AN ANALYSIS OF PATTERNS IN INTERPERSONAL VIOLENCE USING MICHIGAN INCIDENT CRIME REPORTING

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AN ANALYSIS OF PATTERNS IN INTERPERSONAL VIOLENCE USING MICHIGAN INCIDENT CRIME REPORTING DATA

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Michigan Justice Statistics Center

The School of Criminal Justice at Michigan State University, through the Michigan Justice Statistics Center, serves as the Statistical Analysis Center (MI-SAC) for the State of Michigan. The mission of the Center is to advance knowledge about crime and justice issues in the state of Michigan while also informing policy and practice. The Center works in partnership with the Michigan State Police, Michigan's State Administering Agency (SAA), as well as with law enforcement and criminal justice agencies serving the citizens of Michigan.

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About the Authors

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INTRODUCTION

Despite a steady decrease in national rates of violent victimization since the early 1990s (Truman & Langton, 2014), the incidence of violence in America remains high. Michigan has experienced decreases in offending as well, with 2013 data indicating a 7 percent decrease in homicides, a 4 percent decrease in aggravated assaults, and a 1 percent decrease in robberies from 2012 (Michigan Incident Crime Reporting, 2014). Although rates of these violent crimes have decreased statewide, beneath these trends are degrees of uniformity and variation in the characteristics of victims, offenders, and context of violent crime. That is, criminological research has suggested that there is a great degree of regional variation in violent offending and victimization within places (Kposowa, Breault, &, Harrison, 1995; Sampson & Lauritsen, 1994). Even within geographic regions with high rates of offending, there are groups of people that experience disproportionately high rates of violence, particularly young, minority males (Blumstein, 1995, Braga, 2003; McGarrell & Chermak, 2004), especially firearm-related violence.

The *purpose* of the current report is to conduct a *problem analysis of violent victimization and offending* in the State of Michigan, examining patterns in victim, offender, and circumstance characteristics, as well as examine regional variation in violence across the State. These analyses are *designed to inform priorities for strategic intervention*, highlighting the characteristics of victims at the highest risk of violent crime, the most prevalent offender characteristics, and the contexts in which violent offenses are the most prevalent. Additionally, specific attention is given to differential rates of violent victimization within the counties with the highest rates of general and firearm violence.

Research Questions

Towards these ends, this report attempts to provide a thorough descriptive analysis of violent victimization and offending in Michigan, focusing on homicides, aggravated assaults, and robberies. Specifically, the research questions informing the analyses presented in this report ask:

1. What is the distribution of victim, offender, and offense characteristics across incidents of homicides, aggravated assaults, and robberies in Michigan?

2. To what extent does violent victimization and violent victimization by firearms vary across Michigan counties?

3. Which features of Michigan counties are correlated with variation in homicide, aggravated assaults, and robbery victimization?

DATA AND METHODS

Data: The Michigan Incident Crime Reporting System (MICR)

The analyses presented in this report were conducted by utilizing data from the Michigan Incident Crime Reporting system (MICR). As its name implies, MICR is an incident-based crime reporting system maintained by the Michigan State Police (MSP). All law enforcement agencies in the state are required to submit incident-level crime statistics to MSP. Beginning in 1989, MSP shifted reporting requirements from a summary-based system (i.e., such as the aggregate data contained Uniform Crime Reports) to an incident-based system, along the lines of the National Incident-Based Reporting System (NIBRS) (Michigan Department of State Police, 2014). Although Michigan law requires submission of data on a minimum of a monthly basis, currently local agencies are able to submit data to MSP electronically on a continuous basis. Eventually Michigan law enforcement agencies will be able to access MICR data through the MSP Dashboard, allowing these agencies to produce desired reports (Michigan Department of State Police, 2014). Michigan is one of a small number of states with such complete incident-based crime data. The availability of the incident-based MICR data covering the entire state represent a valuable resource for law enforcement, researchers, and policy makers for understanding crime patterns and planning prevention, intervention, and enforcement strategies to reduce crime and violence.

The current study demonstrates the utility of MICR data to gain an in-depth understanding of the nature of violent crime across the State. Given that MICR boasts a high degree of compliance across Michigan law enforcement agencies, these data provide detailed insight into violent crimes that come to the attention of the police. Members of the Michigan Justice Statistics Center research team worked with the Criminal Justice Information Center

(CJIC) at MSP to access the MICR data files. The MICR files consisted of numerous segments which were linked together on the basis of unique incident, victim, offender, and offense identifiers. Detail on the sequential file linking process is explained in Appendix A.

This report analyzes MICR data for the year 2013. For this year of data, 529 Michigan law enforcement agencies were equipped to submit incident data to MICR. Of these agencies, 462 (87.3%) submitted a full 12 months of data, while another 36 (4.9%) submitted less than 12 months of data. As such a total of 498 (94.1%) Michigan law enforcement agencies were either fully or partially represented in the data. In 2013 the MICR contained data on 744,223 unique criminal incidents across the state, where an incident is defined as "one or more offenses committed by the same person or group of persons acting in concert, at the same time and place" (MSP, 2014). Within MICR, each incident is identified by a unique identifier called a 'MIC1 number.' In any given incident, there may be a single victim or multiple victims, a single offender or multiple offenders, and involve the commission of a single offense or multiple offenses by said offenders against said victims. As such, unique identifiers were created for each victim, offender, and offense occurring within each incident (see Appendix A).

Given this report's focus on violent crime, the data were reduced to incidents involving a reported homicide, aggravated assault, or robbery against a victim that was an individual (i.e., a person, excluding businesses and the government as victims). With these criteria in place, the current report analyzes 32,056 unique violent incidents, which included 37,681 unique victims, 35,978 unique offenders, and 32,183 unique offenses (see Table 1).[1]

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[1] It is important to emphasize that this report uses different incident selection procedures than the overall summary reports filed by MSP. As such, the exact totals and rates reported in this document will not match the totals and rates provided by MSP.

Table 1. Total Unique Victims, Offenders, and Offenses across MICR Incidents (N = 32,056 Unique Incidents)

	Homicides	Aggravated Assaults	Robberies	Total
	N	n	n	N
Unique Victims	629	26,668	10,390	**37,681**
Unique Offenders	510	23,995	11,473	**35,978**
Unique Offenses	584	22,617	8,982	**32,183**

Analysis Plan

The purpose of the current report is to examine variation in incidents of interpersonal violence across the State of Michigan. The following will provide a cross-sectional description of the features of victims, offenders, and offenses involving a homicide, an aggravated assault, or a robbery. Given the complexity of the fully linked MICR data file, with the possibility of multiple victims, offenders, and offenses in a single incident, the **dplyr** grammar for data manipulation (Wickham & Francois, 2014) was utilized, as implemented in the R statistical computing environment (R Core Team, 2014). **dplyr** allows for simple counting of unique victims, offenders, or offenses given particular grouping variables of interest, which avoids complications arising from the same victims, offenders, and offenses being represented in multiple rows of the complex file structure. Each table in the report will identify the unit being counted (either victims, offenders, or offenses), and each cell in the table will represent the count of unique units falling into each category of interest (e.g., age groups, race or gender, weapon presence, etc.).

Initially, bivariate tables will examine variation in victim, offender, and offense circumstances across homicides, aggravated assaults, and robberies. For victims, victimization rates for each offense type will be calculated across demographic subgroups. The rates provide a valuable measure of the risk of victimization. Following these bivariate analyses, multivariate models of variation in offenses across Michigan counties will be estimated.

ANALYSES

Victims of Homicides, Aggravated Assaults, and Robberies

The following tables and figures display the distribution of victims of violent crimes across different demographic characteristics and offense types. In this portion of 2013 MICR data there were 37,681 unique victims across 32,056 unique incidents involving a violent crime. Table 2 displays the distribution of victims by age groupings.[2] The modal age category for victims of violent crime was age 19 to 24, accounting for 23 percent of violent victimizations within the data. Victims between the ages of 14 and 29 years old accounted for nearly half of all victimizations (46.4%). There was some variation in the distribution of victim age across offense types around this modal category, with this information presented both in Table 2 and in Figure 1. For homicides, aggravated assaults, and robberies alike, the modal victim age category was age 19 to 24. There was a larger proportion of victims of robberies falling towards the younger side of 19 to 24 (i.e., 14 to 18), relative to homicides and aggravated assaults. There were also more homicide and aggravated assault victims falling into the 25 to 29 category, relative to robberies. Additionally, there was a relatively larger proportion of robbery and homicide victims that were 53 or older, relative to aggravated assaults. However, Figure 2 indicates that there were more robbery victims between the ages of 50 to 60, and a larger proportion of homicide victims above age 70, relative to the other offenses.

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[2] Given the small number of victims missing their age information, no "unknown" or "missing" category is included in the tables.

Table 2. Victim Age by Offense Type (N = 37,681 Unique Victims)

Victim Age	Homicides	Aggravated Assaults	Robberies	Total
	n (%)	n (%)	n (%)	n (%)
13 and Under	41 (6.6%)	1,447 (5.4%)	307 (3.0%)	**1,795 (4.7%)**
14 to 18	43 (6.9%)	2,483 (9.3%)	1,395 (13.4%)	**3,921 (10.4%)**
19 to 24	123 (19.8%)	5,964 (22.4%)	2,509 (24.1%)	**8,596 (22.8%)**
25 to 29	93 (15.0%)	3,661 (13.8%)	1,236 (11.9%)	**4,990 (13.2%)**
30 to 35	86 (13.8%)	3,425 (12.9%)	1,057 (10.2%)	**4,568 (12.1%)**
36 to 42	62 (9.9%)	3,260 (12.2%)	925 (8.9%)	**4,247 (11.3%)**
43 to 52	86 (13.8%)	3,841 (14.4%)	1,313 (12.6%)	**5,240 (13.9%)**
53 and Older	87 (14.0%)	2,538 (9.5%)	1,648 (15.9%)	**4,273 (11.3%)**
Total	**621**	**26,619**	**10,390**	**37,630**

Note: 58 unique victims missing on age; Percentages are column percentages; Column percentages may not sum to 100.0 due to rounding.

Figure 1. Distribution of Victim Age by Offense Type

Table 3 contextualizes the counts of unique victims in Table 2 by comparing them against the age distribution of the Michigan population. Victimization rates per 10,000 residents are displayed for each age group across each offense type. Michigan residents age 19 to 24 showed the highest victimization rate for violent crime, as well as each individual offense type. The victimization rate for this age group was 2.8 times higher than the rate for all Michigan residents.

Indeed, victimization rates substantially higher than the overall rate for all Michigan residents were concentrated around residents between the ages of 14 and 35.

Table 3. Victimization Rates per 10,000 Residents: Victim Age by Offense Type (N = 37,681 Unique Victims)

	Homicides	**Aggravated Assaults**	**Robberies**	**Total Violence**
	Rate	Rate	Rate	Rate
13 and Under	0.2	8.2	1.7	**10.1**
14 to 18	0.6	34.3	19.3	**54.1**
19 to 24	1.5	72.6	30.5	**104.6**
25 to 29	1.6	62.1	21.0	**84.6**
30 to 35	1.2	49.7	15.3	**66.3**
36 to 42	0.7	36.4	10.3	**47.5**
43 to 52	0.6	26.0	8.9	**35.5**
53 and Older	0.3	8.7	5.7	**14.7**
Overall	**0.6**	**27.0**	**10.5**	**38.1**

Consistent with national trends, men were more common among victims of violent crime, comprising more than half of all violent crime victims (58%) (see Table 4). There was variation in the distribution of victim gender across the offense types, however, as women were relatively less frequent as victims of homicides and robberies, but relatively more common as victims of aggravated assaults.

Table 4. Victim Gender by Offense Type (N = 37,681 Unique Victims)

	Homicides	**Aggravated Assaults**	**Robberies**	**Total**
	n (%)	n (%)	n (%)	n (%)
Female	147 (23.5%)	11,834 (44.4%)	3,923 (37.8%)	**15,904 (42.2%)**
Male	479 (76.5%)	14,799 (55.6%)	6,459 (62.2%)	**21,737 (57.7%)**
Total	**626**	**26,633**	**10,382**	**37,641**

Note: 47 unique victims missing on gender; Percentages are column percentages; Column percentages may not sum to 100.0 due to rounding.
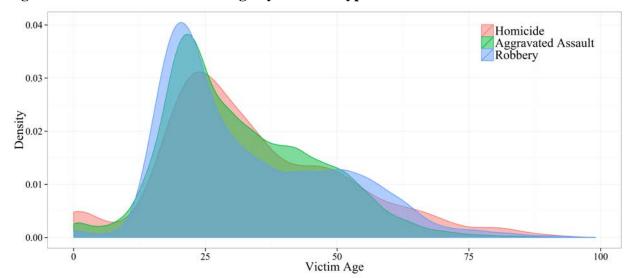
Comparing the victimization counts to population totals, the male violent victimization rate stood at approximately 1.4 times that of women (see Table 5). Disaggregating by offense

type, the largest difference appeared for homicides, whereas the homicide victimization rate for men was more than 3 times that of women. On the other hand, the smallest differential appeared for aggravated assaults, where the male victimization rate was 1.3 times that of women residents.

Table 5. Victimization Rates per 10,000 Residents: Victim Gender by Offense Type (N = 37,681 Unique Victims)

	Homicides	**Aggravated Assaults**	**Robberies**	**Total Violence**
	Rate	Rate	Rate	Rate
Female	0.3	23.5	7.8	**31.6**
Male	1.0	30.5	13.3	**44.8**
Overall	**0.6**	**27.0**	**10.5**	**38.1**

The next series of tables examine the distribution of violent crime across victim race and offense type. These analyses group racial categories as Black (African American), White, or Other race.[3] Across all violent crimes considered, African Americans comprised more than half of all victims (58 percent), and Whites comprised 42 percent of victims (see Table 6). Similar distributions of African American and White victims were observed for aggravated assaults and robberies, but African Americans made up a substantially larger proportion of homicide victims, accounting for nearly three-quarters of all homicides (74%). Victims falling into other racial groups were relatively rare in the data, comprising less than one percent of all victims of violent crime across the state.

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[3] The racial categories grouped into "other" include the categories Asian/Pacific Islander and American Indian or Alaskan Native. These categories were aggregated due to the relatively small number of victims that fall into them. Individuals of "unknown" race were not included in this category.

Table 6. Victim Race by Offense Type (N = 37,681 Unique Victims)

	Homicides	Aggravated Assaults	Robberies	Total
	n (%)	n (%)	n (%)	n (%)
Black	450 (73.9%)	14,613 (56.3%)	6,001 (59.6%)	**21,064 (57.5%)**
White	157 (25.8%)	11,245 (43.3%)	4,017 (39.9%)	**15,419 (42.1%)**
Other	2 (0.3%)	87 (0.3%)	57 (0.5%)	**146 (0.4%)**
Sub-Total	**609**	**25,945**	**10,075**	**36,629**
Unknown	20 (3.2%)	723 (2.7%)	315 (3.0%)	1,058 (2.8%)
Total	**629**	**26,668**	**10,390**	**37,687**

Note: Percentages are column percentages; Column percentages may not sum to 100.0 due to rounding.

Table 7 presents victimization rates across the racial categories of Michigan residents. Violent crime victimization rates for African Americans were substantially higher than for Whites or those in other racial categories. Indeed, the total violence victimization rate for Blacks was 7.5 times that of Whites, attributable to the fact that African Americans comprise 14 percent of the Michigan population but 58 percent of violent crime victims. The largest ratio difference between African American and White residents was for homicides, where the Black victimization rate was 16 times that of White residents.

Table 7. Victimization Rates per 10,000 Residents: Victim Race by Offense Type (N = 37,681 Unique Victims)

	Homicides	Aggravated Assaults	Robberies	Total Violence
	Rate	Rate	Rate	Rate
Black	3.2	104.4	42.9	**150.4**
White	0.2	14.4	5.1	**19.8**
Other	0.0	1.3	0.8	**2.1**
Overall	**0.6**	**27.0**	**10.5**	**38.1**

Note: Victims with unknown rate excluded from rate calculations.

The joint distribution of victim race and gender was also examined (see Table 8). In considering total counts of violent victimizations, African American males (31%) and African American females (25%) were the most common. White males accounted for one-quarter (25%) of violent crime victims. Together, these groups (Black males, Black females, and White males)

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accounted for 80 percent of all violent crime victims. Across the disaggregated crime types, several patterns were apparent. Relative to the overall distribution of violent crime victims, Black males comprised a substantially larger proportion of homicide victims. Additionally, Black females made up a larger proportion of aggravated assault victims than White males, which is striking given than men overall comprise a much larger proportion of aggravated assault victims (see Table 5).

Table 8. Victim Race and Gender by Offense Type (N = 37,681 Unique Victims)

	Homicides	Aggravated Assaults	Robberies	Total
	n (%)	n (%)	n (%)	n (%)
Black Female	77 (12.3%)	6,910 (25.9%)	2,401 (23.1%)	**9,388 (24.9%)**
White Female	63 (10.1%)	4,627 (17.4%)	1,417 (13.6%)	**6,107 (16.2%)**
Other Female	1 (0.2%)	36 (0.1%)	21 (0.2%)	**58 (0.2%)**
Unk. Female	6 (1.0%)	261 (1.0%)	84 (0.8%)	**351 (0.9%)**
Black Male	373 (59.6%)	7,701 (28.9%)	3,600 (34.7%)	**11,674 (31.0%)**
White Male	94 (15.0%)	6,615 (24.8%)	2,600 (25.0%)	**9,309 (24.7%)**
Other Male	1 (0.2%)	51 (0.2%)	36 (0.3%)	**88 (0.2%)**
Unk. Male	11 (1.8%)	432 (1.6%)	223 (2.1%)	**666 (1.8%)**
Total	**626**	**26,633**	**10,382**	**37,641**

Note: 47 unique victims missing on gender; Percentages are column percentages; Column percentages may not sum to 100.0 due to rounding.

Victimization Rates by Subgroup Interactions

To further explore the nature of violent victimization in the 2013 MICR data, victimization rates for age, sex, and race combinations were calculated. For the purposes of these analyses, "young victims" were defined as those victims between the ages of 15 and 24, when the risk for violent victimization has been noted to be significantly higher (Truman & Langton, 2014), particularly since the mid-1980s onwards (Dahlberg, 1998). Specifically, a figure is produced comparing the violent victimization rate for all Michigan residents, young men and women, race and gender combinations, and then young race and gender combinations. A

separate figure is produced for homicides, aggravated assaults, robberies, and total violence – resulting in four figures in all.

In general, Figures 2 through 5 demonstrate the interaction between age, race, and gender in producing variation in violent crime victimization rates. For instance, the overall homicide rate per 10,000 residents for the State of Michigan is 0.6. The homicide victimization rate for young males is 3 times the rate for all residents (1.8 per 10,000), and the rate for young Black males is 15.5 times that (9.3 per 10,000). These estimates are consistent with national trends, placing homicide as the leading cause of death among Black males age 15 to 24 (Centers for Disease Control, 2014). This pattern manifests across homicides, aggravated assaults, and robberies. For each of the violent crime types, the victimization rate for young Black males is the highest among all age, race, and gender combinations. The aggravated assault rate for young Black women is an exception, as it is nearly equivalent to that of young Black males (197 versus 200 per 10,000).
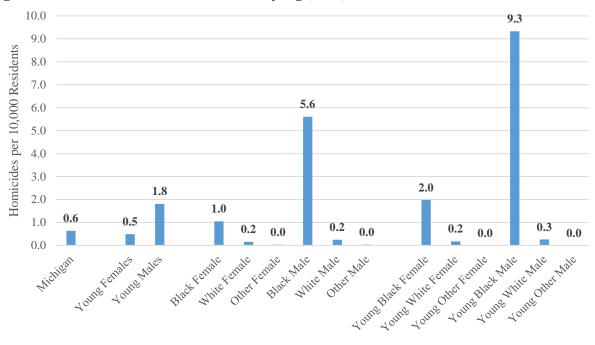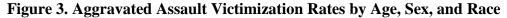
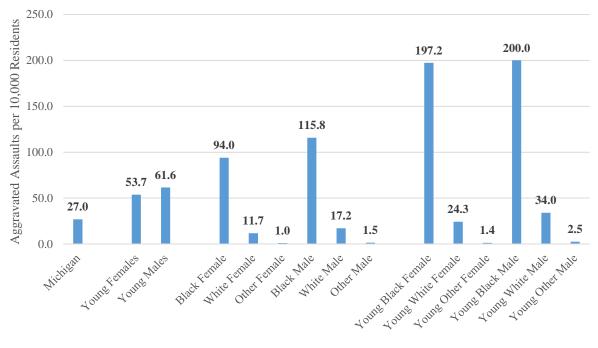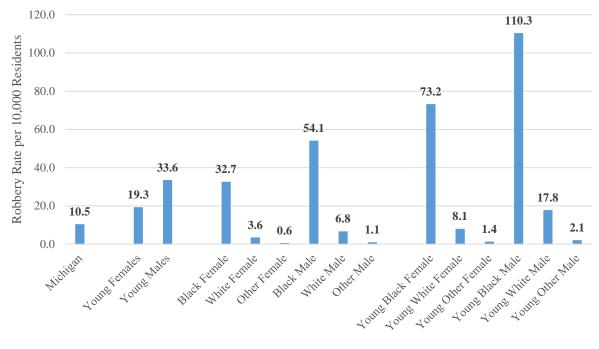**Figure 2. Homicide Victimization Rates by Age, Sex, and Race**

Figure 3. Aggravated Assault Victimization Rates by Age, Sex, and Race

Aggravated Assaults per 10,000 Residents

Category	Rate
Michigan	27.0
Young Females	53.7
Young Males	61.6
Black Female	94.0
White Female	11.7
Other Female	1.0
Black Male	115.8
White Male	17.2
Other Male	1.5
Young Black Female	197.2
Young White Female	24.3
Young Other Female	1.4
Young Black Male	200.0
Young White Male	34.0
Young Other Male	2.5

Figure 4. Robbery Victimization Rates by Age, Sex, and Race

Robbery Rate per 10,000 Residents

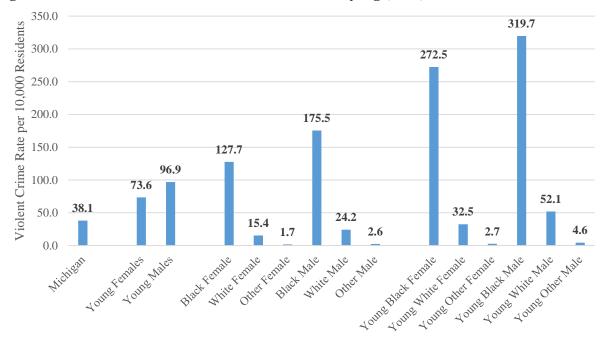| Category	Rate
Michigan	10.5
Young Females	19.3
Young Males	33.6
Black Female	32.7
White Female	3.6
Other Female	0.6
Black Male	54.1
White Male	6.8
Other Male	1.1
Young Black Female	73.2
Young White Female	8.1
Young Other Female	1.4
Young Black Male	110.3
Young White Male	17.8
Young Other Male	2.1

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Figure 5. Total Violent Crime Victimization Rates by Age, Sex, and Race

Perpetrators of Homicides, Aggravated Assaults, and Robberies

In the 2013 MICR data there were 35,813 unique offenders committing 32,183 offenses across 32,056 unique incidents. Due to the fact that offenders are not always identified and apprehended in a given incident, there is considerably more missing data among the offender characteristics, relative to the victims of violent crime. The following tables will describe the characteristics of known offenders of homicides, aggravated assaults, and robberies in the 2013 MICR data.

Offenders of violent crime were most often young adults between the ages of 19 and 24 (29%) (see Table 9). Offenders were also consistently one age group above or below this category, with 59 percent of all offenders being identified as between the ages of 14 and 29. There was considerable variation across individual offense types. Relative to aggravated assaults and homicides, perpetrators of robberies were younger, with more offenders between the ages of

14 and 18. Additionally, 81 percent of robbery offenders were between the ages of 14 and 29, relative to 55 percent of homicide offenders, and 50 percent of aggravated assault offenders.

Table 9. Offender Age by Offense Type (N = 35,813 Unique Offenders)

	Homicides	Aggravated Assaults	Robberies	Total
	n (%)	n (%)	n (%)	n (%)
13 and Under	2 (0.0%)	502 (2.3%)	80 (0.9%)	**584 (1.9%)**
14 to 18	35 (8.5%)	2,315 (10.4%)	2,360 (26.6%)	**4,710 (15.0%)**
19 to 24	139 (33.6%)	5,437 (24.5%)	3,661 (41.3%)	**9,237 (29.3%)**
25 to 29	53 (12.8%)	3,377 (15.2%)	1,165 (13.1%)	**4,595 (14.6%)**
30 to 35	53 (12.8%)	3,312 (14.9%)	857 (9.7%)	**4,222 (13.4%)**
36 to 42	42 10.1%)	2,626 (11.8%)	355 (4.0%)	**3,023 (9.6%)**
43 to 52	47 (11.4%)	2,873 (12.9%)	268 (3.0%)	**3,188 (10.1%)**
53 and Older	43 (10.4%)	1,744 (7.9%)	126 (1.4%)	**1,913 (6.1%)**
Sub-Total	**414**	**22,186**	**8,872**	**31,472**
Unknown	96 (18.8%)	1,809 (7.5%)	2,601 (22.7%)	4,506 (12.5%)
Total	**510**	**23,995**	**11,473**	**35,978**

Note: Percentages are column percentages; Column percentages may not sum to 100.0 due to rounding.

Identified offenders of violent crime are predominantly male. Men comprise four-fifths (80%) of all unique offenders. Across the individual offense types, women make up a relatively smaller proportion of robbery offenders (6%) and a relatively larger proportion of aggravated assault offenders (26%).

Table 10. Offender Gender by Offense Type (N = 35,813 Unique Offenders)

	Homicides	Aggravated Assaults	Robberies	Total
	n (%)	n (%)	n (%)	n (%)
Female	54 (11.1%)	6,161 (26.1%)	663 (6.0%)	**6,878 (19.6%)**
Male	434 (88.9%)	17,434 (73.9%)	10,376 (94.0%)	**28,244 (80.4%)**
Sub-Total	**488**	**23,595**	**11,039**	**35,122**
Unknown	21 (4.1%)	399 (1.7%)	432 (3.8%)	852 (2.4%)
Total	**509**	**23,994**	**11,471**	**35,974**

Note: Percentages are column percentages; Column percentages may not sum to 100.0 due to rounding.

Table 11 displays the racial characteristics of identified violent crime offenders. African Americans comprise the majority of identified offenders, making up more than two-thirds (71%). Robbery offenders were disproportionately African American, as 89 percent of offenders were identified as being Black. On the other hand, the racial distribution of aggravated assault offenders was less polarized, as Whites comprised 37 percent of unique offenders.

Table 11. Offender Race by Offense Type (N = 35,813 Unique Offenders)

	Homicides	Aggravated Assaults	Robberies	Total
	n (%)	n (%)	n (%)	n (%)
Black	362 (75.7%)	14,340 (62.6%)	9,572 (88.9%)	**24,274 (71.0%)**
White	110 (23.0%)	8,452 (36.9%)	1,175 (10.9%)	**9,737 (28.5%)**
Other	6 (1.3%)	130 (0.6%)	20 (0.2%)	**156 (0.5%)**
Sub-Total	**478**	**22,922**	**10,767**	**34,167**
Unknown	32 (6.2%)	1,073 (4.5%)	706 (6.2%)	1,811 (5.0%)
Total	**510**	**23,995**	**11,473**	**35,978**

Note: Percentages are column percentages; Column percentages may not sum to 100.0 due to rounding.

The joint distribution of offender race and gender is displayed in Table 12. Unlike violent crime victim race and gender patterns, where African American males and females, and White males accounted for similar proportions of victims, the identified offenders of violent crimes are more tightly concentrated. Black males accounted for more than half (56%) of identified violent crime offenders. White males represented the second highest total, comprising 22 percent of unique violent crime offenders. In comparing the racial and gender composition of the individual offense types, African American males accounted for the majority of robbery offenders (82%), and for a relatively smaller proportion of aggravated assault offenders (43%), although still represented the modal category. White males consistently comprised the second most frequent race/gender combination among offenders.

Table 12. Offender Race and Gender by Offense Type (N = 35,813 Unique Offenders)

	Homicides	Aggravated Assaults	Robberies	Total
	n (%)	n (%)	n (%)	n (%)
Black Female	31 (6.4%)	4,164 (17.6%)	455 (4.1%)	**4,660 (13.3%)**
White Female	22 (4.5%)	1,821 (7.7%)	185 (1.7%)	**2,028 (5.8%)**
Other Female	1 (0.2%)	31 (0.1%)	3 (<0.1%)	**35 (0.1%)**
Unk. Female	0 (0.0%)	145 (0.6%)	20 (0.2%)	**165 (0.5%)**
Black Male	331 (67.8%)	10,154 (43.0%)	9,051 (82.0%)	**19,536 (55.6%)**
White Male	88 (18.0%)	6,626 (28.1%)	981 (8.9%)	**7,695 (21.9%)**
Other Male	4 (0.8%)	99 (0.4%)	16 (0.1%)	**119 (0.3%)**
Unk. Male	11 (2.3%)	555 (2.4%)	328 (3.0%)	**894 (2.5%)**
Sub-Total	**488**	**23,595**	**11,039**	**35,132**
Unk. Race & Gender	22 (4.0%)	400 (1.6%)	434 (3.9%)	856 (2.3%)
Total	**510**	**23,995**	**11,473**	**35,998**

Note: Percentages are column percentages; Column percentages may not sum to 100.0 due to rounding.

Circumstances of Homicides, Aggravated Assaults, and Robberies

This section of the report will detail important circumstances of violent offenses. The information presented will cover joint victim and offender characteristics, such as the relationship between victim age and offender age, and the relationship between the victims and offenders of violent offenses. Additionally, patterns in the time and location of offenses will be examined.

Victim and Offender Age Pairings

Figures 6 and 7 display the average ages of victims and offenders given the age categories of victims and offenders. For instance, Figure 6 shows the average age of homicide, aggravated assault, and robbery victims for each offender age category. The results in Figure 6 suggest that younger offenders tend to offend against younger victims on the average, and as offenders become older, the average age of victims increases. Similar patterns are observed for homicides, aggravated assaults, and robberies.

Figure 7 produces the same data but for the average age of offenders given the victim age category. On the average, offenders tend to be younger than victims of violent offenses, with robbery offenders being the youngest. As victim age increases, the average offender age increases as well, particularly for homicides and aggravated assaults, which demonstrate a near identical pattern. The average age of robbery offenders do not increase in a similar pattern – the youngest victims have the youngest average robbery offenders, but the average age of robbery offenders levels off after the victim reaches 25 to 29. After this point the average age of robbery offenders remains relatively stable, despite increases in victim age.
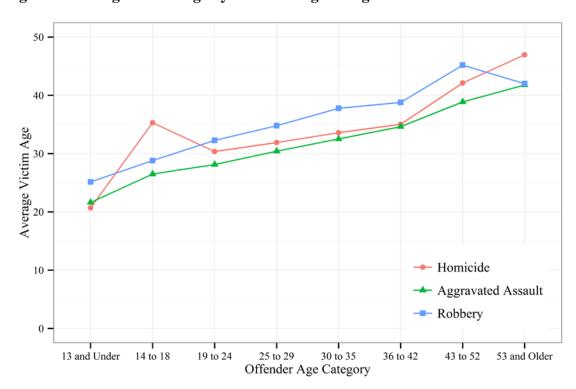
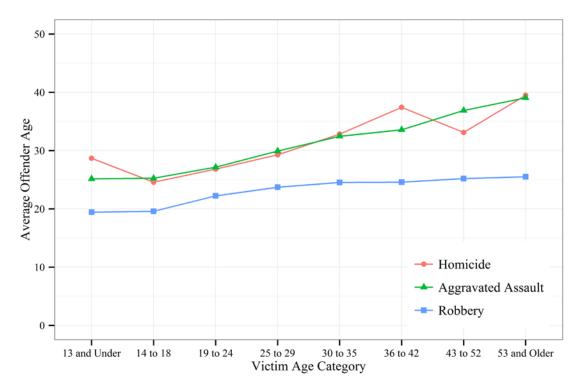**Figure 6. Average Victim Age by Offender Age Categories**

Figure 7. Average Offender Age by Victim Age Categories

Victim and Offender Relationship

Table 13 displays the identified relationships of the victims of violent crimes to the offenders of violent crimes across 32,183 unique violent offenses. For overall violent crime, the victim-offender relationship was bi-modal, with a similar frequency of offenses between acquaintances (21%) and strangers (21%). Approximately 11 percent of offenses were between family members, with a larger proportion of victims that were blood-relatives of the offender (7%), as opposed to non-blood relatives (3%). Nearly one-fifth (19%) of offenses involved victims that are or were in an intimate relationship with their offender.

There was some variation in the victim-offender relationship across individual crime types. Very few victims of robbery were related to their offender by family. Rather, the majority of robbery victims did not know their offender (47%). Homicides and aggravated assaults were more prevalent between victims who knew their offenders in some capacity. Similar proportions

of victims were either murdered or assaulted by acquaintances (28% and 26%, respectively), but a larger proportion of aggravated assault victims were in or used to be in an intimate relationship with their offender (25%).

Table 13. Relationship of Victim to the Offender (N = 32,183 Unique Offenses)

	Homicides	Aggravated Assaults	Robberies	Total
	n (%)	n (%)	n (%)	n (%)
Family				
Blood Relative	34 (7.9%)	2,198 (9.8%)	33 (0.4%)	**2,265 (7.3%)**
Non-Blood	12 (2.8%)	968 (4.3%)	35 (0.4%)	**1,015 (3.3%)**
Intimate Partner				
Current	43 (10.0%)	4,158 (18.5%)	83 (1.0%)	**4,284 (13.8%)**
Former	10 (2.3%)	1,443 (6.4%)	90 (1.1%)	**1,543 (5.0%)**
Acquaintance	118 (27.5%)	5,833 (25.9%)	712 (8.8%)	**6,663 (21.5%)**
Other Known	25 (5.8%)	2,428 (10.8%)	369 (4.6%)	**2,822 (9.1%)**
Stranger	57 (13.3%)	2,731 (12.1%)	3,777 (46.7%)	**6,565 (21.2%)**
Unknown	130 (30.3%)	2,746 (12.2%)	2,992 (37.0%)	**5,868 (18.9%)**
Sub-Total	**429**	**22,505**	**8,091**	**31,025**
Missing	176 (29.1%)	1,929 (7.9%)	1,285 (13.7%)	3,390 (9.9%)
Total	**605**	**24,434**	**9,376**	**34,415**

Note: Percentages are column percentages; Column percentages may not sum to 100.0 due to rounding.

Weapon Use

In more than three-quarters (76%) of violent offenses were offenders armed with some sort of weapon (Table 14). Firearms were the most frequently present in an offense (35%), followed by melee weapons, such as blades or blunt objects (29%).[4] There was considerable variation in weapon use across the individual violent offense types. Firearms were involved in more than three-quarters (78%) of homicides, and only in 7 percent of homicides was the offender unarmed. Firearms were relatively less frequent among aggravated assault offenders, who were most often armed with a melee weapon (37%). Robbery offenders were evenly split between the use of a firearm (49%) and being unarmed (41%).

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[4] Other weapons included the use of motor vehicles, poison, fire, or explosive devices.

Table 14. Weapon Use by Offense Type (N = 32,183 Unique Offenses)

	Homicides	Aggravated Assaults	Robberies	Total
	n (%)	n (%)	n (%)	n (%)
Firearm	411 (77.5%)	6,070 (27.8%)	4,353 (49.9%)	**10,834 (34.9%)**
Melee Weapon	58 (10.9%)	8,154 (37.4%)	634 (7.3%)	**8,846 (28.5%)**
Other Weapon	26 (4.9%)	3,792 (17.4%)	172 (2.0%)	**3,990 (12.8%)**
Unarmed	35 (6.6%)	3,796 (17.4%)	3,558 (40.8%)	**7,389 (23.8%)**
Sub-Total	**530**	**21,812**	**8,717**	**31,059**
Unknown	44 (7.6%)	445 (2.0%)	265 (3.0%)	754 (2.4%)
Total	**577**	**22,257**	**8,982**	**31,813**

Note: Percentages are column percentages; Column percentages may not sum to 100.0 due to rounding.

Victim Injury Severity

Victims were reported sustaining variable degrees of injury. The MICR reports discrete trauma sustained by victims. Consistent with previous analyses of NIBRS data, particular forms of trauma were considered as minor or severe (e.g., Tillyer & Tillyer, 2014).[5] The injury severity categories utilized were no injury, minor injury, severe injury, and fatal injury. More than half of the unique victims in the MICR data were recorded as having sustained no injury (53%). More than one-third (36%) were reported as sustaining a minor injury, with 9 percent receiving a severe injury, and 2 percent receiving a fatal injury (see Table 15). There was some observed variation in victim injury severity across offense types. By definition, all homicide victims sustained a fatal injury. Severe injuries were more prevalent among victims of aggravated assaults (12%) relative to robbery victims (3%). Additionally, robbery victims were more likely to sustain no apparent injury during the event (74%).

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[5] Specifically, "apparent minor injury" and "other major injury" were coded as minor injuries, and "broken bones," "severe laceration," "loss of teeth," "unconsciousness," and "possible internal injury" were coded as severe injuries. It is recognized that this approach to defining and measuring victim injury severity is not ideal (Grommon & Rydberg, forthcoming), but represents the best compromise given the structure of the data.

Table 15. Victim Injury Severity by Offense Type (N = 37,681 Unique Victims)

	Homicides	Aggravated Assaults	Robberies	Total
	n (%)	n (%)	n (%)	n (%)
No Injury	0 (0.0%)	12,291 (46.1%)	7,676 (73.9%)	**19,967 (53.0%)**
Minor Injury	0 (0.0%)	11,178 (41.9%)	2,426 (23.4%)	**13,604 (36.1%)**
Severe Injury	0 (0.0%)	3,199 (12.0%)	282 (2.7%)	**3481 (9.2%)**
Fatal Injury	629 (100.0%)	0 (0.0%)	0 (0.0%)	**629 (1.7%)**
Total	**629**	**26,668**	**10,384**	**37,681**

Note: Percentages are column percentages; Column percentages may not sum to 100.0 due to rounding.

Clearance by Arrest

Not all offenses resulted in the arrest of a suspect. The clearance rates for homicides, aggravated assaults, and robberies by arrest are displayed in Table 16.[6] In considering the total violent offenses in these data, 28 percent resulted in the arrest of a suspect. Homicides and aggravated assaults showed slightly higher clearance rates (34% for each), compared to robberies which had the lowest clearance rate, at 13 percent.

Table 16. Arrests by Offense Type (N = 32,183 Unique Offenses)

	Homicides	Aggravated Assaults	Robberies	Total
	n (%)	n (%)	n (%)	n (%)
Arrest Made	210 (34.5%)	7,917 (34.1%)	1,242 (13.3%)	**9,369 (28.3%)**
No Arrest	398 (65.5%)	15,299 (65.9%)	8,080 (86.7%)	**23,777 (71.7%)**
Total	**608**	**23,216**	**9,322**	**33,146**

Note: Percentages are column percentages; Column percentages may not sum to 100.0 due to rounding.

Time and Location

Patterns in the times and locations of violent offenses are examined in Tables 17 and 18. Offenses were grouped into time of day categories, including early morning (2:00am to 5:59am), morning (6:00am to 9:59am), midday (10:00am to 1:59pm), afternoon (2:00pm to 5:59pm),

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[6] It should be noted that these figures underestimate the clearance rates for each offense type, relative to Michigan State Police statistics. These differences are likely due to the data reduction process in which the subsample of total MICR cases were selected. The authors of this report do not claim that these are the actual arrest rates for each offense type, but simply the arrest rates that were observed within the current subsection of MICR data.

evening (6:00pm to 9:59pm), and late night (10:00pm to 1:59am). These time categories are

similar to those used in previous examinations of NIBRS data (Weber, 2012). Violent offenses

were primarily reported in the evening (23%) and late night (24%) (i.e., between 6:00pm and

1:59am). Violent offenses were least likely to be reported in the morning hours (7%). These

patterns were largely consistent across offense types, with the exception of homicides. Slightly

larger proportions of homicides were reported in the early morning (18%) and fewer homicides

were reported in the afternoon (13%), relative to aggravated assaults and robberies.

Table 17. Incident Time by Offense Type (N = 32,183 Unique Offenses)

	Homicides	**Aggravated Assaults**	**Robberies**	**Total**
	n (%)	n (%)	n (%)	n (%)
Early Morning	101 (17.6%)	2,702 (12.6%)	1,016 (11.9%)	**3,819 (12.5%)**
Morning	50 (8.7%)	1,583 (7.4%)	533 (6.2%)	**2,166 (7.1%)**
Midday	83 (14.5%)	3,056 (14.2%)	1,212 (14.2%)	**4,351 (14.2%)**
Afternoon	72 (12.6%)	4,109 (19.1%)	1,783 (20.9%)	**5,964 (19.5%)**
Evening	120 (20.9%)	4,985 (23.2%)	1,964 (23.0%)	**7,069 (23.1%)**
Late Night	147 (25.6%)	5,035 (23.5%)	2,030 (23.8%)	**7,212 (23.6%)**
Sub-Total	**573**	**21,470**	**8,538**	**30,581**
Unknown	11 (1.9%)	1,147 (5.1%)	444 (4.9%)	1,602 (5.0%)
Total	**584**	**22,617**	**8,982**	**32,183**

Note: Early Morning = 2:00am to 5:59am, Morning = 6:00am to 9:59am, Midday = 10:00am to 1:59pm,
Afternoon = 2:00pm to 5:59pm, Evening = 6:00pm to 9:59pm, Late Night = 10:00pm to 1:59am;
Percentages are column percentages; Column percentages may not sum to 100.0 due to rounding.

Table 18 displays the distribution of violent offenses across particular location types.

These locations are grouped as residence, public-outdoors areas (e.g., offenses occurring in the

street, public areas, or wooded areas), businesses (e.g., offenses occurring within stores),

government buildings, schools, or transportation hubs (e.g., offenses occurring within jails,

public or private schools, bus stops or airports), and other locations (e.g., any known location

that does not fall into any of the aforementioned categories).

The most frequent location for violent offenses to be reported is in a residence, comprising just under half of all violent offenses (46%). The most prevalent location for violent offenses to occur is in public or outdoors areas (39%), suggesting that the majority of violent offenses occur either in a home or public areas outside of a home, but not some other building enclosed location. Across the individual violent offense types, slightly more homicides and aggravated assaults took place within a residence (51% and 58%, respectively). Robberies were much more frequent in public/outdoors locations (62%) and businesses (18%), and less frequent within residences (15%).

Table 18. Incident Location by Offense Type (N = 32,183 Unique Offenses)

	Homicides	**Aggravated Assaults**	**Robberies**	**Total**
	n (%)	n (%)	n (%)	n (%)
Residence	298 (51.3%)	13,099 (58.1%)	1,358 (15.1%)	**14,755 (46.0%)**
Public-Outdoors	211 (36.3%)	6,757 (30.0%)	5,582 (62.2%)	**12,550 (39.1%)**
Business	51 (8.8%)	1,690 (7.5%)	1,605 (17.9%)	**3,346 (10.4%)**
Government / School / Transport Hub	11 (1.9%)	720 (3.2%)	243 (2.7%)	**974 (3.0%)**
Other Location	10 (1.7%)	289 (1.3%)	186 (2.1%)	**485 (1.5%)**
Sub-Total	**581**	**22,555**	**8,974**	**32,110**
Unknown	3 (0.5%)	62 (0.2%)	8 (0.1%)	73 (0.2%)
Total	**584**	**22,617**	**8,982**	**32,183**

Note: Percentages are column percentages; Column percentages may not sum to 100.0 due to rounding.

Violent offenses were observed to vary jointly across time and location. Figure 8 displays frequencies of homicides, aggravated assaults, and robberies at each of the location types at the different times of day. The earliest offenses are displayed in the lightest blue, while the later offenses are displayed in the darker blue.
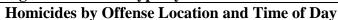
Several patterns are apparent in Figure 8. Within residences, homicides increase in frequency as the time of day progresses, and a similar pattern is observed among homicides at businesses. Homicides in public areas are most frequent in the late night and early morning
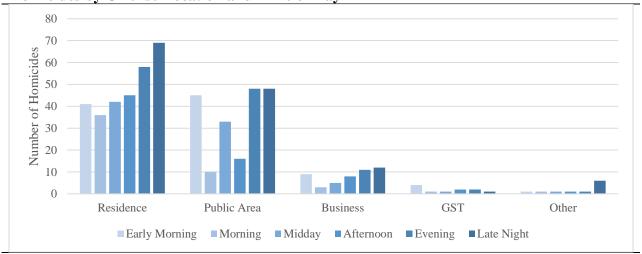
hours, and less frequent during daylight hours. Aggravated assaults are reported in similar patterns across residences and public areas, whereas the frequency of reporting increases moving into the late night hours. As observed in Table 18 (above), robberies are most frequent in public areas, and their frequency in this location type increases into the late hours of the night. Robberies in businesses demonstrate a more uniform distribution, with relatively equivalent frequencies across the midday to late night hours.
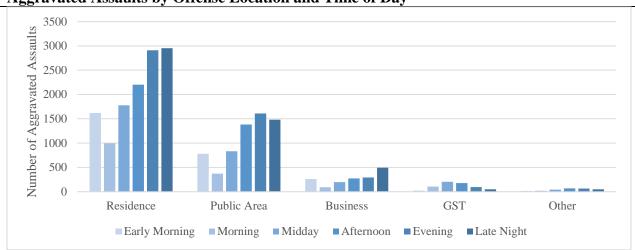
Figure 9 displays similar variation in the temporal nature of violent offending, indicating the frequency of offenses by time of day and the day of the week. In general across the days of the week, for each offense type the frequency of reported offenses is the lowest during daylight hours and increases as time progresses into the late night. The weekends (Saturdays and Sundays) are an exception to this trend, as there is an increased frequency of offenses in the early morning hours, possibly following the end of alcohol trading hours. Relative to aggravated assaults and robberies, homicides also display more variable patterns in offense temporality, potentially due to the relatively smaller number of total incidents.
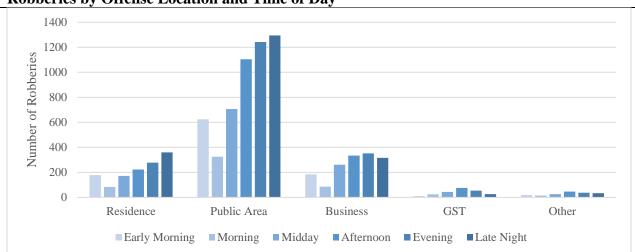
Figure 8. Offense Type by Location and Time of Day

Homicides by Offense Location and Time of Day

Aggravated Assaults by Offense Location and Time of Day
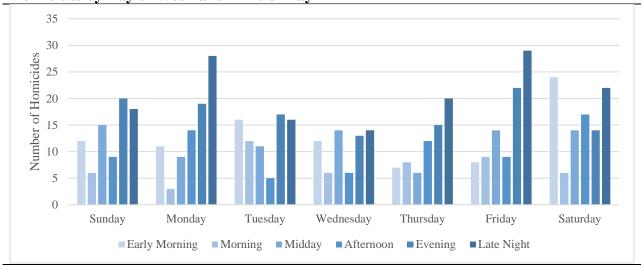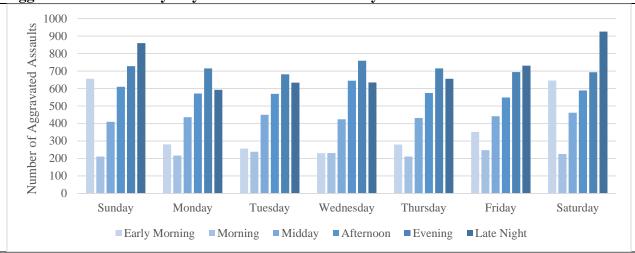

Robberies by Offense Location and Time of Day

Note: GST = Government Building, School, Transportation Hub

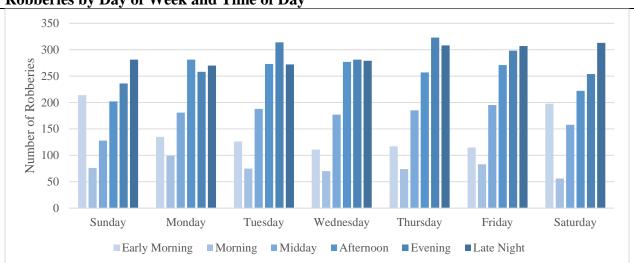**Figure 9. Offense Type by Day of Week and Time of Day**

Homicides by Day of Week and Time of Day

Aggravated Assaults by Day of Week and Time of Day

Robberies by Day of Week and Time of Day

Regional Variation and Correlates of Homicides, Aggravated Assaults, and Robberies

An explicit purpose of this report is to explore regional variation in violent victimization and offending across Michigan counties. Using the **dplyr** package in R, it was possible to easily group the MICR offenses by the county in which they were reported, counting the number of unique victims of violent crime across each. It was then possible to pair the victimization totals in each county to the total population to calculate the victimization rate per 10,000 residents.

Table 19 displays the counties with the top ten highest victimization rates for homicides, aggravated assaults, and robberies. Concerning homicides, Wayne County had the highest homicide rate of the Michigan counties in 2013, at 1.96 per 10,000 residents. This is due to the county containing the city of Detroit, which accounts for a sizable proportion of total homicides. On the other hand, Saginaw and Genesee have similarly high homicide rates, yet are much smaller cities, each with a population one-tenth and one-fifth as large, respectively.

It is worth noting that the small relative population of some Michigan counties resulted in their having a relatively high homicide rate with only a small number of homicides. For instance, Crawford County reported a single homicide in 2013, resulting in the fourth highest homicide rate in the state (0.70 homicides per 10,000 residents). In fact, Michigan homicides were primarily concentrated in Wayne, Saginaw, and Genesee Counties. There were 42 counties without a single homicide (51%), 20 counties reporting a single homicide (24%), and a total of 51 counties with 5 or fewer homicides (61%).

For aggravated assaults and robberies, Wayne also accounts for the highest relative victimization rate – particularly for robberies, where it is nearly double the rate of the next highest county (Genesee). Across all three offense types, there are six counties that appear in the top 10 for each – Wayne, Saginaw, Genesee, Ingham, Muskegon, and Kalamazoo. Of these

counties, Wayne, Genesee, and Saginaw are particularly noteworthy for their historical levels of

violent crime extending back into the 1980s (Matthews, 1997). For instance, in the 2013 MICR

data these three counties comprise 74 percent of all homicides, 54 percent of all aggravated

assaults, and 72 percent of all robberies – further suggesting that violent crime is heavily

concentrated into relatively small geographic areas.

Table 19. Counties with 10 Highest Homicide, Aggravated Assault, and Robbery Victimization Rates per 10,000 Residents.

	Homicides			Aggravated Assaults			Robberies		
Rank	County	Count	Rate	County	Count	Rate	County	Count	Rate
1	Wayne	378	1.96	Wayne	11,543	59.94	Wayne	6,557	34.05
2	Saginaw	31	1.55	Saginaw	1,107	55.34	Genesee	769	18.13
3	Genesee	58	1.37	Mecosta	199	47.64	Ingham	382	13.76
4	Crawford	1	0.70	Genesee	1,833	44.41	Dickinson	34	12.74
5	Ionia	4	0.64	Oscoda	34	39.05	Kalamazoo	280	11.27
6	Gogebic	1	0.63	Calhoun	510	37.61	Saginaw	189	9.45
7	Benzie	1	0.58	Ingham	962	34.65	Muskegon	141	8.11
8	Ingham	15	0.54	Kalamazoo	758	30.51	Berrien	124	7.33
9	Muskegon	8	0.46	Muskegon	481	27.65	Calhoun	89	6.56
10	Kalamazoo	11	0.44	Crawford	38	26.75	Macomb	506	6.09

Table 20 expands on the analysis in Table 19 (above) by examining regional variation in

firearm violence across counties. The results suggest that firearm violence is particularly

concentrated into a small number of counties. As with total homicides, Wayne, Saginaw, and

Genesee Counties showed the highest rates of firearm homicide victimization. There were 58

counties (70%) that had zero firearm homicides, and 75 counties (90%) had 5 or fewer such

homicides during 2013.

Wayne, Genesee, and Saginaw Counties had the top 3 to 4 highest firearm violence

victimization rates across each individual offense type. These three counties accounted for 81

percent of all firearm homicides, 70 percent of firearm aggravated assaults, and 78 percent of

firearm robberies. In this sense, while these three counties already comprised a disproportionate

amount of total violent victimizations, firearm violence is even more concentrated within these three key counties.

Table 20. Counties with 10 Highest Firearm Homicide, Aggravated Assault, and Robbery Rates per 10,000 Residents.

	Homicides			Aggravated Assaults			Robberies		
Rank	County	Count	Rate	County	Count	Rate	County	Count	Rate
1	Wayne	296	1.54	Wayne	4,331	22.49	Wayne	3,709	19.26
2	Saginaw	23	1.15	Saginaw	441	22.04	Genesee	427	10.07
3	Genesee	43	1.01	Genesee	823	19.41	Ingham	157	5.65
4	Ionia	3	0.48	Calhoun	119	8.77	Saginaw	102	5.10
5	Manistee	1	0.41	Muskegon	148	8.51	Kalamazoo	105	4.23
6	Roscommon	1	0.41	Crawford	12	8.45	Muskegon	66	3.79
7	Iosco	1	0.39	Oscoda	7	8.04	Berrien	58	3.61
8	Mason	1	0.35	Ingham	205	7.38	Macomb	228	2.74
9	Muskegon	6	0.34	Kalamazoo	158	6.36	Oakland	318	2.64
10	Clare	1	0.33	Berrien	89	5.55	Baraga	2	2.32

The next section of the report will analyze these three counties more in depth by examining variation in the violent crime victimization rates among age, race, and gender subgroups within these counties.

Violent Crime Victimization Rates among Young Men in High Rate Counties – Wayne, Genesee, and Saginaw

Analyses of victimization rates earlier in the report suggested that among Michigan residents, violent crime victimization is more common among young people, African Americans, and men. Additionally, across all Michigan counties, the violent crime victimization rate was found to be substantially higher for particular combinations of these subgroups, particularly young, Black, males. The following Figures examine the victimization rate among young men in the high victimization rate counties of Wayne, Genesee, and Saginaw, in comparison to victimization rates for the same groups across the State of Michigan.

Homicide victimization rates for young males are displayed in Figure 10. The results suggest that the homicide victimization rates for young males (age 15 to 24) is nearly twice that of all Michigan males, and homicide victimization rate for young, Black, males across Michigan is more than 9 times higher. The homicide victimization rates for young, Black, males in Wayne, Genesee, and Saginaw Counties are displayed in comparison. The rates in Genesee and Saginaw, relatively smaller counties with extremely high rates of violence, were more than double the homicide victimization rate among young, Black, males across all of Michigan, and more than 20 times that of all males across Michigan.
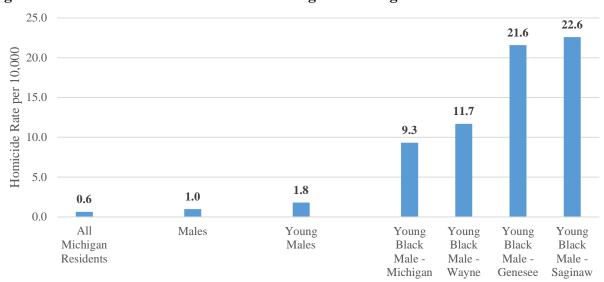
Figure 10. Homicide Victimization Rate: Young Men in High Rate Counties

Figure 11 displays the aggravated assault victimization rate among young males across Michigan and in the high rate counties. Similar to the patterns observed for homicides, the aggravated assault victimization rates were substantially higher among young, Black, males in the high rate counties. In Saginaw County in particular, the victimization rate among young, Black, males was more than 12 times that of all male Michigan residents.
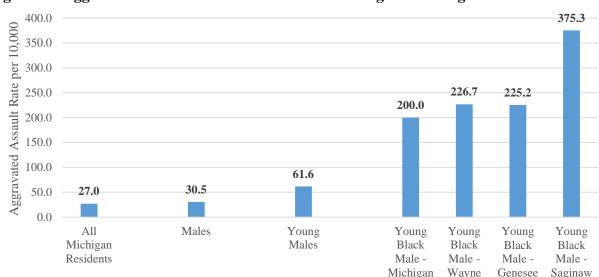
Figure 11. Aggravated Assault Victimization Rate: Young Men in High Rate Counties

The robbery victimization rates demonstrated relatively more variability across the high rate counties. For instance, the robbery victimization rate among young, Black, males in Wayne County was higher than in Genesee, and about three times that of Saginaw. This suggests that each high rate county presents specific crime problems that may be amenable to intervention.
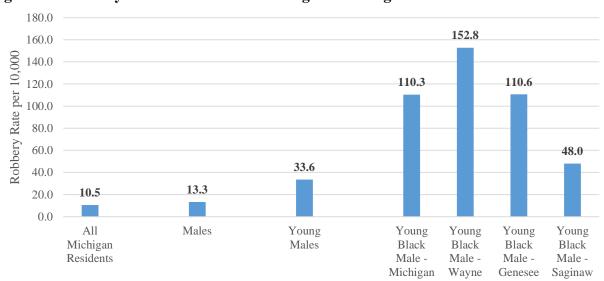
Figure 12. Robbery Victimization Rate: Young Men in High Rate Counties

Finally, Figure 13 presents the victimization rates across all violent crime types combined. These patterns of overall violence indicate that while young, Black, men across

Michigan are at a substantially higher risk of violent victimization, the rates within Wayne, Genesee, and Saginaw Counties present particularly problematic rates of violent victimization.
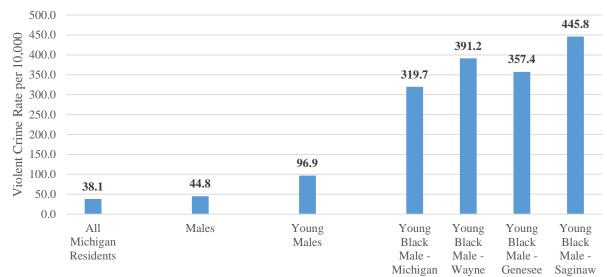
Figure 13. Total Violent Crime Victimization Rate: Young Men in High Rate Counties

Multivariate Models of Violent Crime Victimizations across Michigan Counties

The previous analyses suggest that violent offending and victimization are highly concentrated within several high rate counties. In order to gain a better understanding of factors which contribute to variation in violent victimization across the all counties a series of multivariate negative binomial regression models were estimated. These models examine the relationship between counts of violent victimizations and the distributions of a set of covariates in order to state how those covariates contribute the expected count of violent victimizations in a given county (Gardner, Mulvey, & Shaw, 1995).

The several county-level covariates were constructed using data from the 2010 U.S. Census and the Uniform Crime Reports (UCR). These covariates are described in Table 21. The variables *population density* and *metropolitan county* were included to capture variation violent victimizations across urban and rural locations. The variables *ethnic heterogeneity, concentrated*

disadvantage, and *economic hardship* represent traditional measures of social disorganization which have been found to be ecological correlates of violent victimization (Land, McCall, & Cohen, 1990; Lauritsen, 2001; Pratt & Cullen, 2005). Finally, *police density* is included as a measure of law enforcement strength in the county, including totals of local, county, and state officers allocated to the county.

Table 21. County Covariates used in Multivariate Modeling

Covariate	Description	Source
Population Density	Total population divided by square miles of land area.	US Census (2010)
Metropolitan County	Metro County = 1; Non-Metro County = 0.	Uniform Crime Reports
Ethnic Heterogeneity	Weighted factor score extracted from % Hispanic, % foreign born, and % non-English speaking; alpha = 0.86.	US Census (2010)
Concentrated Disadvantage	Weighted factor score extracted from % Black and % female headed households with children; alpha = 0.89.	US Census (2010)
Economic Hardship	Weighted factor score extracted from % unemployed, median household income, and % receiving supplemental security income; alpha = 0.74.	US Census (2010)
Police Density	Number of law enforcement officers per 1,000 residents.	Uniform Crime Reports (LEOKA, 2010)

The first set of negative binomial regression models in Table 22 examines the relationship between the covariates and the expected counts of homicides, aggravated assaults, robberies, and total violence. The coefficients in Table 22 represent changes in the log-count of violent victimizations given a one units increase in the covariate. Positive coefficients indicate that as the level of the covariate increases, the expected count of violent victimizations also increases. Negative coefficients indicate that as the level of the covariate increases, the expected count of the covariate decreases.

Across each of the separate and combined crime types, population density was positively and significantly associated with violent victimizations – the more densely populated the county,

the higher the expected count of violent victimizations. Other covariates were not significantly associated with variation in violent victimizations across all crime types. Contrary to expectations counties with higher levels of concentrated disadvantage had lower expected counts of aggravated assault victimizations. Counties with higher levels of economic hardship saw significantly higher expected counts of homicides and aggravated assaults. Police density was positively associated with aggravated assault and robbery victimization, suggesting that more police officers are present in counties with relatively high counts of violent victimizations. This likely reflects a greater relative investment in police resources in counties with higher levels of violent crime.

Table 22. Negative Binomial Regression Models for Homicides, Aggravated Assaults, and Robberies on County Covariates (N = 83)

Covariates	Model 1: Homicides	Model 2: Aggravated Assaults	Model 3: Robberies	Model 4: Total Violence
	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)
Population Density[a]	0.43 (0.19)*	0.29 (0.08)***	0.86 (0.18)***	0.35 (0.09)***
Metro County	0.04 (0.38)	0.28 (0.17)	0.67 (0.33)*	0.55 (0.18)**
Ethnic Heterogeneity	-0.22 (0.14)	0.01 (0.06)	-0.11 (0.13)	-0.03 (0.07)
Conc. Disadvantage	0.04 (0.16)	-0.29 (0.08)***	-0.21 (0.16)	-0.33 (0.09)***
Econ. Hardship	0.46 (0.10)***	0.31 (0.05)***	0.36 (0.10)	0.22 (0.06)***
Police Density[a]	0.34 (0.27)	0.38 (0.15)*	0.72 (0.29)*	0.60 (0.17)***
Intercept	-13.1 (0.84)***	-8.20 (0.36)***	-13.6 (0.80)***	-8.48 (0.40)***
-2 Log Likelihood	-225.98	-769.13	-443.14	-807.36
Resid. Deviance (df)	75.96 (76)	87.70 (76)	98.03 (76)	84.81 (76)
LR Test χ^2	8.04**	921.41***	393.63***	2,366.30***

Note: * $p < .05$, ** $p < .01$, *** $p < .001$; Counts represent total victims in each county; Total county population used as offset; LR = Likelihood Ratio
[a] Indicates that the predictor has been logged.

The second set of regression models estimate the contribution of the county-level covariates to counts of violent victimizations by firearms (see Table 23).[7] Similar to the findings

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[7] A model for firearm homicides was not estimated. This is due to the large number of counties with zero firearm homicides (78%), which necessitates the use of a zero-inflated negative binomial regression model. These models

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for the overall violent victimizations models, population density, the county falling in a

metropolitan area, economic hardship, and police density were all positively associated with

counts of firearm aggravated assaults and robberies.[8]

Table 23. Negative Binomial Regression Models for Firearm Homicides, Aggravated Assaults, and Robberies on County Covariates (N = 83)

Covariates	Model 1: Homicides	Model 2: Aggravated Assaults	Model 3: Robberies	Model 4: Total Violence
	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)
Population Density[a]	--	0.31 (0.13)*	0.97 (0.25)***	0.40 (0.13)**
Metro County	--	0.61 (0.26)*	0.58 (0.44)*	0.66 (0.25)**
Ethnic Heterogeneity	--	-0.08 (0.10)	-0.16 (0.18)	-0.08 (0.10)
Conc. Disadvantage	--	-0.21 (0.13)	-0.14 (0.21)	-0.21 (0.12)
Econ. Hardship	--	0.45 (0.45)***	0.36 (0.14)*	0.43 (0.07)***
Police Density[a]	--	0.73 (0.24)**	0.58 (0.38)	0.81 (0.23)***
Intercept	--	10.3 (0.58)***	-15.4 (1.13)***	-10.6 (0.56)***
-2 Log Likelihood	--	-544.00	-321.10	-572.10
Resid. Deviance (df)	--	96.10 (76)	84.67 (76)	96.41 (76)
LR Test χ^2	--	282.15***	149.35***	391.60***

Note: * $p < .05$, ** $p < .01$, *** $p < .001$; Counts represent total victims in each county; Total county population used as offset; LR = Likelihood Ratio
[a] Indicates that the predictor has been logged.

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are generally inappropriate for small sample sizes, such as the current sample of Michigan counties ("R Data Analysis Examples: Zero-Inflated Negative Binomial Regression", 2014). As such, the model for firearm homicides is not estimated.

[8] Additional sensitivity analyses (not shown) were conducted to assess the robustness of the associations in Tables 22 and 23. These analyses estimated alternative models in which adjustments were made for multi-collinearity and outlier violence rates. It was observed that the significant relationship for police density and the different overall violence measures disappeared when multi-collinearity was reduced. A similar change was not observed for firearm violence.

CONCLUSIONS

Limitations

The descriptive analyses in the current report are not without limitation. It is worth noting again that the violent offense totals and rates presented here will differ slightly from official Michigan State Police publications. The current report uses a subset of the overall MICR data and differences in the data reduction process can result in different totals being produced. It is not claimed here that the totals generated in the report are the true offense totals.

Second, the estimation of victimization and offense rates will be subject to some error due to non-reporting by active law enforcement agencies. However, 87 percent of Michigan law enforcement agencies submitted a full 12 years of data, and 94 percent submitted at least partial data, lending validity to the claim that the rates estimated here at least represent relative differences between victim demographic subgroups and counties.

Finally, because of the process through which MICR data are generated, these analyses can only claim to represent violent crimes that are reported to the police, excluding offenses that never came to the attention of law enforcement. Fortunately, violent offenses, particularly the serious violent offenses here have tended to be reported to the police more reliably than other offenses. The most recent data from the National Crime Victimization survey suggests that 68 percent of robbery victims nationally report the incident to the police, as do 64 percent of aggravated assault victims (Truman & Langton, 2014). These figures stand in comparison to 36 percent of all property crime victims nationally reporting their victimization to the police (Truman & Langton, 2014).

Summary and Policy Considerations

  Determining how to allocate scarce resources, at local, state and federal levels, towards reducing violent crime remains a paramount issue for law enforcement. Particularly in Michigan, over the last decade law enforcement agencies increasingly faced relatively high rates of general and firearm violence in spite of declining budgets and declining numbers of sworn personnel. As such, the systematic analysis of MICR data can be utilized to suggest areas of enforcement, prevention and intervention. The analyses in the current report suggest that the risk of violent victimization is strongly concentrated among demographic subgroups and across geographic regions of the state. In Michigan in 2013, young, Black males were at a substantially higher risk for violent victimization – especially for homicides and robberies. Young, Black females made up a disproportionate number of aggravated assault victims – experiencing a victimization rate on par with that of Black males.

  These victimization rates were observed to vary considerably across Michigan counties. Wayne, Saginaw, Genesee, Ingham, Muskegon, and Kalamazoo Counties all had top 10 victimization rates for homicides, aggravated assaults, and robberies. In particular, Wayne, Genesee, and Saginaw counties comprised the top 3-4 counties for rates of firearm violence.

  The concentration of victimization risk is particularly striking when combining demographic characteristics and geography. Specifically within these subareas (Wayne, Genesee, and Saginaw Counties), young, Black males already at a high rate of violent victimization statewide were at an even higher risk of such victimization. Indeed, young, Black males in Wayne, Genesee, and Saginaw Counties had a violent victimization risk in excess of 10 times that of all male Michigan residents. The homicide victimization rate was even more striking as young, Black males in these three counties experienced rates 19 to 37 times that of other

Michigan residents. If this were a discussion of another type of disease, these rates of victimization would be considered a public health epidemic.

These disproportionately high rates of violent victimization within already high violent crime rate counties suggest an appropriate focus for law enforcement intervention and related prevention efforts. Research evidence demonstrates that enforcement, intervention, and prevention, using data-driven, evidence-based strategies hold considerable promise for reducing violence. Specifically, highly focused and targeted interventions have been shown to be the key for crime and violence reduction (National Research Council, 2004). The findings of the current analysis support such highly focused and targeted efforts.[9]

Fortunately, such efforts are underway. The Governor's Secure Cities initiative dedicates enforcement and related resources to Detroit, Flint, and Saginaw (Wayne, Genesee, and Saginaw Counties) along with Pontiac (Oakland County). The U.S. Attorney's Offices in the Eastern and Western Districts have coordinated Project Safe Neighborhoods (PSN) initiatives focused on gun and gang violence in the Counties suggested in this study. Various federally supported initiatives such as Detroit Ceasefire and Detroit PSN, Byrne Criminal Justice Innovation (Detroit and Flint), the Michigan Youth Violence Prevention Center (Flint), Detroit's participation in the Violence Reduction Network, among others, focus on the cities and neighborhoods within these cities suffering high rates of violent victimization.

The operation of DDACTS (Data Driven Approaches to Crime and Traffic Safety) by the Michigan State Police in Flint (Genesee County) already represents one such enforcement-

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[9] The School of Criminal Justice at Michigan State University, with the support of the U.S. Department of Justice, Bureau of Justice Assistance, is developing the Violence Reduction Assessment Tool. Known as the VRAT, it is a planning and assessment tool to support local communities in the identification and effective implementation of evidence-based violence reduction practices. Although currently in development, the School is happy to assist local communities in piloting the use of VRAT to assist their efforts. Please contact Ms. Heather Perez (perezh@msu.edu) for additional information.

guided effort to reduce violence. Part of the Secure Cities initiative, a prior evaluation found

reductions of 14 percent in violent crime and 30 percent in robbery in the target locations of Flint

(Rydberg, McGarrell, and Norris, 2014).

The DDACTS approach is suggested by prior research on the use of directed police patrol

in gun crime hotspots. Studies conducted in Kansas City, Indianapolis, and Pittsburgh found that

such directed patrols focused on illegal firearms in gun crime hotspots resulted in significant

reductions in firearms violence (Sherman and Rogan, 1995; McGarrell et al. 2001; Cohen and

Ludwig, 2003). More recent experimental evidence from St. Louis suggests that directed police

patrols combined with officer self-initiated enforcement activity within tightly defined hotspots

significantly reduced firearm aggravated assaults over a nine-month period (Rosenfeld, Deckard,

& Blackburn, 2014).

In addition to directed patrol at violent crime hotspots, problem solving initiatives

focused on specific places and foot patrol have demonstrated promise for reducing violent crime

(Braga and Weisburd, 2010; Braga, Papachristos, and Hureau, 2012; Ratcliffe et al., 2011).

Yet, there are questions about the long-term impact of focused enforcement efforts alone

(e.g., Sorg et al., 2013). Consequently a broader set of prevention and intervention strategies can

complement these enforcement strategies. These include the Ceasefire focused deterrence model

that addresses group-based violence (Braga et al. 2001; McGarrell et al. 2006; Corsaro and

McGarrell, 2010) and the drug market intervention focused on closing down violence-generating

drug markets (McGarrell 2014; McGarrell et al., 2013). Similar promising strategies include

parolee forums with high risk parolees returning to high violent crime locations (Braga, Piehl,

and Hureau, 2009; Papachristos et al., 2013) and the High Point, North Carolina focused

deterrence approach to intimate partner violence.

Many other evidence-based and evidence-informed interventions are available ranging from primary prevention (e.g., nurse-family partnerships, pre-school), to offender-based interventions (cognitive-behavioral), and community-focused interventions (e.g., crime prevention through environmental design; blight elimination and greening). More information is available at crimesolutions.gov. The common ingredient across these interventions is developing highly focused and targeted interventions based on data-driven problem assessments. Though possible options exist, any Michigan evidence-based approach should consider using detailed MICR data to inform the allocation of resources towards those at the highest risk in the areas with the highest risk of violent crime.

Finally, when considering focusing enforcement, prevention and intervention strategies in the counties, cities, and neighborhoods suffering from the highest rates of violence, it is important to remember that while violence is highly concentrated, it is still a sub-set of people and places that drive the violence problem. Within the high violent crime cities of Detroit, Flint, and Saginaw, most young, African-American men are not carrying and using illegal firearms; most citizens are law abiding; and many street segments, even in high crime areas, do not experience violent crime. This reality calls for careful analysis, highly focused interventions, police-citizen collaboration, balanced enforcement and prevention strategies, economic development and neighborhood revitalization efforts, and fair and respectful policing.

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APPENDIX

MICR FILE LINKING PROCESS

Table A.1: Initial Files Received and Utilized

File Name	File Description
MICR1	Administrative look-up table; Includes date and time
MICRADDRS	Location table
MICR3	Offender table
MICROUSED	Offender used table
MICR5	Victim table
MICRVOFNS	Offense against victim table
MICRVOR	Victim-Offender relationship table
MICR7	Arrestee table
MICRARMED	Arrestee armed table
MICROFFNS	Offense table
MICRATYPE	Activity type table

Table A.2: Unique Identifier Creation

Identifier (File Name)	Components
Victim ID (MICR5)	MIC1_NUMBER + MICR5_VICTIMNO
Victim ID (MICRVOFNS)	MIC1_NUMBER + VOFNS_VICTIMNO
Victim ID (MICRVOR)	MIC1_NUMBER + VOR_VICTIMNO
Offender ID (MICR3)	MIC1_NUMBER + MICR3_OFFENDERNO
Offender ID (MICRVOR)	MIC1_NUMBER + VOR_OFFEDERNO
Offender ID (MICR7)	MIC1_NUMBER + MICR7_ARRESTNO
Offender ID (MICRARMED)	MIC1_NUMBER + ARMED_ARRESTNO
Offense ID (MICROUSED)	MIC1_NUMBER + OUSED_OFFENSE_CO
Offense ID (MICROFFNS)	MIC1_NUMBER + OFFNS_OFFENSE_CO
Offense ID (MICRATYPE)	MIC1_NUMBER + ATYPE_OFFENSE_CO
Offense ID (MICRVOFNS)	MIC1_NUMBER + VOFNS_OFFENSE_CO

Table A.3: Sequential MICR File Linking Process

File Created	File A Linked to …	File B	Linking IDs
admin.addrs	MICRADDRS	MICR1	MIC1_NUMBER
victim.vofns	MICRVOFNS	MICR5	MIC1_NUMBER Victim ID
victim.vofns.vor	MICRVOR	victim.vofns	MIC1_NUMBER Victim ID
ofnd.oused	MICROUSED	MICR3	MIC1_NUMBER
arrest.armed	MICRARMED	MICR7	MIC1_NUMBER Offender ID
ofnd.oused. arrest.armed	arrest.armed	ofnd.oused	MIC1_NUMBER Offender ID
offns.atype	MICRATYPE	MICROFFNS	MIC1_NUMBER Offense ID
victim.vofns.vor. ofnd.oused. arrest.armed	ofnd.oused. arrest.armed	victim.vofns.vor	MIC1_NUMBER Offender ID Offense ID
victim.vofns.vor. ofnd.oused.arrest. armed.offns.atype	offns.atype	victim.vofns.vor. ofnd.oused. arrest.armed	MIC1_NUMBER Offense ID
victim.vofns.vor. ofnd.oused.arrest. armed.offns.atype. admin.addrs	admin.addrs	victim.vofns.vor. ofnd.oused.arrest. armed.offns.atype	MIC1_NUMBER