CRIMINAL ARRESTS AND THE OPIOID EPIDEMIC: AN INVESTIGATION INTO THE SPATIAL AND SOCIAL NETWORK SPILLOVER OF OPIOID OVERDOSES IN CHICAGO

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BACKGROUND

Academics and policy makers have long questioned the role of criminal justice deterrence as an effective strategy to combat opioid overdoses. This study investigates the role of criminal justice intervention practices, i.e., opioid arrests, in effectively preventing opioid overdoses, paying particular attention to whether arrests in spatially proximate or socially connected communities lead to the displacement or prevention of opioid overdoses in a local community. Specifically, we ask:

1. Does the criminal arrests of opioids influence the opioid overdose rate in a) the local community, b) geographically proximate communities, and c) socially connected communities?

2. Does heterogeneity exist in the relationship between arrests and overdoses based on a) the fatality of the overdose, and b) the type of arrest?

DATA & METHODS

Using the case of Chicago, we combine multiple sources of data, including reports from the Cook County medical examiner, emergency medical services information, and arrest reports with commuting statistics for Chicago's 77 community areas between 2016 and 2019. This study uses fixed effects spatial autoregressive models with spatial lags to predict community-level opioid overdose rates. We capture spatial spillovers from communities that share physical borders and capture social spillovers from communities that are connected via daily commuting patterns. We investigate variation by overdose fatality and type of arrest:

DVs: 1) Overdose Incident Rate, and 2) Overdose Fatality Rate

IVs: Arrest for 1) heroin possession, 2) synthetic narcotic possession, 3) heroin manufacturing/ distribution, and 4) synthetic narcotics manufacturing/ distribution

RESULTS

Table 1. Summary of Significance of Local, Spatial, and Social Arrests for Possession

Arrests for Possession	Overdose Incidents			Overdose Fatalities		
	Spatial Model	Social Model	Combined Model	Spatial Model	Social Model	Combined Model
Heroin						
Local Relationship	0.360***	0.318***	0.359***	-0.142	-0.124	-0.131
Spatial Spillover	1.620***		1.636***	0.582***		0.308
Social Spillover		2.409*	-0.256		4.624**	4.002***
Synthetic Narcotics						
Local Relationship	0.129***	0.158***	0.134***	0.133***	0.144***	0.135***
Spatial Spillover	0.182**		0.212***	0.056		0.072
Social Spillover		-0.167	-0.439		-0.127	-0.220

Note: All measures are standardized to a mean of 0 and standard deviation of 1. * p<0.05, ** p<0.01, *** p<0.001

We find a consistent local and spatial spillover effect of arrests for possession on overdose incident rates, with arrests increasing overdose rates. We also find a social spillover effect for heroin arrests, increasing fatal overdoses in socially connected communities.

Table 2. Summary of Significance of Local, Spatial, and Social Arrests for Manufacturing/ Distribution

Arrests for Manufacturing/ Distribution	Overdose Incidents			Overdose Fatalities		
	Spatial Model	Social Model	Combined Model	Spatial Model	Social Model	Combined Model
Heroin						
Local Relationship	0.669***	0.645***	0.659***	-0.055	-0.041	-0.045
Spatial Spillover	0.599***		0.600***	0.184		0.208
Social Spillover		-3.232***	-3.254***		1.958	2.084
Synthetic Narcotics						
Local Relationship	-0.116***	-0.118***	-0.118***	-0.040	-0.044	-0.045
Spatial Spillover	0.014		0.001	-0.027		-0.057
Social Spillover		0.582	0.582		1.213***	1.257**

Note: All measures are standardized to a mean of 0 and standard deviation of 1. * p<0.05, ** p<0.01, *** p<0.001

We continue to find a local and spatial spillover effect for heroin arrests on overdose incident rates. We also find arrests for heroin manufacturing/ distribution successfully disrupt drug supply networks and lower the overdose incident rate in socially connected communities. When it comes to arrests for the manufacturing/ distribution of synthetic narcotics, however, we find displacement occurs. While overdose incidents lower in the local community, fatal overdoses increase in socially connected communities.
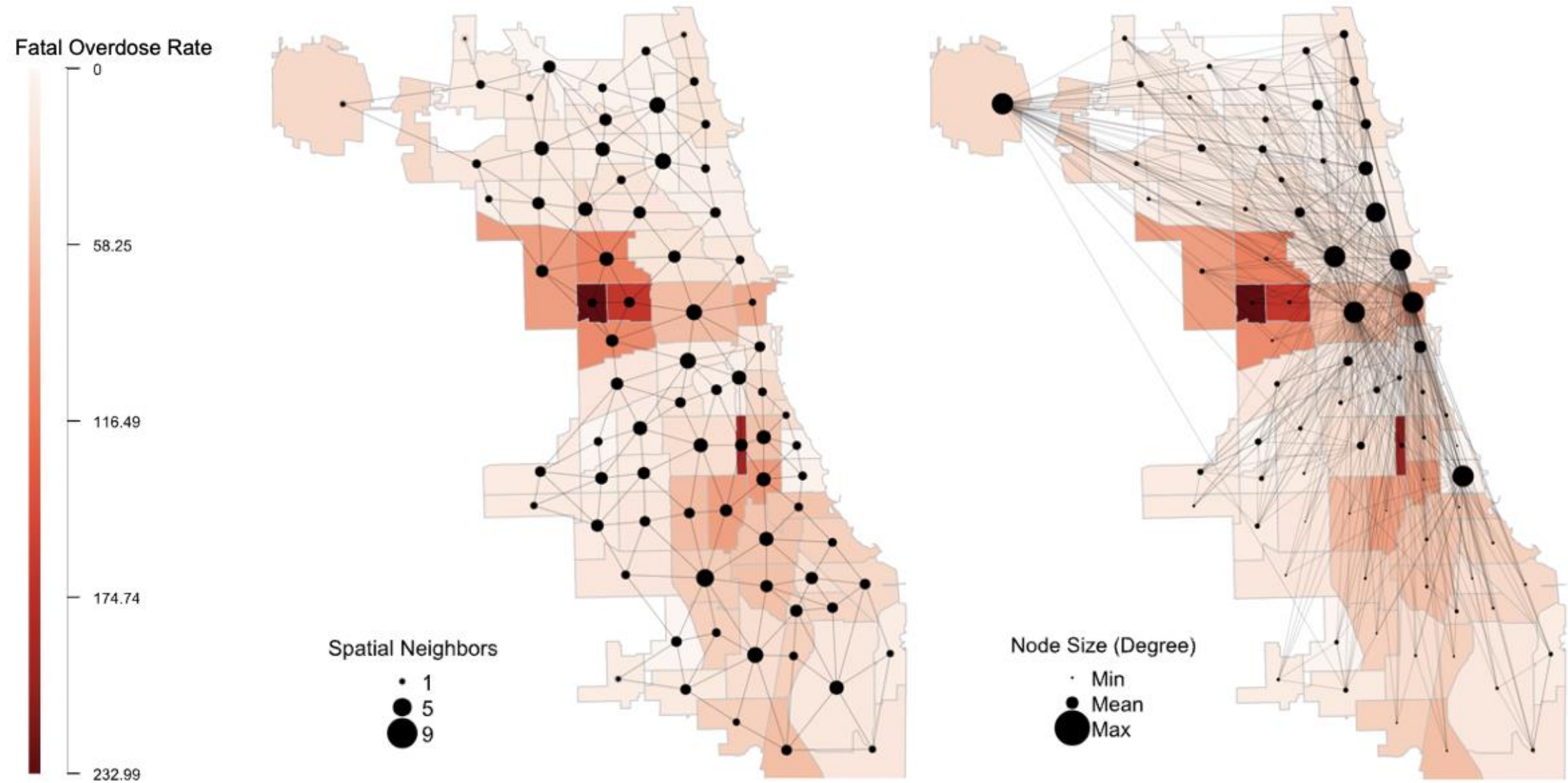
RESULTS

Figure 1. Map of Fatal Opioid-Related Overdose Rates in 2019 across Chicago's 77 Community Areas with Community Ties by a) Spatial Proximity and b) Social Proximity

Note: Rates are per 100,000. Darker shades represent higher fatal opioid-related overdose rates. Spatial proximity is defined using the Queen 1 criteria where every community sharing a contiguous border is defined as spatial neighbors with the opportunity to share spatial spillovers. Social proximity is defined using commuting flows where a community is a social neighbor with the opportunity to share social spillovers if they share at least 0.5% of their residential population commuting to or from work. Nodes are sized by the number of a) spatial neighbors or b) social neighbors.

CONCLUSIONS

Our findings suggest that law enforcement interventions, represented through opioid-related arrests, can have the unintended consequence of increasing opioid-related overdose rates, including fatal overdoses. We find that law enforcement interventions have the potential to backfire not only on local communities, but also on their spatially and socially proximate networks. The results highlight that intercommunity networks across the city facilitate the transmission of opioid overdose risk, a phenomenon that remained otherwise hidden when using standard neighborhood models or spatial models. The results suggest that public health officials and policymakers must consider the spatial networks of mobility when addressing the opioid epidemic.