

# Community-based Interventions to Mitigate Firearm Violence

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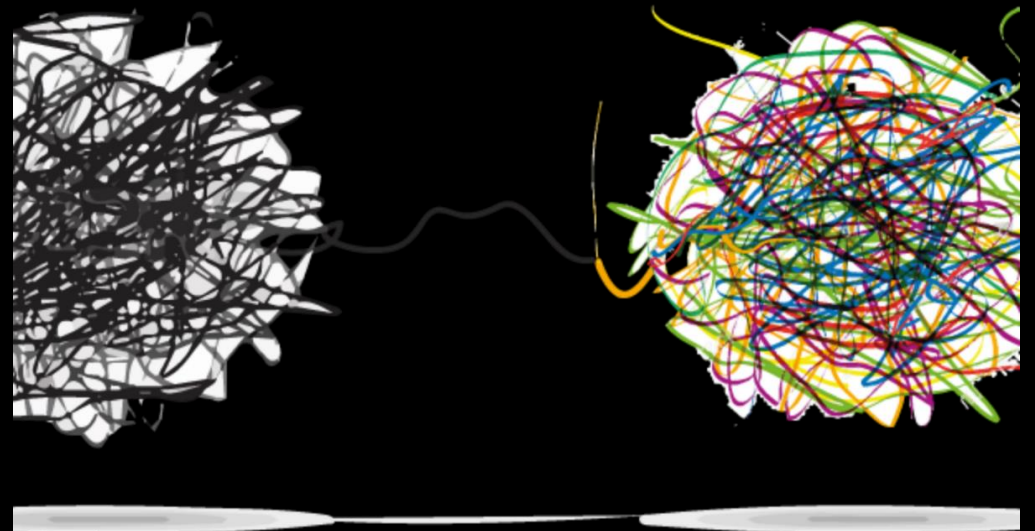
**CT Commission on Community Gun Violence Intervention and Prevention**

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# Definitions

# Wicked Problems

- A **wicked problem** is a social or cultural problem that's difficult or impossible to solve—normally because of its complex and interconnected nature
- Wicked problems lack clarity in both their aims and solutions, and are subject to real-world constraints, which hinder attempts to find a solution (i.e., **policy resistance**)



# Policy Resistance

The failure of policies to achieve the desired outcome

- Occurs when multiple actors in the system resist the policies placed on them



# Systems Thinking

- **Systems thinking** is a holistic approach to analysis that focuses on the way that a system's constituent parts *interrelate* and how systems *work over time* and within the context of larger systems
- Contrasts with traditional analysis, which studies systems by breaking them down into their separate elements
- Focuses on the *structure and relationships* between parts
  - Recognizes the system is more than the sum of its parts
  - Helps overcome or understand reasons underlying policy resistance

# Systems Thinking: Methods

- **Group Model Building** is a participatory approach to systematically diagramming a complex system
  - Engage diverse stakeholders with different perspectives on the problem to collaboratively create a more complete picture
- **Causal loop diagrams** are useful for understanding and acting on complex systems, like the community context of violence
- **System dynamics models** translate causal loop diagrams into a computer-based simulation model to project long-term outcomes

# Applying Systems Thinking to Community Firearm Violence in New Haven, CT

The background of the slide features a stylized illustration of a hand holding a handgun, rendered in a comic book or pop art style. The hand and gun are in shades of brown and grey. The background is a mix of dark green and brown tones with large, abstract, rounded shapes in orange and brown. The overall aesthetic is gritty and urban.

# Our Wicked Problem: Community Firearm Violence

- **Firearm violence** is not an individual-level problem
- **Communities** provide the context within which persistent firearm violence occurs
  - There are numerous community factors that promote or prevent persistent gun violence
    - The relationships between these community factors are complex
  - Multiple interventions have been tried, but firearm violence persists in New Haven

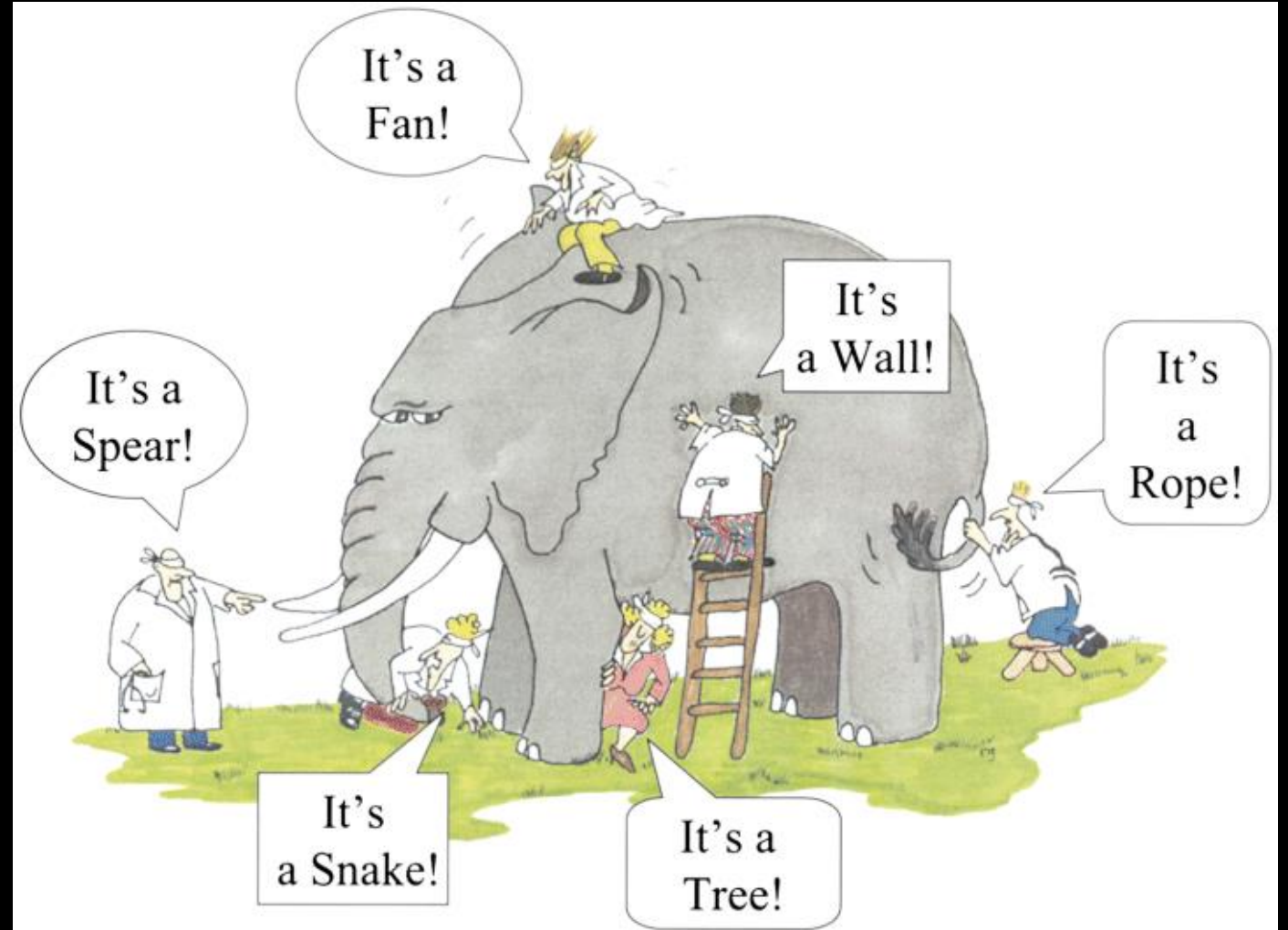


# Using Participatory Systems Science to Address Gun Violence in NHV

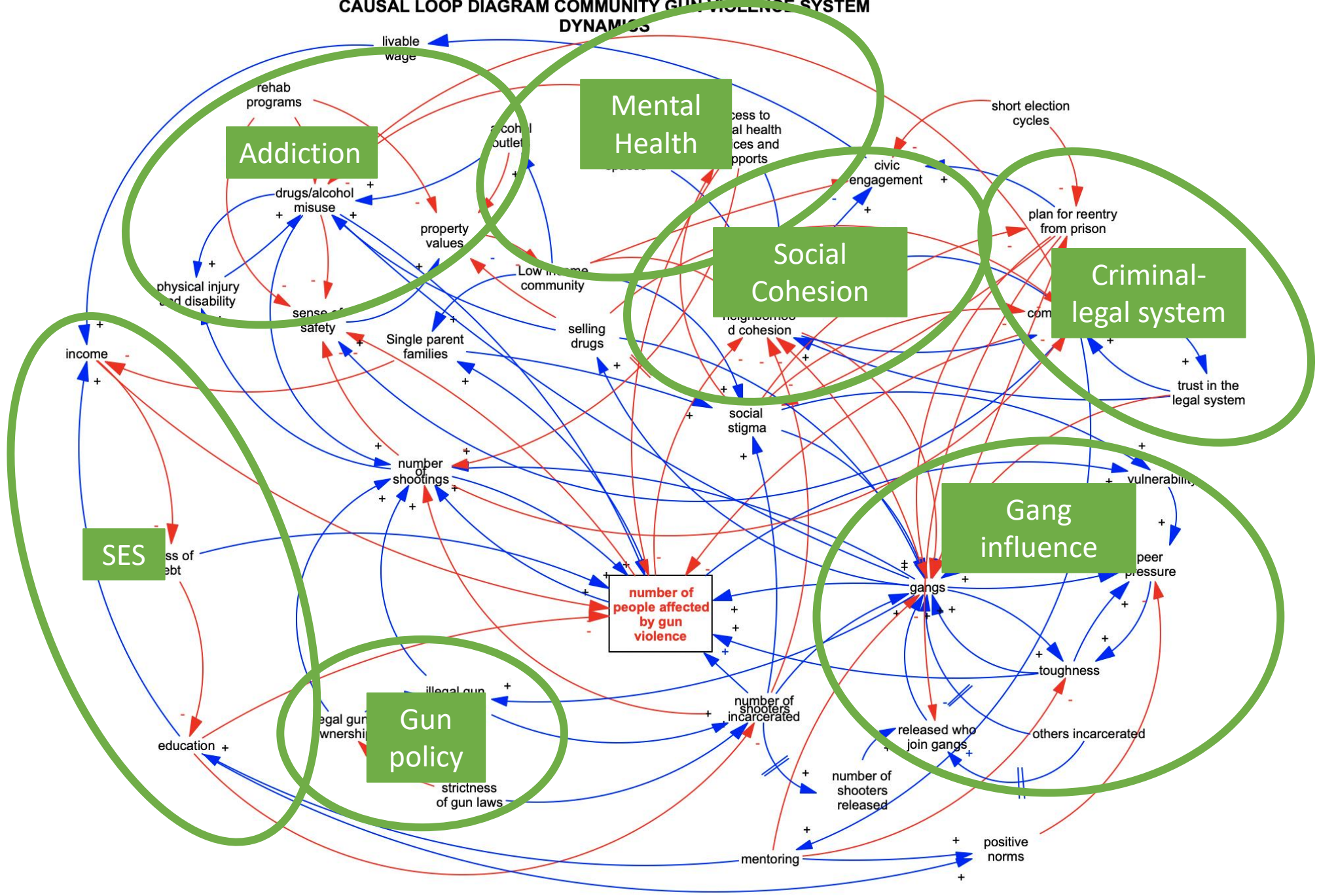
1. Engaged a multi-stakeholder community group from New Haven in a **group model building** process
2. Used the resulting causal loop diagram to create a **system dynamics model** that describes the community context underlying gun violence and simulates the long-term impact of potential interventions
3. Used the causal loop diagram and system dynamics model to identify key **leverage points** in the system
4. **Implement and test** the most effective intervention(s) in our community

# Step 1. Stakeholders Engaged in **Group Model Building** to Describe the Community Context of Gun Violence

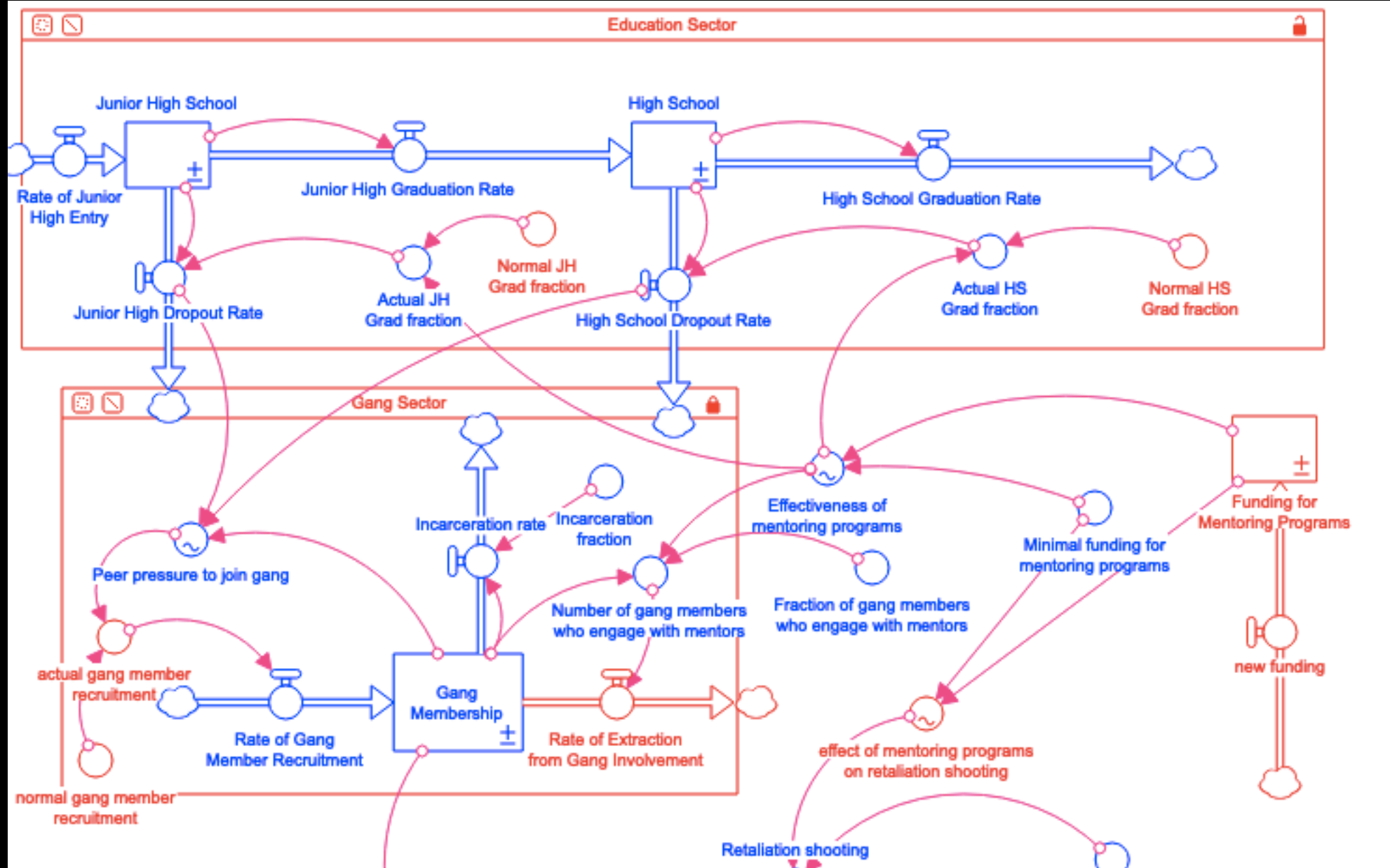
- Residents of high-violence neighborhoods
- Community-based organizations
- Stakeholders from multiple sectors interfacing with gun violence



# CAUSAL LOOP DIAGRAM COMMUNITY GUN VIOLENCE SYSTEM DYNAMICS

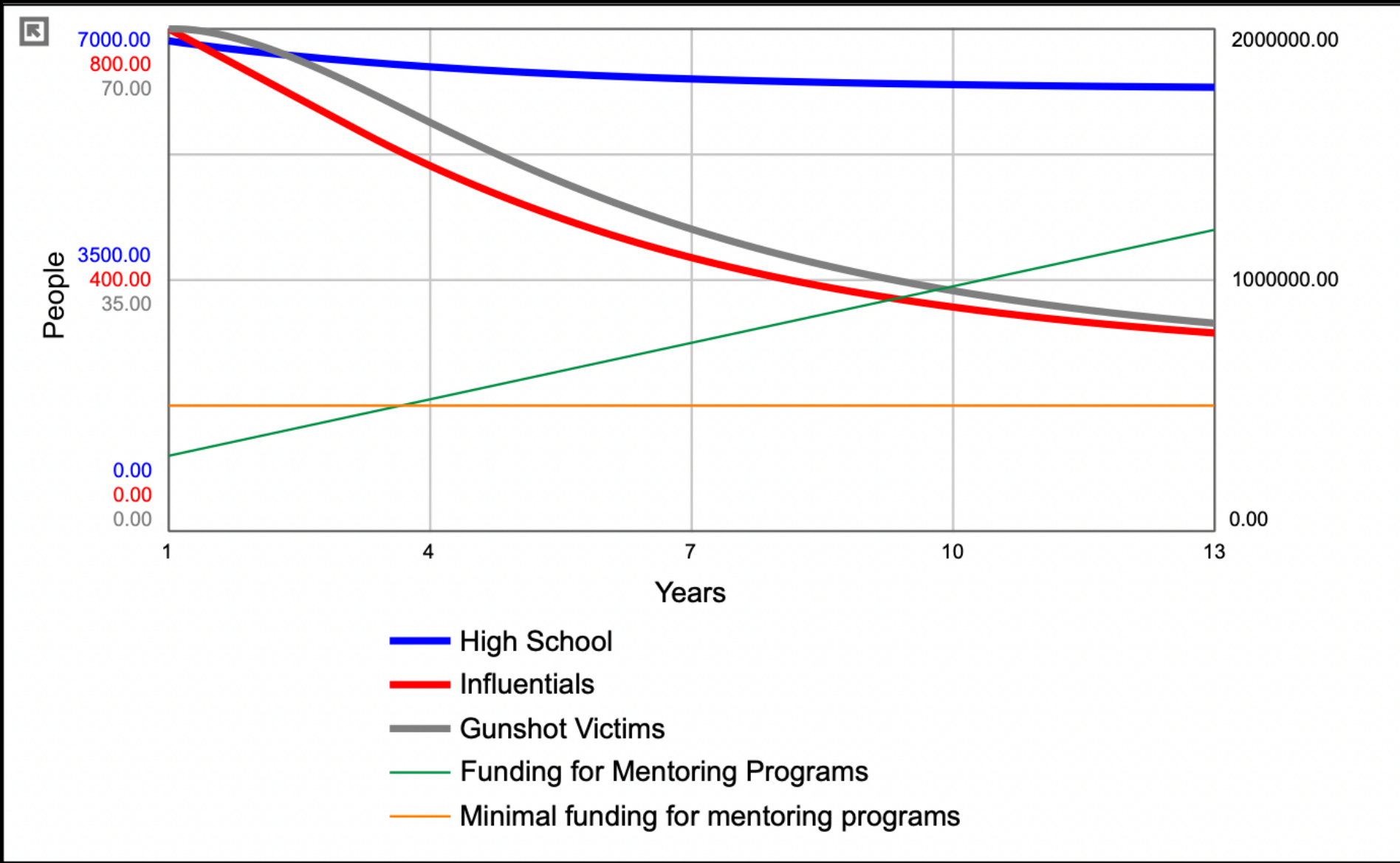


# Step 2. Translation Into System Dynamics Model



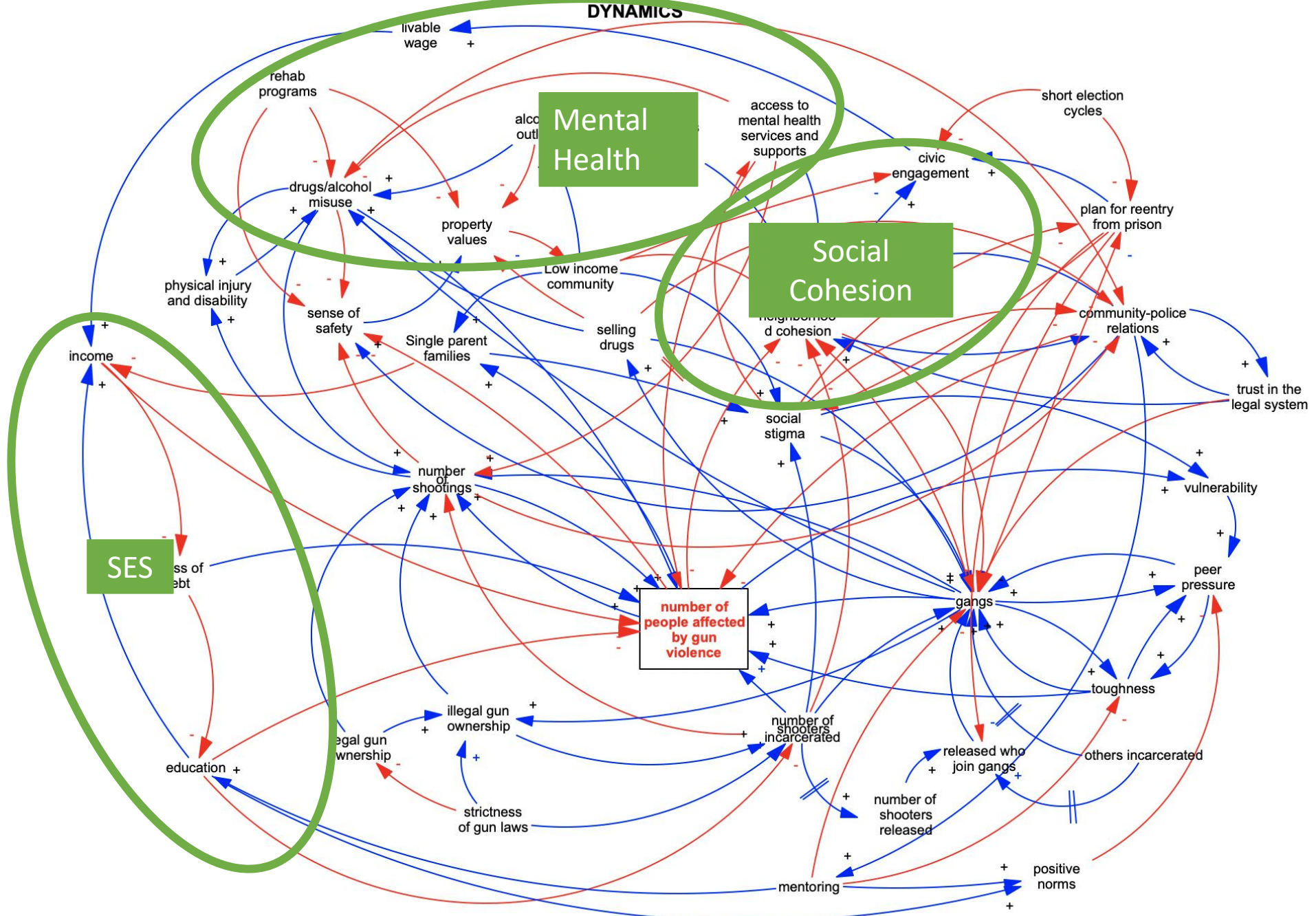


# Simulating Impact of Interventions



# Step 3: Identifying Key **Leverage** **Points** in the System

# CAUSAL LOOP DIAGRAM COMMUNITY GUN VIOLENCE SYSTEM



# Step 4. Implement & Evaluate **TRUE HAVEN**: Multi-level intervention

- 1. Person/family level - *Housing stability***: Home loans or rental assistance coupled with comprehensive financial education
- 2. Community level - *Mental health***: Training a trusted network of community members (e.g., barbers, faith leaders, educators) to recognize those affected by the trauma of gun violence and be able to counsel and/or connect them to mental health resources
- 3. City/state level - *Coalition to address structural racism***: Convene a group of diverse stakeholders that can work to change policies, biases and/or barriers that prohibit equitable access to housing and healthcare



# Specific Aims

- **Aim 1.** To compare the **effectiveness** of TRUE HAVEN versus conditions as usual on neighborhood-level incidence of gun violence and secondary health outcomes.
- **Aim 2.** To examine the **reach, adoption, acceptability, appropriateness, feasibility, and maintenance** of the TRUE HAVEN intervention and multi-level factors that affect a citywide effort to address structural racism (participant/ stakeholder-level).
- **Aim 3.** To understand mechanisms of change and **project long-term impact** and sustainability of TRUE HAVEN.

# TRUE HAVEN Program

## Housing Stability



Housing assistance programs

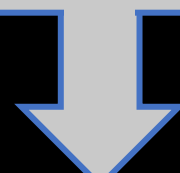
Tailored financial education



## Mental Health Support



Trusted community members counseling and connecting to mental health resources

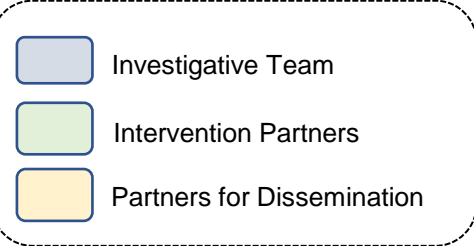


Six neighborhoods eligible for intervention, one neighborhood at a time



1400 New Haven families affected by incarceration





**Multi-Principal Investigators of Parent Intervention**

Dr. Brita Roy  
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Ms. Virginia Spell  
Urban League of Southern Connecticut

**Data Safety Monitoring Board**

**Project and Data Management**  
Nadine Horton

**Community Advisory Board**

**Implementation Science**

Dr. Spiegelman (Co-I)  
Director of Yale CMIPS

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Biostatistician

**Systems Dynamics Modeling**

Mr. Thomas Thornhill  
Modeler

**Community Engaged Research**

Dr. Emily Wang (Co-I)  
Mass incarceration/CBPR

Dr. Danya Keene (Co-I)  
Housing/CBPR

Ms. Christine Montgomery (Co-I)  
Trauma-informed care/CBPR

**Implementation Partners**

Housing: Urban League, CHFA, LCI, Yale Home Buyers Program, YNHH, Neighborhood Housing Services

Trauma-Informed Care: Clifford Beers, Ice the Beef, Transitions Clinic, YCCI

Data: DataHaven, New Haven Police, CHFA

**Intervention Funders/Supporters**

Yale University

Yale New Haven Hospital

Local foundations, banks, businesses

New Haven City

State Housing Authority

**Partners and Targets for Dissemination**

Neighborhood Management Teams/Residents

Professional Societies and Scientific Communities

Connecticut Hospital Association

Intervention Partners/Community Advisory Board

# Study Design

- Eligibility criteria: **Families affected by incarceration** living in 6 low SES New Haven neighborhoods
  - People returning home from prison
  - Families of those currently incarcerated
- Cluster-randomized, **stepped-wedge** design
  - 2 neighborhoods eligible each year over 3 years
- **Implementation science** frameworks (CFIR & RE-AIM)
  - Implementation outcomes
  - Process outcomes
  - Health & well-being outcomes at individual and neighborhood levels
    - **Primary outcome**: rates of neighborhood gun violence
  - Assess for spillover effects

Evidence-Based **Community  
Interventions** that Mitigate  
Firearm Violence

# Effectiveness of Other Community-Based Interventions that Mitigate Firearm Violence

- Best evidence:
  - Dismantling public housing high-rises
  - Blight remediation of buildings and land
- Some evidence:
  - Providing green housing environments
  - Reducing alcohol availability
  - Improving street connectivity
- No effect:
  - Transit changes
  - School openings

# Dismantling Public Housing High-Rises

Citation	Location	Study Period	Study Design	Intervention	Control	Findings
Aliprantis & Hartley <sup>1</sup>	Chicago, IL	1990-2011	Pre-post	Closure and demolition of 180 public high-rise buildings	None	Significant decrease in homicides around demolitions
Santiago, et al <sup>2</sup>	Denver, CO	1992-1995	Pre-post	38 dispersed new public housing developments	None	Decrease in total crimes near dispersed housing sites, compared with citywide
Freedman & Owens <sup>3</sup>	USA	1987-2007	Pre-post	29,870 LIHTC-subsidized rental housing developments (new construction and rehabilitation) placed in service	None	Decrease in robbery and assaults at the county level
Woo & Joh <sup>4</sup>	Austin, TX	2000-2009	Quasi-experimental	20 LIHTC-funded low-income rental housing developments	Remaining areas in census tracts	Nonsignificant decrease in total crime rate near LIHTC impact areas

1. Aliprantis D, Hartley D. Blowing it up and knocking it down: The local and city-wide effects of demolishing high concentration public housing on crime. *Journal of Urban Economics*. 2015 Jul 1;88:67-81.
2. Santiago AM, Galster GC, Pettit KL. 2003. Neighbourhood crime and scattered-site public housing. *Urban Stud*. 40:2147-63
3. Freedman M, Owens EG. Low-income housing development and crime. *Journal of Urban Economics*. 2011 Sep 1;70(2-3):115-31.
4. Woo A, Joh K. Beyond anecdotal evidence: Do subsidized housing developments increase neighborhood crime?. *Applied Geography*. 2015 Oct 1;64:87-96.

# Abandoned house remediation

- Cluster randomized trial in Philadelphia
- Intervention: Full housing remediation
  - Installing working windows and doors
  - Cleaning up trash
  - Weeding
- Reduced firearm violence:
  - Lowered weapons violations by  $-8.43\%$  (95% CI,  $-14.68\%$  to  $-1.19\%$ )
  - Reduced gun assaults by  $-13.12\%$  (95% CI,  $-21.32\%$  to  $-3.01\%$ )
  - Reduced shootings by a nonsignificant  $-6.96\%$  (95% CI,  $-15.32\%$  to  $3.03\%$ )
  - No evidence of displacement of gun violence outcomes was found



# Neighborhood Greening

- Citywide cluster randomized trial to restore blighted vacant land
  - Removed trash and debris, graded the land, planted new grass and a small number of trees to create a park-like setting, installed low wooden perimeter fences, and then regular maintenance
- Participants living near treated vacant lots reported
  - Reduced perceptions of crime (−36.8%,  $P < 0.05$ ), vandalism (−39.3%,  $P < 0.05$ ), and safety concerns when going outside their homes (−57.8%,  $P < 0.05$ )
  - Significantly increased use of outside spaces for relaxing and socializing (75.7%,  $P < 0.01$ )
- Significant reductions in crime overall (−13.3%,  $P < 0.01$ ), gun violence (−29.1%,  $P < 0.001$ ), burglary (−21.9%,  $P < 0.001$ ), and nuisances (−30.3%,  $P < 0.05$ )

# Neighborhood Greening

- Associations between neighborhood segregation, tree cover, and firearm violence across census tracts in six U.S. cities
  - Baltimore, MD; Philadelphia, PA; Richmond, VA; Syracuse, NY; Washington, DC; Wilmington, DE
  - A 1-SD higher privilege was associated with a 42% reduction in shootings (incidence rate ratio (IRR) = 0.58, 95% CI [0.54 0.62],  $p < 0.001$ )
  - A 1-SD increase in tree cover was associated with a 9% reduction (IRR = 0.91, 95% CI [0.86, 0.97],  $p < 0.01$ )
  - Simulated achievement of 40% baseline tree cover was associated with reductions in firearm violence, with the largest reductions in highly-deprived neighborhoods.

# Reducing Alcohol Availability

Citation	Location	Study Period	Study Design	Intervention	Control	Findings
Masho, et al <sup>1</sup>	Richmond, VA	2003	Quasi-experimental	Policy in place for 6 months that restricted sale of off-premise ETOH; limited it to 6 or 12 packs of beer and not single-serve 22- or 40-oz beer	Similar census tracts without restriction	No change in control group from pre- to post intervention; in intervention group there was a drop in pickups, which rebounded after policy was reversed
Heaton, et al <sup>2</sup>	11 cities and counties in VA	2004–2008	Quasi-experimental	Blue law repeals for expanded liquor sales on Sundays	Crimes on days except Sunday; VA jurisdictions with no repeals	Significant increases in minor crimes (5%) and alcohol-related serious crimes (10%), no effect on domestic violence
Han, et al <sup>3</sup>	Pennsylvania	2003-2011	Quasi-experimental	25 outlets affected by the blue law repeal	69 outlets never allowed to sell on Sundays	Significant average increase in total crimes of 0.035 incidents within one-eighth of a mile of affected outlets
Holder <sup>4</sup>	3 communities in CA and SC	1992-1996	Efficacy prevention tria	Neighborhood preventive programs involving community mobilization, limited alcohol availability and access, and increased enforcement in 3 control-matched intervention communities	1 unspecified community	Significant 2% reduction in incidents of hospitalization due to violent assault related to alcohol and other outcomes related to alcohol consumption and injury

1. Masho SW, Bishop DL, Edmonds T, Farrell AD. Using surveillance data to inform community action: the effect of alcohol sale restrictions on intentional injury-related ambulance pickups. *Prevention science*. 2014 Feb;15(1):22-30.
2. Heaton P. 2012. Sunday liquor laws and crime. *J. Public Econ*. 96:42–52
3. Han S, Branas CC, MacDonald JM. 2016. The effect of a Sunday liquor sales ban repeal on crime: a triple-difference analysis. *Alcohol.: Clin. Exp. Res*. 40:1111–21.
4. Holder HD, Gruenewald PJ, Ponicki WR, Treno AJ, Grube JW, et al. 2000. Effect of community-based interventions on high-risk drinking and alcohol-related injuries. *JAMA* 284:2341–47

# Improving Street Connectivity

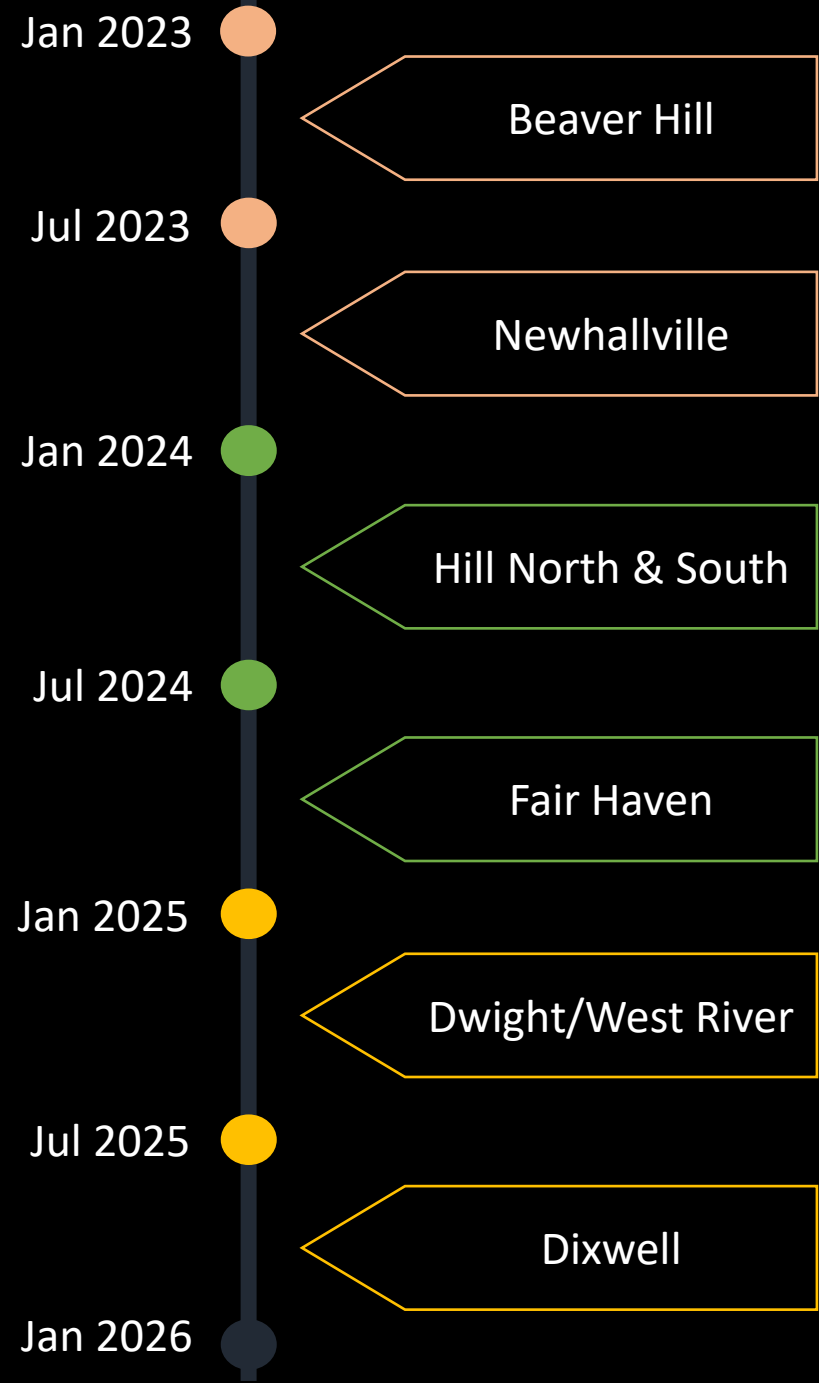
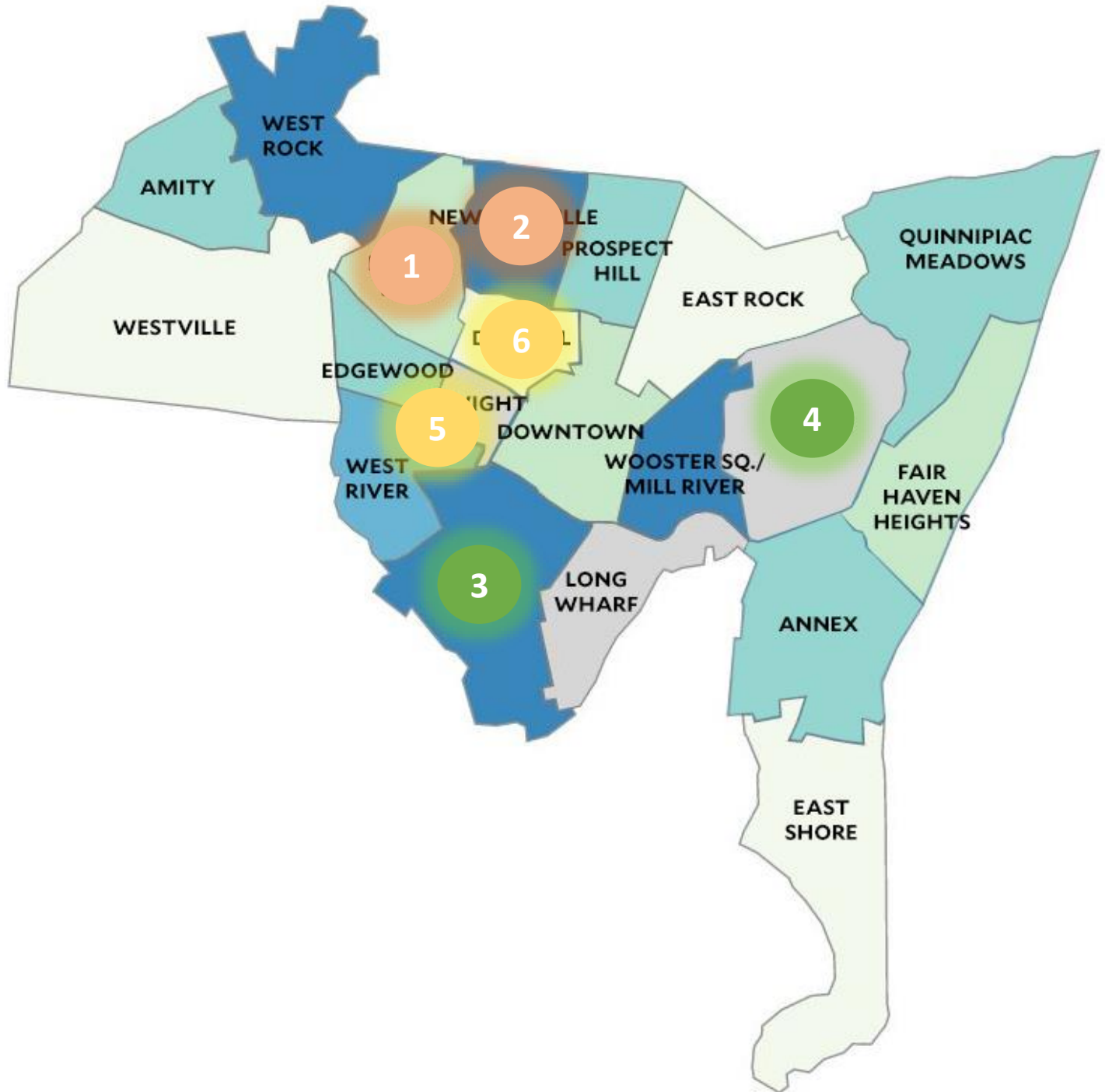
Citation	Location	Study Period	Study Design	Intervention	Control	Findings
Zavosky, et al <sup>1</sup>	Hartford, CT		Quasi-experimental	Street barrier construction	Adjacent streets with no barrier	33% decline in violent crime incidents on the intervention street and 50% decline on adjacent streets
Lasley, et al <sup>2</sup>	Los Angeles, CA	1990-1991	Multiple prepost comparisons	New traffic barriers in 14 streets	None	Violent crimes in the intervention area decreased by 20% in 1990 and 14% in 1991 relative to 1989
Ceccato & Haining <sup>3</sup>	Sweden and Denmark	1998–2001	Pre-post	New four-lane motorway and twoway rail bridge	None	No statistical difference in violent crimes

1. Zavoski RW, Lapidus GD, Lerer TJ, Burke G, Banco LI. 1999. Evaluating the impact of a street barrier on urban crime. *Inj. Prev.* 5:65–68.
2. Lasley JR. Using traffic barriers to design out crime. Report to the National Institute of Justice. California State University, Fullerton. 1996 Nov.
3. Ceccato V, Haining R. 2004. Crime in border regions: the Scandinavian case of Oresund, 1998–2001. *Ann. Assoc. Am. Geogr.* 94:807–26

# Summary

- Firearm violence is a complex problem
- Changing the community context is necessary to mitigate the incidence and effects of firearm violence
- Best current evidence supports interventions that improve housing and neighborhood conditions
- TRUE HAVEN (housing stability & mental health) is currently being tested – results to come soon!

Thank you.



1400 families recruited in total