

# Pharmaceutical Industry Marketing, Physician Prescribing, and Stimulant Misuse

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# Disclosures / Funding Source

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- **Conflict of interest statement:**

- I have no commercial relationships to disclose
- I will not be discussing any unapproved uses of pharmaceuticals or devices

- **Funding Sources:**

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- American Heart Association ENACT: End Nicotine Addiction in Children and Teens grant
- Thrasher Research Fund Early Career Award
- Academic Pediatric Association Young Investigator Award



*By the end of 20 minutes, learners will:*

1. Review the potential causal pathways leading from pharmaceutical company marketing to prescribing and overdose
2. Assess the evidence linking marketing and opioid-related outcomes
3. Identify gaps in the evidence linking marketing and stimulant-related outcomes

# Four Waves of the Overdose Crisis

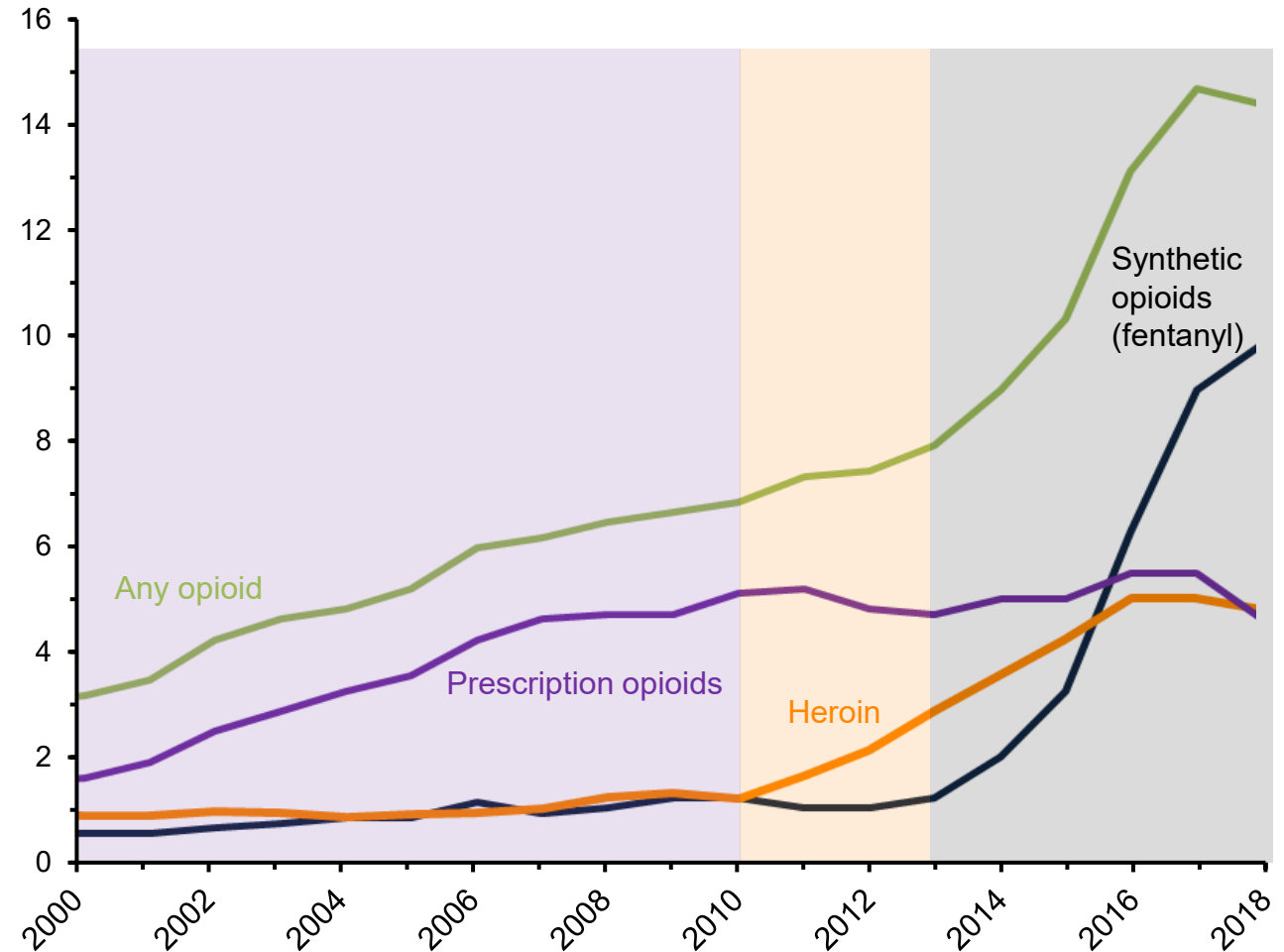
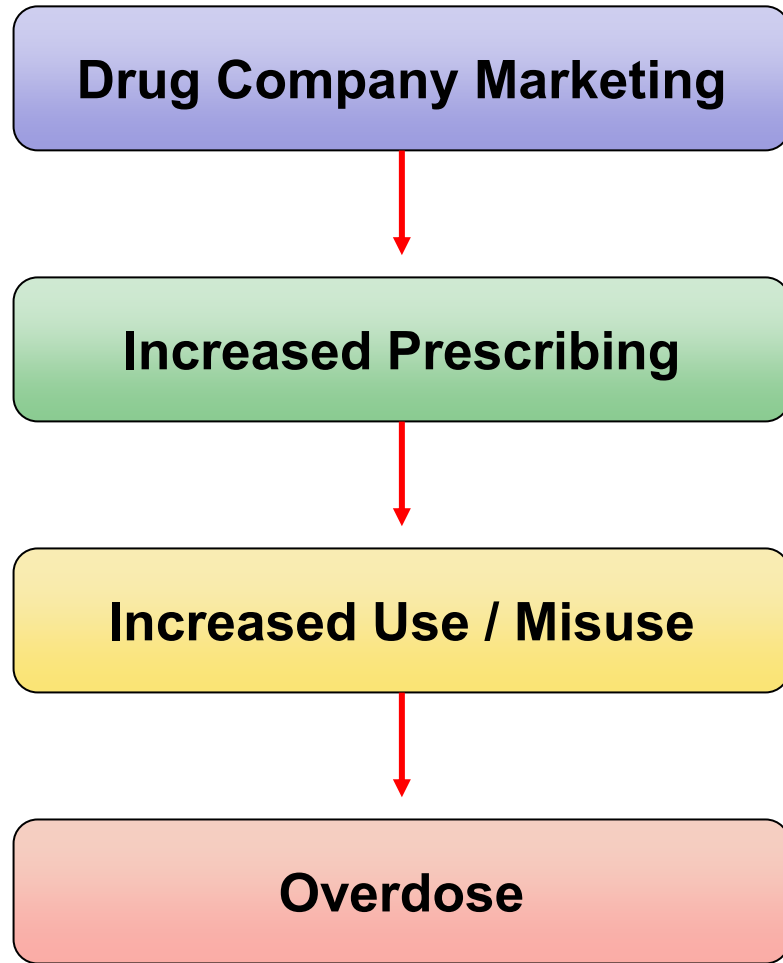
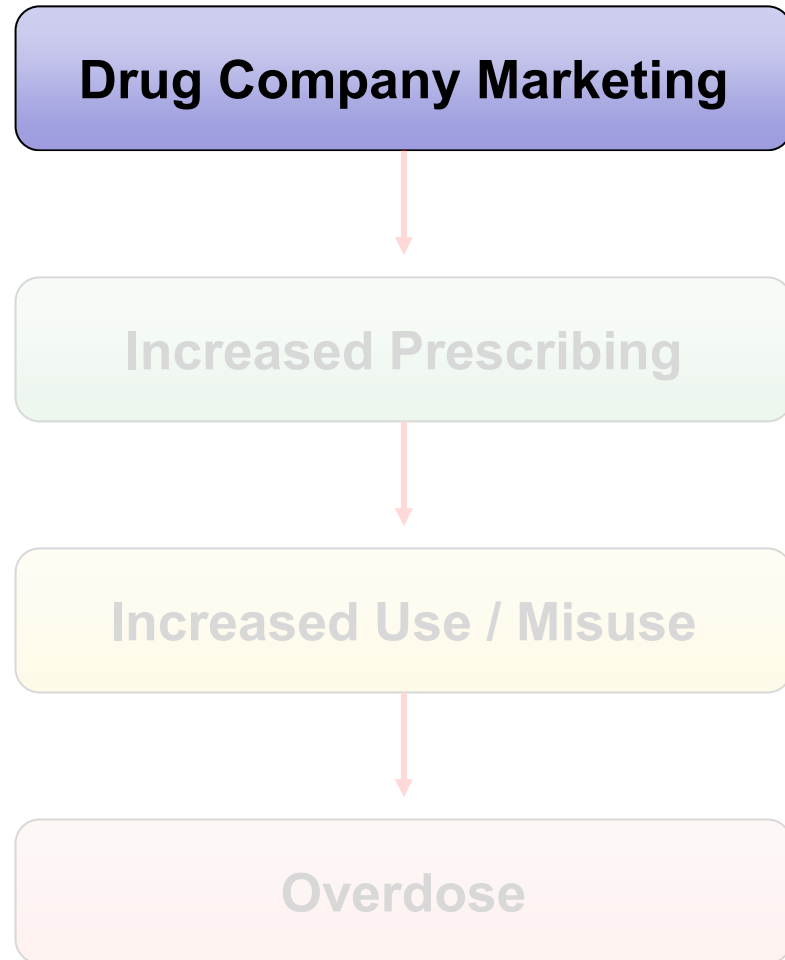


Image adapted from CDC/NCHS National Vitality Statistics System, Mortality; CDC, 2020

# Part 1: Opioids

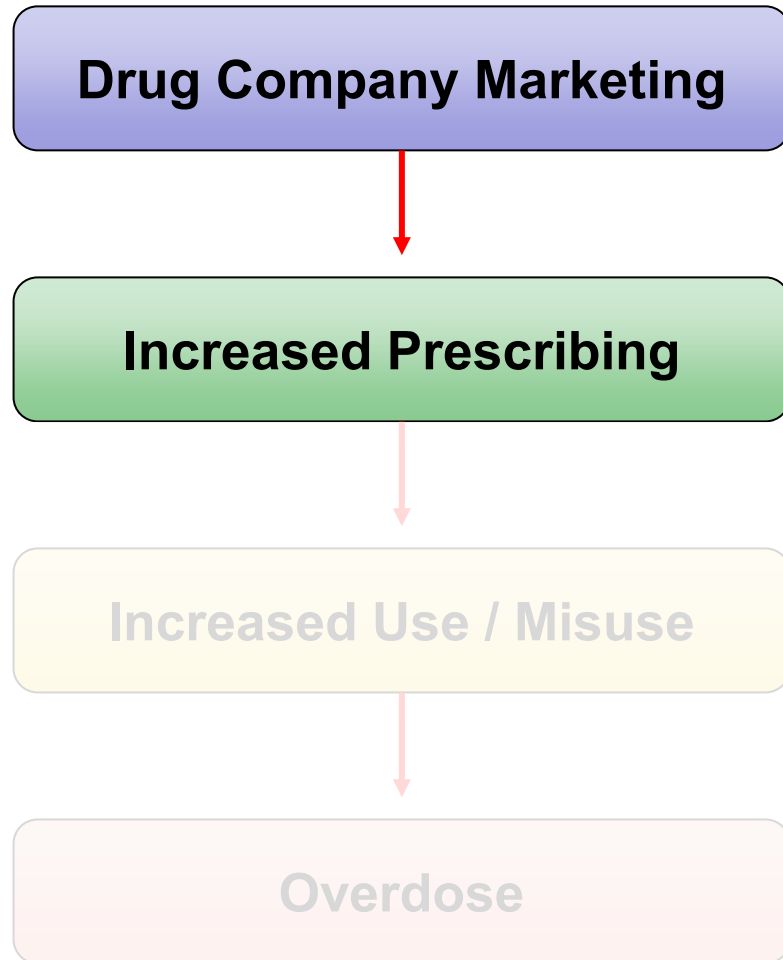
# Drug Company Opioid Marketing



- Physician Payments Sunshine Act of 2010 required documentation of all marketing of value  $\geq \$10$  (effective August 2013)
- Retrospective analysis of all marketing for opioids
- Between Aug 2013 and Dec 2015:
  - **375,266 marketing interactions** (non-research) totaling **\$46,158,388**
  - **68,177 physicians** (1 in 12 overall; 1 in 5 family medicine physicians)
  - Most frequent marketing was **meals** (94%, median value \$14)
  - Most costly marketing was **speaking fees** (63%, median value \$2,010)

Hadland SE et al. *Am J Public Health*, 2017;107(9):1493-5

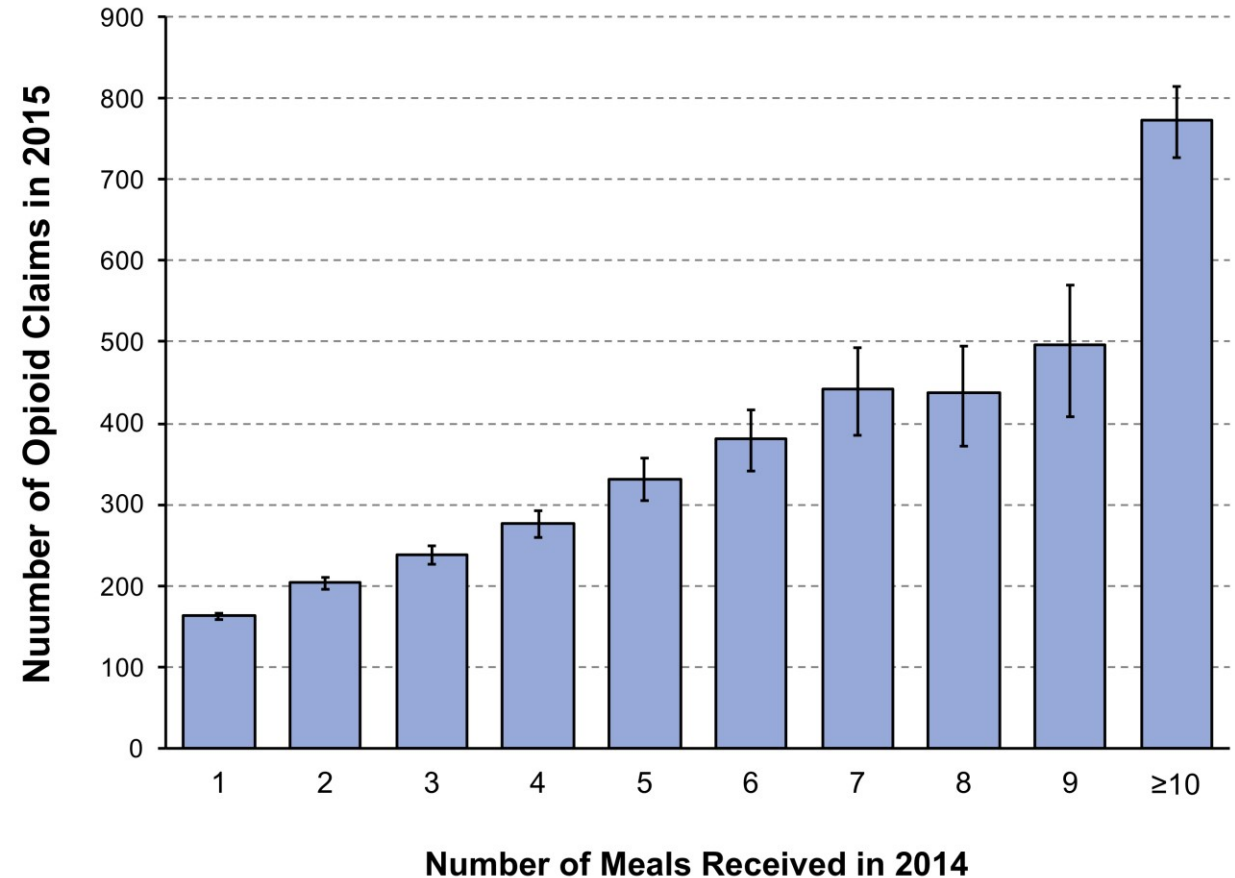
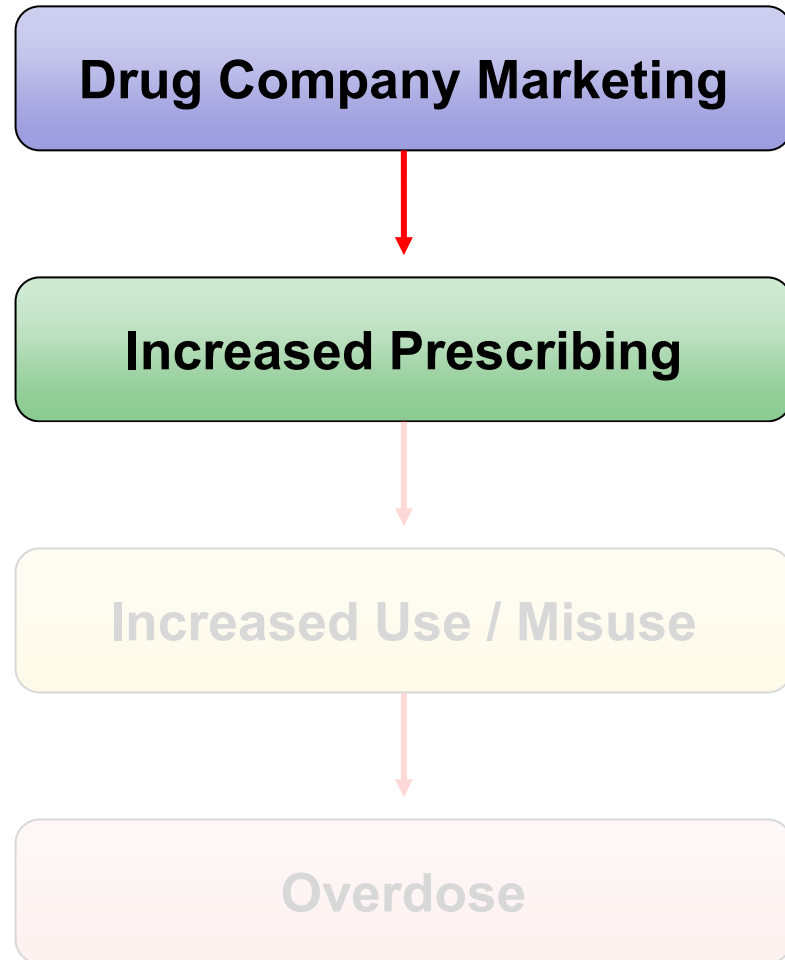
# Opioid Marketing & Prescribing



- Retrospective study of  $n=369,139$  physicians prescribing opioids in Medicare Part D in 2015
- Linked prescribing with Open Payments data on opioid marketing received the previous year (2014)
- Overall, total opioid dispensing **decreased** from 2014 to 2015, but **increased** in physicians who received opioid marketing
- After adjusting for prior opioid claims and changes in total drug claims, physicians receiving marketing had **9.3% (95% CI, 8.7-9.9%)** more opioid claims

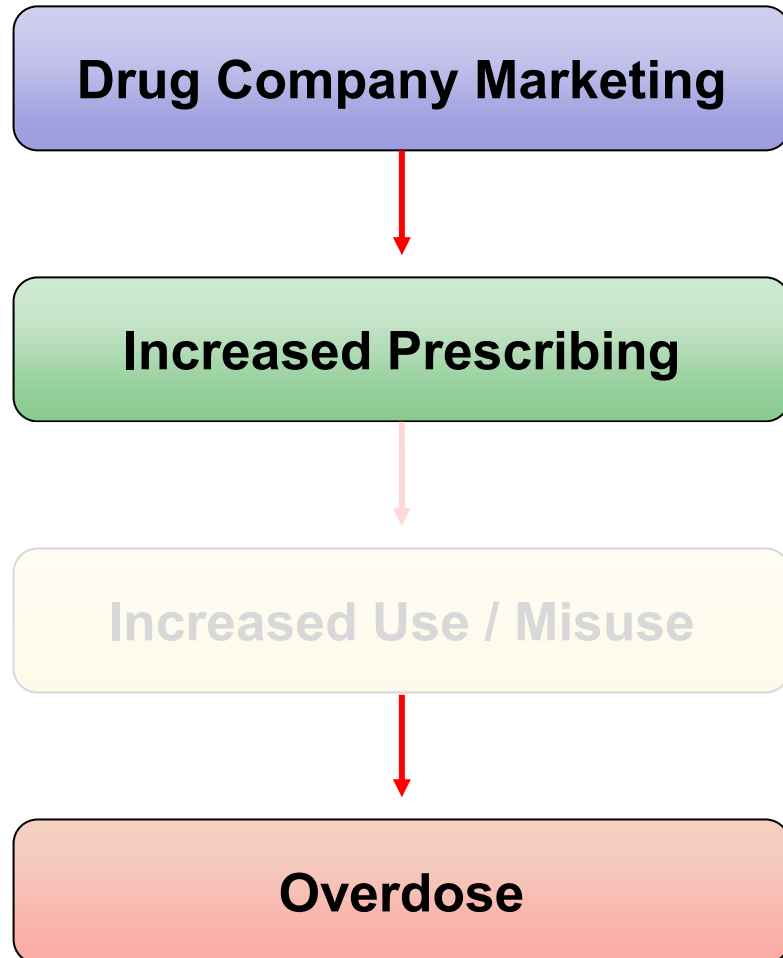
Hadland SE et al. *JAMA Intern Med*, 2018;178(6):861-863

# Opioid Marketing & Prescribing



Hadland SE et al. *JAMA Intern Med*, 2018;178(6):861-863

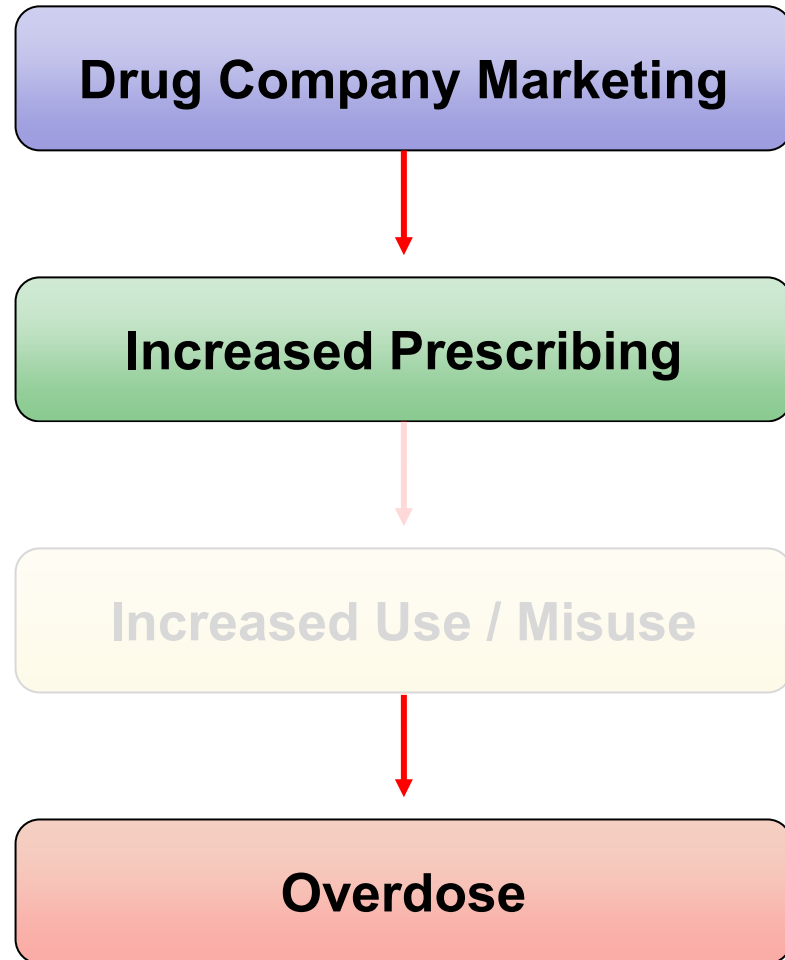
# Opioid Marketing & Overdose



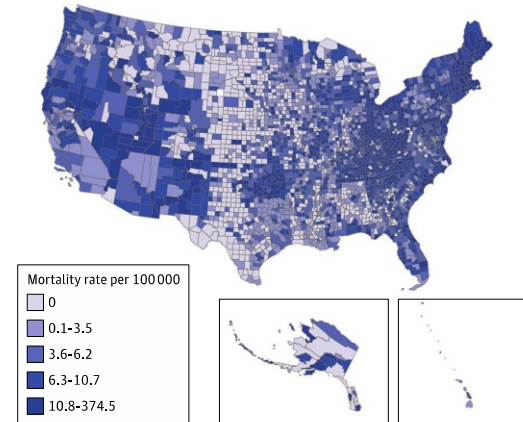
- Retrospective study of 2014-2016 county-level opioid mortality linked to previous year's opioid marketing
- **70%** of counties received marketing
- For a typical county of 10,000 people...
  - **4 additional payments** (=1 SD) were associated with **18% more deaths** involving prescription opioid
  - **1 additional physician** receiving marketing (=1 SD) associated with **12% more deaths**
- This association was mediated by county prescribing rates

Hadland SE, et al. *JAMA Netw Open*. 2019;2(1):e186007

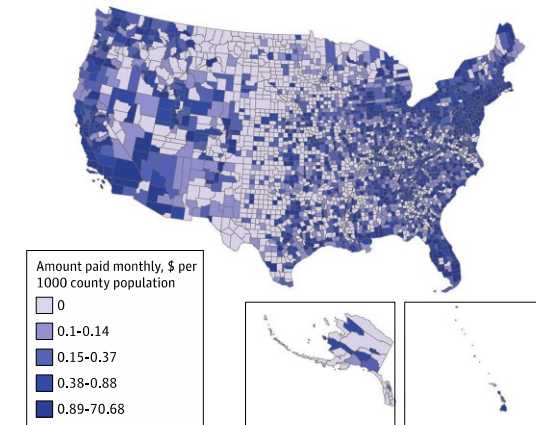
# Opioid Marketing & Overdose



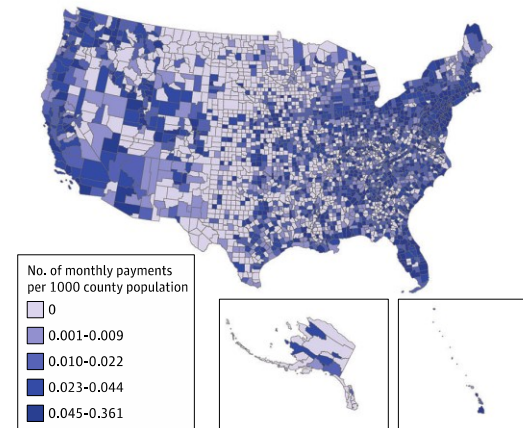
**A** Mean mortality rate from prescription opioid overdoses across US counties (2014-2016)



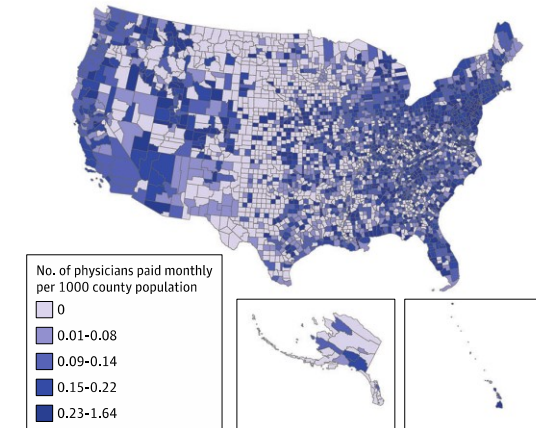
**B** Marketing value in dollars (2013-2015)



**C** Payments to physicians (2013-2015)

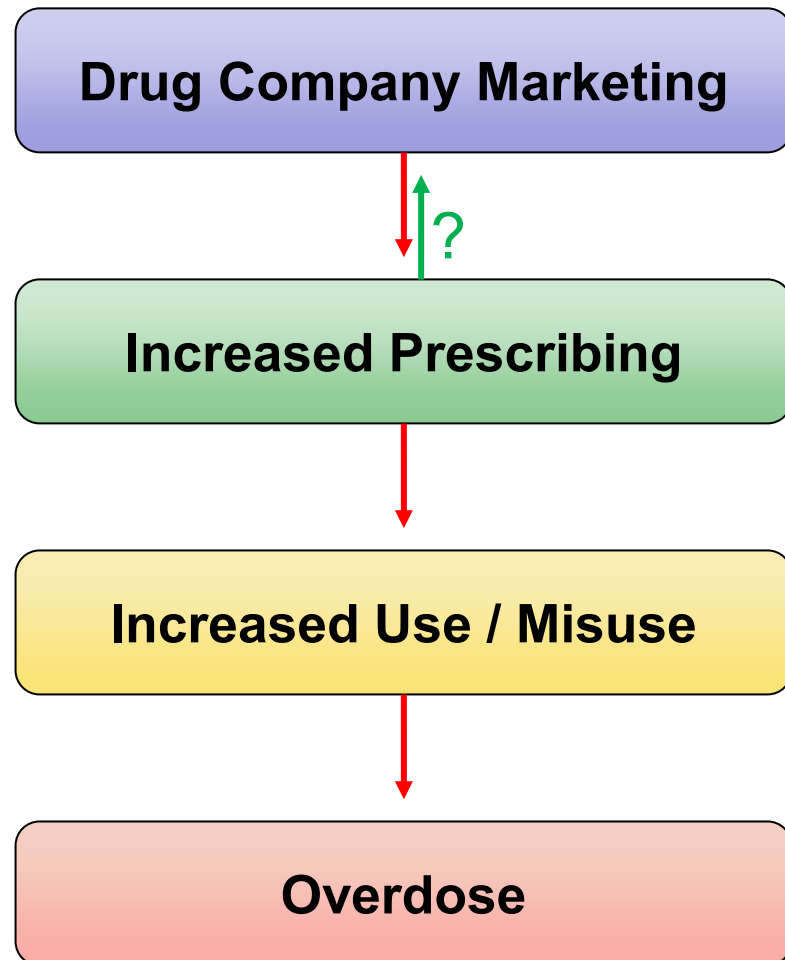


**D** Physicians receiving marketing (2013-2015)



Hadland SE, et al. *JAMA Netw Open*. 2019;2(1):e186007

# A Word on Causality



- Studies are observational and we cannot exclude reverse causality; however, we...
  - Lagged outcomes from exposures
  - Adjusted for previous opioid prescribing
- In truth, there likely *is* reverse causality—that is, drug companies target doctors who already prescribe at high levels
  - This is a known marketing strategy
- Drug companies unlikely to invest millions in marketing if it did not result in profits
- Marketing often targeted counties hard hit by overdose—how can this be justified?

# Part 2: Stimulants

# Stimulant Overdoses

Drug Company Marketing



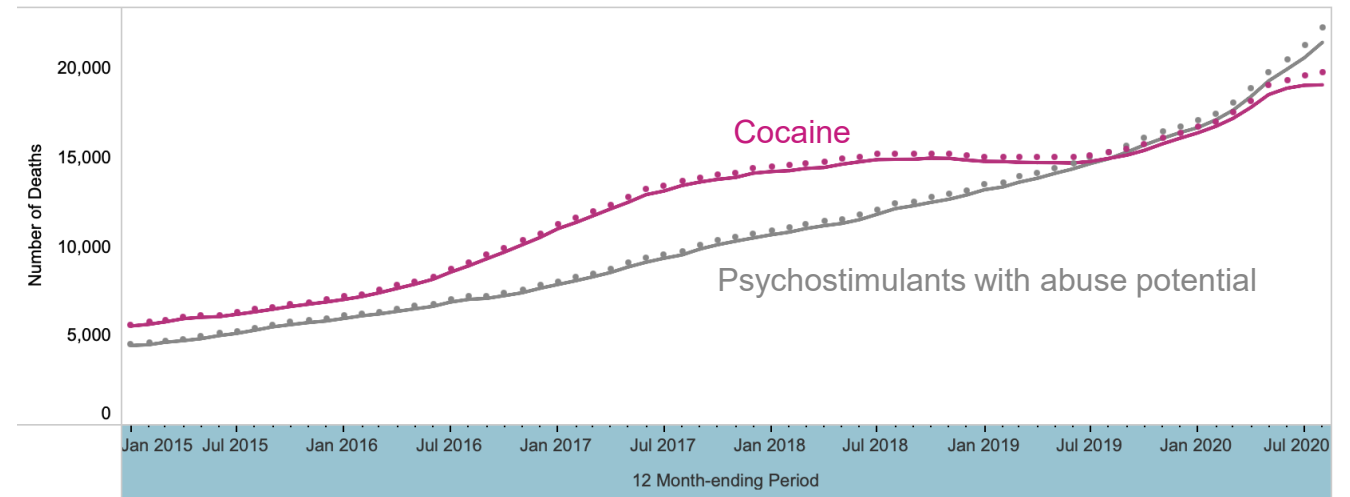
Increased Prescribing



Increased Use / Misuse

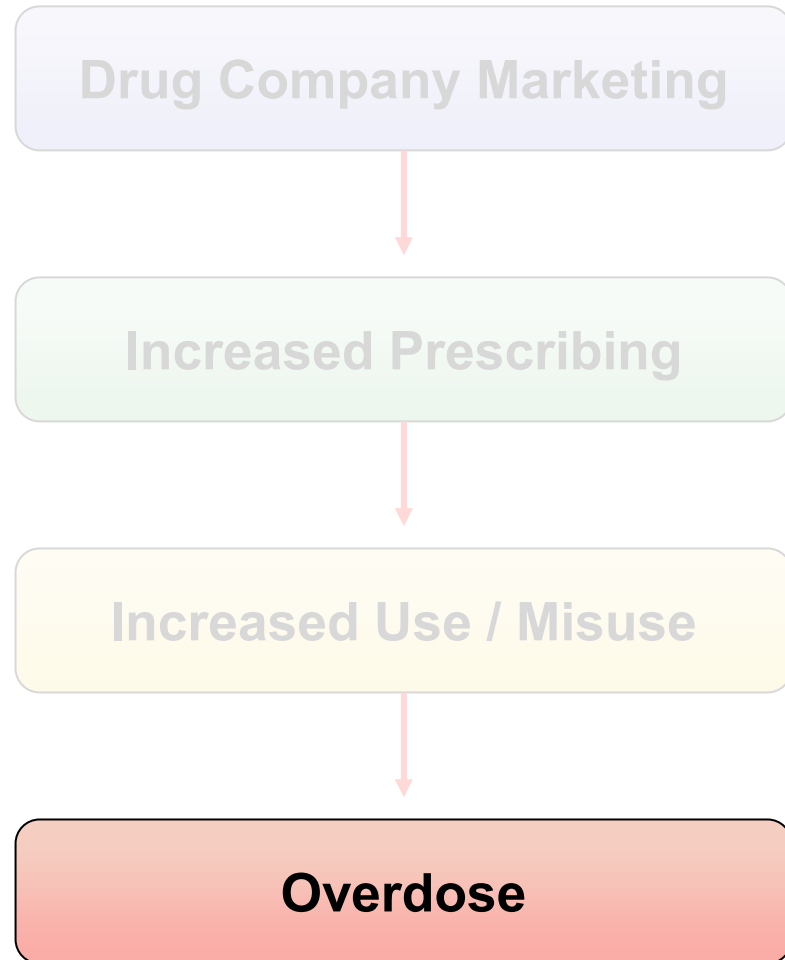


**Overdose**

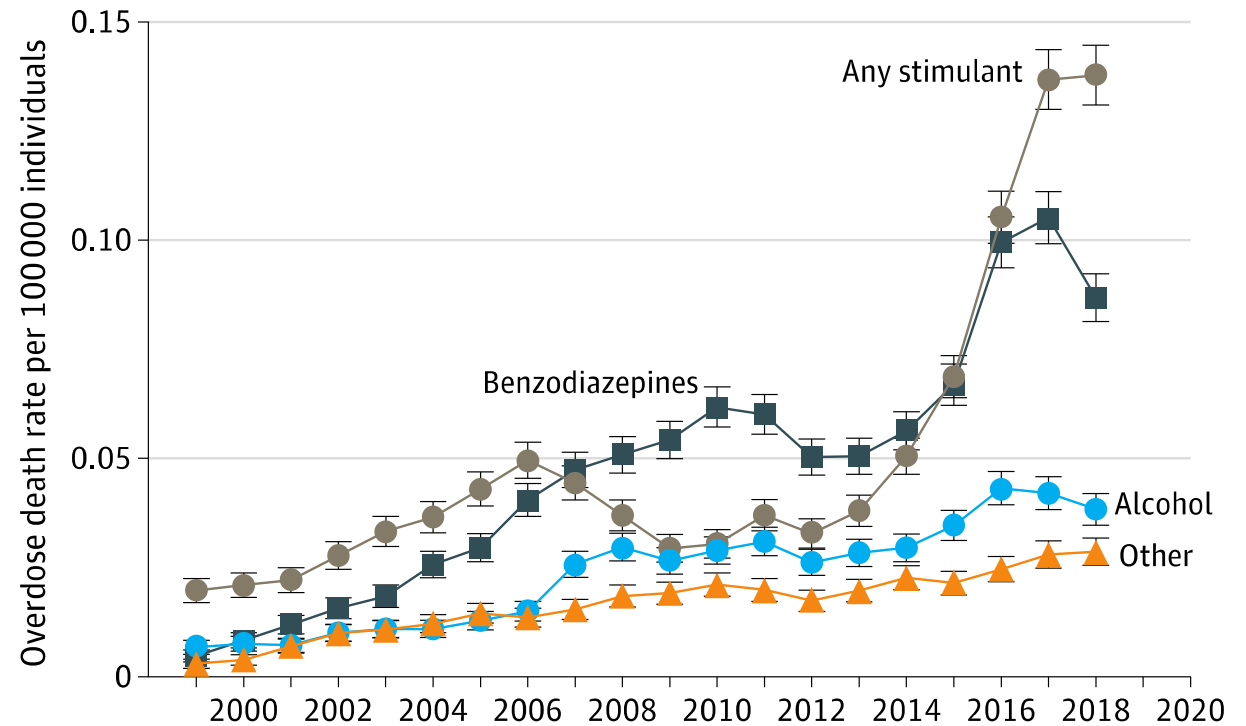


Ahmad FB, et al. National Center for Health Statistics, 2021

# Stimulant Overdoses in Youth 13-25 Years



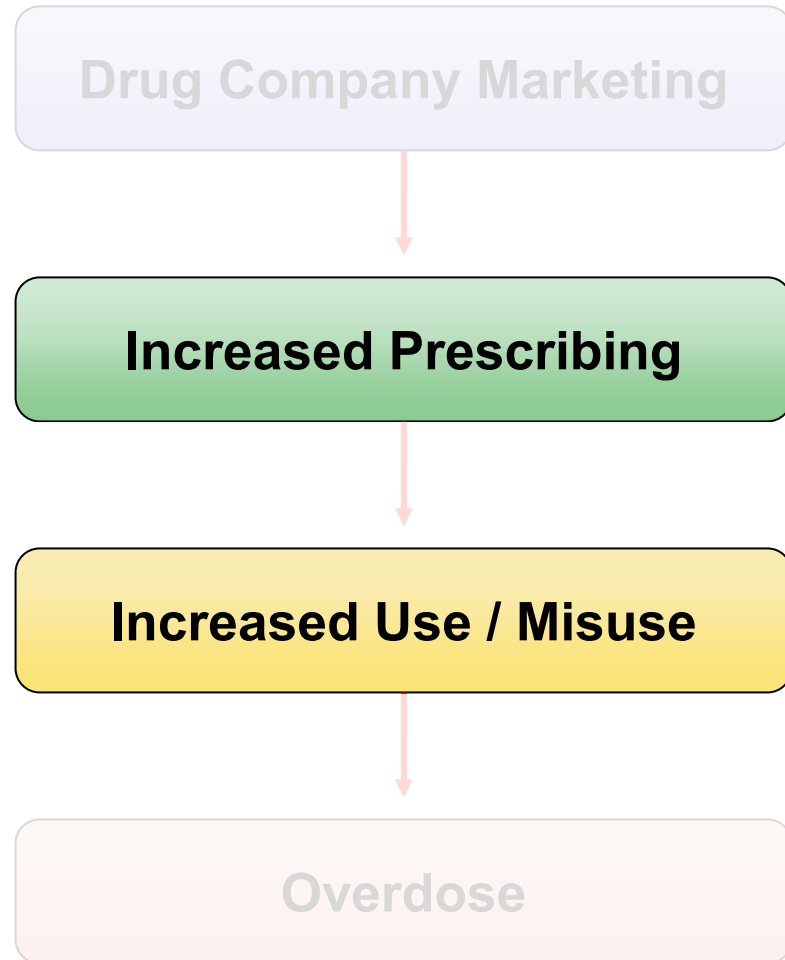
**B** Trends in substance involvement among opioid overdose deaths



Lim J, et al. *JAMA Pediatr.* 2021;175(2):194-196

# Stimulant Prescribing, Use & Misuse

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## Increased Prescribing

- Amphetamine dispensing increased 2.5-fold from 2006 to 2016

## Increased Use / Misuse

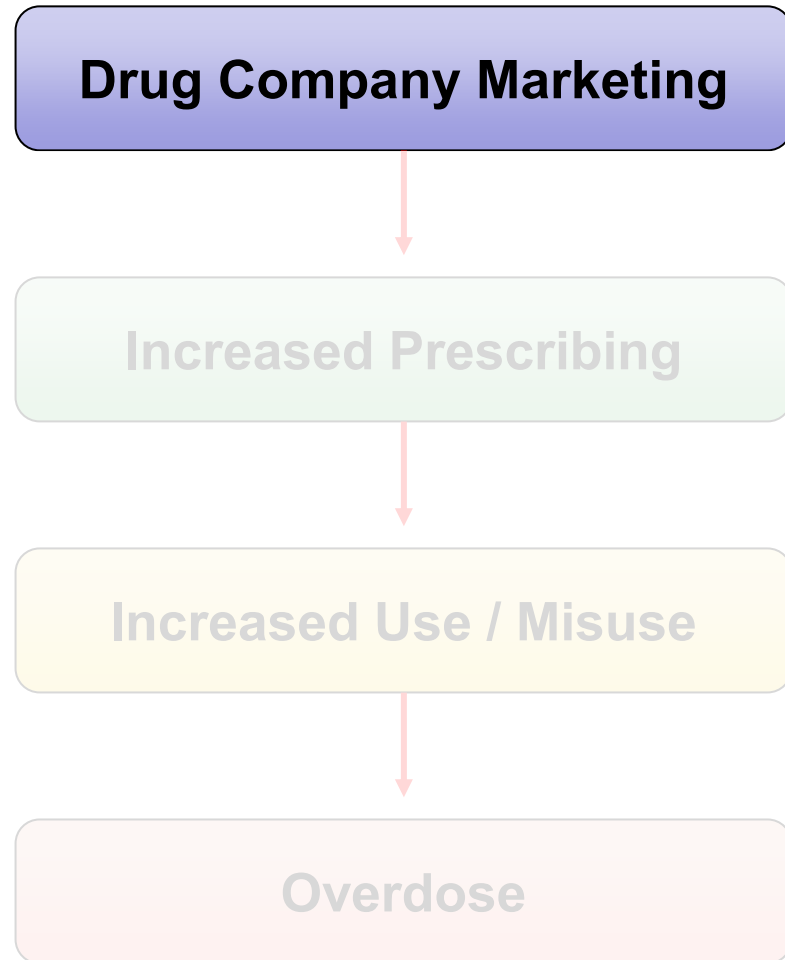
- Per DEA, most commonly used (and misused) prescription stimulant is amphetamine (e.g., Adderall)
- In Monitoring the Future, 1 in 14 college students reports past-year amphetamine use

Monitoring the Future, University of Michigan, 2020

Piper B, et al. *PLoS One*, 2018;13(11):e0206100

# Stimulant Marketing

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- Analysis of stimulant marketing between 2014-2018
- 98% of marketing interactions were meals
- Vyvanse most heavily marketed (nearly half of all interactions)
- **1 in 18 US physicians** received marketing during study period
  - 1 in 5 pediatricians
  - 1 in 6 psychiatrists
  - 1 in 8 family physicians

Hadland SE, et al. *JAMA Pediatr*, 2020;174(4):385-387

## **My Worries:**

### **Poor Understanding of Causal Pathways:**

Pathways from prescription stimulant misuse to illicit stimulant use remain poorly understood

### **New Marketing Strategies:**

To date, marketing has focused on newer, brand-name stimulants (high cost, low volume)

A major manufacturer could instead focus on generic stimulants (low cost, high volume)

This could precipitate a new prescription drug crisis by escalating demand (akin to 1<sup>st</sup> wave of opioid overdose crisis)

### **Adulteration:**

Counterfeit prescription stimulants containing methamphetamine are appearing in the Northeast

Overdose risk on prescription stimulants relatively low, but contamination with illicit methamphetamine high risk (akin to 3<sup>rd</sup> wave of opioid overdose crisis)

## Take-Home Points:

### Conclusions:

1. Opioid marketing is strongly associated with subsequent prescribing
2. Opioid marketing is also linked to county overdose mortality
3. Stimulant marketing, like opioid marketing, is widespread, particularly meals

### Implications:

Marketing may be a counterforce in national efforts to reduce prescribing of controlled substances and overdose mortality

Manufacturers should consider voluntarily ceasing stimulant marketing, and policies should limit the number (not only the dollar value) of industry interactions

# Thank you!

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- National Institute on Drug Abuse K23DA045085, K23DA045085-S1, L40DA042434, UM1DA049412, R01DA047975, R01DA046527-S1
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