

Disparities in Adolescents' Recent Exposure to Local Gun Violence: Linking Incident-level Crime Data to a Population-based Panel Study

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Introduction

Recent exposure to severe forms of community violence, such as local homicides, have an acute effect on children's behavioral self-regulation and academic performance (Sharkey, 2010; Sharkey, Tirado-Strayer, Papachristos, & Raver, 2012). There are also strong correlations between neighborhood violent crime rates and levels of neighborhood economic and racial segregation (Sampson, 2012), indicating that children's exposure to violence is stratified by race and socio-economic status. No national study, however, has systematically examined inequalities in adolescents' recent exposure to severe forms of violence that occur in their local neighborhoods. This lack of research is largely due to the absence of a validated national database of violent incidents that can be geospatially linked to individual residences. Using newly available data from the Gun Violence Archive, we are the first to provide population-based estimates of adolescents' recent exposure to local gun violence by linking incident-level crime data to a national panel study.

The Gun Violence Archive (GVA) is a not for profit corporation that maintains an archive of gun violence incidents collected from media, law enforcement, government and commercial sources. Data from the GVA has been used by journalists to explore patterns in gun violence across time and place (see Aufrichtig, 2017), but to date, GVA data has not been used in scholarly research because the accuracy and reliability of the data has not been systematically evaluated. If validated, GVA data has the potential to be linked with population-based panel studies to provide representative estimates of individual's exposures to gun violence. To assess the potential of using this data in such a manner, our paper has the following aims:

1. Test the validity of GVA data by comparing GVA reports to official state reports.
2. Estimate the prevalence of children's recent exposure to local gun violence using a population-based sample of $\approx 3,500$ adolescents born in 20 large U.S. cities.
3. Examine inequalities in children's recent exposure to local gun violence by race/ethnicity and socio-economic status.

Data and Methods

We use individual-level data on adolescents from the Year 15 follow-up survey of the Fragile Families and Child Wellbeing Study (FFCWS; $N \approx 3,500$), a population-based birth cohort study of children and families. FFCWS includes a stratified, multistage, probability sample of children born in large U.S. cities (population greater than 200,000) between 1998 and 2000. FFCWS oversampled children born to unmarried parents, resulting in a disproportionately large sample of racial/ethnic minority and economically disadvantaged children. When weighted, however, the sample is representative of all births in large US cities between 1998 and 2000. Data collection for the Year 15 follow-up survey occurred between 2014 and 2016.

Incident-level data on gun violence comes from the Gun Violence Archive (GVA). In this paper, we focus on the most severe forms of gun violence. We exclude incidents that did not result in death and incidents that were classified by GVA as suicide, self-defensive, accident, or use of force by a police officer. We classify all other incidents as GVA reported homicides

using firearms. To test the validity of GVA reports, we collect monthly reports of the number of homicides using firearms from state government reporting systems.

Preliminary Results

Preliminary results presented in this extended abstract are based on a small, illustrative analysis of GVA data from January 2014 to December 2016 in Pennsylvania only. These incident-level data are linked to 314 respondents in the FFCWS who resided in Pennsylvania and were interviewed between July 2014 and December 2016 when they were approximately age 15. The complete paper will include incident-level data from all states linked to all $\approx 3,500$ respondents.

Between 2014 and 2016, the Pennsylvania State Police Reporting System reported 1,466 homicides with firearms (40.7 per month on average) and GVA reported 1,373 such incidents (38.1 per month on average). Comparison of these counts suggest that some underreporting in GVA is likely, but not substantial or extensive. Panel A of Figure 1 shows a scatterplot of GVA and state counts. Although several monthly inconsistencies are considerable, the association between monthly counts is strong ($r=0.78$). Panel B of Figure 1 shows a scatterplot of the difference between counts and time (in calendar months). We find little evidence of substantial change in the difference between reports across time.

Given these findings, we link incident-level GVA data from Pennsylvania to the residence and interview date of FFCWS respondents who resided in Pennsylvania at the Year 15 follow-up survey ($N=314$). Table 1 shows the number of children who resided within varying distances from gun homicides that occurred within varying times preceding the date in which they were interviewed. None of the 314 adolescents were interviewed within one week following a gun homicide that occurred within 100 meters of their home. However, 188 adolescents (60%) were interviewed within 6 months of a gun homicide that occurred within 1 mile of their home.

In Table 2, we select varying distances and time frames and compare the prevalence of children's exposure to gun homicides by race and household income. We find overwhelming evidence of racial and socio-economic disparities. For example, nearly 20% (1 in 5) of black children were exposed to a gun homicide within 500 meters from their home in the past 3 months, compared to only 1.4% (1 in 77) of white children; and nearly 75% of black children were exposed to a gun homicide within 1 mile in the past 6 months, compared to only 22% of white children. We find similarly patterned, although less pronounced, disparities when we compare gun violence exposure of children born in poor or near poor households (<200% of the federal poverty line) to that of children born in higher income households.

Discussion

Our preliminary findings provide initial evidence that: (1) GVA incident-level data on homicides with firearms are sufficiently valid and reliable for use in population research; and (2) adolescents' recent exposure to local homicides with firearms are highly stratified by race and socio-economic status. We will extend the work presented in this abstract to the full sample of $\approx 3,500$ children who participated in the Year 15 FFCWS study wave. All incident-level crime data collection and merging is scheduled to be complete by December 2017, at which time we will complete statistical analyses of the racial/ethnic group and socioeconomic disparities in exposure to gun violence. Ultimately, we plan to extend this work to consider how differential exposure to local incidents of gun violence may contribute to inequalities in adolescent wellbeing across a range of educational and social-emotional outcomes.

References

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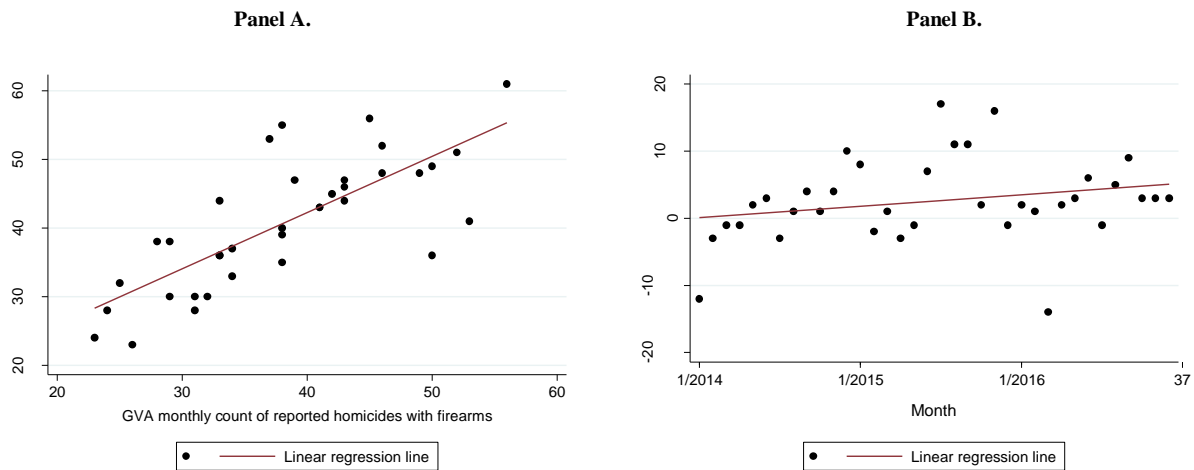


Figure 1. Relationship between Gun Violence Archive (GVA) and official state monthly counts of reported homicides with firearms in Pennsylvania from 2014 to 2016.

Table 1. Number of Pennsylvania FFCWS respondents exposed to local homicides using firearms (N=314)

	Distance from residence				
	100 meters	250 meters	500 meters	1 kilometer	1 mile
Days before interview date					
7	0	0	4	11	21
14	0	0	7	22	41
30	0	4	14	51	87
60	1	8	31	79	122
90	1	12	46	100	144
180	4	19	67	136	188

Table 2. Percentage of Pennsylvania FFCWS respondents exposed to local homicides using firearms by race and household income

	250 meters, 6 months	500 meters, 3 months	500 meters, 6 months	1 mile, 1 month	1 mile, 6 months
<i>By child's race</i>					
Black (N=205)	5.9%	19.5%	28.8%	20.0%	74.6%
White (N=74)	1.4%	1.4%	1.4%	6.8%	21.6%
<i>By child's household income</i>					
Poor/near poor ¹ (N=201)	8.5%	17.9%	24.9%	18.9%	69.7%
Middle/high income ² (N=113)	1.8%	8.8%	15.0%	11.5%	42.5%

¹ Less than 200% of the federal poverty line. ² Greater than or equal to 200% of the federal poverty line.