Tracing the Public Health Consequences of the Police Murder of George Floyd

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Introduction

MPD Murder of George Floyd

- highly publicized police murder of Mr. George Floyd on May 25th, 2005
  - in part catalyzed the growing #Blacklivesmatter movement
  - sparked sustained protests locally and around the world
- Much talk about increases in homicide and gun violence in this period (Star Tribune)
- This event and ensuing unrest led us to consider...
  - What does the timing look like (e.g., when did increases happen?)
  - What explains these increases?
  - What else has an event of this magnitude impacted (e.g., health?)
    - to what extent has it done so in an unequal fashion?

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Broad Research Questions

- What has been the public health impact of this police murder?
  - firearm assault injury incidence?
  - mental health diagnoses?
  - differentially based on race and space?
- How does police violence generally impact public health?
  - how is police violence shaped by legacies of structural racism?

Roadmap

- **Part 1**: The Effects of The Police Murder on Public Health
  - firearm assault injury (Larson et al. 2023)
  - mental health hospital incidence (Santaularia et al. *under review*)
- **Part 2**: Historical Structural Racism, Police Shootings, and Health
  - new, fresh proposed research
- **Part 3**: Strategies of Resilience and Racial Healing in Minneapolis
- **Part 4**: Questions and Discussion
  - *what ideas do you have to inform our continued research*
  - *what questions should we be asking?*

Tracing the Public Health Consequences: Work Completed

Literature Review: Gun Injury

- Why would we expect an uptick in gun injury after the murder?
  - pandemic explanation
    - weakening of social bonds, heightened visibilities of existing vulnerabilities (Wrigley-Field et al. 2020)
  - depolicing explanation (Shjarback et al. 2017)
  - augmentation of legal estrangement (Bell 2017)
    - bolstering feelings of distrust in legal institutions and feelings of structural social exclusion

Literature Review: Mental Health Diagnoses

- mental health effects of *exposure* to police violence
  - general anxiety and depression (Geller et al. 2014; Alang et al. 2021)
  - suicide attempts (DeVylder 2017)
  - anticipation of future police violence (Salas-Hernandez et a. 2022)
- general health effects extend beyond direct exposure (DeVylder et al. 2022; Haile et al. 2023)
- exposure to police killing associated with .14 additional poor mental health days per months for Black individuals (Venkataramani et al. 2018)
  - no increase for White individuals

Research Questions

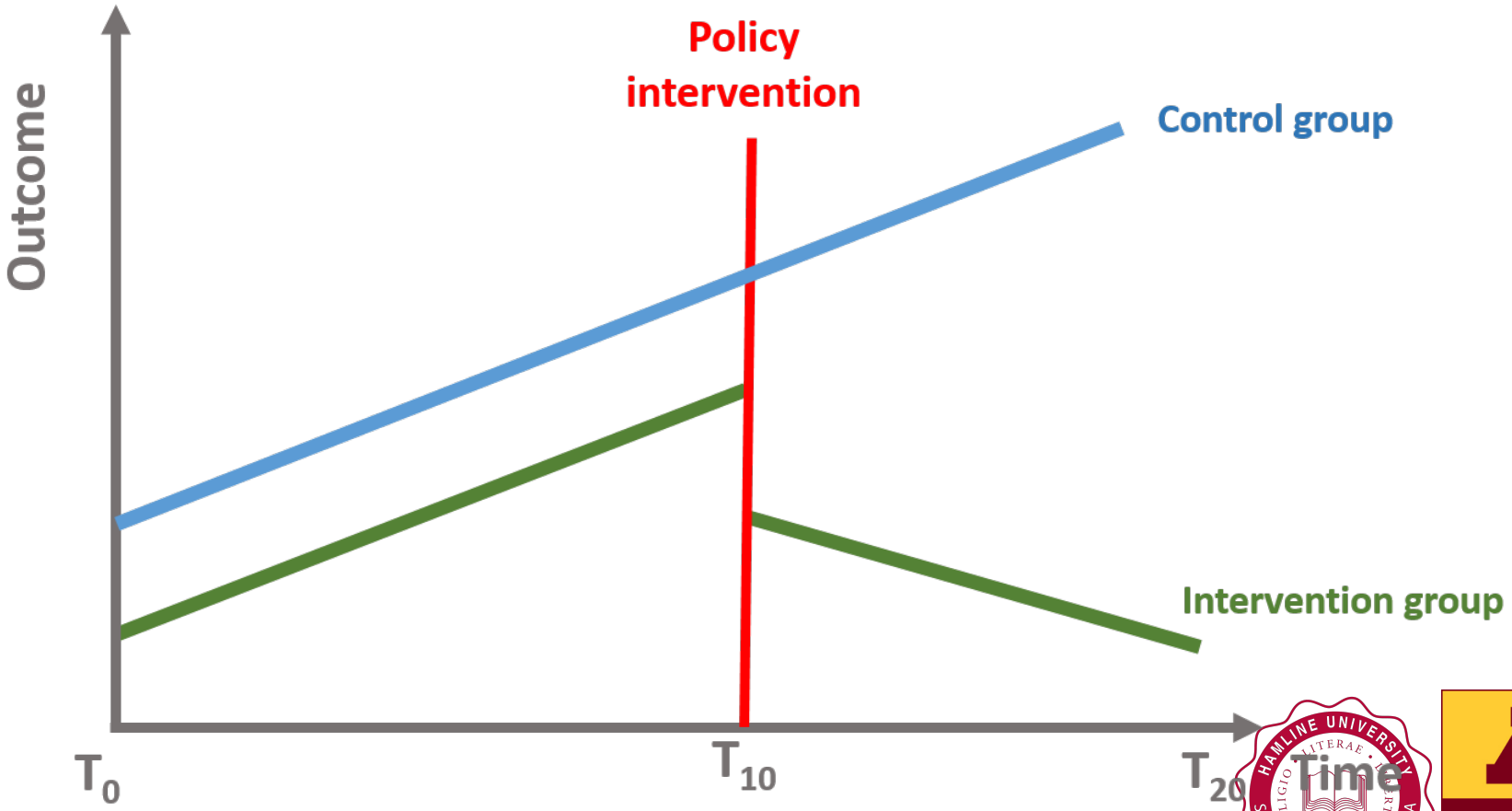
- Did firearm assault injuries increase after the police murder of Mr. Floyd?
  - if so, was there spatial variation in this increase?
  - if so, does pandemic policy or changes in policing explain the increase?
- Did mental health diagnoses increase after the police murder of Mr. Floyd?
  - if so, amongst which racial groups?
  - if so, where was there spatial variation in the increase?

Data

- Outcome Variables (Minnesota Hospital Association Data)
  - firearm assault injury rate per 100,000
  - mental health diagnoses per 1,000
- Focal Predictor Variables
  - time trend, event indicator, post-event time trend
- Time Varying Controls
  - pandemic policy (stay at home, state of emergency)
  - weather (MN DNR)
  - amount of darkness before 12am (`suncalc` in R)
  - proportion school days (Minneapolis Public Schools)
  - MPD Use of Force (lag)
  - MPD Stops (lag)
  - MPD Officer Involved Shootings (lag)
  - Median Household Income
  - Percent Black
  - concentrated disadvantage

Design: Interrupted Time Series

$$y_t = \beta_0 + \beta_1 Time_t + \theta Event_t + \beta_2 TimePost_t + \phi \mathbf{X}_t + \rho_1 y_{t-1} + \rho_2 y_{t-2} + \rho_3 y_{t-3} + \epsilon_t$$



Firearm Assault Injury Incidence: City-Wide Changes

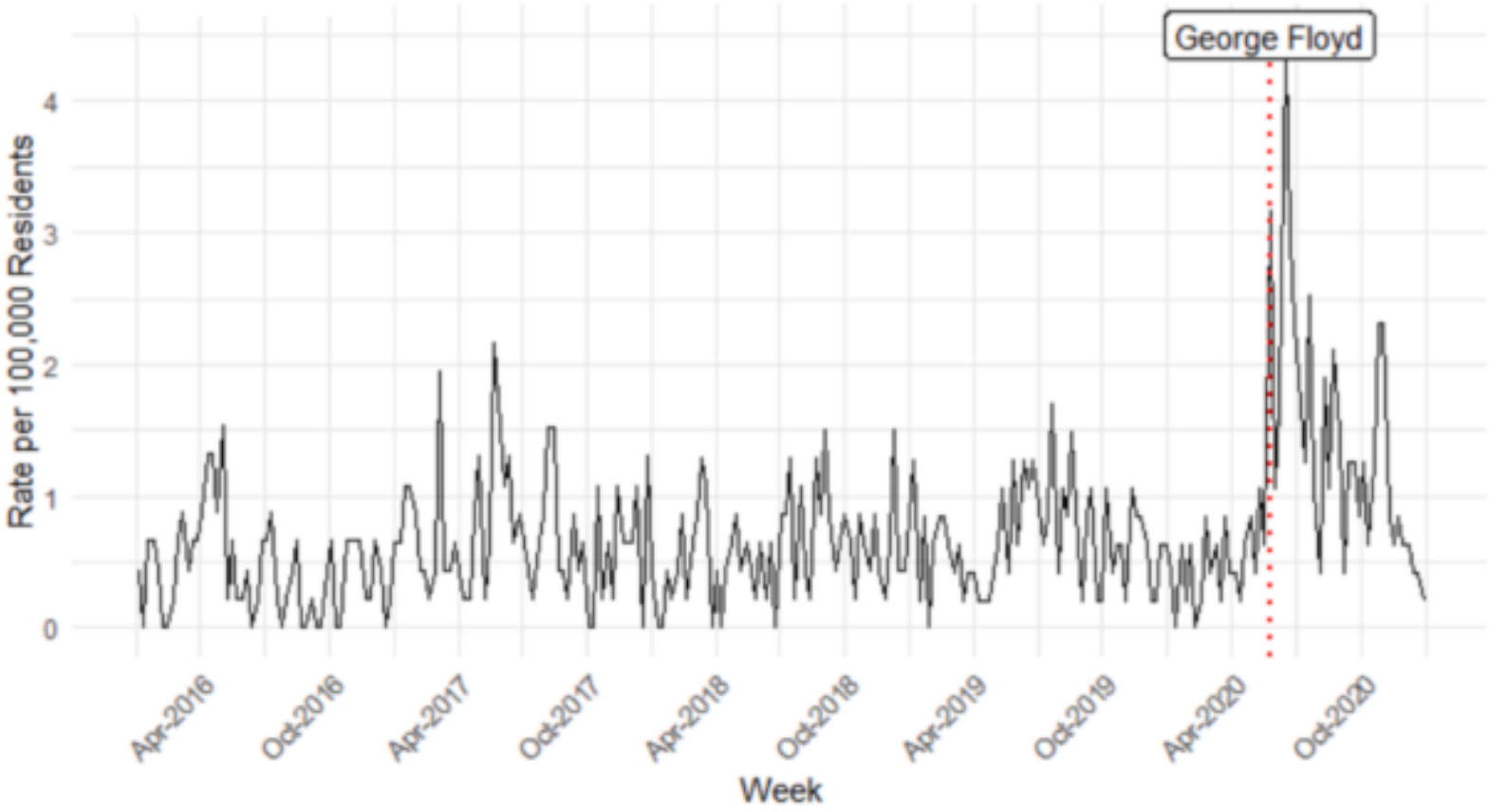


Fig. 1. Weekly Firearm Assault Injuries, MHA Hospital Data 2016–2020.

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Firearm Assault Injury Incidence: ZCTA-Specific Changes

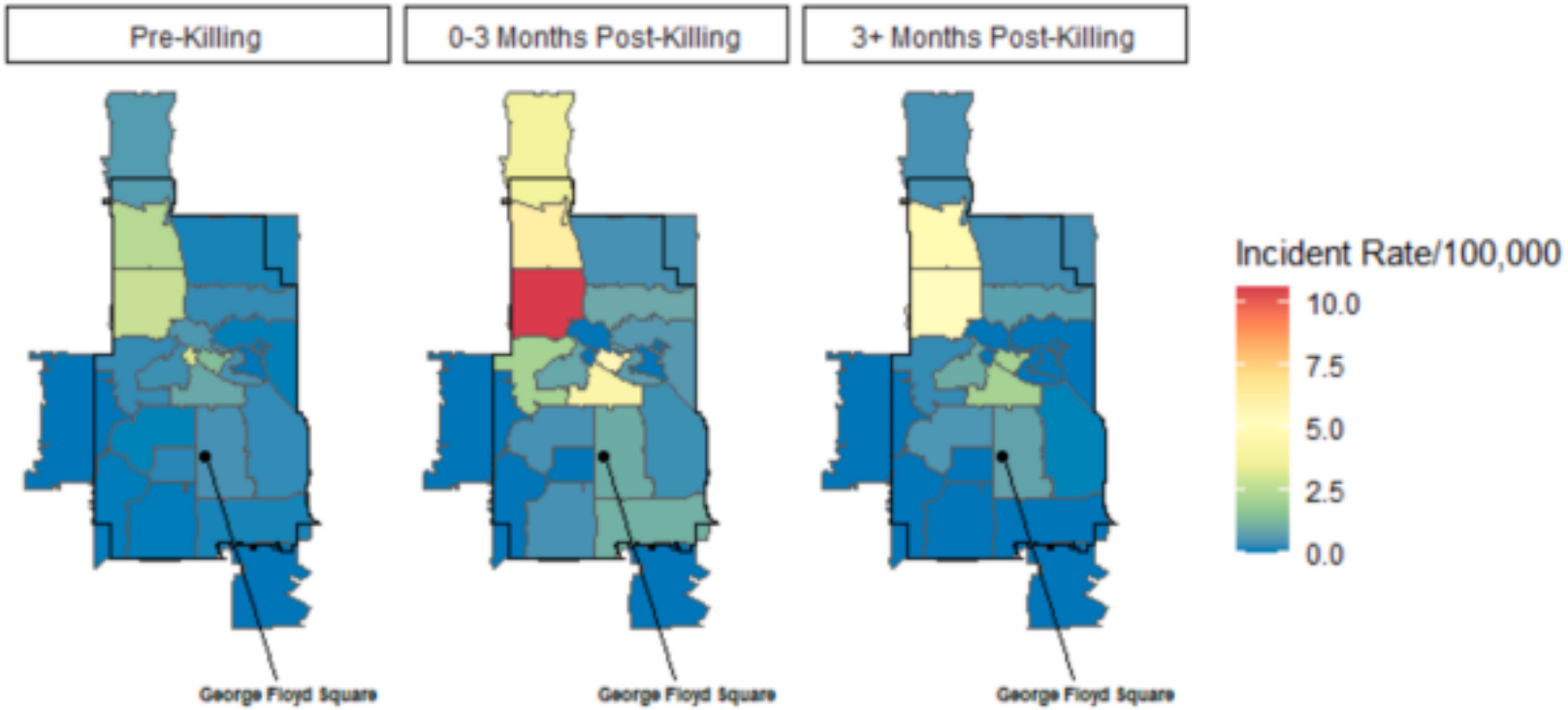

Fig. 2. Weekly Firearm Assault Injury Rates by ZCTA and Period, MHA Hospital Data 2016-2020.

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Firearm Assault Injury Incidence: ITS AR(1) Models

Table 2
Interrupted time series models of firearm assault injuries.

	Firearm Assault Injuries				
	Rate per 100,000				
	AR(1) TSR (1)	AR(1) TSR (2)	RE HLM (3)	RE HLM (4)	RE HLM +Int. (5)
T	0.001	−0.001	0.003	0.002	0.001
	(−0.0003|0.002)	(−0.003|0.001)	(0.0004|0.005)	(−0.0005|0.004)	(−0.002|0.004)
COVID - State of Emergency	−0.463	−0.411	−0.646	−0.506	−0.439
	(−1.026|0.100)	(−0.995|0.173)	(−2.001|0.708)	(−1.864|0.853)	(−1.917|1.040)
COVID - Stay at Home	0.403	0.416	0.242	0.156	0.189
	(−0.179|0.984)	(−0.183|1.016)	(−1.151|1.636)	(−1.240|1.553)	(−1.331|1.709)
Post-Killing	1.781	1.775	1.330	1.277	0.282
	(1.176|2.387)	(1.137|2.414)	(−0.092|2.751)	(−0.149|2.703)	(−1.375|1.938)
T Post-Killing	−0.048	−0.047	−0.035	−0.032	−0.036
	(−0.068|−0.028)	(−0.070|−0.025)	(−0.081|0.011)	(−0.078|0.015)	(−0.086|0.015)
MPD Use of Force $_{t-1}$		−0.015		−0.130	−0.123
		(−1.400|1.370)		(−0.184|−0.077)	(−0.175|−0.070)
MPD Stops $_{t-1}$		−0.121		0.035	0.076
		(−0.365|0.122)		(0.019|0.051)	(0.055|0.098)
MPD OIS $_{t-1}$		−27.382		−1.953	−1.668
		(−67.727|12.964)		(−12.946|9.040)	(−13.095|9.759)
AR(1)	0.142	0.065			
	(0.021|0.263)	(−0.071|0.201)			
Median HH Income					0.00001
					(−0.00001|0.00002)
Percent Black					0.038
					(0.014|0.062)
Post-Killing X Percent Black					0.063
					(0.032|0.094)
Constant	0.579	0.931	0.800	0.834	−0.412
	(−0.194|1.352)	(−0.204|2.066)	(−1.093|2.694)	(−1.073|2.740)	(−2.785|1.961)
SD(ZCTA)			0.904	0.922	0.504
SD(Residual)			5.352	5.364	5.577
Observations	260	217	5993	5928	5460
R^2	0.385	0.407			
Log Likelihood			−18,592.500	−18,406.520	−17,172.070
Akaike Inf. Crit.			37,210.990	36,845.050	34,382.150
Bayesian Inf. Crit.			37,298.070	36,952.040	34,507.650
Residual Std. Error	0.463 (df = 248)	0.474 (df = 202)			
F Statistic	14.117*** (df = 11; 248)	9.898*** (df = 14; 202)			

Models include controls for seasonality. 95% Confidence Intervals in parentheses.

Firearm Assault Injury Incidence: Interaction Plot

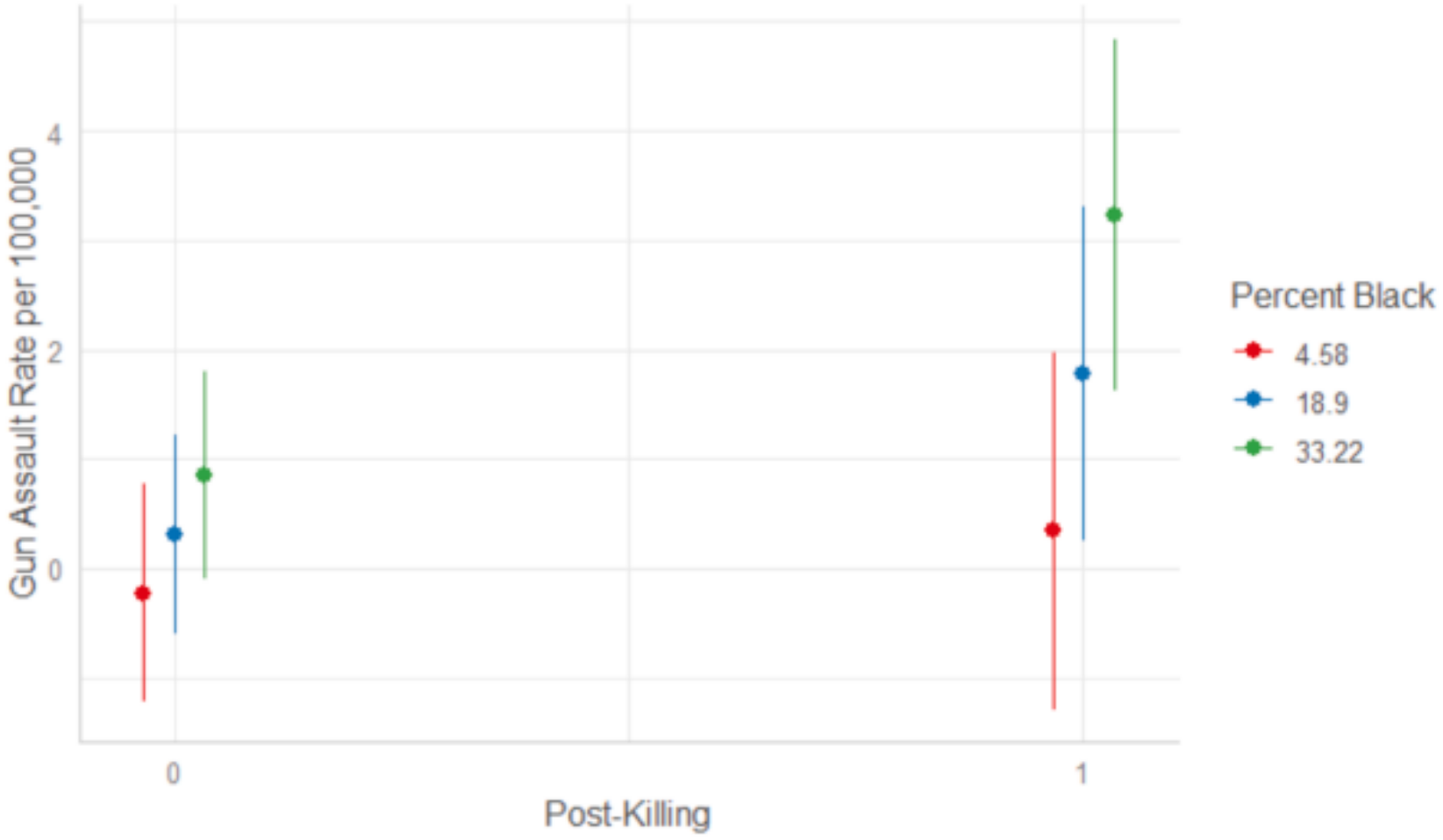

Fig. 3. Post-Killing X Percent Black Interaction Plot.

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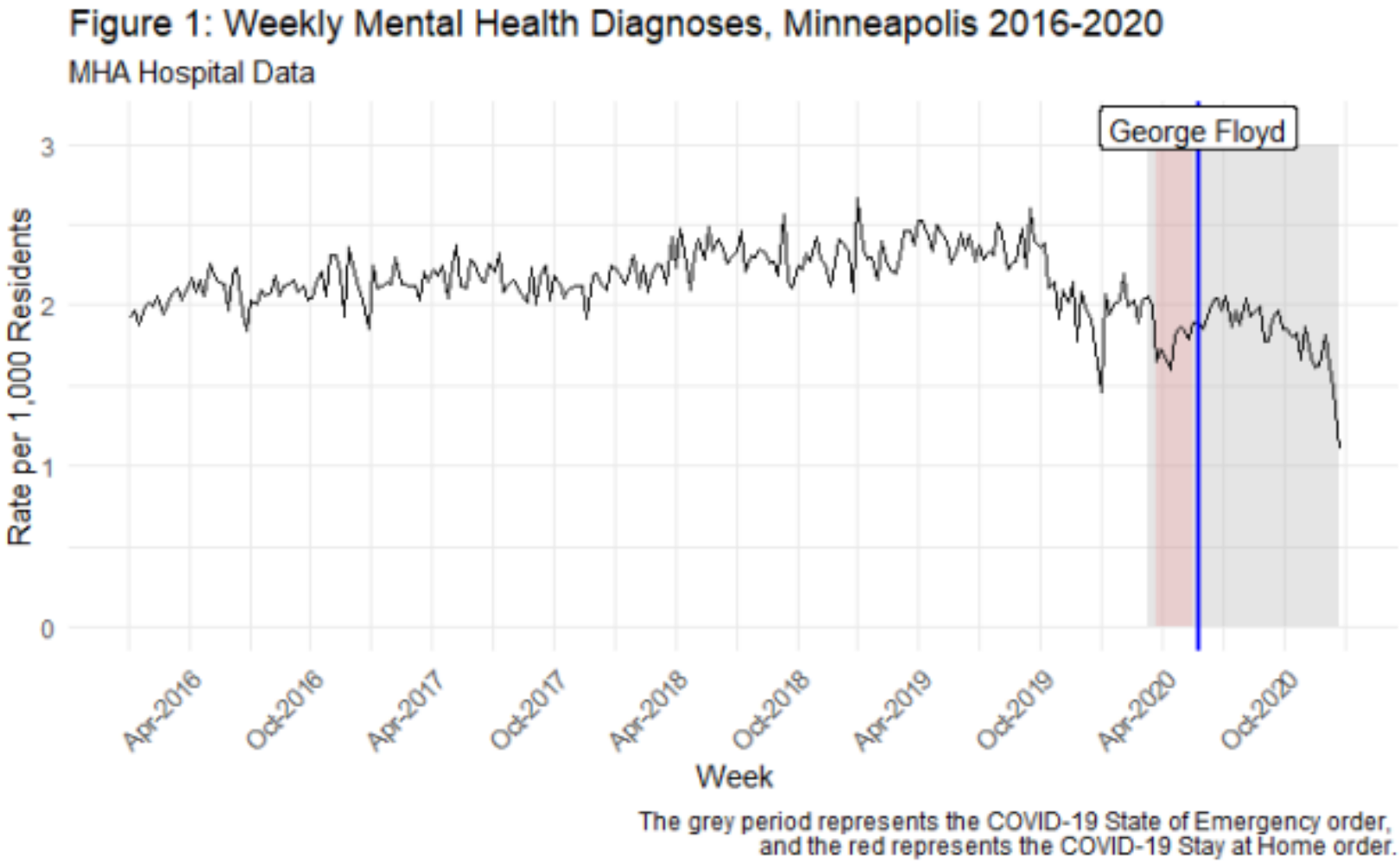
Mental Health Incidence: City-Wide Changes



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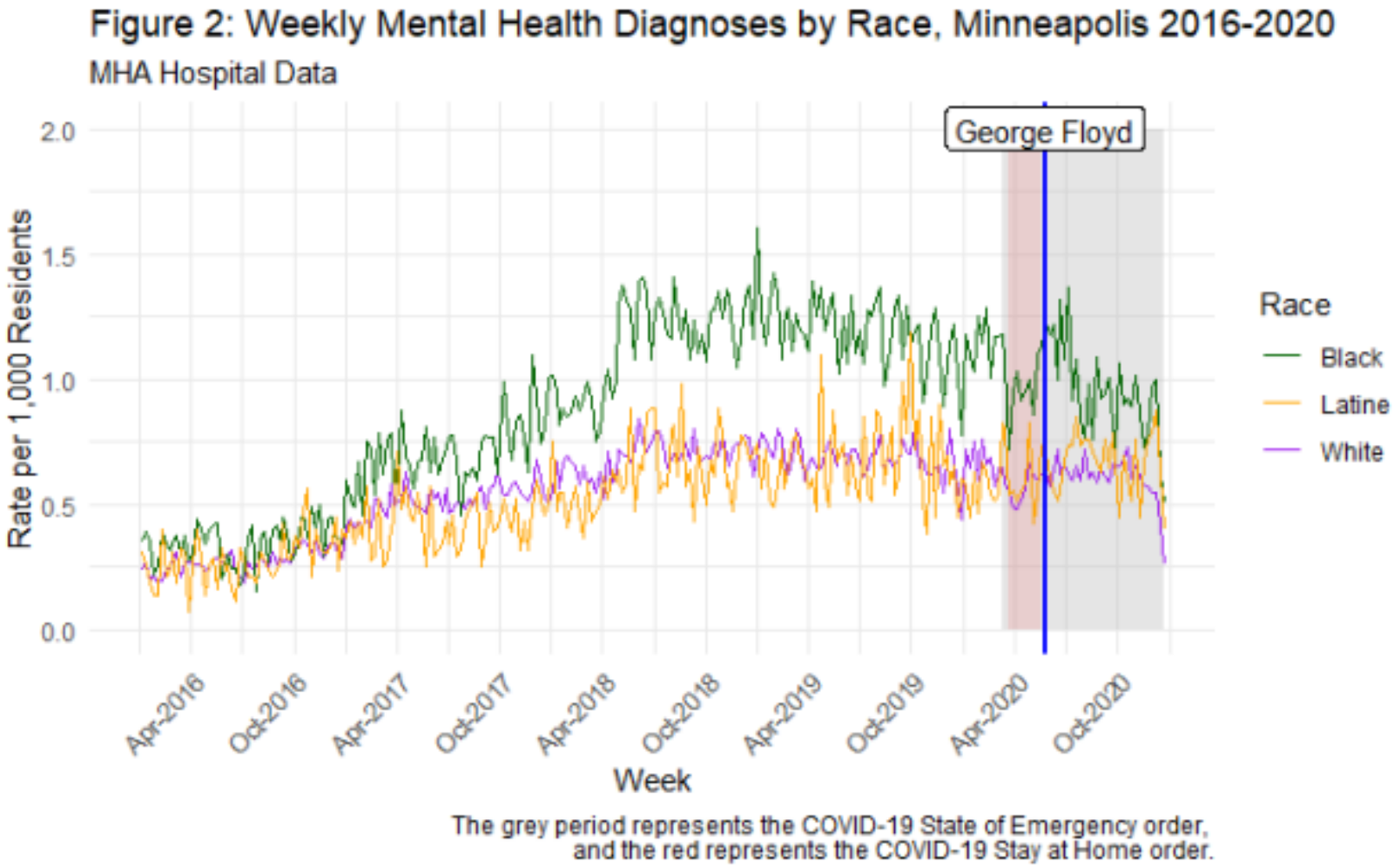
Mental Health Incidence: City-Wide Changes by Race



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Mental Health Incidence: ITS AR(3) Models

Table 1: Interrupted Time Series Models of Mental Health Diagnoses, Minneapolis 2016-2020

	Mental Health Diagnoses/1,000			
	Overall	White	Black	Latine
	(1)	(2)	(3)	(4)
T	−0.0001	0.0003	0.001	0.002
	(-0.001|0.0004)	(-0.00001|0.001)	(0.0004|0.002)	(0.001|0.002)
Post-Killing	0.152	0.061	0.228	0.022
	(-0.015|0.319)	(-0.022|0.144)	(0.043|0.413)	(-0.158|0.203)
T Post-Killing	−0.010	−0.005	−0.007	−0.001
	(-0.015|-0.004)	(-0.007|-0.002)	(-0.013|0.0001)	(-0.007|0.005)
COVID - State of Emerg.	−0.198	−0.057	−0.278	−0.095
	(-0.357|-0.039)	(-0.136|0.022)	(-0.451|-0.104)	(-0.263|0.072)
COVID - Stay at Home	0.066	0.016	0.193	−0.026
	(-0.096|0.228)	(-0.064|0.095)	(0.015|0.372)	(-0.199|0.148)
MPD Use of Force t-1	0.412	0.241	0.112	−0.046
	(0.042|0.781)	(0.056|0.426)	(-0.297|0.521)	(-0.446|0.353)
MPD Stops t-1	−0.030	0.003	0.040	0.024
	(-0.091|0.031)	(-0.028|0.034)	(-0.028|0.108)	(-0.042|0.091)
MPD OIS t-1	−11.137	−3.609	0.917	−0.772
	(-21.857|-0.416)	(-8.956|1.739)	(-10.919|12.754)	(-12.339|10.795)
Mean Max. Temp.	0.002	0.0004	0.0002	0.001
	(0.0004|0.003)	(-0.0001|0.001)	(-0.001|0.001)	(-0.001|0.002)
Snow (in.)	0.011	0.012	−0.001	−0.017
	(-0.036|0.058)	(-0.011|0.035)	(-0.053|0.050)	(-0.067|0.034)
Precip. (in.)	−0.259	−0.077	−0.155	−0.014
	(-0.425|-0.094)	(-0.159|0.004)	(-0.335|0.026)	(-0.192|0.164)
AR(1) Overall	0.315			
	(0.180|0.451)			
AR(2) Overall	0.268			
	(0.132|0.404)			
AR(3) Overall	0.135			
	(0.001|0.269)			
AR(1) White		0.457		
		(0.321|0.594)		
AR(2) White		0.201		
		(0.053|0.349)		
AR(3) White		0.110		
		(-0.030|0.250)		
AR(1) Black			0.340	
			(0.205|0.475)	
AR(2) Black			0.175	
			(0.035|0.315)	
AR(3) Black			0.231	
			(0.095|0.366)	
AR(1) Latine				0.076
				(-0.063|0.215)
AR(2) Latine				0.122
				(-0.016|0.261)
AR(3) Latine				0.101
				(-0.038|0.239)
Constant	0.601	0.058	0.013	0.120
	(0.256|0.946)	(-0.027|0.142)	(-0.161|0.188)	(-0.054|0.295)
Observations	216	216	216	216
R^2	0.725	0.712	0.749	0.395
Residual Std. Error (df = 201)	0.126	0.063	0.140	0.137

Note: 95% Confidence Intervals in parentheses

Mental Health Incidence: Spatial Variation

Figure 3: RE Coefficients-White Residents

Rate per 1,000

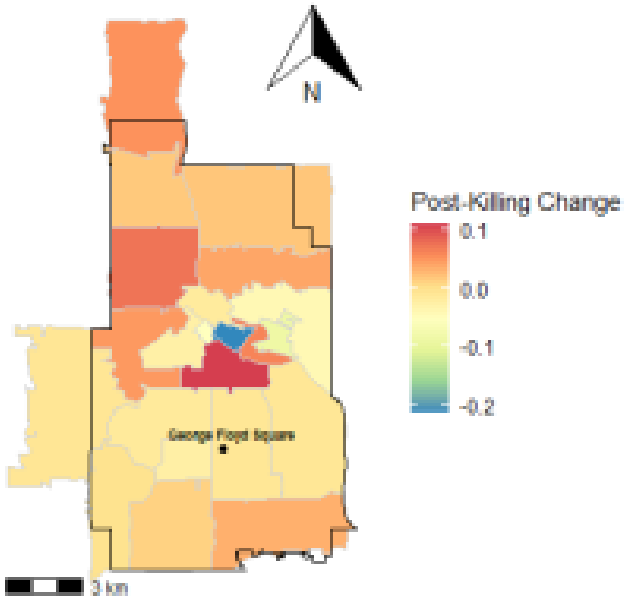


Figure 4: RE Coefficients-Black Residents

Rate per 1,000

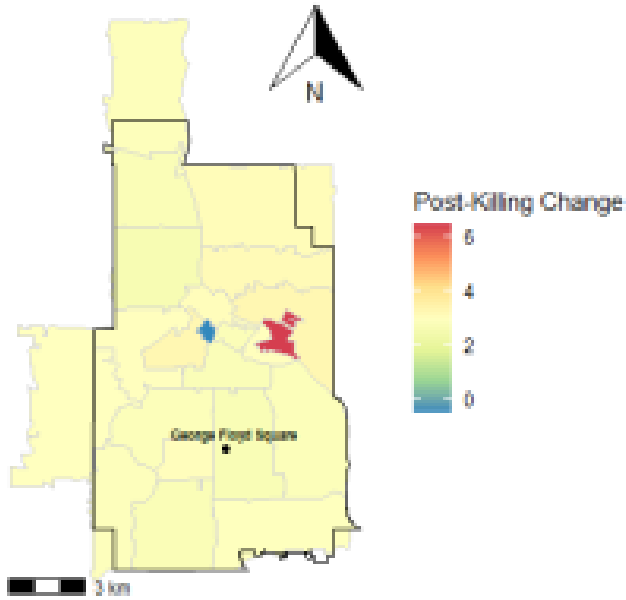


Figure 5: RE Coefficients-Latine Residents

Rate per 1,000

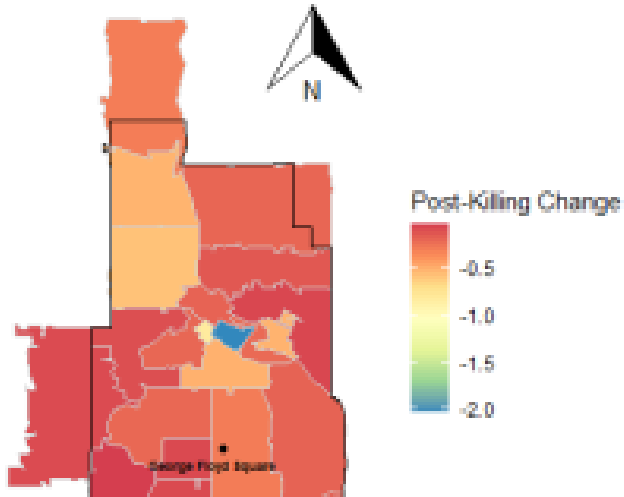
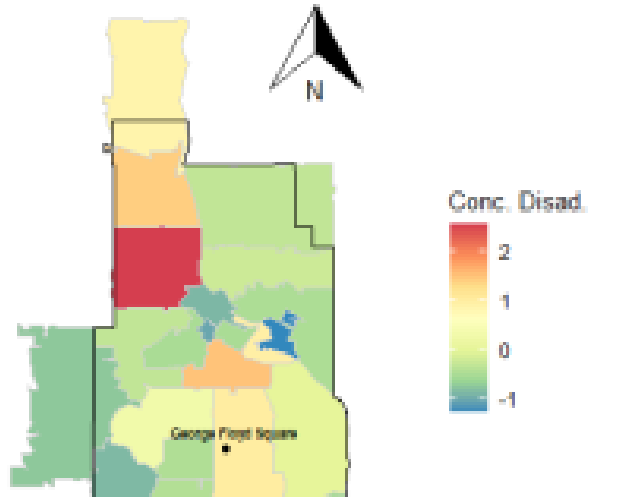


Figure 6: Concentrated Disadvantage

Standard Deviation Units



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Conclusions

- the police murder of Mr. Floyd
  - increased firearm assault injury incidence
    - larger increases in ZCTAs with higher percent Black population
    - increase not explained by COVID-19 policy or "depolicing"
  - increased mental health diagnoses in Minneapolis
    - increase concentrated amongst Black residents
    - increase was global for Black residents (increase for White residents in areas of higher concentrated disadvantage)

Structural Racism, Police Violence, and Health: Work Ahead

Introduction: Police Violence

- police shootings
  - In 2023 (thus far...), 915 people fatally shot by police (Mapping Police Violence 2023)
  - unarmed Black person about 3.5x more likely to be shot that an unarmed White person (Ross 2015)
  - lifetime risk of being killed by police 1 in 1,000 for Black men (Edwards et al. 2018)
    - ~2.5 higher risk as compared White men
  - racial disparities as well in use of force generally (Knox et al. 2020)

Introduction: Structural Racism and Police Violence

- historical practices of structural racial exclusion
  - redlining ("HOLC Grades")
    - ranged from "A" to "D" and process of assignment highly racialized (Faber 2020)
    - effectively conflated race and "financial risk"
  - racial covenants
    - clauses inserted into property deeds to prevent non-White individuals from owning or renting space
- Individuals in lower HOLC graded areas experience worse contemporary health outcomes
  - physical and mental health (Lynch et al. 2021), life expectancy (Graetz et al. 2022), etc.
- redlined spaces linked to higher incidence of fatal encounters with police (Mitchell and Chiahay 2022)

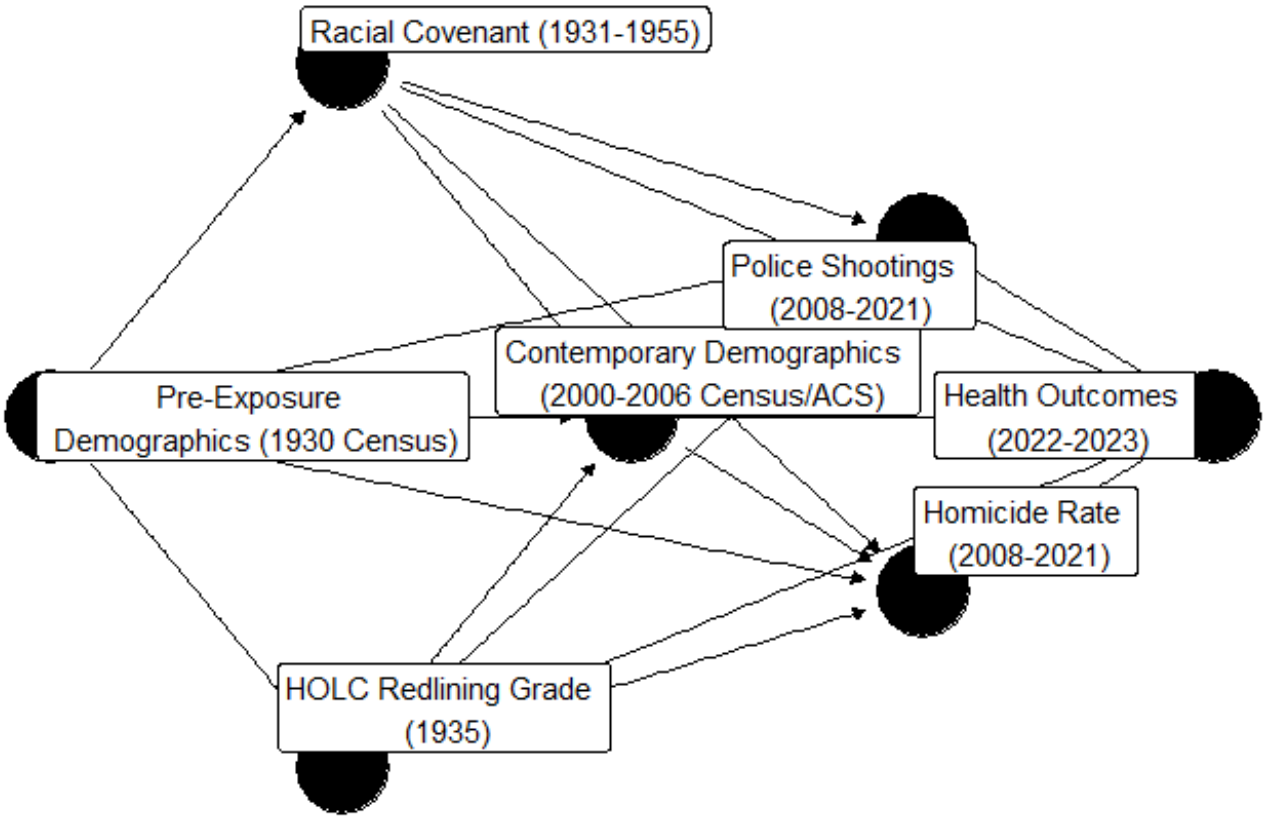
Introduction: Police Violence and Health

- direct health related concerns (e.g., morality, injury)
- health effects of *exposure* to police violence
  - general anxiety and depression (Geller et al. 2014; Alang et al. 2021)
  - suicide attempts (DeVylder 2017)
  - anticipation of future police violence (Salas-Hernandez et a. 2022)
- general health effects extend beyond direct exposure (DeVylder et al. 2022; Haile et al. 2023)

Research Questions

- **RQ1**: What's impact of historical redlining and racial covenants on police shootings?
  - net of current homicide rates and other factors
- **RQ2**: What's the impact of police shootings on health?
  - firearm assault injury, mental health, substance use, suicide, etc.
- **RQ3**: Do police shootings mediate the relationship between structural racism and health outcomes?
- **RQ4**: What are the mechanisms by which police shootings effect health outcomes? What are strategies of resilience used by community members and how do these strategies shape these processes?

Theoretical Model



Data: Quantitative

- Key Exposures (Mapping Prejudice Project)
  - presence of redlining in ZCTA
  - presence of racial covenants in ZCTA
- Key Outcomes (Minnesota Hospital Association Data)
  - health diagnoses per 1,000
- Key Mediator (OpenMinneapolis)
  - rate of police shootings
- Controls
  - Pre-Exposure demographics and economic structure (1930 Census Data)
  - contemporary demographics and economic structure (2000-2006 Census Data)

Redlining in Minneapolis and St. Paul

Racial Covenants in Minneapolis and St. Paul

Mixed Method Design: Quantitative

- modeling the relationship between historical exposure to redlining/racial covenants and contemporary police shootings
  - spatial lag autocorrelation (AR) models adjusting for historical demographics
- modeling the relationship between police shootings and health outcomes
  - two-way fixed effects (TWFE) model on panel data from 2008-2023
- modeling the relationship between historical exposure to redlining/racial covenants and health outcomes
  - testing for a mediation effect of police shootings using a counterfactual mediation approach (Graetz et al. 2022)

Mixed Method Design: Qualitative

Racial Healing in Minneapolis

Discussion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Discussion

- Thank you for attending our breakout session!
- Very much looking forward to hearing your ideas about where to take our work
- Contact Information
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