



# Its Best in the West: Managing Methamphetamine use in the ED

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# Disclosures

- No financial conflicts of interest
- Receive grant funding from NIH for two clinical trials using injectable buprenorphine for opioid use disorder (CTN-0099), and methamphetamine use disorder (CTN-0110)

# Learning Objectives

- Understand burden and complexity of clinical care in the ED related to methamphetamine use disorder
- Develop strategies to manage complications, including agitation and psychosis, from methamphetamine use
- Integrate treatment strategies for methamphetamine use disorder for ED patients

## Case

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24 year old male presents to the ED agitated after using meth

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He was placed on a 5150 hold for "grave disability"

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He is disorganized and combative with staff, several prior ED visits for meth use

# Background

Meth is causing some problems, to put it mildly

# Methamphetamine

- **Enhances release of dopamine, NE and serotonin**
  - **Potent, long lasting stimulant**
    - **No clear treatment**

Meth is the most commonly used illicit drug in the world – and spans income status

The impact of income on drug use depends on the type of drug

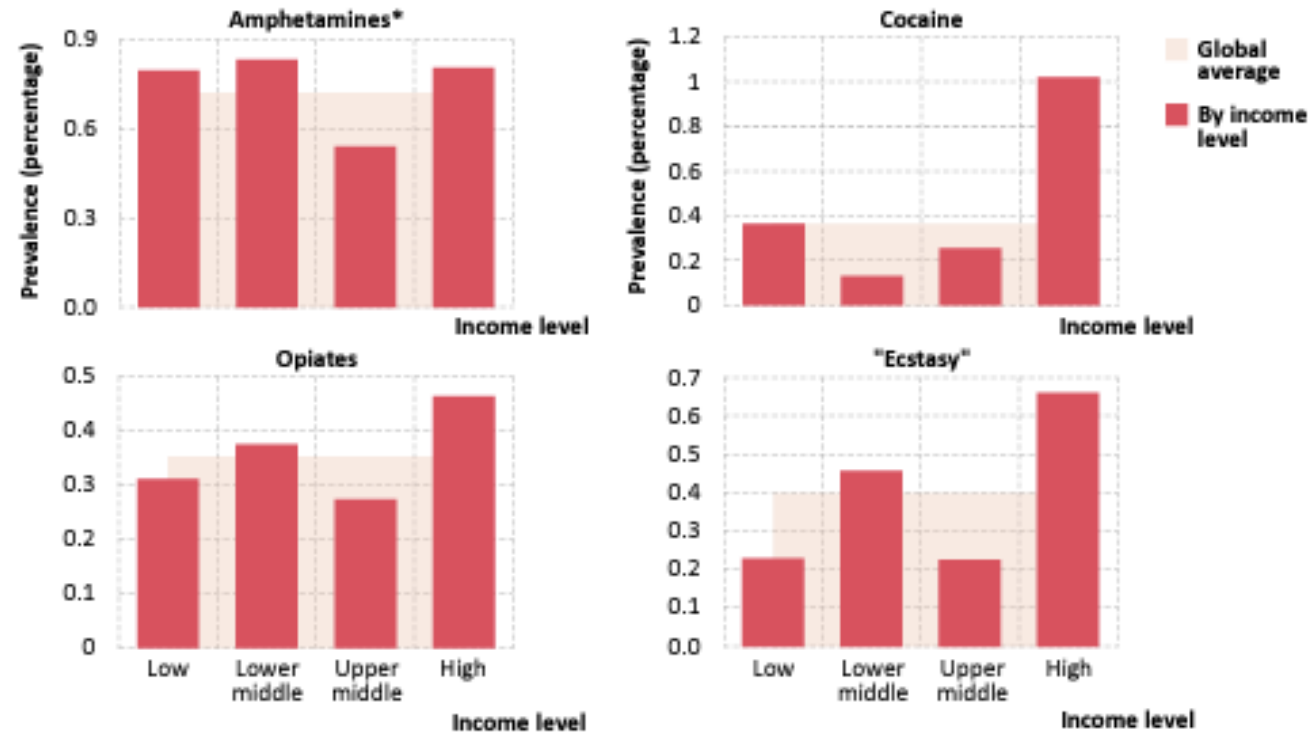
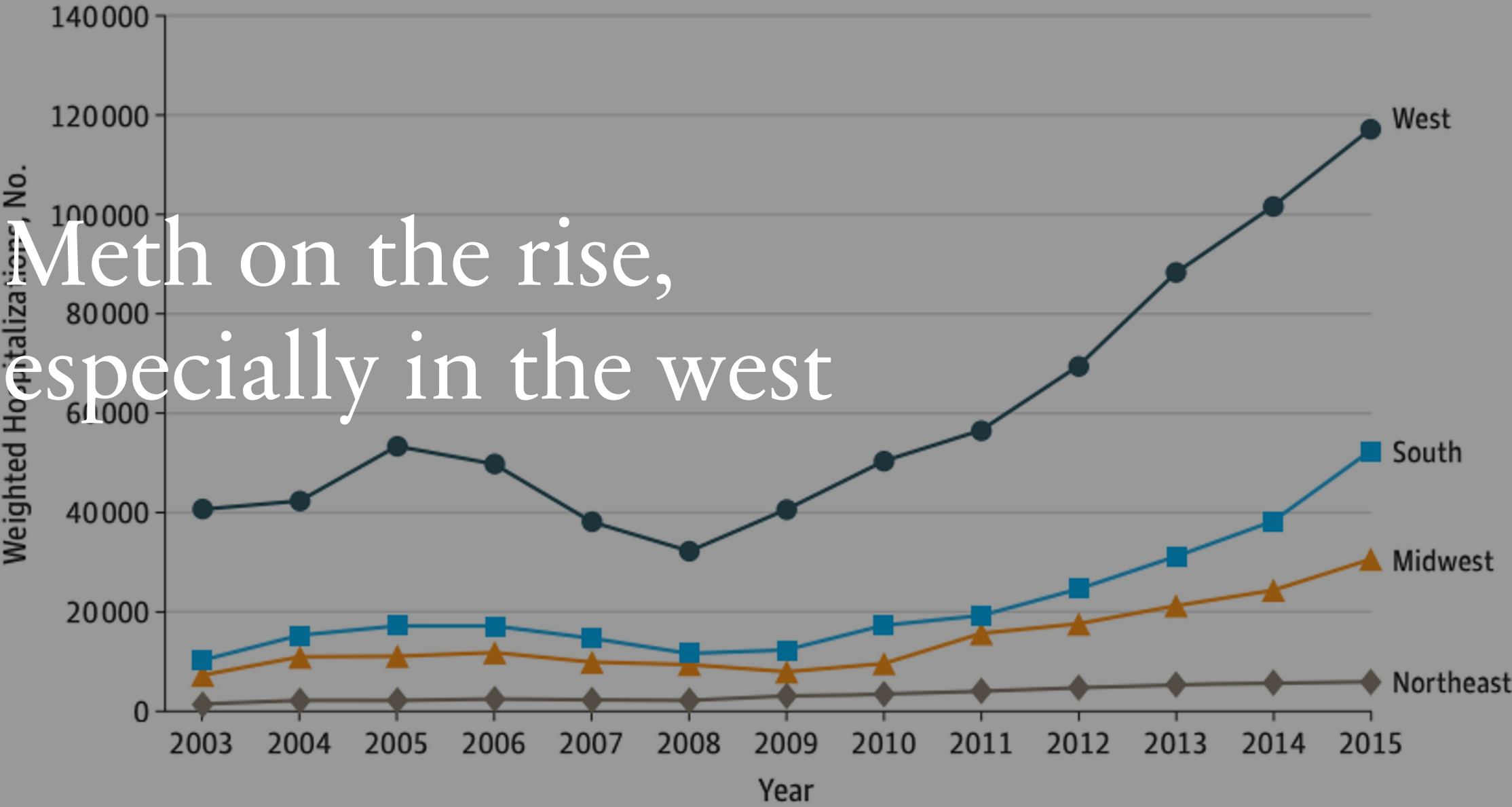
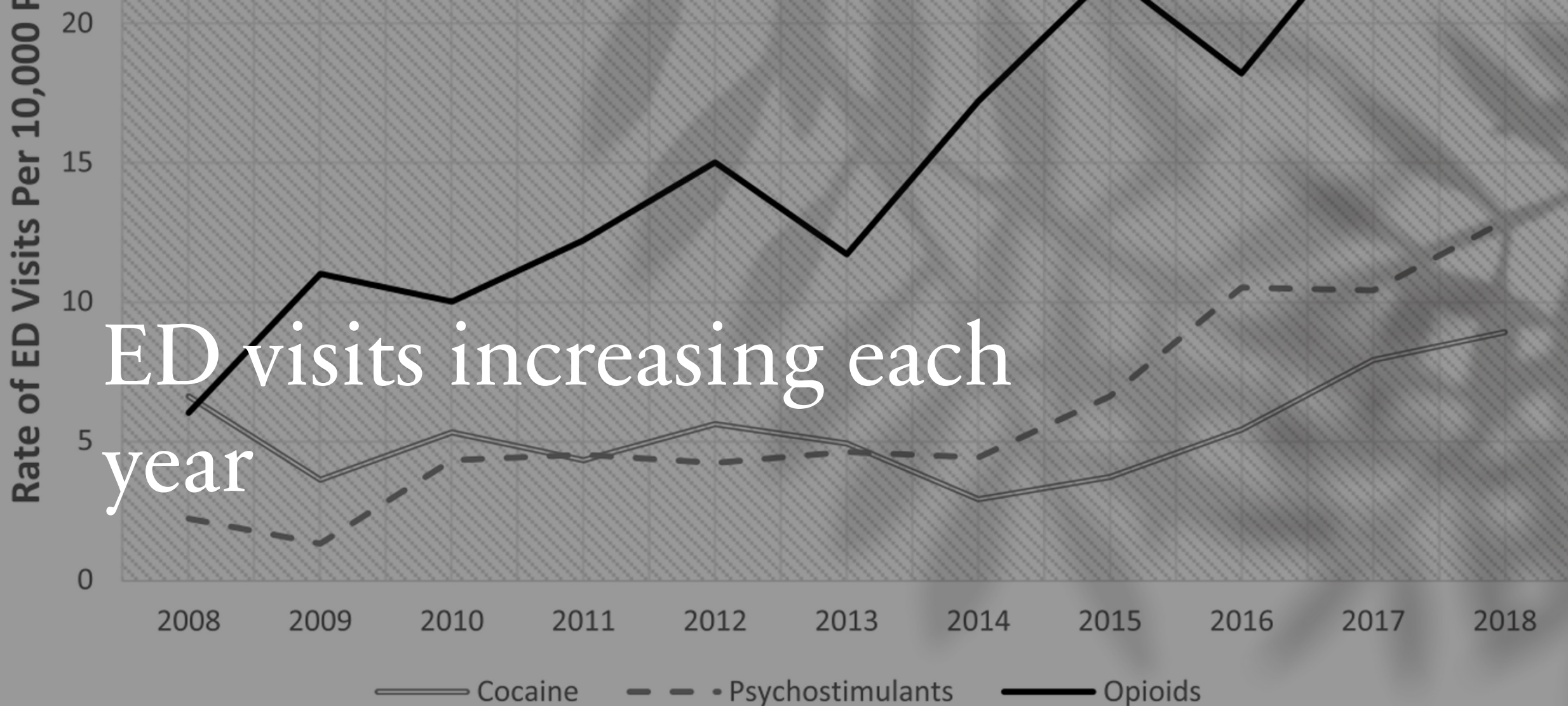


Figure 2. Amphetamine-Related Hospitalizations by US Census Region, 2003 to 2015



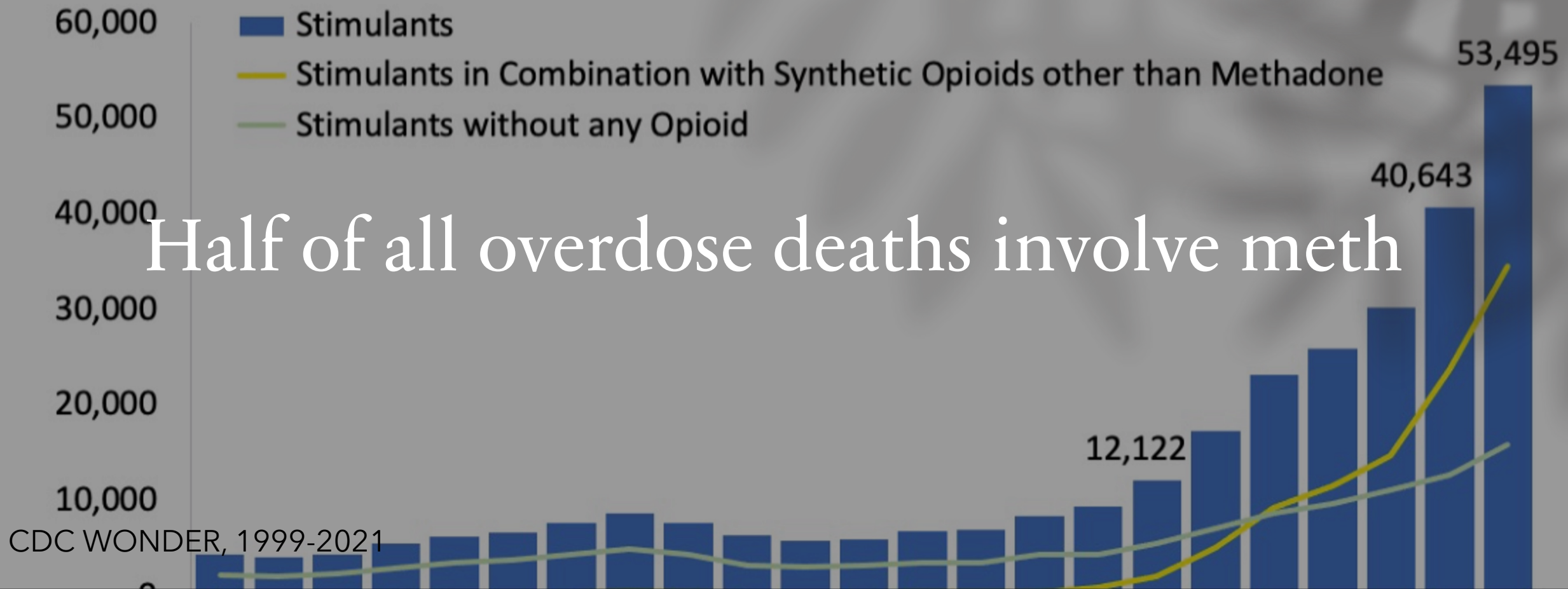
Meth on the rise,  
especially in the west





**Fig. 1** Annual trends in rates of national emergency department visits related to cocaine, psychostimulant, or opioid use, 2008–2018. Emergency department visits categorized by drug-type if any of the top three *ICD9-CM/ICD10-CM* diagnoses codes were related to opioid, cocaine, or psychostimulant use. Visits were mutually exclusive for drug type, as visits associated with two or more drug-categories were excluded. Rates were calculated by dividing weighted number of visits in each year by US Census Bureau estimates of civilian, noninstitutionalized adults aged 18 and older for that year. All rates per 10,000 population. Source: National Hospital Ambulatory Medical Care Survey Suen et al.

# Figure 6. National Overdose Deaths Involving Stimulants (Cocaine and Psychostimulants\*), by Opioid Involvement, Number Among All Ages, 1999-2021





Who has treated a  
meth overdose?

# Co-Use with opioids is the RULE (and much more complicated)

- Highest rates of:
  - Overdose
  - Unstable housing
  - Serious mental illness
  - Injection drug use
  - Blood born viral infections
- Lowest rates of:
  - Treatment engagement and retention

# Meth complication categories in the ED

- Psychiatric (agitation)
- Cardiovascular/neurologic
- Trauma
- Overdose (usually opioid related)

# Psychiatric complications of methamphetamine use

- What are some pharmacologic strategies for sedation?
- Is there any evidence for these strategies in this population?

# De-escalation strategies

- Reasonable to attempt for any patient with agitation or psychosis
- No data to suggest this is easier or harder with meth vs. primary psychosis

## Miller's Law

"To understand what another person is saying, you must assume that it is true and try to imagine what it could be true of."



Pharmacologic  
sedation for meth  
intoxication

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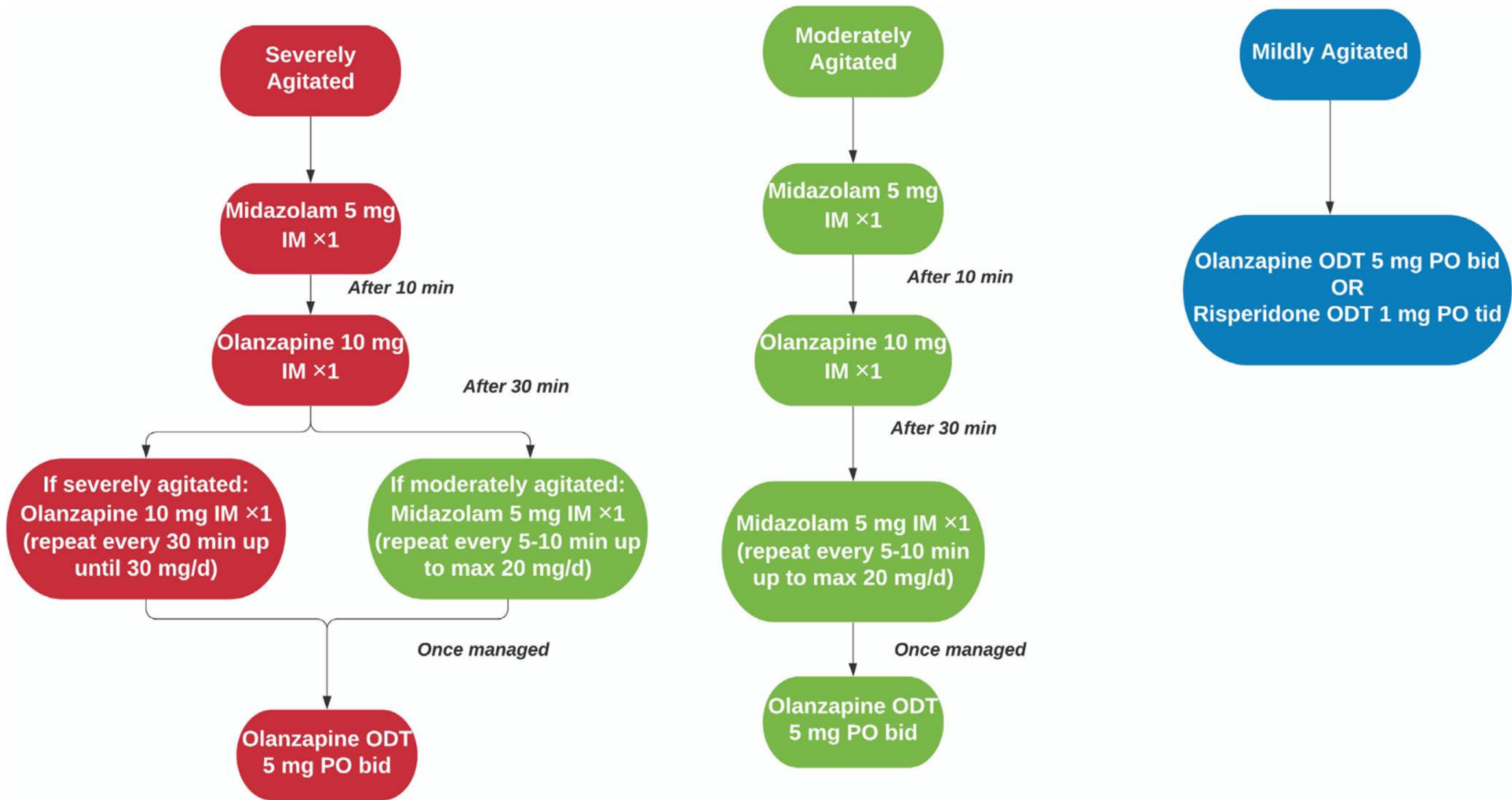
Benzos should be first  
line

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Okay to treat psychosis  
with anti-psychotics



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Specific literature about  
meth is unrevealing



**PAIN MANAGEMENT AND SEDATION/ORIGINAL RESEARCH** | VOLUME 72, ISSUE 4, P374-385, OCTOBER 01, 2018

# Intramuscular Midazolam, Olanzapine, Ziprasidone, or Haloperidol for Treating Acute Agitation in the Emergency Department

Lauren R. Klein, MD, MS   • Brian E. Driver, MD • James R. Miner, MD • ... Erik Fagerstrom, BS • Rajesh Satpathy, BA • Jon B. Cole, MD • Show all authors

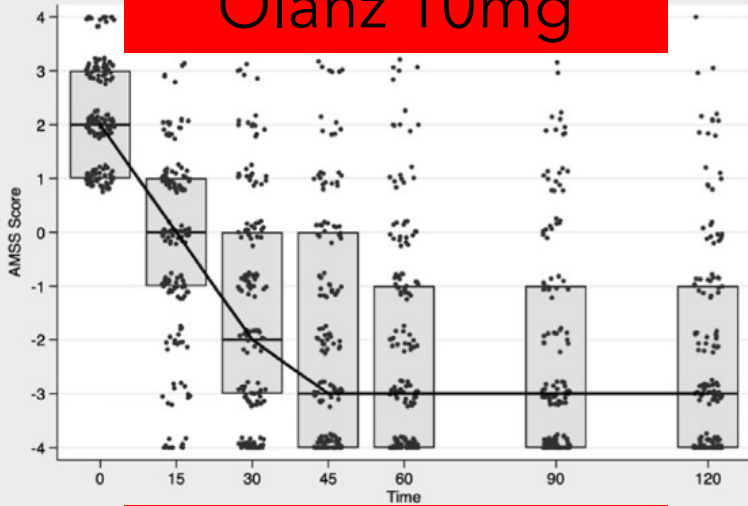
Published: June 06, 2018 • DOI: <https://doi.org/10.1016/j.annemergmed.2018.04.027>



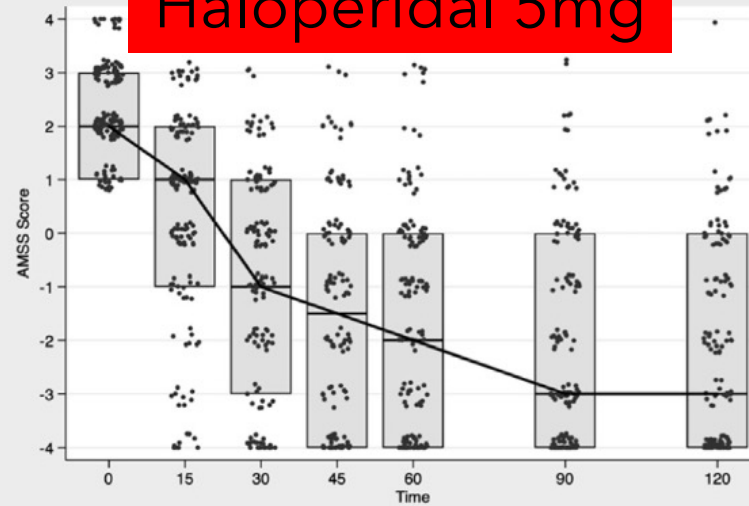
# Medications

- Olanzapine 10mg IM
- Haloperidol 5mg IM
- Haloperidol 10mg IM
- Midazolam 5mg IM
- Ziprazadone 20mg IM

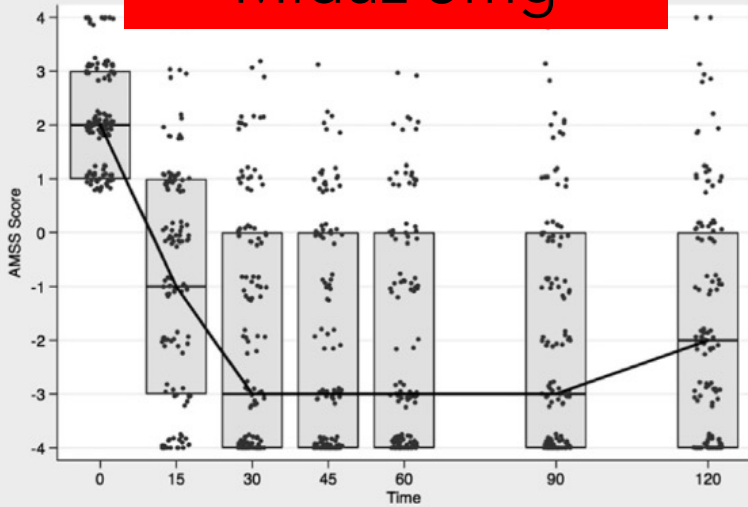
Olanz 10mg



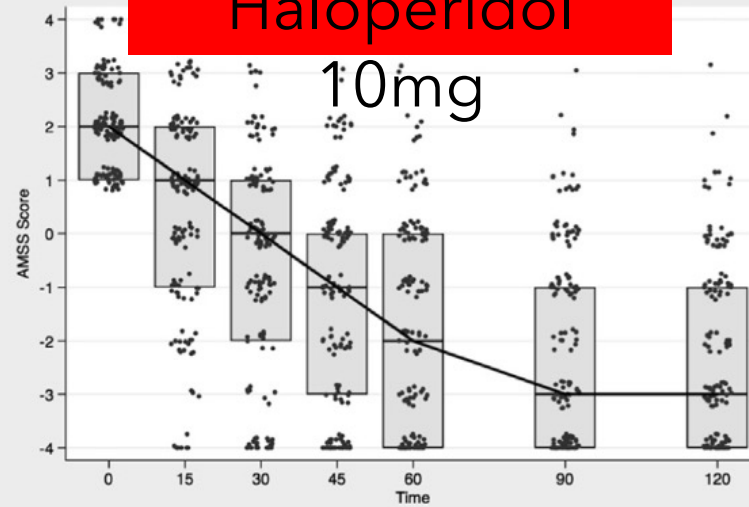
Haloperidal 5mg



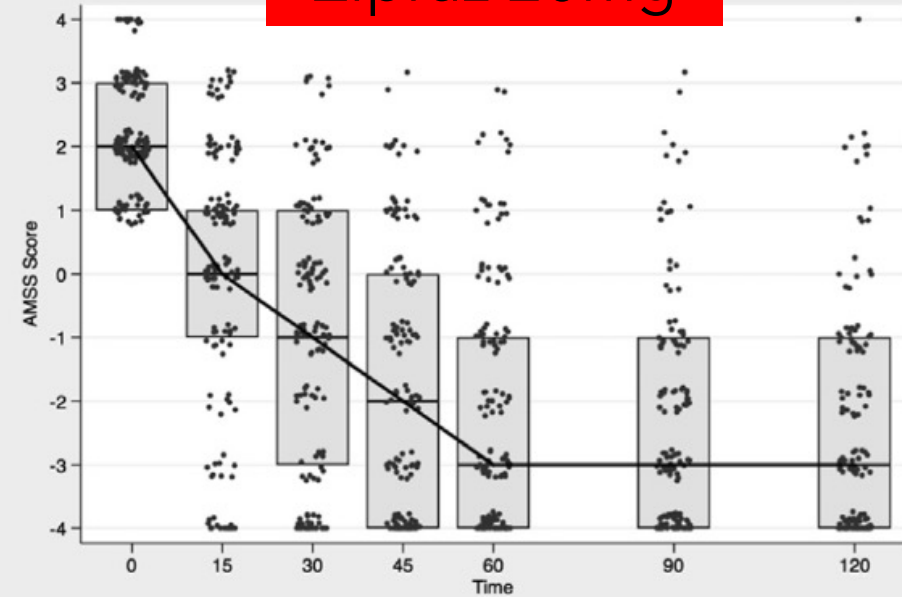
Midaz 5mg



Haloperidol  
10mg



Zipraz 20mg



# Take away

- Midaz and Olanzapine both worked well
- Didn't look at combination meds
- All similarly low adverse events
- Low rates of stimulant use in this population

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286, AUGUST 01, 2021

# A Prospective Study of Intramuscular Droperidol or Olanzapine for Acute Agitation in the Emergency Department: A Natural Experiment Owing to Drug Shortages

Jon B. Cole, MD   • Jamie L. Stang, BS • Paige A. DeVries, BS • Marc L. Martel, MD •

James R. Miner, MD • Brian E. Driver, MD

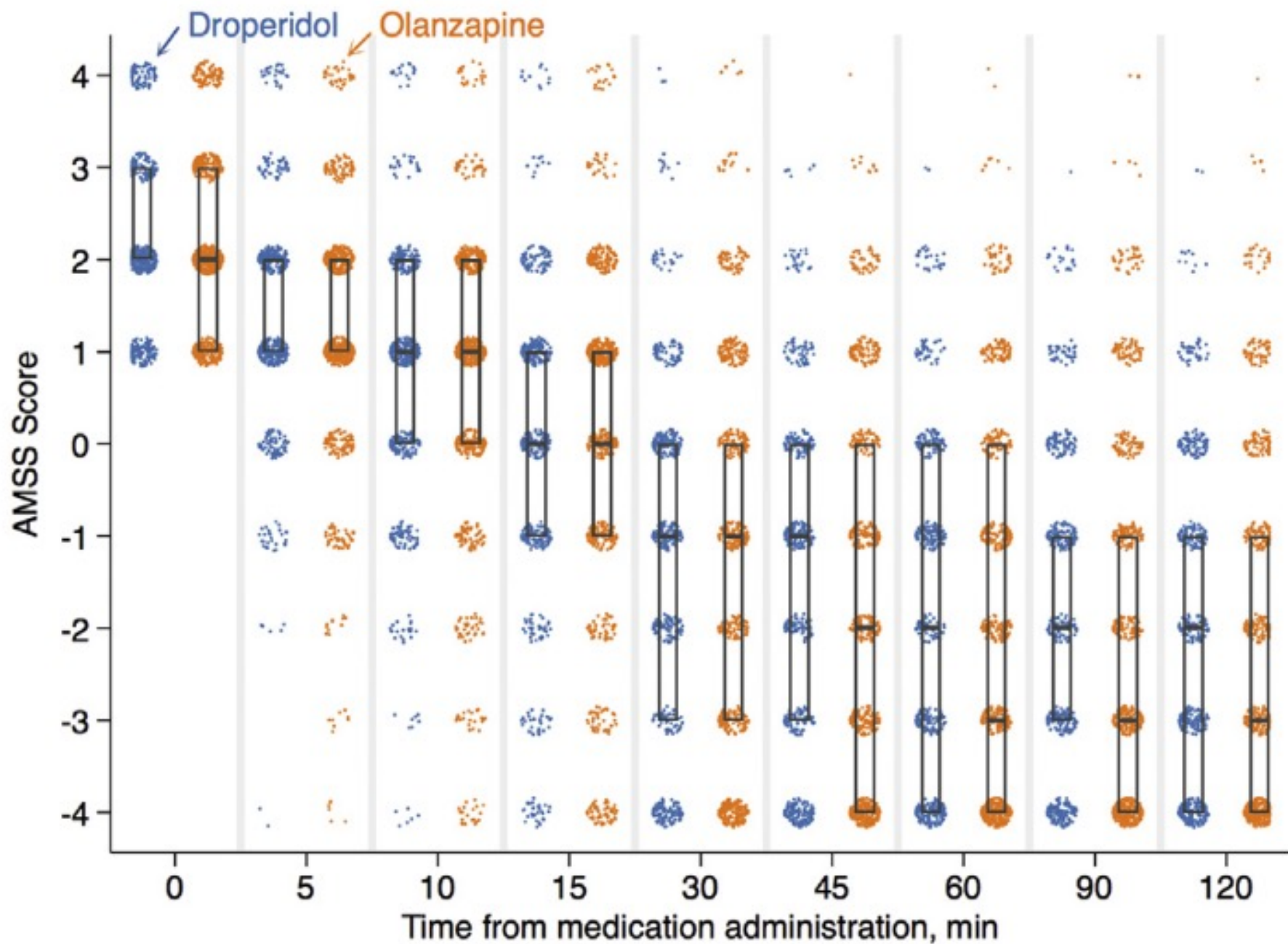
Published: April 09, 2021 • DOI: <https://doi.org/10.1016/j.annemergmed.2021.01.005> •



# Medications

- Olanzapine 10mg IM
- Droperidol 5mg IM





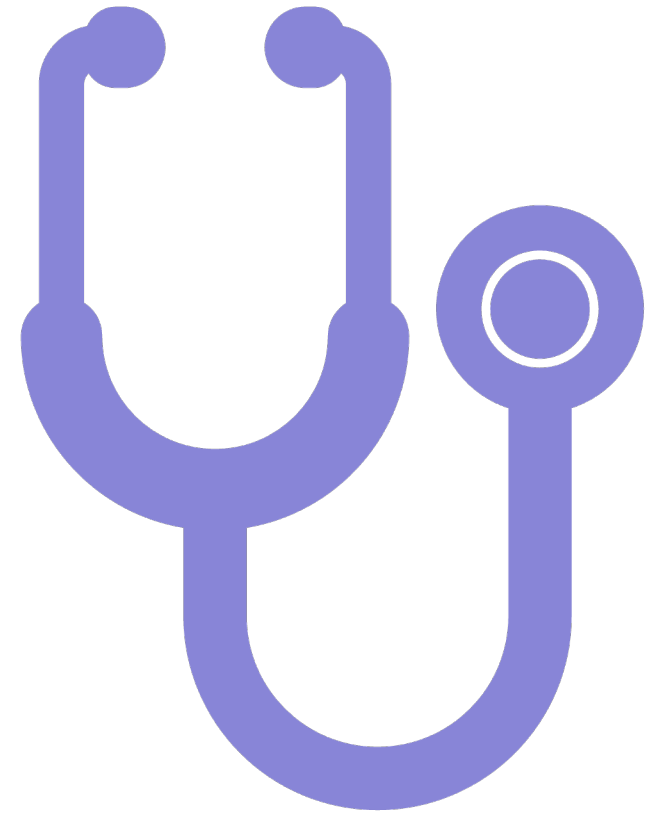
# Take away

- Olanz 10mg = Droperidol 5mg
- All “intoxicated”
- Institutional preferences at play

# General approach

- Most patients will respond to a combination of a combination of:
  - De-escalation
  - Benzos
  - Antipsychotics
- Its reasonable to stick to institutional practice patterns

# Additional critical care considerations



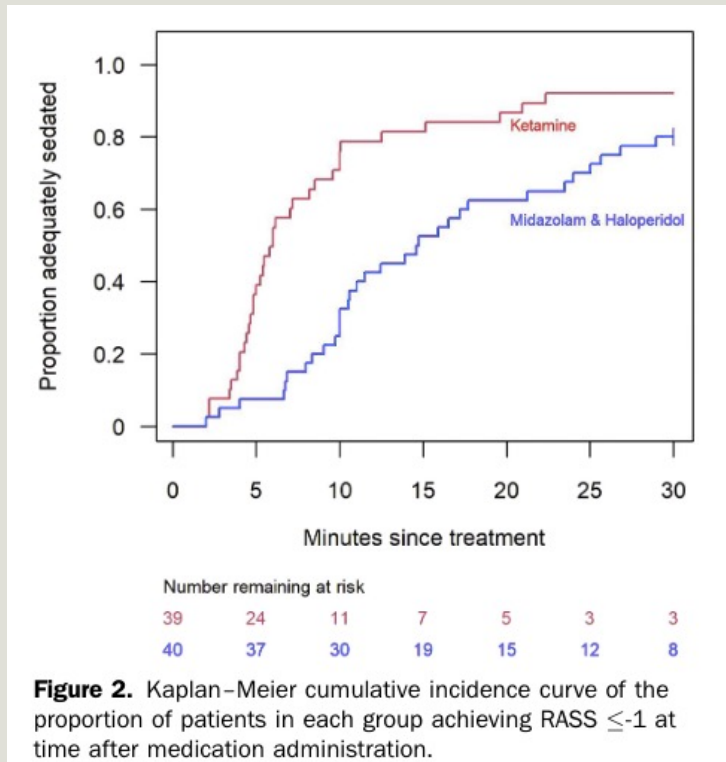
# Ketamine and sedation

- What role (if any) does stimulant intoxication play?

# Ketamine

vs.

# Midazolam (5mg)+Haloperidol (5mg)



**Table 2.** Frequency of serious adverse events.

Serious Adverse Event	Haloperidol and Midazolam (n=40)	Ketamine (n=40)
Apnea	1 (2.5)	2 (5.0)
Supplemental oxygen required	1 (2.5)	1 (2.5)
Laryngospasm	0	1 (2.5)
Dystonia	0	1 (2.5)
<b>Total</b>	<b>2 (5%)</b>	<b>5 (12.5%)</b>

# Prehospital ketamine for agitation in setting of substance use

N=86 patients given ketamine for delirium with agitation

Utox used to classify substance use\*

Low rates of meth, high rates of cocaine

Concurrent cocaine use associated with higher rates of intubation

# Ketamine and profoundly agitated patients

Profoundly agitated patients have high rates of substance use

Profoundly agitated patients have high rates of intubation

Profoundly agitated patients occasionally receive ketamine



# Dexmedetomidine and stimulant use

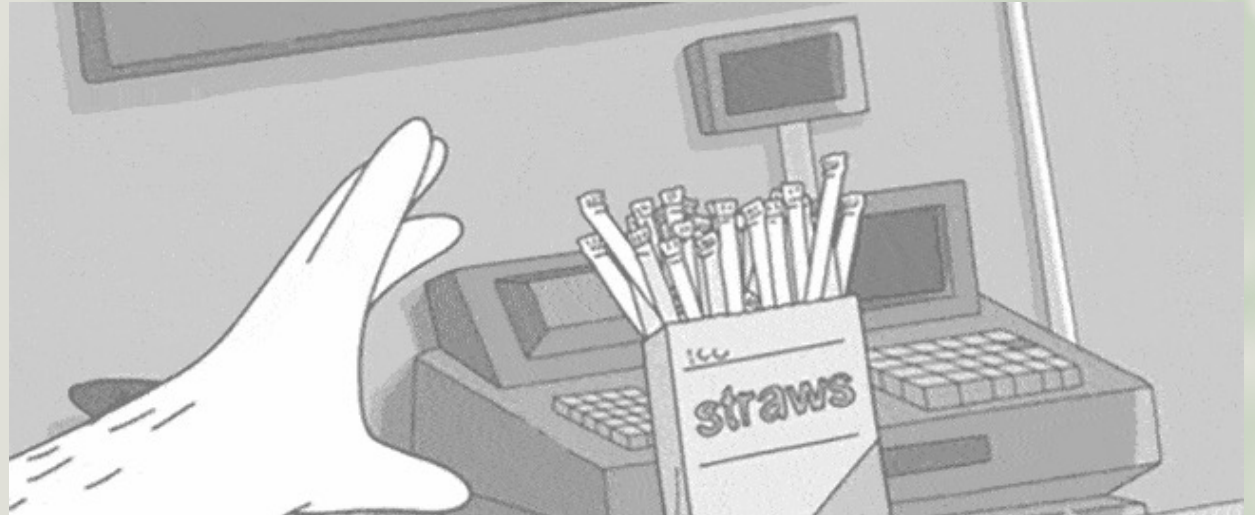
- Case report of use in benzo refractor patients
- Could this reduce sympathetic drive

# Ketamine and catecholamine depletion

- Ketamine induces catecholamine secretion from adrenals
  - Typical increase in blood pressure
- Observational data suggests in catecholamine depleted patients (shock), it can cause hypotension
- Analogies made with stimulant intoxication - are these patients catecholamine depleted?

# Succinylcholine and meth intoxication

- Succ associated with mild hyperK (idiosyncratic), malignant hyperthermia
- Stimulant use may be complicated by rhabdo or hyperthermia



Complications in critically ill patients more likely related to underlying pathology as opposed to acute intoxication

## Intraoperative vasopressor use during emergency surgery on injured meth users

Alexandra Marie Edwards,<sup>1</sup> Eric Gregory Johnson ,<sup>2,3</sup> Andrew C. Bernard<sup>4</sup>

## Sedation and analgesia needs in methamphetamine intoxicated patients: much ado about nothing

Elaine Chiang<sup>a,1,\*</sup>, Jon Case<sup>a</sup>, Mackenzie R. Cook<sup>b</sup>, Martin Schreiber<sup>b</sup>, Cody Sorenson<sup>a</sup>, Cassie Barton<sup>a</sup>

# Consider substance use disorder

- ED episodic care is part of broad opportunity to treat SUDs



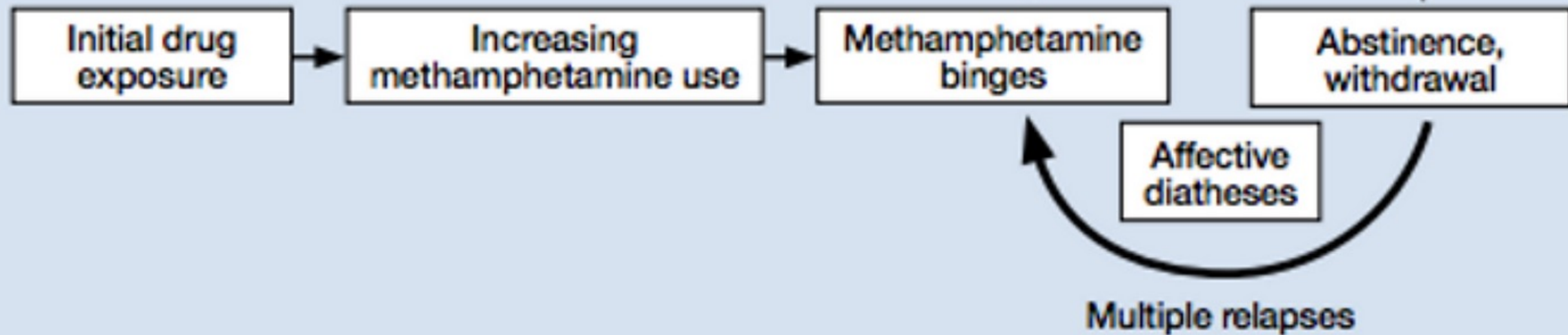
Methamphetamine use (disorder)

The ED is an *opportunity* to treat SUDs

Figure

## Cycle of methamphetamine abuse

Cadet, Jean Lud, and M. S. Gold.  
"Methamphetamine-induced psychosis:  
who says all drug use is reversible." *Curr.  
Psychiatry* 16 (2018): 15-20.



THE BAD THINGS  
HAPPEN HERE

# Treatment of Methamphetamine / Stimulant Crisis

1. Sleep. No sleep = No recovery. They have to sleep.

- Treat any agitation with benzodiazepine +/- antipsychotic
- Let them rest. Assist to find shelter.
- Example: Trazodone 50-100mg nightly x 1 week

2. Antipsychotic. Any hint of psychosis

- Example: Olanzapine 5-10mg twice a day X 1 week
- Explain it is OK to take as needed to: "slow down your thoughts and help you sleep."

3. Mirtazapine May help reduce withdrawal symptoms.

- 30mg at night



# General Approach

Agitation without psychosis → BDZ

Psychosis → BDZ + Antipsychotic

# BEAT Meth –ED-based study

- PES “multimodal” intervention for meth use induced psychosis
- Meds: Antipsychotics and benzos
- Double meal portions
- Discharge planning with goal to engage in outpatient or residential programs
- Higher rates of engagement in outpatient treatment

A close-up photograph of a variety of pharmaceutical pills and capsules scattered on a light-colored, textured surface. The pills come in many colors including blue, green, red, yellow, white, pink, and brown. Some are round, some are oval, and some are capsules. The text is overlaid on the left side of the image.

No approved  
broadly effective  
pharmacotherapy  
for stimulants

# Medications with some support for reducing meth use

- Mirtazapine
  - 30mg daily, moderate evidence reduces use (mainly 1 RCT)
- Bupropion (high dose) + Naltrexone-XR
  - ADAPT-2 trial with higher rates of abstinence use, multi-center clinical trial
  - Significant cash incentives in both arms
- Agonists treatments (methylphenidate, dexamphetamine,
  - Mixed results, some recent association data

# MURB - Bup 4 Meth

- RCT of injectable buprenorphine vs placebo
- Based on kappa opioid antagonism
- Targets a co-using population that doesn't meet moderate-severe OUD criteria

# Treatments with some support for reducing meth use

- Cognitive behavioral therapy
  - Moderate evidence that can decrease use, even a few sessions
- Contingency management
  - Good evidence CM can decrease meth use
- Psychosocial interventions less effective after treatment over, less effective for more severe disorders

# Summary

- Methamphetamine contributes to significant morbidity and mortality
- Agitation and psychosis are common complications when presenting to the ED
- Typical sedation approaches include de-escalation and pharmacotherapy
- Critical care treatment focused on resuscitation
- ED visits are an opportunity consider treatment options



Thanks!