

# Friends and Drugs: The Role of Social Networks in the Opioid Epidemic

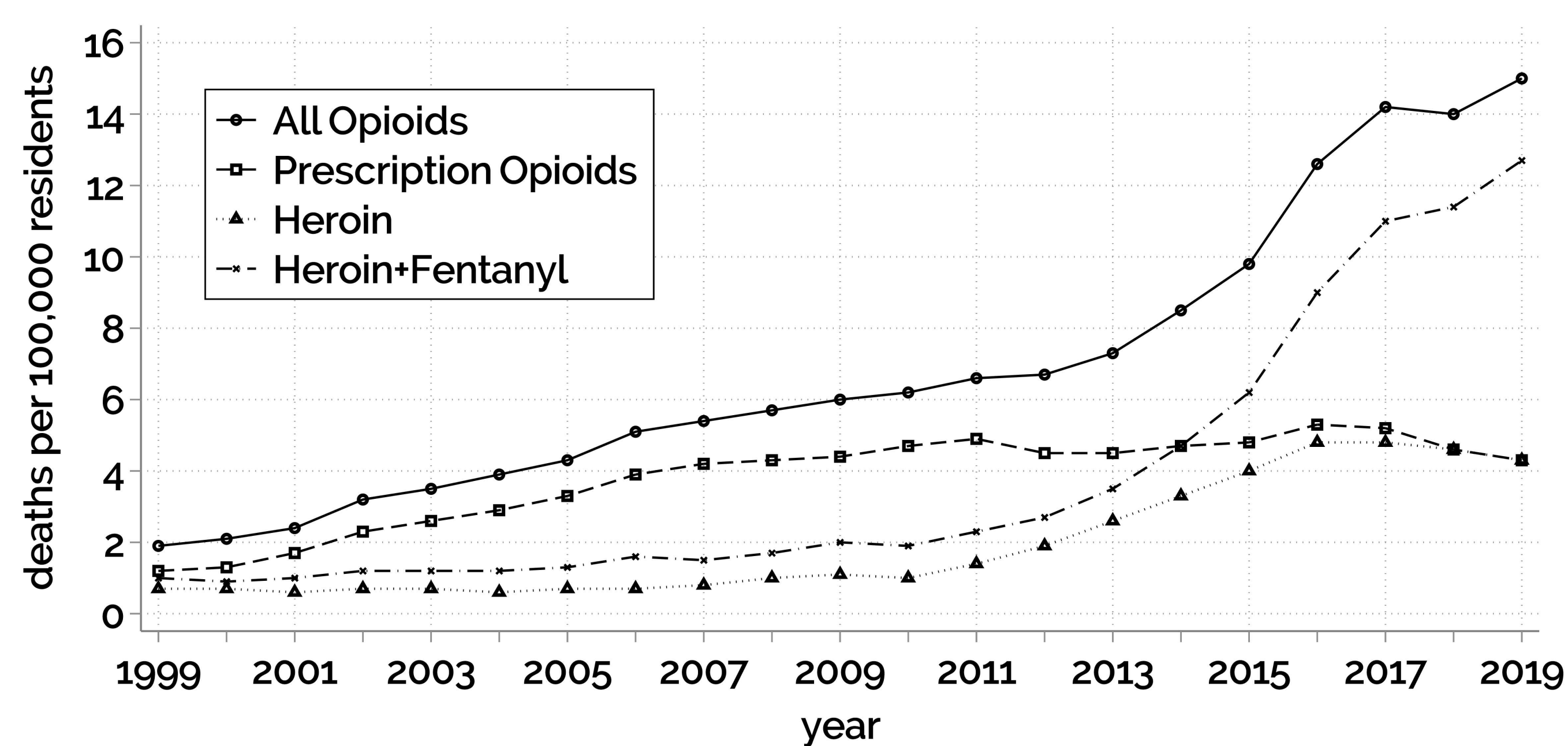
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## Abstract

Having many friendship links to counties with high exposure to the opioid epidemic positively correlates with overdose death rates. This correlation is not driven by physical proximity and socio-economic characteristics. To establish causality, we exploit the 2010 OxyContin reformulation and the staggered introduction of must-access Prescription Drug Monitoring Programs (PDMPs). Both events led to the unintended consequence that users switched to illegal opioids, thereby constituting shocks to illegal drug consumption that are exogenous to friendship network formation. Having more friends exposed to counties severely affected by these adverse consequences leads to higher opioid overdoses, suggesting a causal friendship network effect. High levels of local social capital, though, can reduce such negative spillovers.

## Motivation & Research Question



- Prescription opioids have triggered severe public health crisis in the U.S. with more than 1 million lives lost since 1999
- Spatial spread of opioid epidemic not well-understood
- Research Question: What is the role of friendship networks in the opioid epidemic?

## Literature & Contribution

We relate and contribute to three streams of literature:

1. Literature on forces shaping opioid epidemic (e.g., Alpert et al., 2018, 2022; Finkelstein et al., 2018; Kim, 2021; Pierce and Schott, 2020)
2. Rapidly growing literature on friendship networks and social ties (e.g., Bailey et al., 2018b,a; Chetty et al., 2022a,b; Kuchler et al., 2022a; Rehbein and Rother, 2020)
3. Literature studying role of friendship networks in the spread of epidemics (e.g., Buckee et al., 2021; Kuchler et al., 2022b)

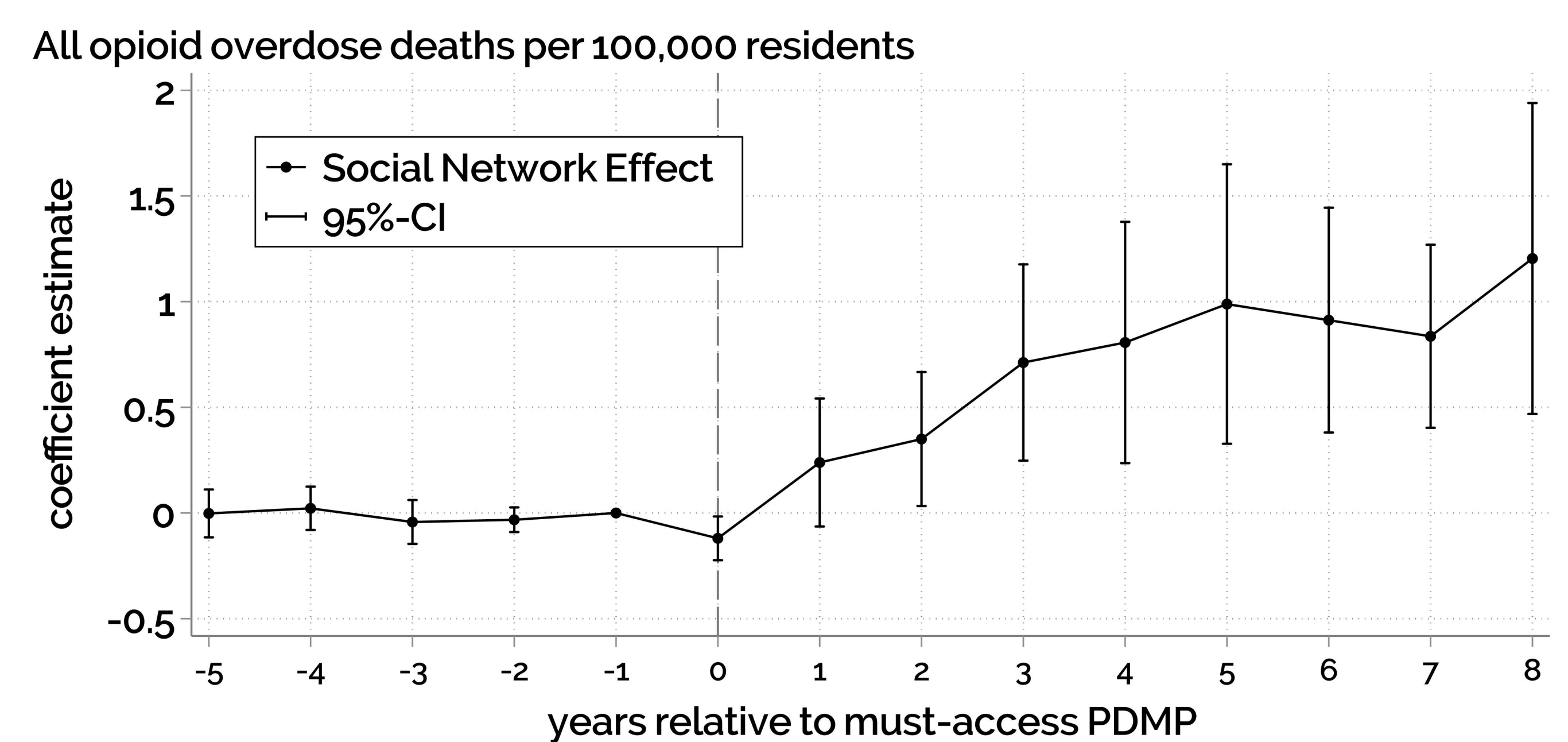
## Data

- Social Connectedness Index (SCI) to proxy for real-world county-to-county friendship links
- Mortality data from the Centers for Disease Control and Prevention (CDC)
- Opioid supply data from ARCOS DEA and the CDC
- Socio-economic control variables (demographics, education, income, etc.) from various sources

## Empirical Design

- Challenges: (1) self-selection into and (2) correlated exposure to shocks within friendship networks
- Solution: random shocks to parts of existing friendship network
- Setting: must-access PDMPs reduce opioid prescriptions, but significant substitution with illegal opioids (e.g., heroin and fentanyl)  $\rightsquigarrow$  unintended shocks to illegal drug consumption
- Do shocks to illegal drug consumption in PDMP-implementing states propagate through friendship networks to counties in non-implementing states?

$$\text{NetworkExposure}_{it} = \sum_{s(i) \neq s(j)}^S \mathbb{1}(\text{PDMP in state } s(j))_t \times \frac{SCI_{ij}}{\sum_h SCI_{ih}}$$
$$\text{Deaths}_{it} = \alpha \times \text{NetworkExposure}_{it} + \delta X_{it} + \phi_i + \gamma_{st} + \varepsilon_{it}$$



## Summary of Results

- Substantial substitution with illegal opioids after introduction of must-access PDMPs
- Out-of-state counties not directly affected by PDMP implementation also experience substantial substitution with illegal opioids due to friendship network exposure
- Friendship network effect concentrated in heroin and fentanyl overdose deaths and large (11% of sample average)
- High levels of within-county social capital can reduce negative spillover effects

## Implications & Outlook

- Results allow for better prediction of which counties most likely to be affected and subsequent adoption of preventive measures
- In future research, we plan to analyze the social spread of other non-infectious diseases (e.g., depression, diabetes, etc.)

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