Violent Streets, Violent Homes?
The Concentration of Intimate Partner Violence in Chicago Neighborhoods[1]

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Abstract: A robust research tradition has shown that interpersonal violence between men clusters in specific urban neighborhoods and is associated with structural disadvantage. This paper argues that predominantly male-on-male street crime is only one component of the urban crime problem: in addition, male-perpetrated intimate partner violence against women is also concentrated in disadvantaged urban communities. This research considers the possibility that such communities face a double burden of violence, both on the street *and* inside of homes. Using restricted arrest data from the Chicago Police Department[2], I show that intimate partner homicides are spatially concentrated in Chicago's most disadvantaged neighborhoods. Specifically, 54% of all IP homicides committed between 1994 and 2011 took place in just 20% of Chicago's neighborhoods. Further analyses confirm that the observed spatial clustering is statistically significant, and that the highest rates of IP homicides consistently occur in the same disadvantaged neighborhoods. Additionally, I employ arrest data on domestic violence from 1999 to 2012 to demonstrate that IP homicides are spatially associated with nonfatal violence. My findings shed light on contextual factors that put women at risk of intimate partner violence, revealing the utility of viewing this pressing social problem through an ecological lens.

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[2] Data were obtained under a research agreement between Andrew Papachristos and the Chicago Police Department. These data are restricted because they include victim information. All analyses are my own; however, this work was conducted under the supervision of Andrew Papachristos. Results do not represent the views of the Chicago Police Department or the City of Chicago.

A robust research tradition has demonstrated that interpersonal violence between men concentrates in specific urban neighborhoods and is associated with structural disadvantage. We know that street violence, which is predominantly male-on-male, is devastating to communities: research demonstrates the heavy consequences for women and children (Clark et al. 2008; Hill & Jones 1997). But what if violence against women disproportionately burdens these same communities? Despite prolific work on the neighborhood determinants of delinquency and crime, there is scant research on the geography of female violence victimization. Violence against women is overwhelmingly perpetrated by men, particularly intimate partners (Watts & Zimmerman 2002). In this way, if we are to understand the full extent to which multiple types of violence afflict our nation's most disadvantaged urban areas, we must incorporate studies of intimate partner violence into neighborhood effects scholarship. Situated at the intersection of research on neighborhood inequality and research on gender-based violence, this paper investigates the neighborhood distribution of intimate partner homicides between 1994 and 2011 across the city of Chicago. My findings shed light on contextual factors that put women at risk of intimate partner violence, revealing the utility of viewing this pressing social problem through an ecological lens.

Intimate partner violence [1](IPV) is a major health problem for women in the U.S[2]. Over 1.3 million[3] women are victims of IPV each year and 30% of female homicides are perpetrated by intimate partners[4] (Bureau of Justice Statistics [BJS] 2010). Among women of childbearing age[5], IPV is the leading cause of serious injuries and the second most common cause of death (Hewitt, Bhavsar, & Phelan 2011). Importantly, IPV disparately affects women, as 85% of victims of all IPV are female (Rennison 2003), and women are six times more likely than men to be injured (Buzawa 2003). IPV is linked to numerous adverse outcomes for women: women in

violent intimate partner relationships are 50% more likely to sustain serious injuries, including broken bones, traumatic brain injuries, or knife wounds, which require hospitalization (Kernic, Wolf, & Holt 2000). At the same time, IPV is associated with stress-related illnesses including chronic pain, irritable bowel syndrome, and migraines (Campbell 2002). Victims of IPV are also likely to suffer poor mental health outcomes, including post-traumatic stress disorder (PTSD), anxiety, and depression (Ellsberg et al. 2008). Finally, IPV has social and economic consequences for women as well: IPV is associated with unemployment, eviction, and homelessness (National Institute of Justice [NIJ] 2007; Desmond & Valdez 2013; Pavao et al. 2007), underscoring the devastating impact of IPV on all facets of women's lives. In addition to warranting humanitarian concern, IPV packs a hefty fiscal punch: IPV against women costs at least $8.3 billion per year in medical expenses and lost productivity (CDC 2012b).

IPV's impact reaches beyond women, as children are also victims of this abuse: in 38% of cases, IPV against women takes place in a household where a child or children lived (BJS 2010). Children in such households are at risk of both physical and psychological harm. Children of abused mothers are 57 times more likely to be injured than other children (Parkinson, Adams, & Emerling 2001). In some cases, violence victimization is directly related to IPV: a study of 139 children injured during a domestic violence incident demonstrated that 39% of these children were attempting to stop the violence, and 48% of these children were under 2 years old and were being held by a parent when they were attacked (Christian et al. 1997). Young children in particular are at risk of being injured (Campbell & Lewandowski 1997). In addition to physical violence, children in households where IPV takes place are also at risk of substantial psychological harm. Research indicates that over 10 million children witness intimate partner violence between their parents each year (Straus 1992). Witnessing IPV is increasingly

considered a form of psychological child abuse (Gilbert et al. 2009). Exposure to IPV during childhood has adverse effects on socio-emotional development, and is associated with increased internalizing and externalizing behaviors (Kitzmann et al. 2003). Furthermore, exposure to IPV has a negative impact on children's cognitive development: high levels of IPV were associated with an 8-point reduction in IQ [6] (Koenen et al. 2003). These adverse developmental consequences from exposure to IPV in turn impact children's long-term life chances: childhood IPV exposure is associated with increased risk-taking behaviors in adolescence and adulthood (Bair-Merrit, Blackstone, & Feudtner 2006). In this regard, IPV may be implicated in the reproduction of inequality across generations.

However, IPV victimization is not distributed evenly across the U.S. population; rather, research indicates that it is socially concentrated among socioeconomically disadvantaged women who live in urban areas (BJS 2010; Rennison and Welchans 2000). Specifically, scholars have shown that women who are younger, especially ages 16-24, and women who are black, divorced or separated, low-income, and who rent their homes face the highest risk of IPV among women (Rennison and Welchans 2002). However, researchers have not yet adequately considered how neighborhoods may shape these individual risks. Given persistent race and class segregation in U.S. cities (Jargowsky 1997; Sampson 2012), we have reason to believe that IPV is not evenly distributed across urban neighborhoods, either.

Scholarship and policy have traditionally treated street crime and IPV as discrete, unrelated social problems. However, I argue that in order to fully understand the extent to which violence impacts disadvantaged communities, we must look beyond street crime and additionally consider how IPV is distributed in urban areas. Furthermore, because stark neighborhood

inequality is a persistent reality in U.S. cities (Sharkey 2008), adopting a neighborhood perspective will contribute to our understanding of IPV risk factors.

This paper examines the neighborhood distribution of intimate partner (IP) homicides using a rich dataset from the city of Chicago. Specifically, I use restricted Chicago Police Department homicide data, in combination with arrest data, to determine the extent to which IPV is concentrated in particular Chicago neighborhoods. This study is unique among ecological studies of intimate partner violence because I use administrative data collected over an 18- year period, where neighborhood location is identified[7]. Thus, these data enable me to address my research questions with an explicitly spatial lens. In comparison to other crimes, homicides are more likely to be reported to police and to be accurately classified (Ronceck & Meier 1991). Thus, using homicide data minimizes measurement error; since IPV research is plagued by measurement challenges, this is an important advantage of using these data (Johnson 1995). This topic is timely, as experts on neighborhood effects have recently called for attention to gender differences in neighborhood effects research (Popkin, Leventhal, & Weisman 2008; Sampson 2008: 193; Zimmerman and Messner 2010), and the National Research Council highlighted the need for neighborhood based studies on violence against women (Kruttschnitt, McLaughlin, & Petrie 2004)[8].

This paper demonstrates that intimate partner (IP) homicides are spatially concentrated in Chicago's most disadvantaged neighborhoods. In fact, 54% of all IP homicides committed between 1994 and 2011 took place in just 20% of Chicago's neighborhoods. Because IP homicides are typically preceded by ongoing abuse (Campbell 2002), these findings indicate that these neighborhoods are disproportionately burdened by severe forms of IPV. Additional analyses confirm that the observed clustering is statistically significant, and that the highest rates

of IP homicides consistently occur in the same disadvantaged neighborhoods. Finally, analyses of domestic violence and violation of order of protection arrest data allows me to confirm that my IP homicide results are robust and indicative of broader patterns of violence against women.

BACKGROUND

Neighborhoods and crime

Since the publication of William Julius Wilson's *The Truly Disadvantaged* in 1987, there has been a proliferation of scholarly work addressing the extent to which neighborhood inequality exists in the U.S., and its effects on communities and individuals. Researchers widely agree that neighborhood inequality not only exists, but persists in the U.S. (Wilson 2010), and that concentrated poverty[9] increased between the 1970's and the 1990's (Jargowsky 1997). Importantly, neighborhood disadvantage disparately affects minority communities and families (Jargowsky 1997; Wilson 1987); thus, neighborhood effects research is an important component in understanding the reproduction of inequality across generations (Ainsworth 2002). Moiduddin and Massey underscored this point: they argued that because black people living in poverty are far more likely to reside in high poverty neighborhoods when compared to white people living in poverty, they are exposed to very different social contexts (2006:2).

Importantly, the spatial clustering of social problems such as crime and delinquency has been tied to specific neighborhoods despite population turnover, indicating the need to look beyond individuals in the persistence of such problems (Sampson 1997:5). In particular, racial invariance theory posits that the disproportionate number of African American criminal offenders and victims in the U.S. population can in fact be explained by neighborhood inequality (Sampson & Wilson 2005). Specifically, Sampson and Wilson argue that patterns of socioeconomic segregation in U.S. cities have created urban communities that are isolated from

mainstream society and where disadvantage is highly concentrated. Over time, these patterns disable a community's capacity for social control, and contribute to high rates of violent crime. Thus, I argue that neighborhood effects research offers many compelling reasons to examine the relationship between neighborhoods and IPV risk.

Risk Factors for IPV

Historically, research on IPV has emphasized individual risk factors for IPV (Wright 2011:3); however, recent studies have examined contextual risk factors as well. Here, I overview the micro- and macro-level risk factors that contribute to IPV.

Individual and Couple Level Risk Factors

Literature on interpersonal violence has documented a large set of individual and couple-level risk factors for IPV. Being female is a primary risk factor for IPV, as women experience 85% of all IPV; and the rate of IPV for women is six times higher than for men on average (Fagan and Browne 1994, Rennison and Welchans 2002). Additionally, scholars agree that when women are victims to IPV, the consequences are more serious (Jasinski & Williams 1998). Women are six times more likely to experience an injury, be hospitalized, and experience fear as a result of IPV perpetrated by a male partner (Buzawa 2003). Furthermore, the reasons that men and women perpetrate IPV differ: when women physically attack male partners, it is more often in self-defense (Dobash et al. 1992).

Notably, researchers have consistently found that poverty is risk factor for IPV victimization risk for women, both in the U.S. and internationally (Raphael & Tolman 1997; World Health Organization [WHO] 2010). Though the mechanisms are not yet well understood, the association between poverty and IPV has been demonstrated across diverse studies (WHO 2010). Researchers have suggested that poverty may drive IPV risk in a number of ways: first, by

making women more vulnerable to violence, and second, by making male partners more likely to engage in violent behavior (WHO 2010). Because women living in poverty face greater economic constraints, they may have a harder time leaving an abusive relationship. At the same time, researchers have suggested that in some cases, poverty may lead men to feel that they have failed to meet cultural standards for their gender (WHO 2010).

Importantly, Johnson (1995) argued there are two primary types of IPV[10]: common couple violence and patriarchal terrorism. Johnson underscored that the differences between these two categories are crucial for understanding IPV. Common couple violence is described as intermittent and specific to a particular situation or conflict; women are just as likely as men to be perpetrators. By contrast, patriarchal terrorism is persistent and systematic, and is rooted in the male partner's desire to have control over his female partner. In survey research, scholars have differentiated between these two types of IPV by measuring the severity and frequency of IPV. The most severe and frequent IPV is more often indicative of ongoing abuse, rather than a situational conflict between partners (Johnson 1995; Wright 2011). Thus, the IP homicides discussed in this paper are likely to represent gender-specific patterns of abuse related to patriarchal terrorism rather than common couple violence.

Contextual Risk Factors

As a starting point, Miles Doan and Kelly (1997) demonstrated that IPV is concentrated in space, and that higher neighborhood rates of IPV are is correlated with measures of neighborhood disadvantage. In addition, an emerging literature base investigates the causal relationship between neighborhood characteristics and IPV (or domestic violence more broadly); this literature is key in shifting the research and policy paradigm away from emphasizing micro-level risk factors exclusively. Such studies may be grouped into two categories: the first group

examines IPV for male and female victims, and a smaller group of studies looks at IPV for female victims only[11].

In studies examining the predictors of IPV for both genders, scholars have shown that important neighborhood-level factors, including structural factors and social processes, are related to neighborhood levels of IPV. Miles-Doan (1998) showed that resource deprivation is positively related to neighborhood rates of IPV. Similarly, Fox & Benson (2006) found that among non-poor couples, living in a neighborhood with higher concentrated disadvantage was associated with a higher risk of IPV. Scholars have also shown that the availability of resources and services, including numbers of police and social workers per capita, is negatively related to neighborhood IPV rates (Xie, Lauritsen, and Heimer 2012). Similarly, collective efficacy, which measures a neighborhood's social cohesion and capacity for informal social control, is also negatively related to IPV (Browning 2002). Notably, one study using hierarchical linear models found that the observed elevated domestic violence risk for African Americans is almost entirely explained by ecological context, that is, when African Americans are compared to whites who live in similar neighborhoods, the association between race is greatly reduced (Benson, Wooldredge, Thistlewaite, & Fox 2004). This finding underscores the limitations of examining individual risk factors alone to understand IPV risk.

The second group of studies has examined predictors of IPV for female victims exclusively. As with overall IPV victimization, female IPV victimization is also predicted by higher levels of neighborhood disadvantage (Benson et al. 2003) and low median income (Grisso et al. 1999). In addition, scholars have shown that IPV is driven by residential instability (Benson et al. 2003). Wright (2011) examined female IPV victimization in Chicago and found that this type of IPV shares many of the same predictors as street crime. Specifically, Wright (2011)

found that concentrated immigration, physical disorder, and legal cynicism at the neighborhood level were positively associated with rates of IPV. At the same time, Wright (2011) showed that collective efficacy and social ties were negatively associated with IPV and could therefore be considered protective factors. Because she employed hierarchical linear models, Wright (2011) was able to show that women's risk of IPV victimization is not fully accounted for by individual- and household-level factors; at the same time, Wright's work documents that for women, IPV risk varies by neighborhood even after controlling for key individual- and household-variables. Notably, the quantitative studies noted above are consistent with recent work by urban ethnographers who have documented that young black women who live in neighborhoods of concentrated disadvantage experience high rates of violence (Jones 2010; Miller 2008).

Although previous studies have examined relationships between neighborhood structural factors and IPV rates, we have very little information about the distribution of IPV across urban space. In sum, previous empirical research has predominantly investigated this problem with an *aspatial* perspective; thus, previous work is substantially limited by what scholars have termed the "checkerboard problem," i.e., considering neighborhood units in isolation without accounting for the broader social composition and the influence of proximate neighborhoods (White 1983). Furthermore, although Wright has done the most comprehensive study of neighborhood effects and IPV available, her work uses data from household surveys and therefore is unlikely to be representative of the most severe cases of IPV. Thus, the design of this paper enables me to address the weaknesses in the literature in two ways: first, I am able to determine if IPV is concentrated over space during an 18-year period, and second, by looking at homicide data, I can speak to the most severe cases of IPV that may not be captured in household survey data.

DATA & METHODS

In order to test these hypotheses, I examined the geographic distribution and characteristics of IP homicides in Chicago, Illinois over the 18-year time period between 1994 and 2011. In addition, I use domestic violence and violation of orders of protection arrest data from 1999-2012. The advantage of using Chicago as a case study is that it is considered a representative U.S. city because of its racial and economic diversity (Earls et al. 2007); additionally, research has shown that IPV patterns in Chicago are representative of those in Northeast industrial cities in general (Browning 2002). Specifically, I used data from the four following sources to test my hypotheses: the Chicago Police Department (CPD), the U.S. Census, the City of Chicago Data Portal, and the Project for Human Development in Chicago Neighborhoods (PHDCN).

The unit of analysis for this study is the neighborhood, which I operationalize by using 342 "neighborhood clusters" developed by PHDCN researchers (Earls et al. 1997)[12]. PHDCN researchers designed the 342 neighborhood clusters by joining the 847 Chicago census tracts such that each neighborhood cluster is internally homogenous on important indicators like housing density and racial/ethnic makeup. Each neighborhood cluster consists of approximately 8,000 residents on average.

I used a restricted crime dataset from the CPD that included 10,881 homicides. These cases comprise the population of homicides that occurred from January 1, 1994 to December 31, 2011 in Chicago. Since the perpetrator-offender relationship is key to classifying IPV homicides, I dropped 5,705 cases where this relationship was coded as "not established." Previous research has indicated that in such cases, the relationship is most likely to be between strangers, since crimes perpetrated by non-strangers are more likely to result in arrest (Rosenberg and Mercy

1991 as cited in Miles-Doan & Kelly 1997:136). Of the 5,176 remaining homicide cases, I determined that 522 cases were IPV-related. I identified IPV homicides by selecting all homicides where the perpetrator and victim were current or former intimate partners; specifically, this included codes for boyfriend/girlfriend, ex-boyfriend/ex-girlfriend, husband/wife, or ex-husband/ex-wife. I then excluded 12 cases where the victim's gender was unknown, as well as 2 cases with missing address information, leaving 508 cases for analysis.

There are several strategic advantages for using homicide data to examine IPV. First, it is widely agreed that more serious offenses are more likely to be reported to police; in this way, using homicide data minimizes measurement error relative to using other crime data (Ronceck & Meier 1991). Additionally, unlike other crimes, homicides are not likely to be identified differently depending on the police who responds to the crime (Papachristos et al. 2011), i.e., social construction is also less likely to contribute to inconsistencies in measurement. Additionally, this narrow focus on the most severe cases makes it more likely that I am obtaining data on the type of IPV that Johnson (1995) termed patriarchal terrorism (discussed further above). Finally, since homicide necessarily results in the victim's death, there is no chance that the incidents represent the same perpetrator-victim pair; this is especially important for studying IPV, where the same couple may be involved in multiple reports of IPV to the police (Miles-Doan 1998).

In addition, I used CPD arrest data on domestic violence and violations of orders of protection. Doing so allows me to confirm that my IP homicide results are representative of broader trends in violence against women. Between January 1, 1999 and December 31, 2012, the CPD made 2,952,304 arrests. I narrowed these data to examine 139,581 domestic violence related arrests. 136,747 (97.97%) of these arrests for domestic violence, which included battery

and aggravated battery. 2,834 (2.03%) of these arrests were for violations of orders of protection (VOPs). I was able to obtain a 100% address rate for these incidents using ArcGIS. These arrest data do not provide information on victim characteristics or victim-offender relationship, so I am unable to determine the percent committed by intimate partners (as opposed to other types of family members) or the percent of victims who are female.

In order to map the distribution of IP homicides across Chicago neighborhoods, I used ArcGIS to geocode each crime event to a neighborhood cluster. I then aggregated the incidents to create neighborhood cluster-based event counts; I use population data from the 2000 U.S. Census to determine crime rates per neighborhood. I also used geographic shapefiles from U.S. Census TIGER/Line 1990 and 2000 data, and shapefiles from the City of Chicago Data Portal to create maps of the Chicago area. I used Stata to produce all statistical results, as well as ArcGIS and GeoDa software to perform spatial analyses.

RESULTS

Incident-Level Descriptive Statistics

[INSERT TABLE 1 ABOUT HERE]

The descriptive results[13] presented above demonstrate IP homicide victimization trends between 1994 and 2011. The results indicate that in nearly two-thirds of cases, women are the victims of IP homicide. This proportion is consistent with results from other studies, which have indicated that the rate of female to male IP homicide victims is 2:1 (Fagan & Browne 1993). In terms of racial and ethnic patterns, the vast majority (75.5%) of IPV homicide victims were black; this pattern is even more pronounced for male IP homicide victims, of whom 91.4% were black. These results indicate that the percent of black IP homicide victims is highly disproportionate given that blacks comprise 32.9% of Chicago's population 2010 (U.S. Census 2010); in other words, Chicago's black population is at greater risk of IP homicide victimization. Whites make up the second largest group of IPV homicide victims; for women, about ¼ of all

IPV homicide victims are white. In contrast with Chicago's black population, whites are at lower risk of IP homicide, as whites made up 45% of the Chicago population in 2010 (U.S. Census 2010). The percent of Hispanic victims are notably small (6.86%) given that Hispanics make up nearly one-third of the Chicago population in 2010 (U.S. Census 2010). Additionally, 92.7% of IP homicide victims were murdered by an opposite-sex partner; for women, this trend is stronger, as over 95% were murdered by a male partner. For male victims however, about 13.2% were murdered by a same-sex partner.

In 86% of cases, perpetrators used a weapon to commit the crime. Knives (46.7%) and guns (31.4%) were the most commonly used weapons. However, these trends vary substantially by gender: while women were most likely to murdered by a partner who used a gun, the vast majority of men (79.4%) were murdered by a partner who used a knife. Finally, my results indicate that although 79.4% of IP homicides occurred in a home (i.e., a private residence or public housing), a substantial percentage (12.6%) occur in public. This last finding calls into question the assumption that IPV is a crime that happens "behind closed doors," and suggests that researchers ought to consider the extent to which IPV crimes take place in public places as well.

[INSERT TABLE 2 ABOUT HERE]

For domestic violence related arrests, the vast majority of offenders are men (85.7%). Although these arrest data do not provide victim information, recall that 85% of IPV victims are female (Rennison 2003) and IPV against women is typically perpetrated by male partners (Watts & Zimmerman 2002). Thus, we can reasonably assume that in the vast majority of these male-perpetrated DV cases, the victim is female.

Neighborhood Patterns of IPV

[INSERT TABLE 3 ABOUT HERE]

Table 3 above presents neighbor level summary statistics for the average annual rates for IP homicide and nonfatal domestic violence and VOPs, for 1994-2011 and 1999-2012, respectively. Figure 1 below illustrates the neighborhood distribution for the standardized version of these annual crime rates. Figure 1 demonstrates that the distribution of IP homicides and nonfatal domestic violence across Chicago neighborhoods is highly skewed: this is indicative of a stark disparity in the distribution of IPV in Chicago. In terms of the percentage breakdown, I found that 35.7% of Chicago neighborhoods experienced zero IP homicides during the 18-year time period studied, and 77.3% of neighborhoods experienced two or fewer IPV homicides. In contrast, 2.9% of neighborhoods experienced 6 to 10 IP homicides each, meaning that these 10 neighborhoods each faced rates of IP homicide that were more than 2.5 standard deviations above the mean for Chicago. Overall, 54% of all IP homicides committed between 1994 and 2011 occurred in just 20% of the neighborhoods. This indicates that IP homicides are indeed concentrated in space in Chicago.

[INSERT FIGURE 1 ABOUT HERE]
[INSERT FIGURE 2 ABOUT HERE]

Figure 2 above again demonstrates that IP homicides are heavily concentrated in just a few Chicago neighborhoods. However, this map yields important information not available in a standard distribution table: it indicates, notably, that neighborhoods with the highest rates of IP homicide are clustered in space. In other words, this disparity is compounded by the fact that a neighborhood with a high IP homicide rate is likely to be adjacent to other neighborhoods with high IP homicide rates. I used an Anselin Local Moran's I test to determine if this clustering pattern is meaningful. This test determines the likelihood that the observed similarity in IP homicide rates (whether high or low) between a focal neighborhood and adjacent neighborhoods

is different than what we would see in a random distribution. The test yields a value for each neighborhood, such that "High-High" indicates that a focal neighborhood with a high crime rate is surrounded by neighborhoods with high crime rates, and that this spatial pattern is significant. Results indicated that there are two main statistically significant clusters of neighborhoods with high rates of IP homicide. These clusters are marked by cross-hatching in Figure 2: the first cluster is on the West Side, and the second cluster centers on the South Side. Additionally, the third area on the map is a cluster of neighborhoods in the North Side of Chicago where IP homicide rates are low.

In addition, I conducted further analyses to determine if this pattern was consistent throughout the 18-year time period studied. Since IP homicide is a relatively rare event, I constructed 6-year rates of IP homicide per neighborhood. Again, though IP homicide has declined in Chicago, along with other types of crime, the disproportionate concentration of IP homicide remained relatively stable. My analyses confirmed that the clustering of higher IP homicide neighborhoods is consistent over time: IP homicide tends to be concentrated most prominently in the West and South Sides of Chicago. Importantly, previous research has shown that these two regions of the city were highly disadvantaged relative to other regions in Chicago between 1970 and 1990 (Brooks-Gunn 2007).

[INSERT FIGURE 3 ABOUT HERE]
[INSERT FIGURE 4 ABOUT HERE]

I conducted the same tests to determine if nonfatal domestic violence and VOPs are concentrated in Chicago. Figure 3 confirms that this is the case, and is evidence that the clustering of IP homicide in the West and South Sides of Chicago is indicative of a broader trend in gender-specific violence. Finally, I assessed the apparent spatial association between IP homicide rates and rates of other domestic violence by using a bivariate Anselin Local Moran's I

test. This bivariate test allows me to determine the chance that the observed similarity in an IP homicide rate in a focal neighborhood and domestic violence rates in its adjacent neighborhoods is different than what we would see in a random distribution. Again, we see that there are major high rate clusters in the West and South Sides, and a low rate cluster in the North Side, confirming that this spatial inequality is meaningful. This is further evidence that IP homicide is consistently concentrated in the same neighborhoods; not only does this reaffirm the results demonstrated above, it also indicates clearly that research on neighborhoods and IPV must account for spatial autocorrelation between neighborhoods.

DISCUSSION AND CONCLUSIONS

Over the past century, innumerable studies have examined the relationship between neighborhoods and social problems, and have established a clear link between neighborhoods' emergent characteristics and the local propensity for crime. In recent decades, policy has followed suit: New York, Chicago, and Los Angeles have all instituted neighborhood-based policing practices in an attempt to reduce street crime and street violence in particular (NIJ 2004). These watershed efforts, however, have neglected to address violence against women. This paper argues that predominantly male-on-male street crime is only one component of the urban crime problem: in addition, male-perpetrated intimate partner violence against women is also concentrated in disadvantaged urban communities. This research considers the possibility that such communities face a double burden of violence[14], both on the street *and* inside of homes.

The primary objective of this paper was to determine if IPV is concentrated in urban neighborhoods, and if the observed pattern was consistent over time. In sum, my findings indicate that IP homicides are spatially concentrated in the most disadvantaged urban

neighborhoods in Chicago, and that this pattern is consistent over the 18-year time period examined. These results are consistent with my hypotheses. Though there is no doubt that IPV is devastating in any circumstances, this study demonstrates that the impact of IPV is disparately borne by women who already live in the most vulnerable communities. Given that IPV perpetrated against women has direct and indirect consequences on children, this clustering pattern presents a significant public health concern. Alarmingly, these findings show that disadvantage urban communities not only face disproportionately high rates of male-on-male street crime, but also face high rates of male-on-female violence. In this way, the problems associated with inner-city violence may be far worse than scholars and policymakers have previously considered.

There are a number of important methodological and theoretical implications of this work. In terms of assessing previous literature on IPV, these findings show that researchers must look beyond individual and couple level risk factors to fully understand the processes that lead to this major social problem. In fact, given the extreme inequality in IPV across neighborhoods, individual-level victimization risk factors such as race may be far less significant than previously thought (indeed, one study has already demonstrated this, but further research is needed on this topic; see Benson, Wooldredge, Thistlewaite, & Fox 2004 for details). At the same time, research on structural determinants of IPV must account for the spatial clustering of IPV in disadvantaged urban areas; analyzing neighborhoods as isolated units of analyses is not an adequate methodological approach and for this reason, much of the previous research on this topic is likely to have produced biased results. In addition, I argue that urban scholars have thus far improperly conceptualized of IPV as an issue that is separate from violent street crime. In doing so, we have missed an opportunity to consider two key dimensions of urban crime:

specifically, how gender inequality *and* boundaries between public and private domains influence violent crime. The intersections between neighborhood inequality, gender, and the domestic spaces may prove to be a rich area for theoretical development.

Finally, these findings offer a number of new avenues for research. Future studies ought to investigate the extent to which high IPV rates are determined by factors internal to communities- including neighborhood structural features, social processes, and cultural adaptations; and external to communities – such as police practices, housing ordinances, and social service provision. These types of determinants have been shown to influence other types of violent crime, and researchers using hierarchical linear models have found that they are related to IPV (see discussion above). However, since few studies have used models that explicitly account for spatial clustering of IPV, additional studies using appropriate modeling techniques ought to examine these relationships further.

This study presented evidence of the spatial concentration of IPV; however, I do not presently attempt to determine the causes of this pattern. Thus, it is an open question whether the observed pattern is due to compositional factors or actual neighborhood effects. Notably, few previous studies on neighborhoods and IPV have used methods that rule out the possibility that the relationship between neighborhood disadvantage and IPV is due to neighborhood composition; thus, future studies on this topic should employ methods that specifically address this issue. However, regardless of the original reasons that IPV is now concentrated in urban neighborhoods, the persistent clustering of this type of violence over nearly 20 years suggests that there are local social norms or cultural patterns that contribute to this pattern, independent of individual propensities toward violence. For example, urban ethnographer Jody Miller (2008) has argued that legal cynicism and desensitization to violence in highly disadvantaged

neighborhoods contribute to higher local rates of violent offending and victimization. Furthermore, there may be factors exogenous to local communities that contribute to disparities in intimate partner homicide: specifically, neighborhood variation in policing practices and access to legal recourse is likely to impact women's ability to escape an abusive relationship before the violence escalates to the point of homicide. Along these lines, recent work by Desmond and Valdez (2013) showed that abused women renting homes in disadvantaged neighborhoods face major barriers to receiving any protection from police. Specifically, they note that Milwaukee's nuisance property ordinance allows the city to fine landlords for tenants' behavior, even when this behavior includes 911 calls; thus, in disadvantaged neighborhoods, landlords commonly evict women who call police for domestic violence victimization in order to avoid being fined by the city. This policy has the perverse "effect of forcing abused women to choose between calling the police on their abusers (only to risk eviction) or staying in their apartments (only to risk more abuse)" (2013: 21).

In this vein, this research has important policy implications, regardless of the original reasons that led to the spatial concentration of IPV. Just as urban scholarship has overwhelmingly ignored violence against women, current urban crime policy focuses on combating street crime. However, this paper indicates that the goals of community policing are relevant to intimate partner violence in addition to street violence; with some adjustments, current practices could effectively address violence against women as well. For example, we know that legal cynicism is associated with higher rates of street crime, independent of other relevant neighborhood characteristics (Kirk & Papachristos 2011). Thus, one of the goals of community policing has been to build trust and relationships between community members and police in order to prevent crime. My research suggests that targeting at-risk neighborhoods to

build trust could also be an effective solution for IPV prevention as well. Ultimately, my research shows that we need a comprehensive response to street violence and IPV, rather than differentiated solutions.

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Table 1: IP Homicide, *Victim* and Incident Characteristics (N=508)

	Both Genders (N=508)	Women (N =335; 65.69%)	Men (N=175; 34.31%)
	Median or Percent	*Median or Percent*	*Median or Percent*
Median Age……	36	35	37
Race/Ethnicity			
Black…….....	73.53	64.18	91.43
Hispanic……...	6.86	8.34	4.00
White…….....	18.84	25.90	4.57
Other…….....	0.77	1.58	0
Relationship with Perpetrator*			
Opposite-sex……	92.71	95.83	86.73
Same-sex……..	7.29	4.17	13.27
Weapon used**			
Firearm……	31.37	40.00	14.86
Knife……	45.69	28.08	79.43
Other weapon……	9.02	12.24	2.86
Location of homicide			
Private residence…….	71.96	71.34	73.14
Public housing…….....	7.45	5.08	12.00
Public way……..	12.55	14.93	8.00

* Offender sex was missing in 181 cases, so percentages here are calculated only for cases where both victim and perpetrator sex were available. There were 329 such cases total; including 113 for male victims and 216 female victims. Note that 100% of the data from 2002-2009 were missing offender sex, and these account for 97.2% of missing cases.

** Percentages here do not add to 100 because in the remainder of cases, no weapon was used (for example, the victim was strangled).

Table 2: Nonfatal Domestic Violence and Violations of Orders of Protection, *Perpetrator* and Incident Characteristics (N=139,581)

	Both Genders (N= 139,581)	Women (N=19,928; 14.28%)	Men (N=119,639; 85.71%)
	Median or Percent	*Median or Percent*	*Median or Percent*
Median Age……..	30	30	32
Race/Ethnicity			
Black…….....	68.59	78.29	66.98
Hispanic…….....	19.85	11.39	21.26
White…….....	10.05	9.06	10.21
Other…….....	1.51	1.26	1.55
Incident Type			
Violation Order of Protection.....	2.03	1.65	2.09
Domestic Battery and Aggravated Domestic Battery……..	97.97	98.35	97.91

Table 3: Neighborhood Summary Statistics, Average Annual Rate for IP Homicide (1994-2011) and Nonfatal DV/VOPs (1999-2012)

Crime Rates Per 1,000 Residents	IP Homicide (N=508)	Nonfatal DV/VOPs (N= 139,581)
Mean ……..	.011	3.84
Standard Deviation…….	.014	2.70
50thth Percentile…….	.007	2.98
75th Percentile……	.016	5.73
90th Percentile……	.030	7.63
99th Percentile ……	.065	11.51
Min. ……..	0	.32
Max……	.075	18.57

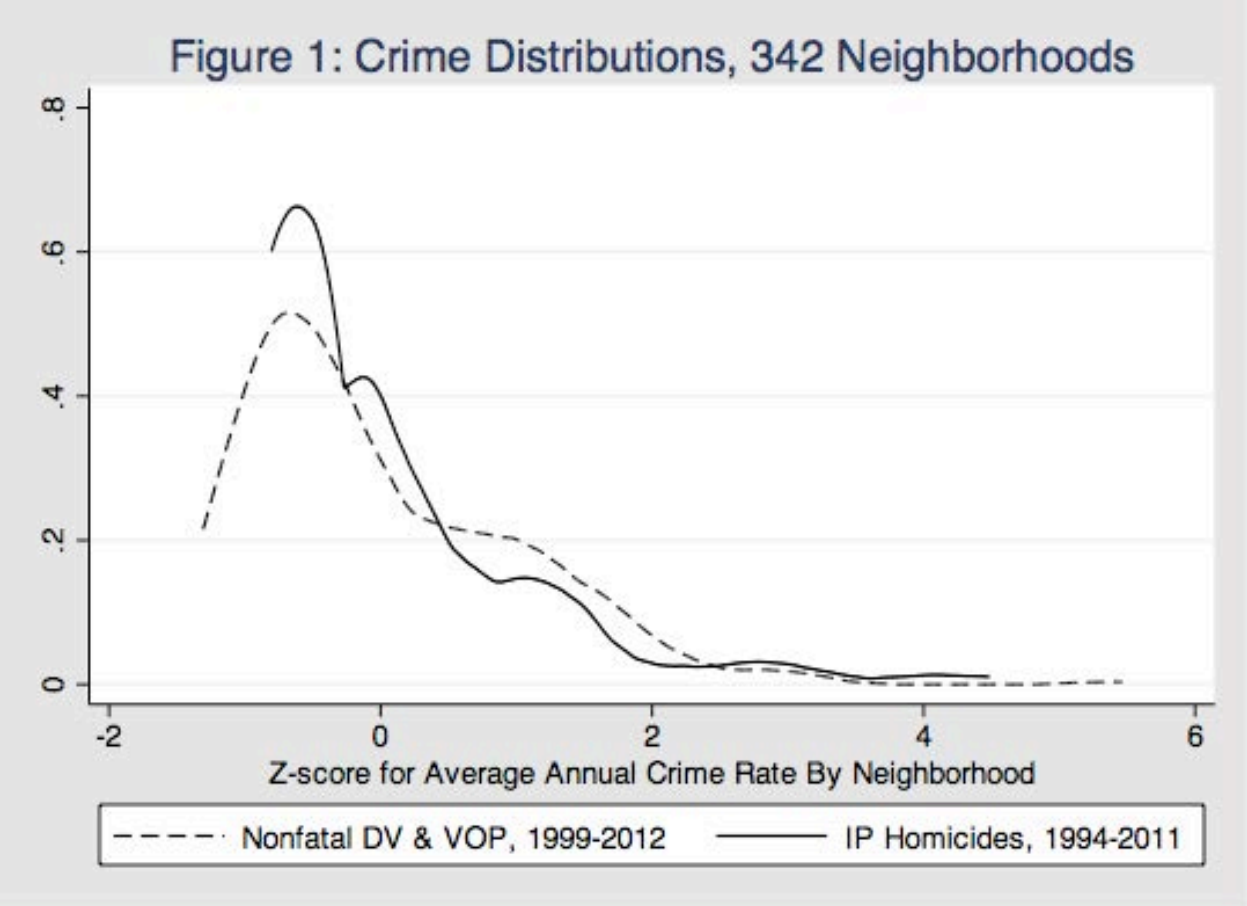
Figure 1: Crime Distributions, 342 Neighborhoods
0
.2
.4
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.8
-2
0
2
4
6
Z-score for Average Annual Crime Rate By Neighborhood
Nonfatal DV & VOP, 1999-2012
IP Homicides, 1994-2011

Figure 2: Average Annual Intimate Partner Homicide Rate By Neighborhood, 1994-2011

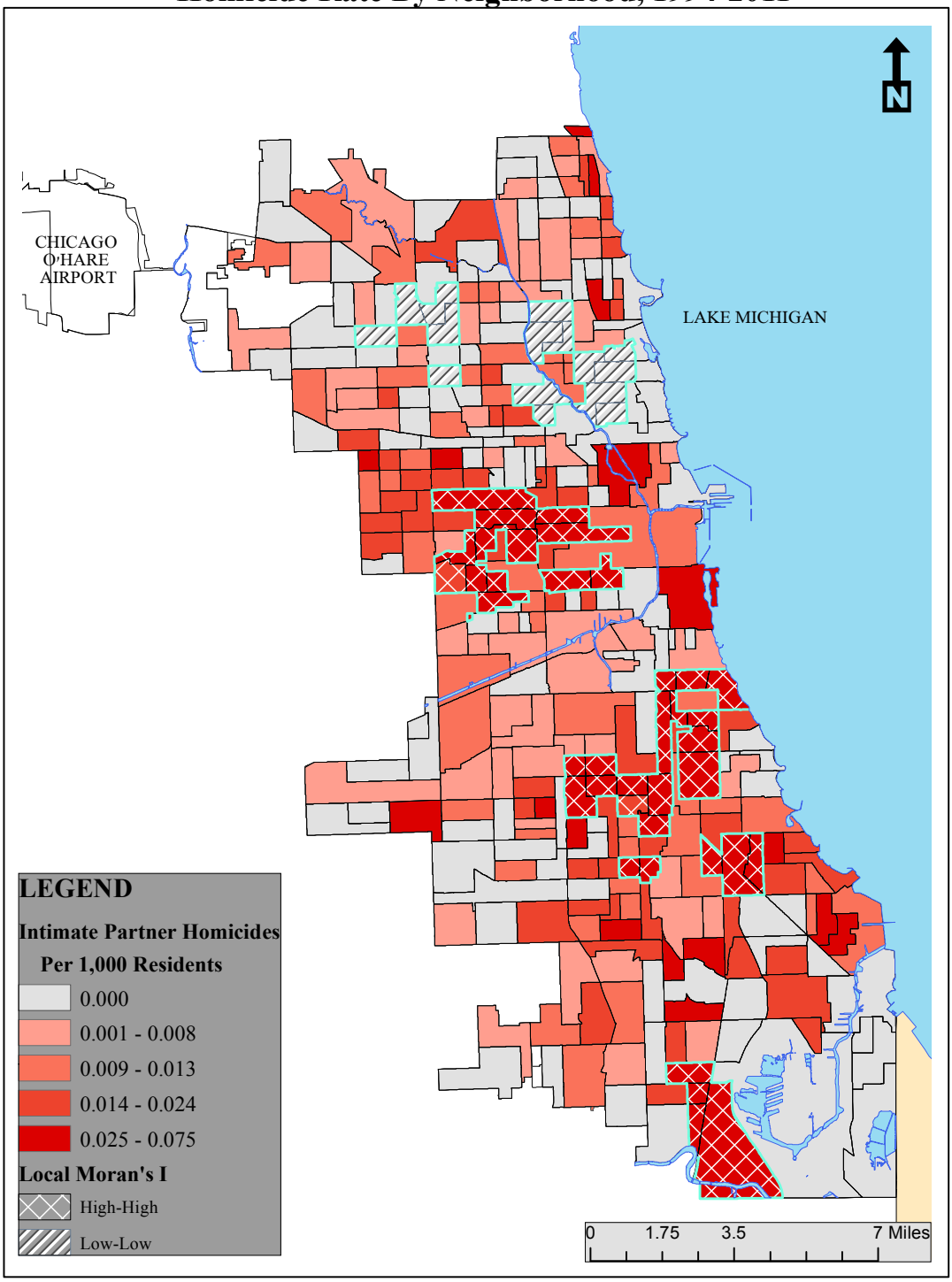


Figure 3: Average Annual Nonfatal Domestic Violence and Violations of Orders of Protection Arrest Rate by Neighborhood, 1999-2012

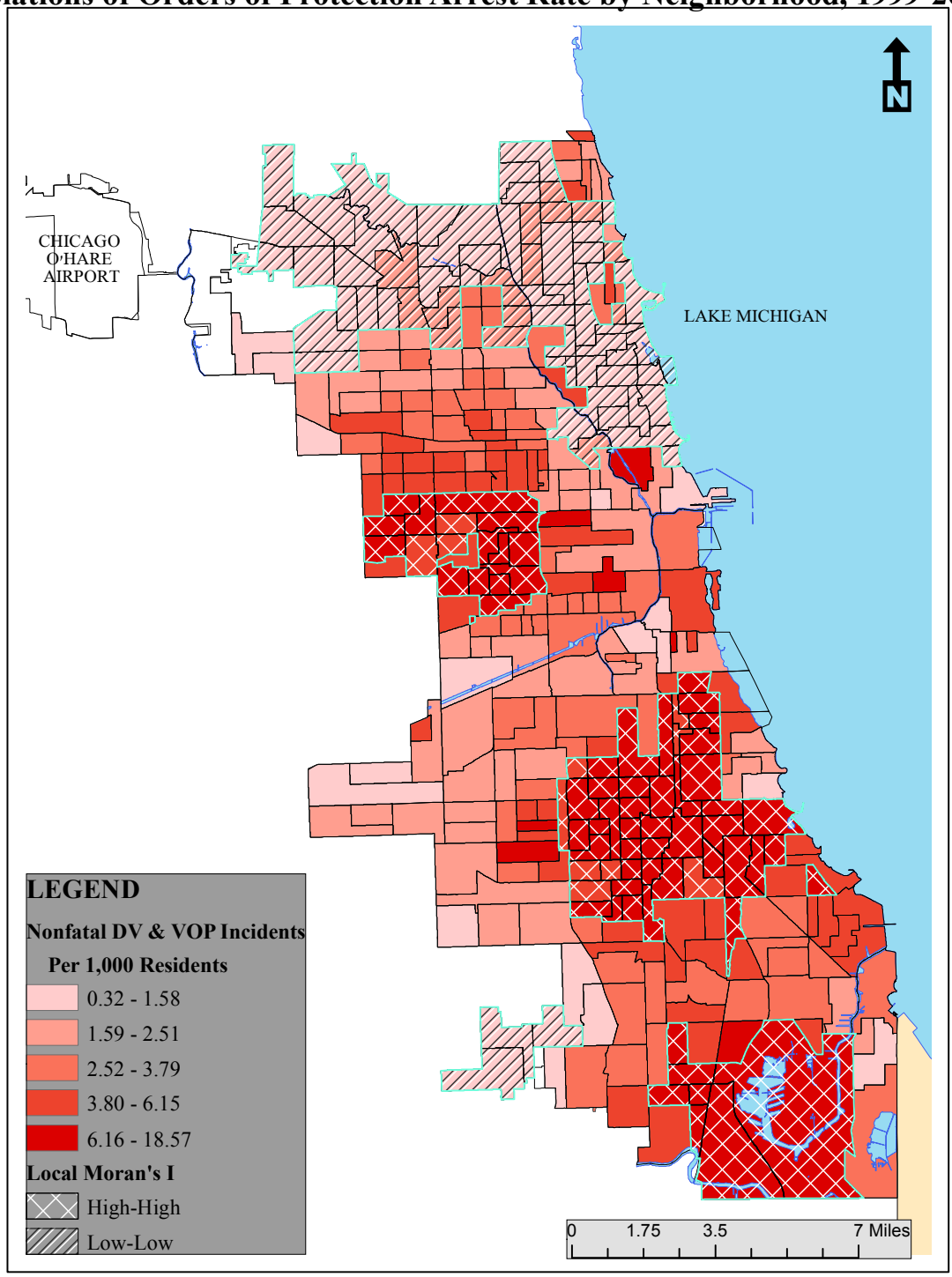
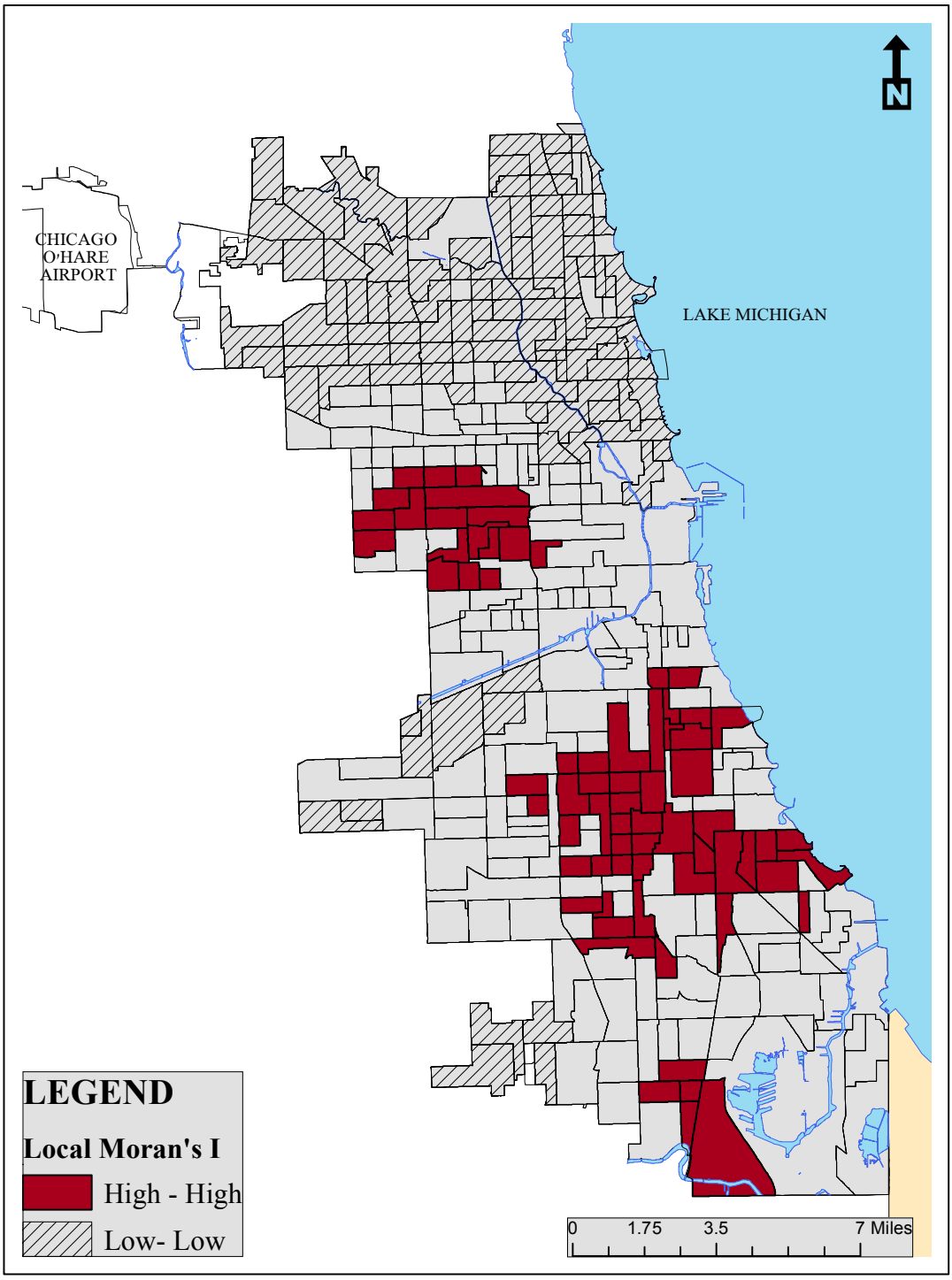


Figure 4: Bivariate Local Moran's I Results, Comparing Average Annual Rates of IP Homicide and Nonfatal Domestic Violence/Violations of Orders of Protection



Notes

[1] The terms IPV and domestic violence are often used interchangeably, but refer to different types of violence. This paper is concerned specifically with IPV, defined as "physical, sexual, or psychological harm by a current or former partner or spouse. This type of violence can occur among heterosexual or same-sex couples and does not require sexual intimacy" (Centers for Disease Control and Prevention[CDC] 2012a). Domestic violence is a broader term that refers to violence by any family or household members, or intimates; thus, IPV may be considered a subtype of domestic violence.

[2] In addition, recent evidence indicates that IPV is an international public health problem: the World Health Organization (2013) estimates that 30% of women globally will be experience IPV in their lifetimes.

[3] This is a conservative estimate: the National Violence Against Women Survey estimates that 1.5 million women are victims to IPV each year (Tjaden & Thoennes 1998). Other surveys estimate these numbers to be far higher.

[4] This percentage has been stable since the 1970s (Rennison 2003). Importantly, IPV can result in death in other ways as well: in addition to homicide, IPV can result in suicide, maternal mortality, and AIDS-related death (Heise, Ellsberg, & Gottmoeller 2002).

[5] Ages 15-44.

[6] Note that this study compared twins, so this difference was net of genetic characteristics. Exposure to violence in the home may be particularly problematic for children's development, given than more diffuse/indirect exposure to neighborhood violence has also been shown to have acute negative impacts on cognitive performance (Sharkey 2010).

[7] By contrast, most studies on neighborhoods and IPV do not use data in which the relative location of neighborhoods is identified; thus, any analyses are likely flawed by not accounting for spatial autocorrelation. A few studies do use data in which the actual neighborhood location is identified; however, the IPV data is limited to a one- or two-year time period, and thus is unable to capture long term trends (for example, see Browning 2002 or Miles-Doan & Kelly 1997).

[8] Additionally, federal urban policy has begun to support neighborhood-based social programs (U.S. Department of Education 2012).

[9] The term concentrated poverty is often used vaguely. To be clear, concentrated poverty is typically measured as the percent of households living below the federal poverty line in a given census tract (Jargowsky 1997). Thus, concentrated poverty can occur in a densely populated area but could also describe a neighborhood where population density is decreasing and there are many vacant lots.

[10] Johnson uses the term domestic violence, but is referring to violence between intimate partners.

[12] The PHDCN includes 343 neighborhood clusters, including 1 that represents Chicago O'Hare Airport. I excluded the Airport neighborhood cluster, as it is not primarily a residential neighborhood (this decision is in line with other studies that use these data; for example, see Papachristos et al. 2011:221.

[13] Note that further analysis is needed to determine if these gender differences are statistically significant.

[14] Not to be confused with the term "triple burden," used by scholars to refer to the disadvantages faced by black women because of gender, race, and class subordination (for example, see Quinn 1993 or the discussion of intersectionality in McCall 2005).