

A Spatial Examination of Gun Violence in New Jersey

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EXECUTIVE SUMMARY

The purpose of this project was to quantify and explore interpersonal gun violence across the state of New Jersey. One of main goals was to identify the areas that account for a disproportionate share of firearm violence. It sought to accomplish two broad objectives: 1) to move beyond the focus on firearm homicides and to extend analysis to non-fatal, injurious shooting victims and 2) to examine the distribution and rates of shootings across place by employing the smallest and most precise units of analysis that were possible. This latter objective proved difficult and the limitations are discussed in more detail in the “Methods” section. Using data from an Open Public Records Act (OPRA) request to the New Jersey State Police’s Regional Operations and Intelligence Center (ROIC), I analyzed three years (2019-2021) worth of all interpersonal shootings among members of the general population (i.e., no suicides or police shootings of citizens). In that recent three-year period, 3,724 individuals from throughout the state had been struck by gunfire – 636 of them fatally (17.1%). These data were then merged with population figures from the US Census Bureau’s 2020 Decennial Census to estimate the risk of being shot across municipalities and zip codes among the general population as well as for males ages 18-34.

The results found that interpersonal gun violence in New Jersey is concentrated and residentially segregated among a small set of municipalities and zip codes across the state. Only 25% of municipalities had a shooting victim over a three-year period from 2019-2021, whereas 75% did not experience a single gunshot victim from interpersonal firearm violence. For example, the top 8 municipalities with the largest total number of people shot – densely-populated urban locales – accounted for nearly three-quarters of all gunshot victims in the state; the top 15 municipalities accounted for 85% of all gunshot victims. Similar results were found among juveniles who were shot, albeit being slightly more concentrated across place. In addition to other

descriptive statistics, the project also identifies and lists the municipalities and zip codes with the highest rates of gun violence. While some of these findings were not surprising, there are a few standardized rates that do stand out: both the city of Salem (352 per 100,000 population-years) and the borough of Penns Grove (186 per 100,000) in Salem County came in as number 1 and 2 in the state, respectively, and exceeded that of the Camden (176 per 100,000) and Trenton (147 per 100,000), which ranked 3rd and 4th, respectively. Top 50 lists with highest propensity of gun violence at the zip code level are also presented.

Mirroring trends among the country at large, interpersonal gun violence New Jersey disproportionately affects young Black and, to a lesser extent, Hispanic men. Gun violence is concentrated in a small number of municipalities and zip codes; however, an examination at smaller units of analysis – specifically census tracts – was precluded due to data limitations with the shooting location information provided by the NJ State Police’s ROIC. The hope is for this research – particularly elucidating the municipalities and zip codes most impacted by gun violence – to be used to leverage all available resources to those areas for gun violence intervention and prevention, including but not limited to: innovative law enforcement and prosecutorial programs (e.g., focused deterrence/pulling levers strategies) as well as evidence-based petitioning for increased funding to community recreational centers and school-based aftercare programs.

METHODS

Data were obtained through an Open Public Records Act (OPRA) request to the New Jersey State Police’s Regional Operations and Intelligence Center (ROIC). The precise language of the OPRA request reads as follows: “All fatal and injurious (i.e., struck by gunfire) shootings among members of the general population (not police shootings of citizens) in years 2019 through 2021 (3 total years). Ideally, it would include the race/ethnicity, age, and gender of the individual shot;

also, whether the shooting was fatal or non-fatal, injurious. Also, specific geographic information on the location of the shootings (e.g., 500 block of 5th street, town, zip code). All records can be de-identified for names.”

Most of the measures in the OPRA request were fulfilled except for the shooting location information. Originally, the NJ State Police’s ROIC only supplied the city/municipality where each shooting occurred. It was relayed that more precise location information was “law enforcement sensitive.” Several attempts, including by a member of the New Jersey Gun Violence Research Center’s leadership, were made to negotiate with the NJ State Police in order to secure more precise location information to – ideally – identify the census tracts. Census tracts are, arguably, more akin to neighborhood-level units of analysis in terms of geographic size and population numbers. However, the NJ State Police’s ROIC agreed **to only provide the zip code identifier for each shooting** – not any other information that would assist in the identification of the specific census tract. This was a tremendous limitation of the overall project.

There were other efforts to troubleshoot and work around the data limitations in order to obtain the census tract identifiers. One avenue was to use the Gun Violence Archive (GVA) by doing a case-by-case search for each shooting using the date/time, municipality, and shooting victims’ demographic information. GVA usually provides an address or x,y coordinates (or both) for incidents in its catalogue. Yet, presence in the GVA is usually contingent on some type of media coverage. After a few hours of attempting this method, there was a recognition that non-fatal shootings were underreported in the GVA. Given the time constraints of the project’s funding, the decision was made to examine shootings across both municipalities and zip codes – although future research should examine gun violence in the state across census tracts if possible.

Data on all interpersonal shootings in the state for years 2019-2021 were then merged

with population measures from US Census Bureau’s 2020 Decennial Census, particularly tables “P1” (Total Population) and “P12” (Sex by Age for Selected Age Categories). They were used to calculate the risk of being shot (i.e., incidence rates) in population-years across 1) municipalities and 2) zip codes for both the general population at large as well as among young males aged 18-34 with the following formula:

$$\text{Risk of Being Shot} = [(\text{Number of shooting victims}) / (\text{Population X Timeframe})] \times 100,000$$

The population figures from the 2020 Decennial Census were simply multiplied by three to account for the 3 years’ worth of shooting data (2019-2021).

OUTCOMES

Broad Descriptive Statistics

There was a total of 3,724 individuals struck by interpersonal gunfire across New Jersey in 2019-2021. Given the 2020 population estimate of 9,288,994 (X3) for the entire state, the risk being of shot was 13.4 per 100,000 in population-years. Here is the breakdown of broad summary statistics and demographic information for those 3,724 people struck by gunfire:

Year

2019: 1,088

2020: 1,303

2021: 1,413

Following national trends, New Jersey experienced a nearly 20% increase in shooting victims in 2020 compared to 2019. The number of shooting victims increased again in 2021.

Fatal Versus Injurious

Fatal: 636 (17.1%)

Non-fatal, injurious: 3,088 (82.9%)

The vast majority of shooting victims in the state, more than 8 in 10, survive their gunshot wounds.

Race/Ethnicity

Black Non-Hispanic: 2,898 (77.8%)
Black Hispanic: 33 (0.9%)
White Hispanic: 417 (11.2%)
White Non-Hispanic: 118 (3.2%)
Asian or Pacific Islander: 10 (0.3%)
American Indian or Alaskan Native: 1 (0.02%)
Unknown: 247 (6.6%)

Black and, to a lesser extent, Hispanic New Jerseyans are disproportionately impacted by transactional gun violence. Members of these racial/ethnic groups account for 89.9% of those shot in the state over a three-year period. Non-Hispanic whites are underrepresented (3.2%).

Gender

Male: 3,216 (86.4%)
Female: 443 (11.9%)
Transgender: 1 (0.02%)
Unknown: 64 (1.7%)

Age

Mean = 29.6

< 18 (i.e., juveniles): 238 (6.4%)
18 – 34: 2,499 (67.1%)
35 – 49: 712 (19.1%)
50+: 236 (6.3%)
Unknown: 39 (1.0%)

Juveniles Shot (i.e., < 18 years old)

A total of 238 juveniles were shot between 2019-2021 – 6.4% of all shooting victims. Here is a breakdown of broad summary statistics and demographic information for those 238 juveniles struck by gunfire:

Race/Ethnicity

Black Non-Hispanic: 159 (66.8%)
Black Hispanic: 3 (1.3%)
White Hispanic: 13 (5.5%)
White Non-Hispanic: 1 (0.4%)
Unknown: 62 (26.1%)

Similar to shooting victims in general, Black and, to a lesser extent, Hispanic juveniles are disproportionately impacted by transactional gun violence. Members of these racial/ethnic groups account for 73.6% of those shot in the state over a three-year period. There was only a single non-Hispanic white juvenile shot (Male, aged 16) (0.4%). It is important to note that the juvenile shooting measures had a significant issue with unknown race/ethnicity (n = 62; 26.1%).

Gender

Male: 191 (80.3%)
Female: 41 (17.2%)
Unknown: 6 (2.5%)

Municipalities

Only 35 municipalities recorded one or more juveniles shot from 2019-2021. The top six of them – Newark (n = 80; 33.6%), Camden (n = 24; 10.1%), Trenton (n = 24; 10.1%), Paterson (n = 23; 9.7%), Jersey City (n = 21; 8.8%), and Atlantic City (n = 14; 5.9%) – accounted for 78.2% of all juveniles shot (n = 186) over the three-year period.

Young Men Aged 18-34

Nationally, young men aged 18-34 are overrepresented among both shooting victims and known perpetrators of gun violence. This is a demographic group that warrants additionally scrutiny based on these patterns. Throughout New Jersey over the three-year period, a total of 2,207 shooting victims were males aged 18-34 – 59.3% of all those struck by interpersonal gunfire. Given the 2020 population estimate of 1,031,142 males aged 18-34 (X3) for the entire state, the risk being of shot for this demographic group statewide was 71.3 per 100,000 in population-years. It will be a primary focus for the examination of shooting risk across zip codes.

Gunshot Victim Frequency

A small number of municipalities account for the majority of all gunshot victims in the state, while

most municipalities did not experience a single gunshot victim from 2019-2021. Out of 566 municipalities in the state, only 143 of them had one or more individuals shot over a three-year period (25.3%). This includes 137 plus 6 unincorporated communities and census-designated places (CDPs) located within municipalities; there were 9 individuals shot in these unincorporated communities and CDPs from 2019-2021. Approximately 75% of municipalities across New Jersey (n = 423) did not record a single gunshot victim in the three years of data tracking. Table 1 displays the top 15 municipalities in terms of raw shooting victims along with the total number of individuals shot, the percentage of gunshot victims in the state, and the standardized rate of individuals being shot per 100,000 in population years.

Table 1 – Top 15 Municipalities for the Total Number of Shooting Victims (2019-2021)

Rank (Total)	Municipality (County)	Total Shot (% of state)	Rate Per 100,000
1	Newark (Essex)	949 (25.5%)	102
2	Paterson (Passaic)	447 (12.0%)	93
3	Trenton (Mercer)	402 (10.8%)	147
4	Camden (Camden)	378 (10.2%)	176
5	Jersey City (Hudson)	273 (7.3%)	31
6	Atlantic City (Atlantic)	148 (4.0%)	128
7	Elizabeth (Union)	103 (2.8%)	25
8	New Brunswick (Middlesex)	86 (2.3%)	52
9	Irvington (Essex)	83 (2.2%)	45
10	East Orange (Essex)	62 (1.7%)	30
11	Salem (Salem)	56 (1.5%)	352
12	Asbury Park (Monmouth)	55 (1.5%)	121
13	Millville (Cumberland)	50 (1.3%)	61
14	Plainfield (Union)	44 (1.2%)	27
15	Bridgeton (Cumberland)	32 (0.9%)	39

Newark, the state’s largest municipality with an estimated population of 311,549 in 2020, accounted for approximately 25% of all those shot from 2019-2021. In fact, the top 8 municipalities comprised nearly three-quarters (74.8%) of all shooting victims (n = 2,786) and the top 15 made up 85.1% of all shooting victims in the entire state over a three-year period (n =

3,168). As Table 1 highlights in column 4, there is a wide degree of variation in the rates of individuals shot across those top 15 municipalities in total shooting victims: from highs in Salem (352 per 100,000), Camden (176 per 100,000), Trenton (147 per 100,000), and Atlantic City (128 per 100,000) to lows in Elizabeth (25 per 100,000), Plainfield (27 per 100,000), East Orange (30 per 100,000), and Jersey City (31 per 100,000). Standardized rates per population-years are explored in more detail next.

Rates of Interpersonal Gun Violence (Municipalities)

In order to allow for apples-to-apples comparisons across population size, per capita rates of gun violence in population-years were calculated and examined using municipalities as the units of analysis. Table 2 on the next page presents the list of the top 30 municipalities with the highest rates of shooting victims per 100,000 residents in population-years. Those municipalities with 5 or fewer shooting victims across the three-year period were excluded from the top 30 list in order to eliminate cases where a small number of shooting victims in very small jurisdictions (i.e., a few thousand people) would yield rates that were overly sensitive to comparably small changes in the prevalence of gun violence.

Despite much coverage of the state's urban gun violence problem in more populous cities, Salem (352 per 100,000) and Penns Grove (186 per 100,000) rank #1 and #2, respectively, before Camden (176 per 100,000) and Trenton (147 per 100,000) coming in at #3 and #4, respectively. The top 27 municipalities with highest rates of shooting victims all exceed New Jersey's average of 13.4 shooting victims per 100,000 in population-years. This means the rate of individuals shot in Salem (Salem County) from 2019-2021 is more than 26 times the state average, followed by Penns Grove and Camden (> 13X) and Trenton (> 10X).

Table 2 – Top 30 Municipalities for Highest Rates of Shooting Victims (2019-2021)^a

Rank	Municipality (County)	Risk of Being Shot in Population-Years Per 100,000 (2019-2021)
1	Salem (Salem)	352
2	Penns Grove (Salem)	186
3	Camden (Camden)	176
4	Trenton (Mercer)	147
5	Fairfield* (Cumberland)	132
6	Neptune City (Monmouth)	130
7	Atlantic City (Atlantic)	128
8	Asbury Park (Monmouth)	121
9	Newark (Essex)	102
10	Paterson (Passaic)	93
11	Paulsboro (Gloucester)	65
12	Millville (Cumberland)	61
13	New Brunswick (Middlesex)	52
14	Irvington (Essex)	45
15	Bridgeton (Cumberland)	39
16	Pleasantville (Atlantic)	36
17	Burlington City (Burlington)	34
18	Willingboro (Burlington)	31
19	Jersey City (Hudson)	31
20	East Orange (Essex)	30
21	Plainfield (Union)	27
22	Orange (Essex)	26
23	Elizabeth (Union)	25
24	Edgewater Park (Burlington)	22
25	Roselle (Union)	18
26	Linden (Union)	18
27	Pemberton Township (Burlington)	15
28	Vineland (Cumberland)	13
29	Pennsauken (Camden)	13
30	Passaic (Passaic)	11

* Fairfield (Cumberland County) is inflated due to a mass shooting at a house party where 14 people were shot. When that single event and the 14 shooting victims are removed, the risk of being shot becomes 48.1 per 100,000 in population-years – placing the municipality #14 on the list above between New Brunswick and Irvington.

a. Municipalities excluded from the top 30 list due to 5 or fewer shootings from 2019-2021 (County in parentheses): Elmer Borough (Salem); Pemberton Borough (Burlington); Woodlynne Borough (Camden); South Toms River (Ocean); Quinton (Salem); Seaside Park (Ocean); Hampton (Hunterdon); Newfield (Gloucester); Brooklawn (Camden); Seaside Heights (Ocean); Carneys Point (Salem); Knowlton (Warren); Clayton (Gloucester).

Rates of Interpersonal Gun Violence (Zip Codes)

Similar calculations were next conducted using zip codes as the unit of analysis. Many of the larger, more urban municipalities have several zip codes each; however, most suburban and rural municipalities share a single zip code. This is a limitation of the data restrictions that prohibits the ability to examine rates of gun violence across smaller, more precise places – akin to “neighborhoods.” Table 3 on the next page provides the list of the top 50 zip codes with the highest rates of shooting victims per 100,000 residents in population-years. Again, zip codes with 5 or fewer shooting victims across the three-year period were excluded from the top 50 list in order to eliminate cases where a small number of shooting victims in less populous areas would yield rates that were overly sensitive to comparably small changes in the prevalence of gun violence.

The zip code comparisons allow for the examination of rates of gun violence across different parts of cities. For example, while Newark – as a municipality – was ranked #9 (102 per 100,000) in Table 2, Table 3 highlights the variation in the city with rates of citizens shot. Zip code “07108” ranks #3 in the state with 230 individuals shot per 100,000 from 2019-2021, while zip codes “07107” (70 per 100,000) and “07104” (49 per 100,000) rank #22 and #32, respectively. All 50 of the zip codes in Table 3 exceed New Jersey’s average of 13.4 shooting victims per 100,000 in population-years.

Table 3 – Top 50 Zip Codes for Highest Rates of Shooting Victims (2019-2021)^a

Rank	Place	Risk Per 100k	Rank	Place	Risk Per 100k
1	Trenton (08608)	315	26	Paterson (07513)	58
2	Camden (08104)	246	27	Trenton (08611)	57
3	Newark (07108)	230	28	Jersey City (07304)	57
4	Camden (08103)	225	29	Paterson (07524)	54
5	Trenton (08609)	209	30	New Brunswick (08901)	50
6	Salem (08079)	176	31	Trenton (08629)	50
7	Newark (07103)	167	32	Newark (07104)	49
8	Paterson (07501)	156	33	Paulsboro (08066)	48
9	Trenton (08618)	145	34	Millville (08332)	47
10	Camden (08102)	143	35	Asbury Park (07712)	47
11	Newark (07106)	138	36	Irvington (07111)	45
12	Newark (07112)	129	37	Elizabeth (07201)	44
13	Atlantic City (08401)	128	38	Plainfield (07063)	41
14	Paterson (07522)	121	39	Pemberton (08068)	40
15	Paterson (07514)	120	40	Elizabeth (07206)	39
16	Paterson (07505)	114	41	East Orange (07018)	38
17	Camden (08105)	113	42	Pleasantville (08232)	37
18	Newark (07114)	111	43	Willingboro (08232)	31
19	Newark (07102)	93	44	Paterson (07503)	30
20	Paterson (07504)	77	45	Bridgeton (08302)	29
21	Penns Grove (08069)	75	46	Orange (07050)	26
22	Newark (07107)	70	47	East Orange (07017)	22
23	Jersey City (07305)	68	48	Neptune City (07753)	21
24	Trenton (08638)	64	49	Trenton (08691)	20
25	Fairfield (07004)	59	50	Pennsauken (08110)	19

a. Zip codes excluded from the top 50 list due to 5 or fewer shootings from 2019-2021 [County in parentheses]: Plainsboro (08536) [Middlesex], Franklin (07416) [Somerset], and Buena (08310) [Atlantic].

Finally, standardized rates of males aged 18-34 who were shot in 2019-2021 were calculated across zip codes, and the top 50 are presented in Table 4 on the following page (excluding those zip codes where 5 or fewer males aged 18-34 were shot over the 3-year period).

Table 4 – Top 50 Zip Codes for Highest Rates of Shooting Victims: Males Aged 18-34 (2019-2021)^a

Rank	Place	Risk Per 100k	Rank	Place	Risk Per 100k
1	Camden (08104)	1,490	26	Millville (08332)	298
2	Trenton (08608)	1,439	27	Paterson (07524)	293
3	Salem (08709)	1,226	28	Fairfield (07004)	290
4	Newark (07108)	1,157	29	Newark (07104)	289
5	Camden (08103)	924	30	Pemberton (08068)	287
6	Paterson (07501)	825	31	Trenton (08638)	271
7	Trenton (08609)	699	32	Paulsboro (08066)	257
8	Newark (07106)	698	33	Elizabeth (07201)	253
9	Atlantic City (08401)	675	34	Irvington (07111)	236
10	Paterson (07514)	658	35	Jersey City (07304)	233
11	Newark (07112)	647	36	Trenton (08629)	225
12	Paterson (07522)	640	37	Elizabeth (07206)	206
13	Paterson (07505)	563	38	Willingboro (08046)	192
14	Trenton (08618)	551	39	East Orange (07018)	190
15	Newark (07103)	544	40	Trenton (08611)	186
16	Camden (08105)	540	41	Pleasantville (08232)	177
17	Camden (08102)	499	42	Plainfield (07063)	163
18	Paterson (07513)	427	43	Paterson (07503)	157
19	Penns Grove (08069)	425	44	Neptune City (07753)	141
20	Paterson (07504)	404	45	New Brunswick (08901)	140
21	Jersey City (07305)	362	46	Orange (07050)	127
22	Newark (07102)	358	47	Bridgeton (08302)	126
23	Newark (07114)	334	48	East Orange (07753)	117
24	Newark (07107)	333	49	Elizabeth (08691)	103
25	Asbury Park (07712)	330	50	Vineland (08110)	92

a. Zip codes excluded from the top 50 list due to 5 or fewer shootings from 2019-2021 among males aged 18-34 [County in parentheses]: Buena (08310) [Atlantic], Edgewater Park (08010) [Burlington]; Franklin (07416) [Somerset], Whitesboro (08242) [Cape May]; Trenton (08691) [Mercer].

Zip codes “08104” in Camden, “08608” in Trenton, “08709” in Salem, and “07108” in Newark ranked 1 through 4, respectively, and exceeded more than 1,000 shot per 100,000. Remember that the rate of males aged 18-34 being shot for the entire state averaged 71.3 per 100,000 in population-years. The zip codes listed in Table 4 range from approximately 1.3 times New Jersey’s average for this demographic group (#50 – Vineland “08110”) to more than 20 times the state average (#1 Camden “08104”).

LESSONS LEARNED

The lack of publicly available data (i.e., what the NJ State Police's ROIC supplies to researchers and non-law enforcement officers more broadly) limits our ability to more thoroughly and precisely examine interpersonal gun violence across smaller units of analysis, especially census tracts. Other workarounds and data sources, particularly newer crowdsourced collections, may not offer a solution. For example, the Gun Violence Archive (GVA) usually does provide an address or x,y coordinates, but shootings present in the GVA are contingent on media coverage. Non-fatal shootings may be less likely show up as a data point in the GVA.

The promising news is that these location measures do exist. Researchers might need to collaborate and partner with the law enforcement community, specifically New Jersey State Police or the state's Attorney General's Office, to gain access to such location information (e.g., deidentified street address, intersections, or x,y coordinates). A professional goal of mine is to continue to work towards securing better state-wide shooting location information in order to facilitate a census tract examination of gun violence across New Jersey.

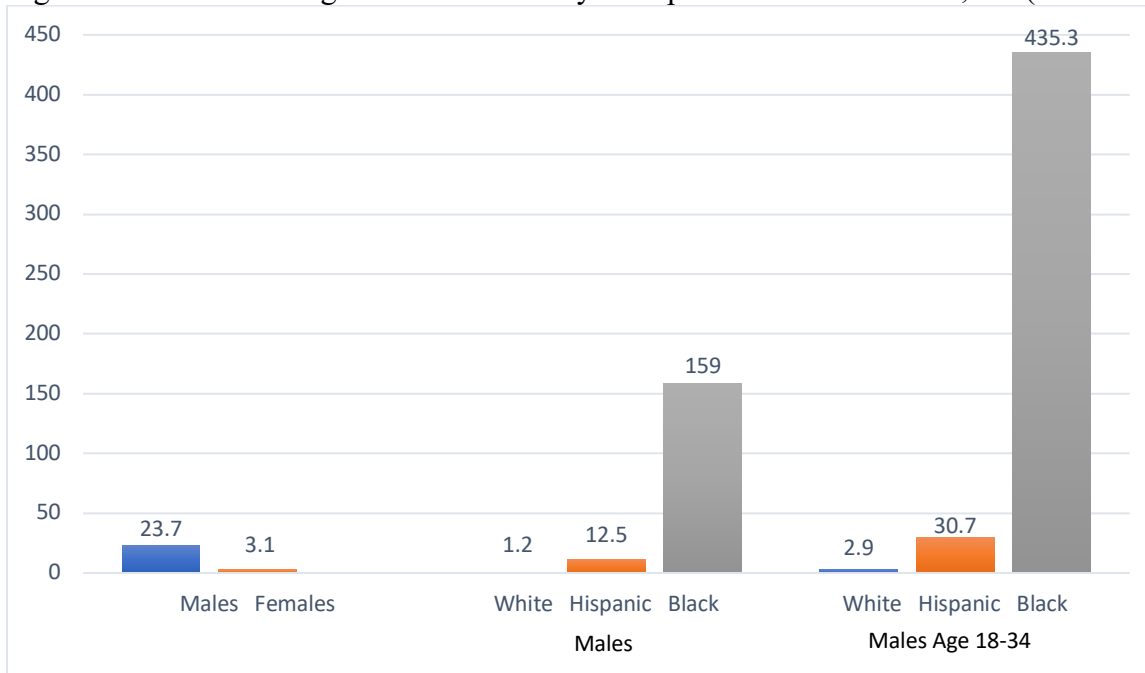
IMPACT

This research served to examine and quantify transactional gun violence across place in the state of New Jersey, while also exploring its disproportionate impact on young minority males. It aimed to focus attention on the broader nature of gun violence by including non-fatal, injurious shooting victims in addition to those who are shot fatally. Using three years' worth of all shooting victims from transactional gun violence among members of the general public (i.e., no suicides or police shootings of citizens), the project identified the very communities – those municipalities and zip codes that bear the brunt of New Jersey's gun violence problem. A relatively small number of places in the form of both municipalities and zip codes account for the lion's share of all shooting

victims. There is tremendous variation in the risk of being shot across municipalities and zip codes – oftentimes within the same municipality.

Additionally, young minority men – particularly non-Hispanic Black men aged 18-34 – account for the majority of those shot. In fact, Figure 1 calculated the risk of being shot throughout the state from 2019-2021 for different demographic groups: male versus female; non-Hispanic white, Hispanic, and non-Hispanic Black males; and finally non-Hispanic white, Hispanic, and non-Hispanic Black males aged 18-34. The comparisons are startling, and they represent one of the most egregious racial disparities in our society.

Figure 1 – Rates of Being Shot in New Jersey in Population-Years Per 100,000 (2019-2021)



*31 of those shot who were categorized as “Black Hispanic” were excluded from calculations.

One of the goals here was to identify the municipalities and zip codes with the highest rates of transactional gun violence as these are the places most in need of assistance. Next, the research community, law enforcement, government agencies, and community organizations and non-profits should leverage any and all available resources to those areas for gun violence intervention and prevention.