine; MDPV = methylenedioxypropylvalerone			



Acute intoxication



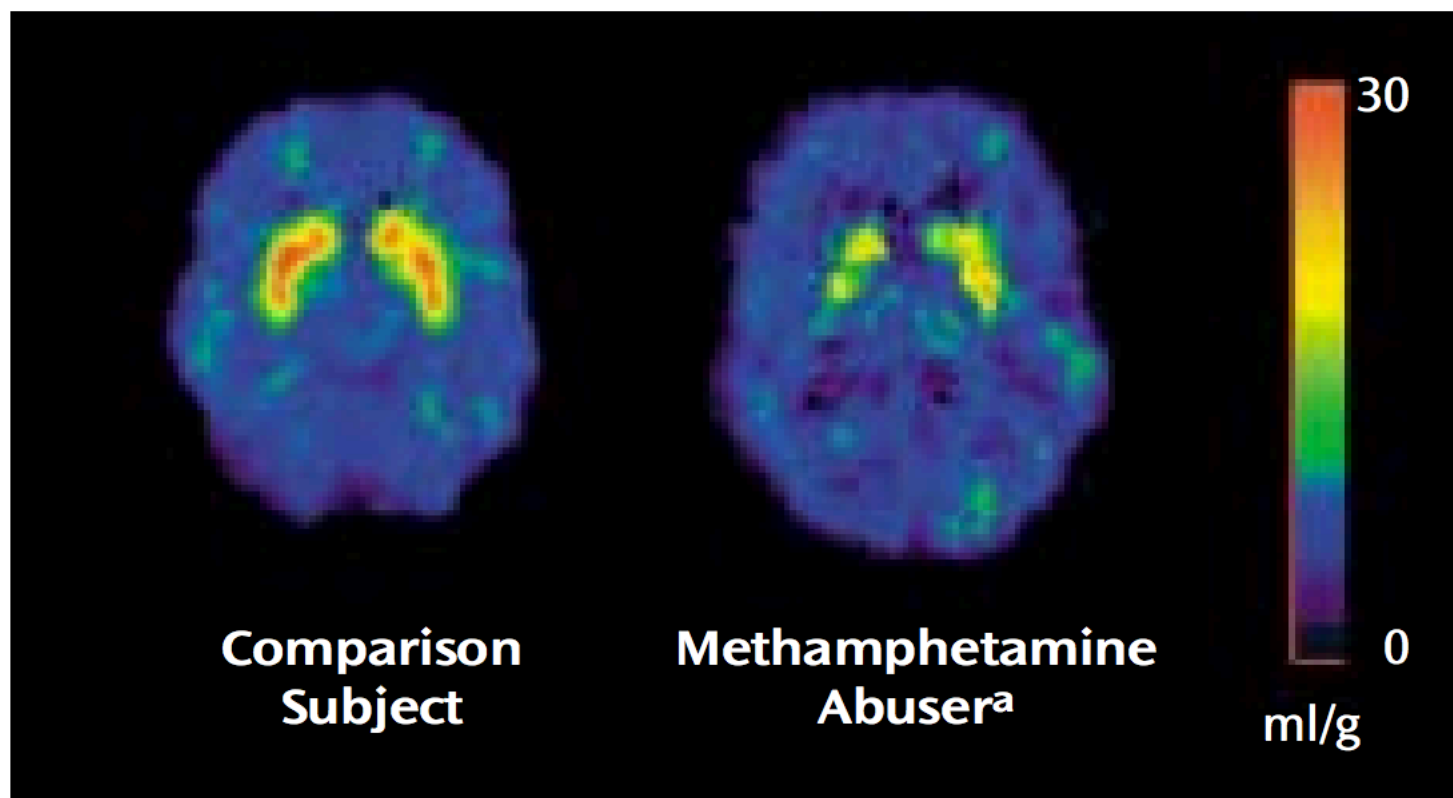
- Mania/paranoia/psychosis
- Hypertension, agitation, sweating
- Skin-picking/formication (delusions of insects under the skin)
- Abnormal movement (choreoathetosis, ataxia)
- Miosis

Meth-associated health complications

Cardiac	Infectious	Hematologic	Gastrointestinal
Chest pain	HIV	Necrotizing angiitis	Acute liver injury
CAD	Viral hepatitis		Mesenteric infarction
Myocardial infarction		MSK	Ischemic colitis
Tachycardia	Neurologic	“Meth mouth”	Pancreatitis
Hypertension	ICH	Rhabdomyolysis	
Dysrhythmias	Ischemic stroke	Traumas	Pulmonary
Dilated CMO	Seizure	Osteomyelitis	Pulmonary edema
Aortic dissection	Cognitive impairment		Pulmonary hypertension
Infective endocarditis		Obstetrical	
	Dermatologic	Fetal growth restriction	Renal
Genitourinary	Picking/excoriations	Premature delivery	Myoglobulinuria
STIs	Cellulitis	Abruption	Necrotizing angiitis
	Abscesses		

***Societal harms:** environmental hazards/pollution, crime, violence.

Neurotoxicity (dopamine neurons)

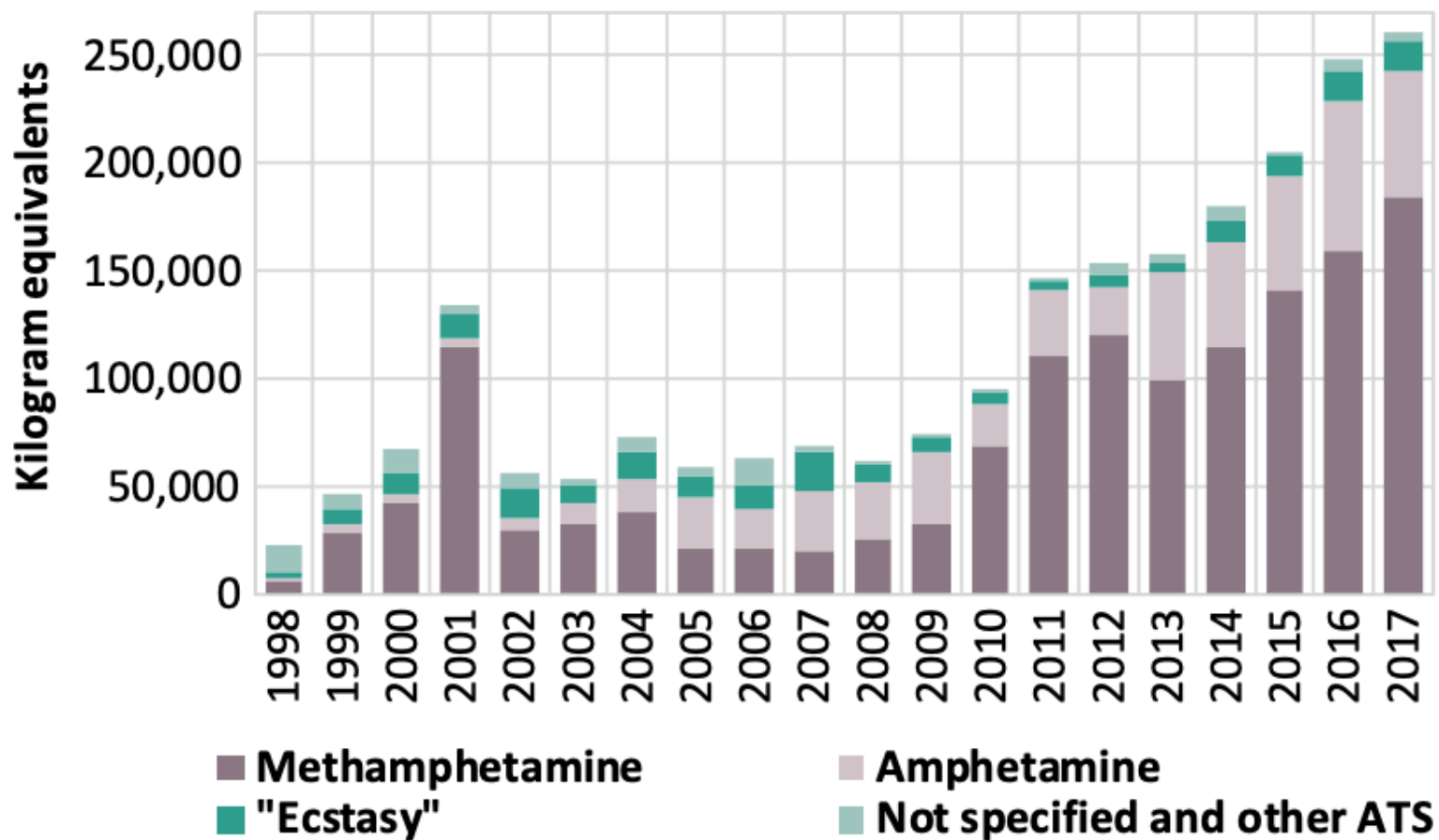


^a PET scan was performed 80 days after detoxification.

Epidemiology



FIG. 27 Global quantity of amphetamine-type stimulants seized, 1998–2017

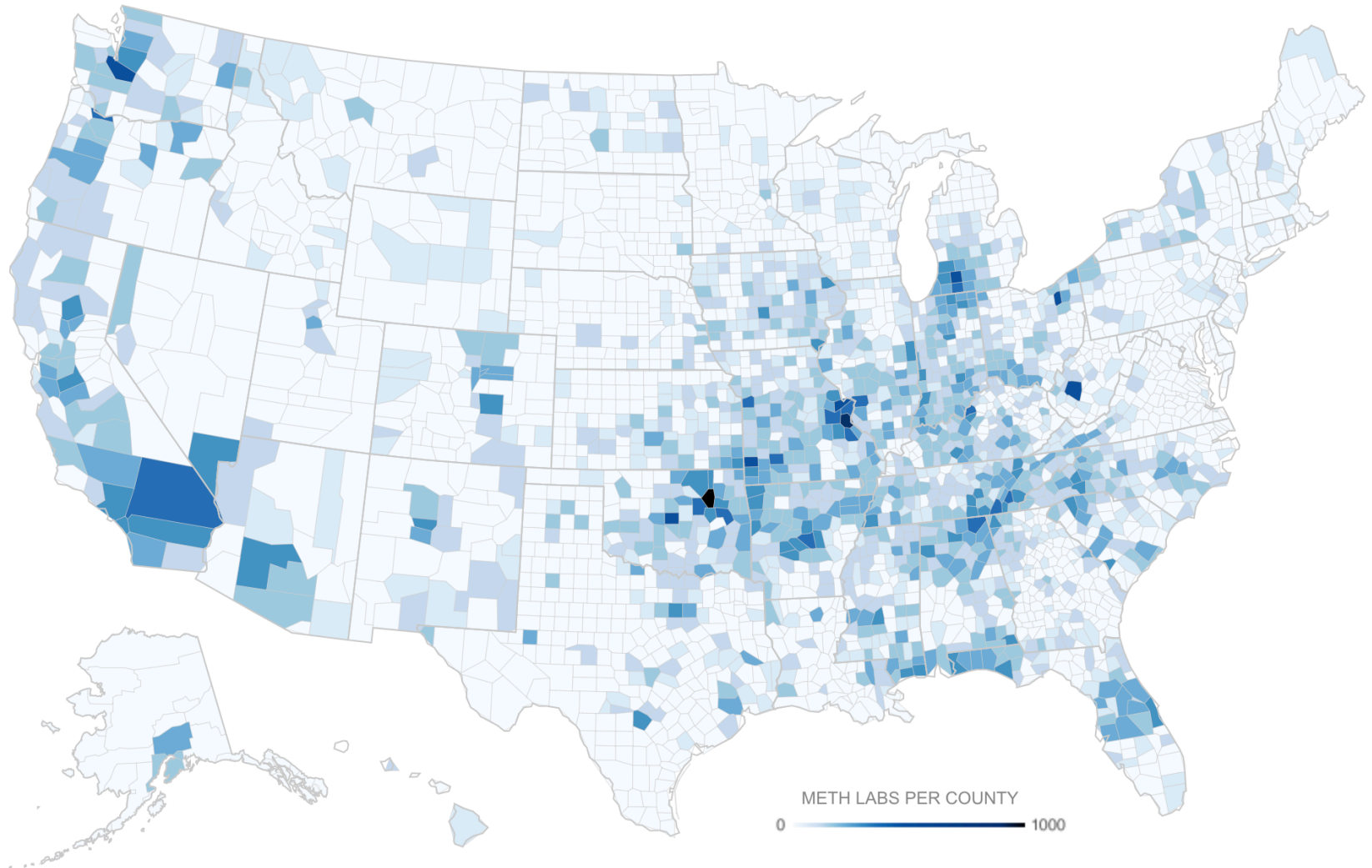


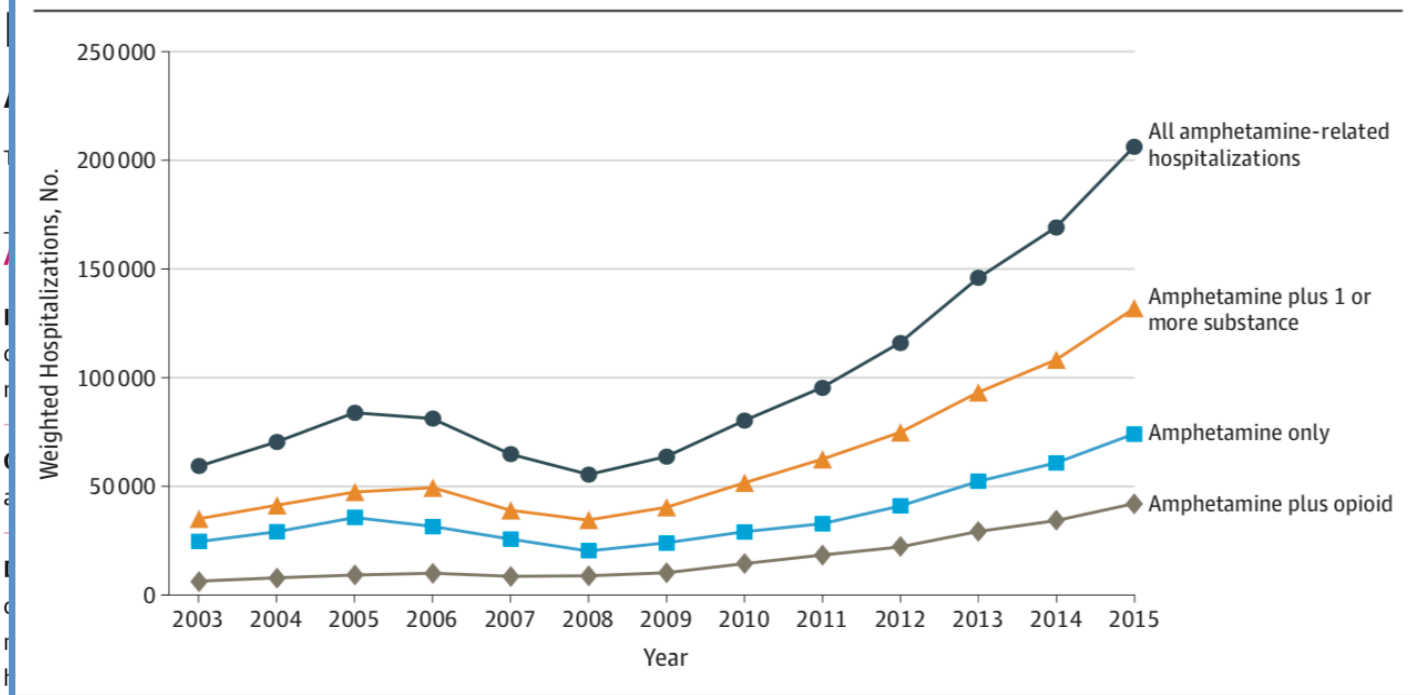
US National Survey on Drug use and Health: Prevalence of Illicit Drug Use

Table 1.6B Types of Illicit Drug Use in Lifetime, Past Year, and Past Month among Persons Aged 18 or Older: Percentages, 2015 and 2016

Drug	Lifetime (2015)	Lifetime (2016)	Past Year (2015)	Past Year (2016)	Past Month (2015)	Past Month (2016)
ILLCIT DRUGS^{1,2}	51.2	51.1	17.9	18.2	10.2 ^a	10.9
Marijuana	46.9	47.0	13.6 ^a	14.1	8.4 ^b	9.1
Cocaine	15.9	15.8	1.9	2.0	0.8	0.8
Crack	3.7	3.6	0.3	0.4	0.2	0.2
Heroin	2.1	2.0	0.3	0.4	0.1	0.2
Hallucinogens	16.5	16.7	1.7	1.8	0.5	0.5
LSD	10.3	10.5	0.5 ^b	0.7	0.1	0.1
PCP	2.6	2.6	0.0	0.0	0.0	0.0
Ecstasy	7.4	7.4	1.0	0.9	0.2	0.2
Inhalants	9.7 ^a	9.1	0.4	0.5	0.1	0.2
Methamphetamine	5.9	5.9	0.7 ^a	0.6	0.4 ^a	0.3
Misuse of Psychotherapeutics ^{3,4}	nr	nr	7.2	7.1	2.4	2.4
Pain Relievers ⁴	nr	nr	4.7 ^a	4.3	1.4	1.3
Tranquilizers	nr	nr	2.3	2.3	0.7	0.7
Stimulants	nr	nr	2.0	2.1	0.6	0.7
Sedatives	nr	nr	0.6	0.6	0.2	0.2
OPIOIDS (HEROIN USE OR PAIN RELIEVER MISUSE)⁴	nr	nr	4.8 ^a	4.5	1.5	1.4

Methamphetamine Lab Distribution in the US



**Figure 1. Amphetamine-Related Hospitalizations in the United States, 2003 to 2015**

regression models were used to examine in-hospital mortality and length of stay. Analysis of these data was conducted from November 2017 to August 2018.

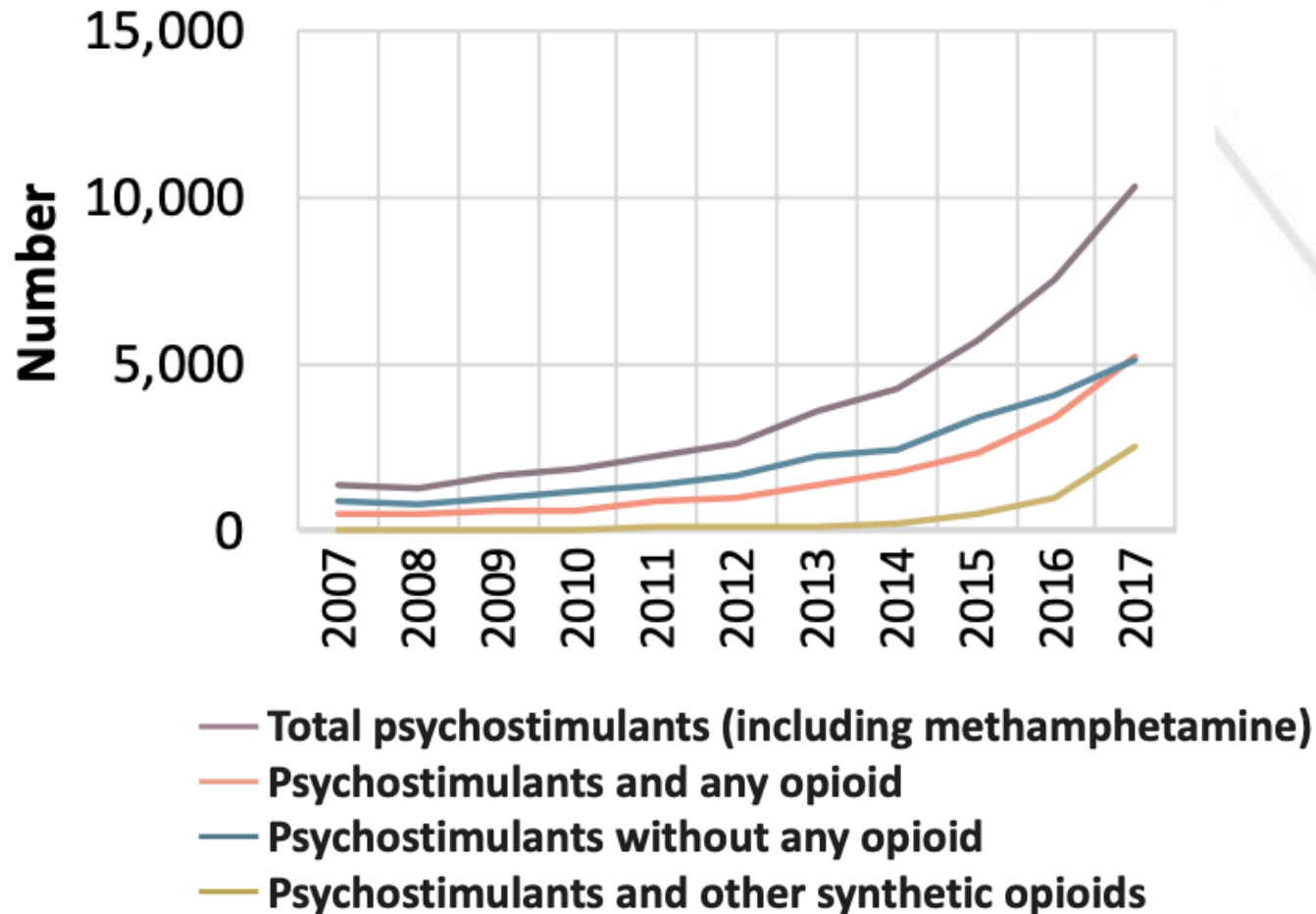
EXPOSURE Amphetamine dependence or abuse or amphetamine poisoning.

MAIN OUTCOMES AND MEASURES Annual hospitalizations, in-hospital mortality, length of stay,

States and the predominant payer being Medicaid.

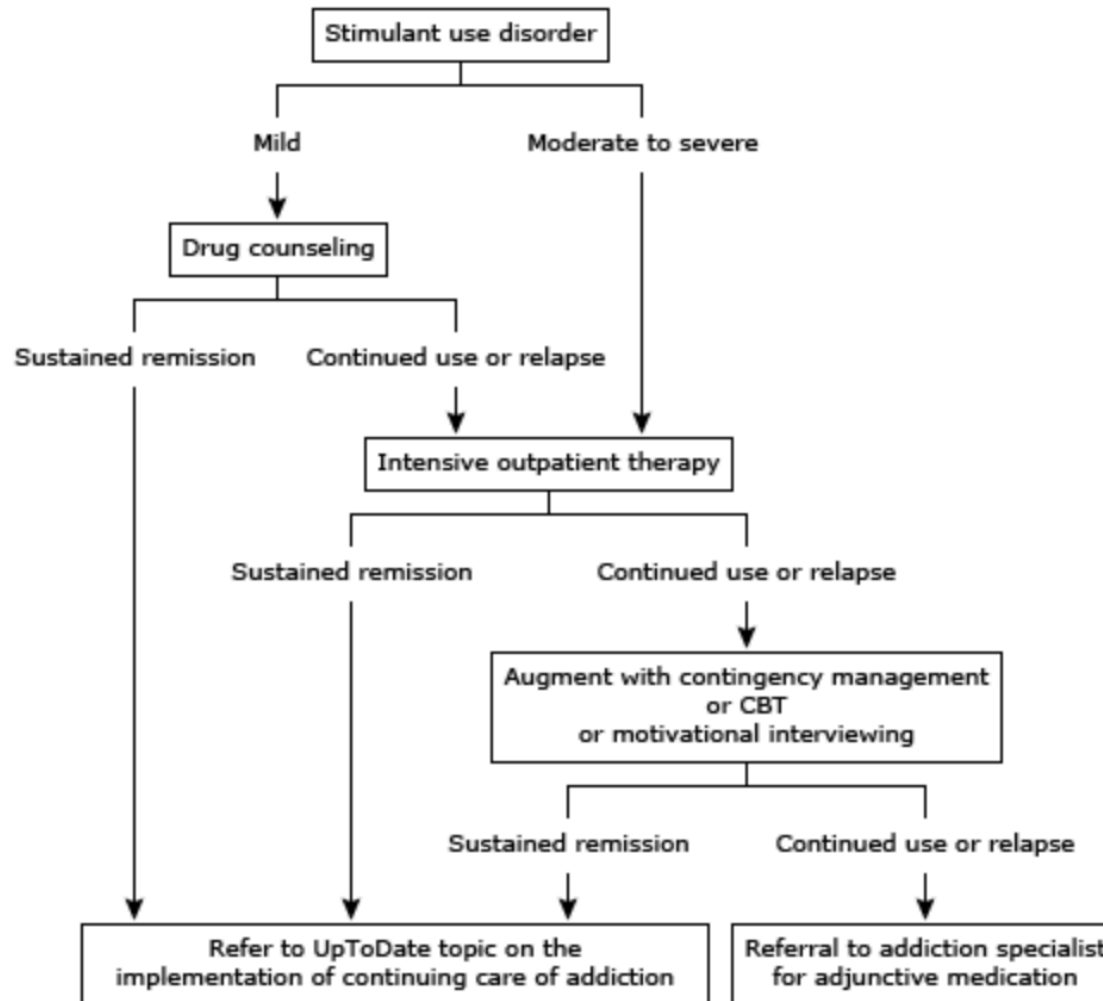
Meaning Amphetamine use may be an emerging public health issue; pharmacologic and nonpharmacologic

Psychostimulant-related overdose deaths in US, 1999-2017



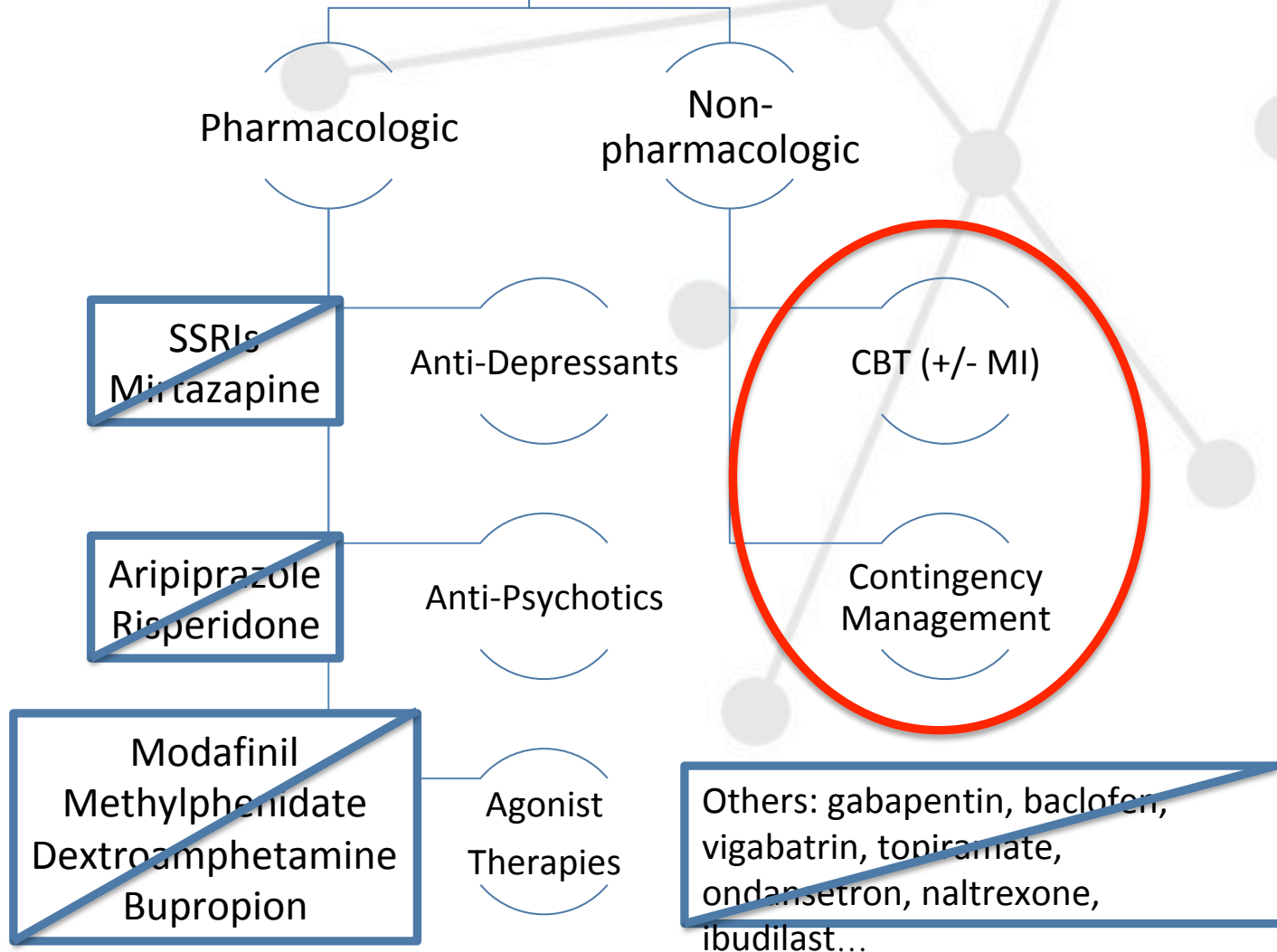
Treatment

Approach to treatment for stimulant use disorder



CBT: cognitive-behavioral therapy.

Stimulant Use Disorder Treatment



Trial medications

Study Drug	Effect
Psychostimulants (dexamphetamine, methylphenidate)	9 RCTs: may decrease use, craving, and/or severity of addiction?
Topiramate	2 RCTs: may decrease use, and/or severity?
Mirtazapine	1 RCT: may decrease use?
Bupropion	5 RCTs: may decrease use?
Naltrexone	2 RCTs: may decrease use and/or craving?
Modafinil	3 RCTs: may decrease use?

**Studies limited by retention, adherence, primary outcomes.*

Treatment of Stimulant Use Disorder: Psychosocial Treatments

1. Contingency management
 2. Cognitive behavioural therapy
 3. Motivational interviewing
 4. Relapse prevention
 5. Psychodynamic therapy
 6. Combinations programs
- Overall small to moderate effects (dropout rates are typically >40%)
 - Immediate effects noted, long-term benefits for meth use disorder not clear

Treatment of Stimulant Use Disorder: Psychosocial Treatments

Contingency Management

- Goal is to reduce reinforcement provided by drug use while simultaneously increasing reinforcement for healthier activities
- Applies contingencies in the form of reinforcement and consequences in order to reduce substance use
- Often uses a voucher-based system to give possible rewards for staying in treatment or remaining drug-free
- A 2016 systematic review found that contingency management helped to decrease use in a diverse group of substance use disorders, with a treatment effect that weakened but did not disappear following treatment termination



BMC Public Health



Research article

Open Access

A public health response to the methamphetamine epidemic: the

Clinical responses to CM in PROP were similar to CM delivered in drug treatment programs. [...] Further expansion of programs like PROP could address the increasing needs for acceptable, feasible, and cost-effective methamphetamine treatment in this group with exceptionally high rates of HIV-infection.

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Conclusions

- The prevalence of methamphetamine use continues to rise and it is associated with numerous physical, psychiatric, and social harms
- Methamphetamine use is associated with an increased risk of contracting HIV and worse HIV treatment outcomes
- Evidence-based treatments are available for stimulant use disorder, psychosocial approaches (esp. CM) remain the gold standard and can be implemented in settings with high rates of HIV

Questions?

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