

Short-Term Effect of San Jose's Gun Liability Insurance on Gun Violence

Victor Kilanko

March 18, 2025

Gun Violence: A Public Health Crisis

- Gun violence is a major public health and economic challenge in the U.S.
- In 2022, over 48,000 firearm-related deaths occurred, averaging 132 per day (Villarreal et al., 2024).
- Non-fatal firearm injuries burden healthcare systems, with 200+ daily ER visits (Schnippel et al., 2021).
- Annual societal cost: \$557 billion (2.6% of U.S. GDP) (Song, 2022).

Gun Violence in California

- California faces similar trends despite strict gun laws.
- 3,200+ gun deaths annually, \$40B in economic costs, \$1B taxpayer burden (EveryStat, 2024).
- San José residents bear \$442M annually in gun-related costs (Miller and Azrael, 2022).

Unintentional Gun Harm

- Unsecured firearms significantly contribute to accidental shootings (Webster and Starnes, 2000; Wilson et al., 2023).
- 4.6M children live in homes with loaded, unsecured guns (Miller and Azrael, 2022).
- A child under ten is fatally shot every six days in the U.S. (CDC).

San José's Firearm Liability Insurance Mandate

- Ordinance No. 30716 requires:
 - Liability insurance for firearm owners (City of San José, 2022).
 - Annual Gun Harm Reduction Fee for violence prevention programs.
 - Enforcement via citations and firearm impoundment.
- First U.S. city to implement such a policy; New Jersey has since followed.

Impact and Research Agenda

- San José has 50,000–55,000 firearm-owning households (Lehmann, 2023), and about 326,767 total households (US Census Bureau).
- Nationally, 70% of firearm injuries stem from assaults, less than 20% are unintentional (Centers for Disease Control and Prevention (CDC), 2024).
- This study examines the impact of Ordinance No. 30716 on gun violence trends since January 2023.
- Builds on research analyzing firearm regulations and public safety (Smart et al., 2024).

Broader Context: Firearm Policies in the U.S.

- Between 1995 – 2023, 180+ studies analyzed 18 firearm policies and 8 safety outcomes (Smart et al., 2024).
- Policies studied include:
 - Minimum age requirements, prohibitions associated with mental illness and domestic violence, surrender of firearms by prohibited possessors, extreme-risk protection orders.
 - Background checks, licensing and permitting requirements, waiting periods, firearm safety training, lost or stolen firearm reporting, firearm sales reporting and registration.
 - Bans on assault weapons and high-capacity magazines, bans on low-quality handguns, stand-your-ground laws, child-access prevention (CAP) laws, concealed-carry laws.
 - Gun-free zones, laws allowing armed staff in K-12 schools.
- There is little on evidence-based impact of gun liability insurance policy.

Step 1: Target Parameters

- **Gun Violence- Gun Discharge 911 Calls**
- **Gun Violence- Firearm Injuries**

Why Use Regression Discontinuity Design (RDD)?

- RDD identifies causal effects using a cutoff-based policy rule that segments units into treated or control groups.
- San Jose's Ordinance provides exemptions for individuals facing financial hardship.
- Under SJMC section 10.32.225, individuals who would experience undue financial burden are not required to comply with the ordinance.
- An individual qualifies for an exemption if their household income falls at or below the Extremely Low Income (ELI) threshold for Santa Clara County.
- The ELI threshold is set at 30% of the Area Median Income (AMI), adjusted for household size.
- AMI calculations are released annually by the California Department of Housing and Community Development (HCD).

Santa Clara County Median Household Income

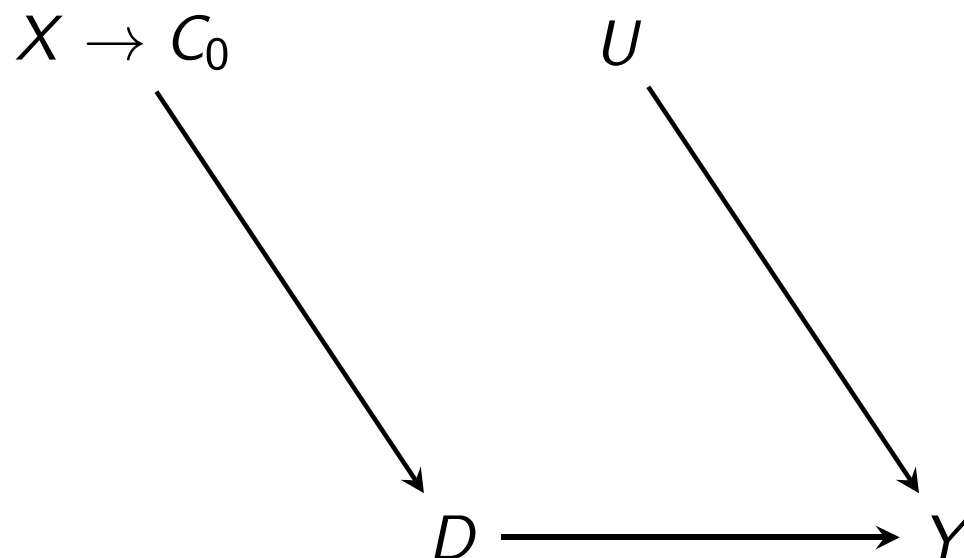
- HCD uses the 2022 ACS median family income data (as opposed to household income data) from the 2022 ACS as calculated by the Census Bureau as the basis of FY 2024 Income Limits for all areas of California.
- Santa Clara's AMI is set at \$184,000 for a family of 4 with the C_o at \$55300.

Number of Persons in Household:		1	2	3	4	5	6	7	8
Santa Clara County Area Median Income: \$184,300	Acutely Low	19350	22100	24900	27650	29850	32050	34300	36500
	Extremely Low	38750	44250	49800	55300	59750	64150	68600	73000
	Very Low Income	64550	73750	82950	92150	99550	106900	114300	121650
	Low Income	102300	116900	131500	146100	157800	169500	181200	192900
	Median Income	129000	147450	165850	184300	199050	213800	228550	243300
	Moderate Income	154800	176900	199050	221150	238850	256550	274250	291900

Figure: From CA HCD- Page 12

RDD Identification Strategy

- Sharp RDD: Treatment is deterministic at the cutoff (fully enforced policy).
- Continuity Assumption: No other policies changed at the same threshold.
- Local Treatment Effect: We estimate the effect at the income threshold.
- Running Variable: Household-Adjusted Family Income is the treatment assignment with the cutoff set at 30% of San Jose's Family Income.
- Outcome: Number of gun discharge incidents per month.



where X represents Annual Family Income, C_0 is 30% of San Jose's family income, D denotes the gun liability insurance policy, and Y represents gun discharge calls.

RDD Estimation Strategy

- **Local Regression:**

$$Y_i = \beta_0 + \beta_1 D_i + f(X_i - c_0) + \epsilon_i$$

where:

- Y_i = Gun discharge 911 calls.
- D_i = Indicator for households above the income threshold.
- X_i = Family Income (running variable).
- C_0 = 30% of Area Median Income (threshold).
- $f(X_i - c_0)$ = Flexible function of income deviation from the threshold.
- **Bandwidth Selection:** Data close to the threshold is more informative.

RDD Assumptions and Validity Checks

- Continuity Assumption: No simultaneous treatments at the cutoff. Without the treatment, my outcome of interest would have remained a smooth function of X (no jumps).
- Placebo Tests: Look at pre-policy trends, and check if other cities with different ELI have jumps at 30% of San Jose's AMI.

Data Requirements

To conduct a robust analysis of the impact of San Jose's Gun Liability Insurance Law, the following household-level data are required:

- Household Income: Annual income data for households.
- Household Size: Number of individuals in each household.
- Gun Ownership: Indicator of firearm possession within the household.
- Gun Insurance Payment: Whether the household has paid for gun liability insurance.
- Gun Injuries: Number of gun-related injuries occurring within the household in the past 12 months and past 24 months.