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1968 - 2010 Winnebago County Homicide and Suicide Trends and Disparities

Winnebago County Health Department



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1968-2010 Winnebago County Homicide and Suicide Trends and Disparities

Prepared by Jeffrey B. Wang¹, J. Maichle Bacon²

Abstract

Suicides and homicides are the second and third leading causes of death, respectively, among teenagers and young adults aged 15-24 in Illinois, highlighting the need for studies and analysis on the risk and cultural factors contributing to this phenomenon. This report investigates key trends and demographics in homicides and suicides in Winnebago County. Detailed and compressed mortality records from 1968 to 2010 were evaluated through from the CDC Wide-ranging Online Data for Epidemiologic Research (WONDER) database, along with supplemental information from the State of Illinois and Rockford Police Departments to gain a picture of violent crimes in Winnebago County. Funding identified adolescents and young adults aged 15-34 as more susceptible to gun violence. Additionally racial disparities in homicides are even disproportionately more predominant in Winnebago than within the US. Young African American males aged 15-24 are the most at risk group, being more than 6 times as likely to fall victim to a homicide than the overall average. Furthermore, the proportion of homicides involving firearms has risen since the late '80s and early '90s from 53% to 67%. Many homicides are concentrated on the West Side and Downtown regions of Rockford. For suicides, Winnebago County's average rate from 2006-2010 is significantly higher than the Illinois average but is significantly lower than the national rate. Caucasians are more than twice as likely to commit suicide as any other race, with middle-aged men aged 35-44 as a

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major risk group. Furthermore, over the past decade, there has been an upward trend in suicide by drug overdose and hanging, in comparison with a decrease in other techniques. While far from a comprehensive survey of violence in Winnebago County, the authors hope that this report will inform future interventions in and studies on suicides and homicides and their risk and protective factors.

Introduction

Behind accidental injuries, suicide and homicide are among the three leading causes of death for adolescents and young adults aged 15-24, accounting for approximately 32% of all deaths in that age group in 2010 [1]. It is estimated that these fatalities in 2005 alone cost the State of Illinois over \$2.4 trillion in terms of both medical care and lost lifetime labor [1]. In response to growing concerns regarding intentional self-harm and homicide, Harrison of the Winnebago County Health Department (WCHD) conducted previous studies on suicide and homicide trends from 1979-2005 [2,3]. This report extends this previous analysis by taking a wider interval of time (i.e. 1968-2010) and also addressing in more detail the trends in demographics for homicide and suicide victims.

Methods

The Wide-ranging ONLINE Data for Epidemiologic Research (WONDER) is an open database established by the Centers for Disease Control (CDC) for the public and epidemiologists to analyze public health information. Mortality data for homicides and suicides was collected from CDC WONDER from 1968-2010 [4,5]. To be included, the mortality (1) must be to a resident of Winnebago County, (2) occurred within Winnebago County and (3) have the primary cause of death coded as suicide or assault (ICD-10: X60-Y09, ICD-9: E950-969, ICD-8: E950-969), in accordance with previous studies conducted by WCHD [3]. Rates are calculated according to 100,000 group-specific population (e.g., gender, race, age-group, etc.). In some cases, CDC WONDER

suppressed the number of mortalities for privacy concerns in the event that there were a small number of fatalities in a specific category. The Illinois State Police Uniform Crime Reports from 1996-2010 were also analyzed to provide the number of homicides and assaults each year [6]. Data on the location, age, race, and gender of homicide victims reported to the Rockford Police Department were also obtained through a FOIA request. Data analysis was conducted in Mathematica, MS Excel, and the Google Maps API.

Results

Homicides

From 2006-2010, there have been a total of 94 homicides, with an average rate of roughly 6.4 per 100,000 population. This is marginally (but not statistically significantly) higher than national average (5.7, $p=0.146$) and is comparable with the average in Illinois (6.6, $p=0.373$). Figure 1 shows the changes in homicide rates over time and five-year moving averages to account for year-to-year variability. The data shows that the number of homicides have increased up to about 1998, at which point, the number of homicides have decreased during the earliest 2000s and has been increasing during the past five years, in contrast to other trends in Illinois and in the United States. Furthermore, the proportion of the homicides involving a firearm has increased significantly from the late '80s (49%) to the late 2000s (62.8%, $p < 10^{-10}$). Although trends in firearm homicides are closely correlated with those of total homicides, the proportion of homicides involving a firearm dipped during the '80s and then increased during the early '90s to reach a relatively constant level in the 2000s (Figure 2)

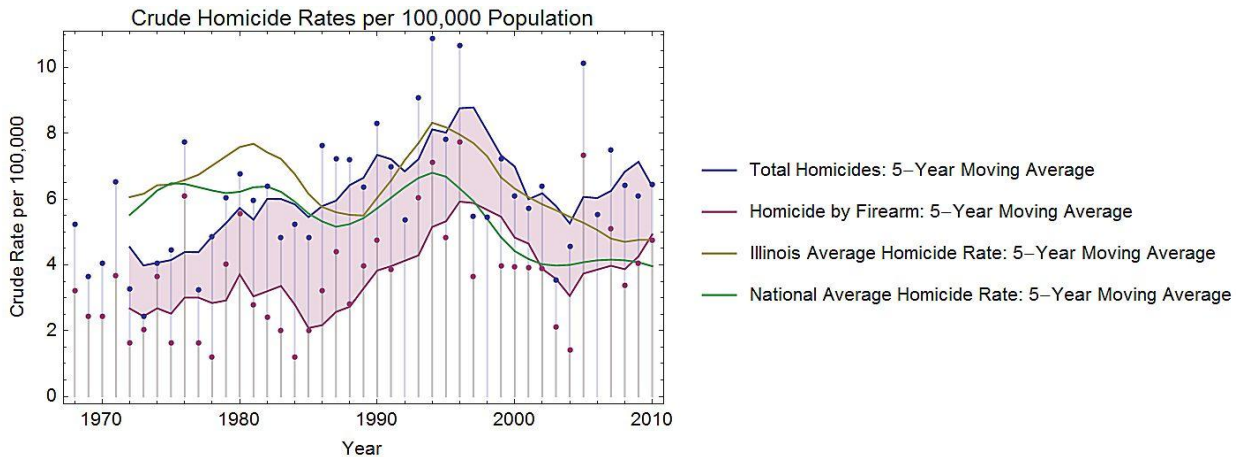


Figure 1: 1968-2010 Annual Homicides in Winnebago County. Population rates are estimated based on bridged-race census counts and post-census estimates as determined by the CDC and National Center for Health Statistics. Number of homicides by firearm in 1992, 1998, and 2006 were suppressed for privacy concerns due to low numbers.

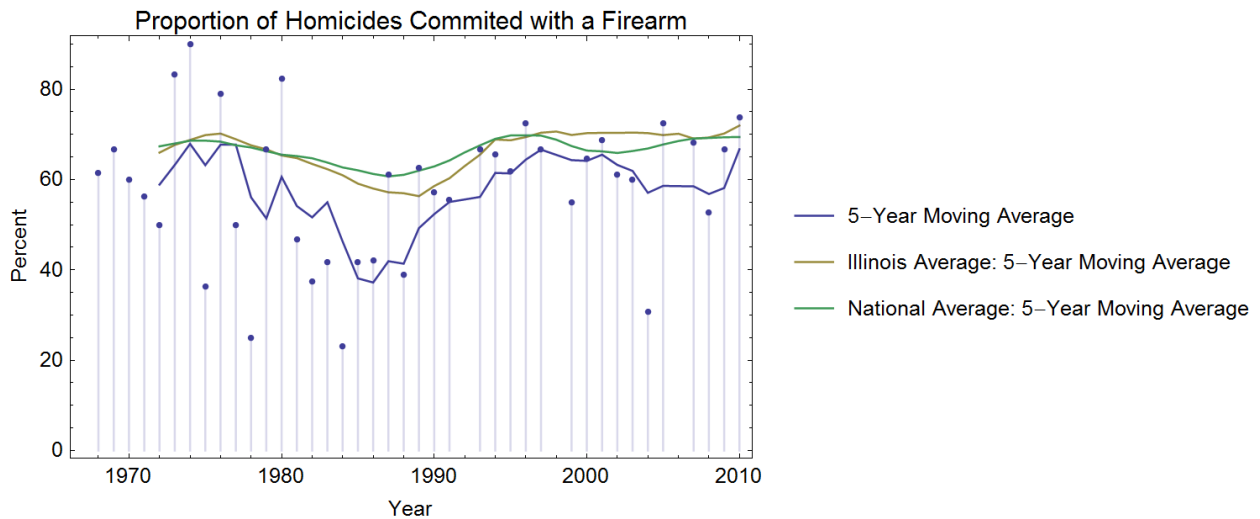


Figure 2: Trends in the proportion of homicides committed with a firearm.

Similar trends have been identified in violent crimes in general. The number of assaults in Winnebago reported to the police has also dipped in the early 2000s and then rose again towards the end of the decade (Figure 3). Also, assault and homicides tend to be correlated; the ratio of murders to assaults as reported to the police has remained relatively constant during the past decade (Figure 4). This suggests, although does not confirm, that the problems and factors contributing to homicides may also be characteristic of other violent crimes.

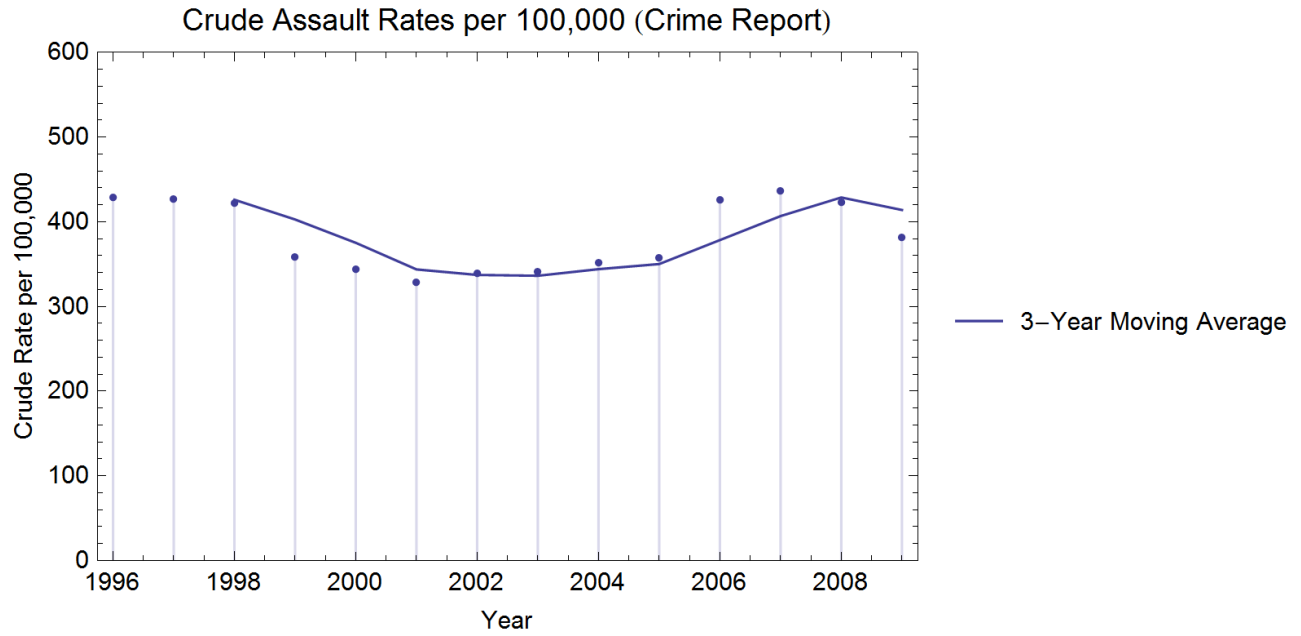


Figure 3: Number of assaults annually reported to police departments in Winnebago County from 1968 to 2009

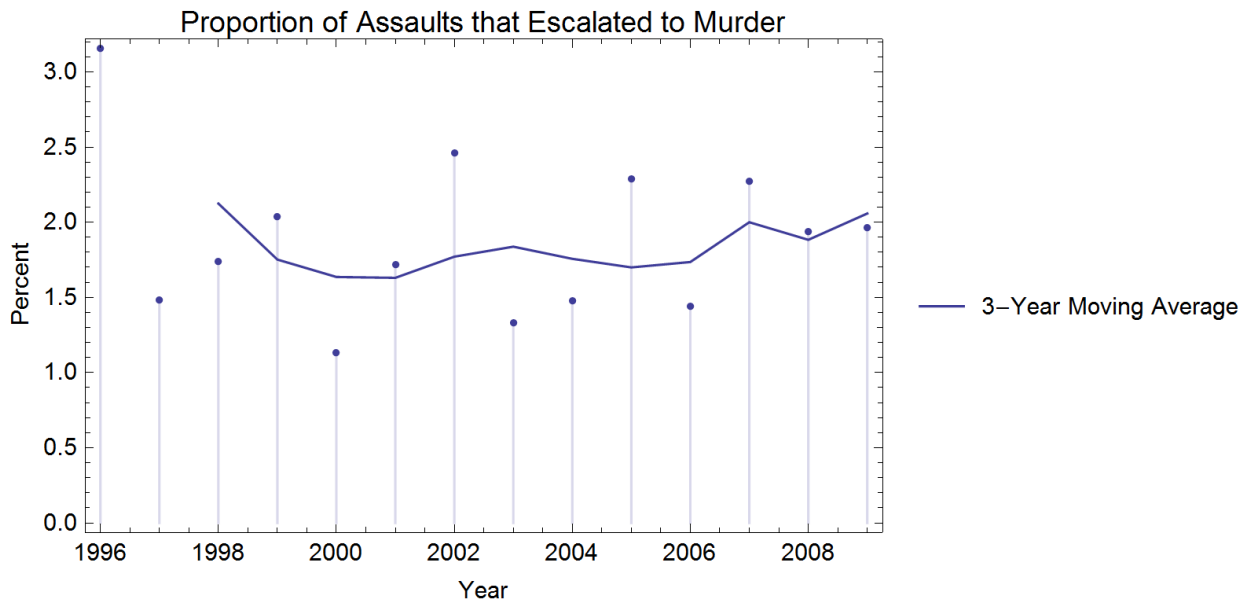


Figure 4: Annual proportion of assaults that escalate to a murder as reported to police departments in Winnebago County annually from 1968 to 2009

Demographics of homicide victims, compiled in five-year segments, are summarized in Table 1. Notably, African Americans in Winnebago County are eight times more likely than Caucasians and six times more like than other racial and ethnic groups to fall victim to a homicide from 2006-2010. It is important to note that this disparity is especially pronounced within Winnebago County as compared to the United States. The average homicide rate among African Americans in Winnebago County from 2006-2010 is 26.7, which is statistically significantly lower than the rate in the United States, 20.2 ($p=0.04$). On the other hand, the homicide rate among whites and other races is comparable with the United States. The homicide rate among adolescents and young adults aged 15-34 is more than twice the average rate in Winnebago County.

5 Year Demographics of Homicide Victims

		1986-1990		1991-1995		1996-2000		2001-2005		2006-2010	
		Percent (n=92)	Rate (avg=7.3)	Percent (n=106)	Rate (avg=8.0)	Percent (n=95)	Rate (avg=6.9)	Percent (n=88)	Rate (avg=6.2)	Percent (n=94)	Rate (avg=6.4)
Sex											
	Female	30.4	4.3	19.8	3.1	20.0	2.7	20.5	2.5	18.1	2.3
	Male	69.6	10.5	80.2	13.3	80.0	11.3	79.5	10.1	81.9	10.7
Race											
	Black	39.1	31.7	52.8	43.1	50.5	32.3	45.5	24.0	54.3	26.7
	White	60.8	5.0	47.2	4.3	49.4	3.9	53.4	3.9	43.6	3.3
	Other	0.0	0	0.0	0.0	0.0	0.0	1.1	2.7	2.1	4.5
Hispanic											
	Yes	N/A*	N/A*	N/A*	N/A*	13.9	13.5	16.7	11.9	10.6	6.6
	No	N/A*	N/A*	N/A*	N/A*	86.1	6.0	83.3	5.7	88.6	6.4
Age											
	15-24	45.7	23.4	36.8	23.0	16.9	21.6	27.3	13.0	29.8	14.7
	25-34	19.6	8.3	34.9	17.3	30.5	14.9	26.1	12.4	26.6	13.6
	35-44	19.6	9.9	14.2	7.1	18.6	8.2	17.0	7.0	13.8	6.3
	Other	15.1	2.1	14.1	2.1	33.9	3.8	29.6	3.1	29.8	3.1
Cause of Death											
	Unspecified										
	Firearm	49.0	3.6	55.7	4.5	61.0	4.2	62.5	3.9	62.8	4.0
	Sharp Object	23.9	1.8	10.4	4.5	20.0	1.4	13.6	0.8	11.7	0.7
	Other	27.1	2.0	33.9	2.7	18.9	1.3	23.9	1.5	25.5	1.6

*Data unavailable because Hispanic origin was not documented at that time under the ICD-09 System

Table 1: 1986-1990 Five-Year Homicide Victim Demographics in Winnebago County by Percent and Mortality Rate. Rates are per 100,000 population of that specific group.

The age disparities for homicides rates are seven to ten fold higher in African Americans in comparison to the white rate (Table 2). As can be seen, African Americans aged 15-34 are more than twice as likely than the average African American to fall victim to a suicide, whereas for Caucasians the phenomenon is not nearly as apparent. Figure 5 illustrates the proportion of the homicides attributed to a specific group based on race, again illustrating how age disparities are especially apparent within African Americans. Homicide is the leading cause of death among African American teens, accounting for almost 50% of deaths in that age and racial category in the Midwest. Furthermore, the proportion of teenagers killed with a firearm from 2006-2010 is much higher than the average in Winnebago County, regardless of race (78.6%, $p=0.04$). This highlights the prevalence of gun violence and perhaps violence apathy among our youth, a social problem that could be targeted by educational programs and legislation.

Race	Age Group	Homicides	Rate
Black	15-24	42	59.4
	25-34	35	60.4
	35-44	17	31.1
	Other	13	5.5
	Total	107	25.5
White	15-24	22	6.1
	25-34	22	5.9
	35-44	18	4.1
	45-54	16	3.6
	Other	30	2.3
	Total	108	3.7

Table 2: Age demographics of homicides from 1998-2010 according to race. Rates are per 100,000 population of the specific group

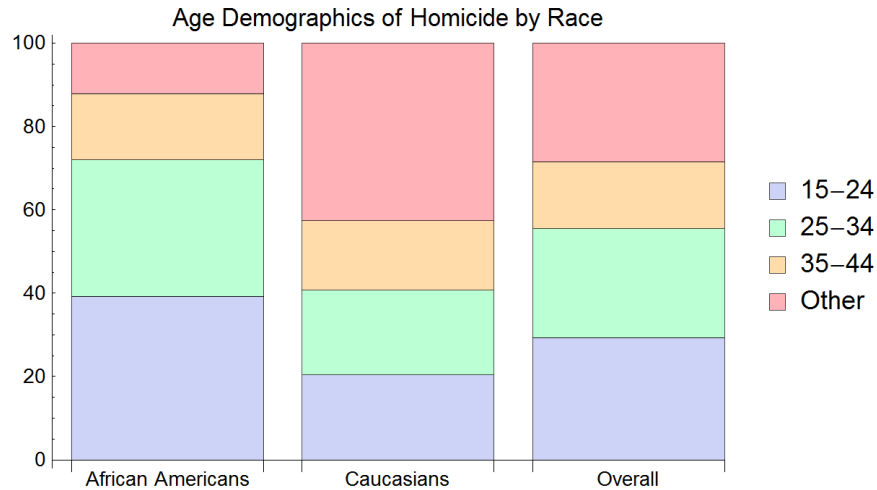


Figure 5: Proportion of Homicides associated with each age group, according to race

Finally, a spatial analysis of homicides reported to the Rockford Police Department indicate the disproportional distribution of homicides in Rockford for the period of 2005-2012 (Figure 6). The ZIP Codes 61101 and 61104 are both especially affected, with homicide rates at least three times the average for Winnebago County as a whole. The ZIP Codes 61102 and 61103 are two other “risk zones” for homicides. These trends were relatively consistent each year for which the data was available (i.e. 2005-2012, Table 3). An interactive version of the map can be accessed on the WCHD website for more details and higher resolution. This data can be helpful for future targeted intervention and an increased police presence to discourage violent activity. This is being reflected in the City Police Department’s Community Policing efforts and through increased attention to weeding out crime (e.g. former Weed and Seed Initiative in Ellis Heights and Kishwaukee Corridor areas).

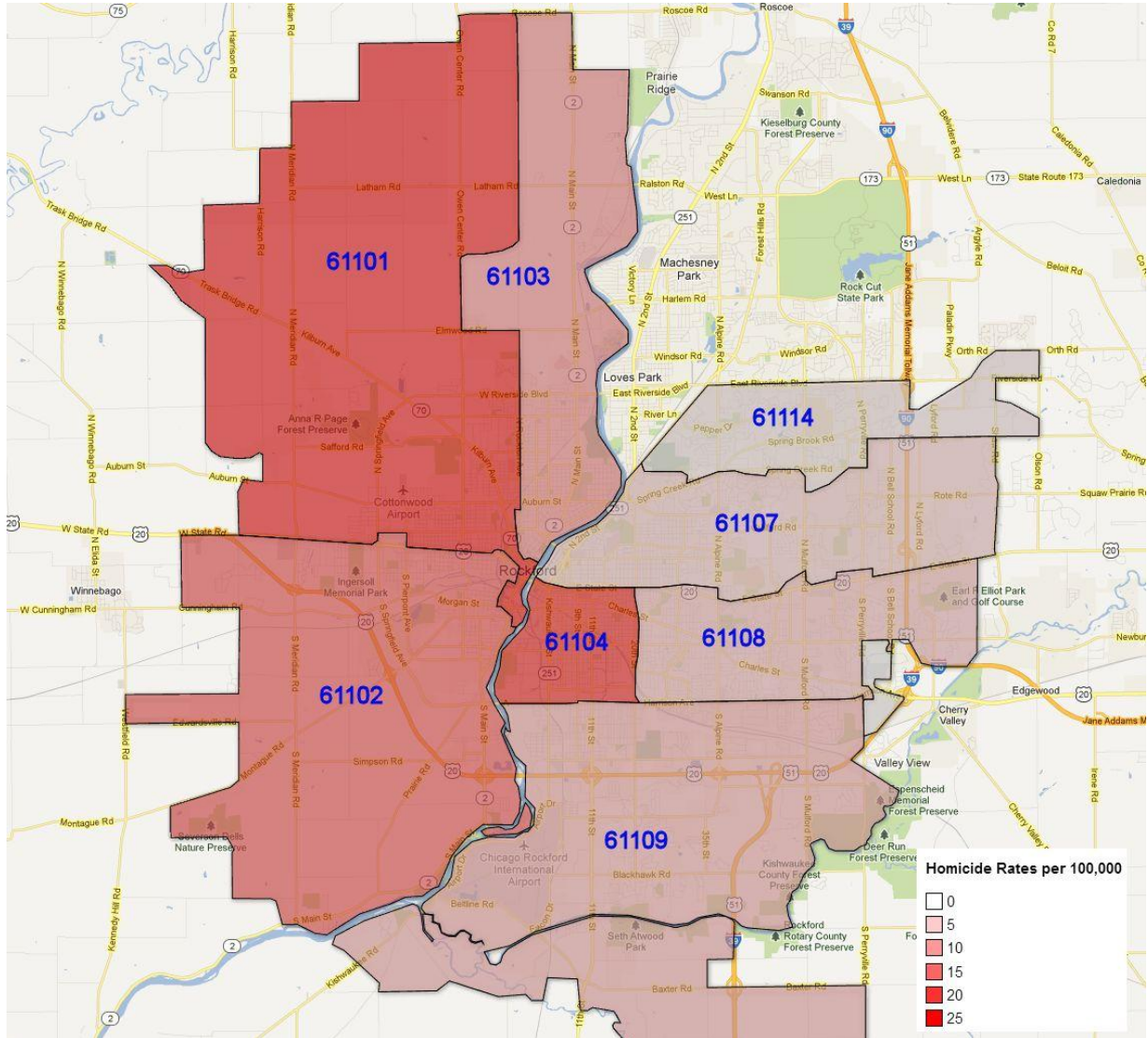


Figure 6: Homicide rates per 100,000 from 2005-2012, subdivided by ZIP Codes in Rockford, IL. An interactive map is available on the WCHD website.

Distribution of Homicides in Rockford by ZIP Code

ZIP Code		61101	61102	61103	61104	61107	61108	61109	61112	61114
Summary	Percent (n=159)	24.5%	17.0%	13.2%	20.1%	6.3%	7.5%	10.1%	0.0%	1.3%
	Rate (avg=9.7)	22.6	16.4	10.7	20.8	4.1	5.3	7.1	0.0	1.6
2005	Percent (n=20)	20.0%	20.0%	15.0%	30.0%	0.0%	5.0%	10.0%	0.0%	0.0%
	Rate (avg=9.8)	18.5	19.5	12.2	31.1	0.0	3.5	7.1	0.0	0.0
2006	Percent (n=19)	21.1%	21.1%	15.8%	31.6%	0.0%	0.0%	10.5%	0.0%	0.0%
	Rate (avg=9.3)	18.5	19.5	12.2	31.1	0.0	0.0	7.1	0.0	0.0
2007	Percent (n=20)	20.0%	20.0%	20.0%	20.0%	5.0%	0.0%	15.0%	0.0%	0.0%
	Rate (avg=9.8)	18.5	19.5	16.3	20.8	3.3	0.0	10.6	0.0	0.0
2008	Percent (n=23)	17.4%	13.0%	13.0%	17.4%	13.0%	17.4%	8.7%	0.0%	0.0%
	Rate (avg=11.2)	18.5	14.6	12.2	20.8	9.9	14.0	7.1	0.0	0.0
2009	Percent (n=20)	25.0%	10.0%	20.0%	5.0%	15.0%	15.0%	10.0%	0.0%	0.0%
	Rate (avg=9.8)	23.2	9.7	16.3	5.2	9.9	10.5	7.1	0.0	0.0
2010	Percent (n=21)	19.0%	23.8%	4.8%	19.0%	4.8%	9.5%	14.3%	0.0%	4.8%
	Rate (avg=10.3)	18.5	24.3	4.1	20.8	3.3	7.0	10.6	0.0	6.3
2011	Percent (n=22)	40.9%	9.1%	13.6%	18.2%	4.5%	0.0%	9.1%	0.0%	4.5%
	Rate (avg=10.7)	41.7	9.7	12.2	20.8	3.3	0.0	7.1	0.0	6.3
2012	Percent (n=14)	35.7%	21.4%	0.0%	21.4%	7.1%	14.3%	0.0%	0.0%	0.0%
	Rate (avg=6.8)	23.2	14.6	0.0	15.6	3.3	7.0	0.0	0.0	0.0

Table 3: Distribution of homicides in Rockford according to ZIP Code. Rates are by 100,000 population.

Suicides

The average suicide rate in Winnebago from 2006-2010 is 10.1 per 100,000 population, which is significantly greater than the rate in Illinois (6.6, $p < 10^{-5}$) but less than the rate in the United States (11.8, $p = 0.020$). For the past two decades, the suicide rate has been lower than during the '70s and '80s (Figure 6). The number of suicides by firearm has remained relatively constant over time, which led to an increased proportion of suicides committed with a firearm up to about the '90s, and then declined in the second half of the past decade (Figure 7).

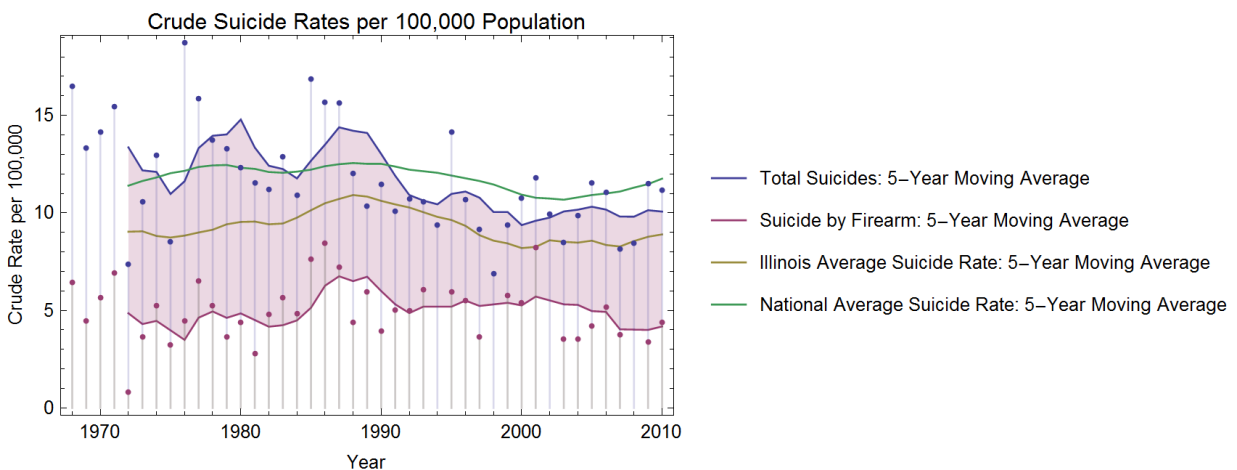


Figure 6: Annual trends in suicide rates per 100,000 population in Winnebago County

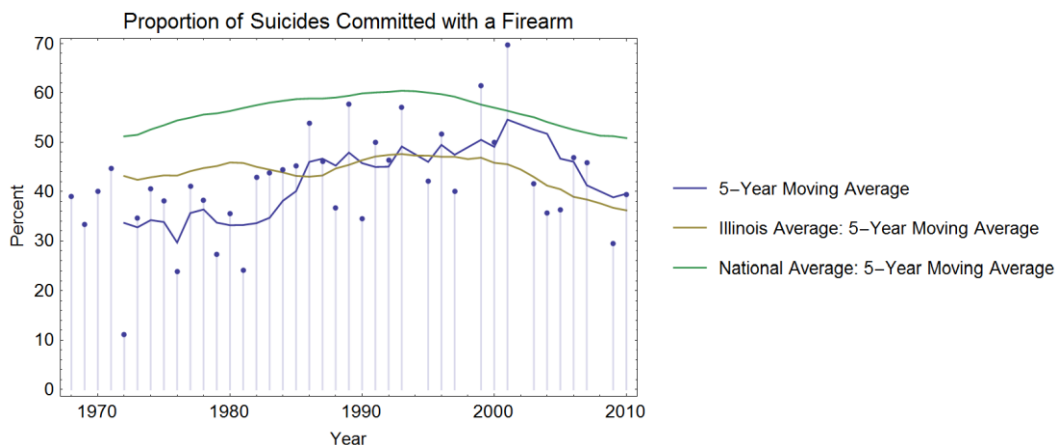


Figure 7: Trends in the proportion of suicides committed with a Firearm

The demographics of suicides are summarized in Table 4. The vast majority of suicides were Caucasian, who are twice as likely to commit suicide as other racial and ethnic groups. The average rate for African Americans from 2001 to 2010 was 4.2. This finding is in line with other studies done in Illinois [7]. This demographic breakdown is in line with phenomena observed nationally and in the State of Illinois, after correcting for differences in suicide rates established above. Men are more than 4 times as likely to commit suicide as females. Male gender and being middle-aged 34-54 are the two highest risk factors, being 1.7-1.8 times more likely to commit suicide than average. The two leading methods for committing suicides are firearms and hanging. However, in recent years the proportion of suicides committed with a firearm appears to be decreasing. Instead, more people are committing suicide by asphyxiation and drug overdose. While the proportion of suicides committed by drug overdose is still low, the relatively rapid increase in their use does indicate that further studies should be conducted on how they are being used and what risk factors should be taken into account when dispensing potentially harmful medication. Furthermore, better breakout on the types of drugs and medications used could be illuminating. The age disparity in gun violence observed for homicides is not seen in suicides.

		5 Year Demographics of Intentional Suicide Victims									
		1986-1990		1991-1995		1996-2000		2001-2005		2006-2010	
		Percent (n=163)	Rate (avg=13.0)	Percent (n=145)	Rate (avg=11.0)	Percent (n=95)	Rate (avg=6.9)	Percent (n=146)	Rate (avg=10.3)	Percent (n=148)	Rate (avg=10.1)
Sex											
	Female	23.3	5.9	20.7	4.4	21.7	2.0	24.0	4.8	18.9	3.7
	Male	76.7	20.6	79.3	17.9	78.3	7.3	76.0	16.1	81.1	16.7
Race											
	Black	8	11.5	N/A [†]	N/A [†]	N/A [†]	N/A [†]	N/A [†]	N/A [†]	N/A [†]	N/A [†]
	White	91.4	13.3	95.9	11.9	93.8	8.8	94.5	11.4	91.9	11.0
	Other	0.6	6.0	4.1	3.9	6.2	4.0	5.5	3.9	8.1	5.1
Hispanic											
	Yes	N/A*	N/A*	N/A*	N/A*	0.0	0.0	3.4	4.2	4.1	3.9
	No	N/A*	N/A*	N/A*	N/A*	100.0	10.1	96.6	10.9	95.9	10.8
Age											
	15-24	17.2	15.3	15.9	13.9	7.1	5.7	7.5	6.0	12.8	10.0
	25-34	23.9	18.0	24.8	16.9	26.8	19.4	17.8	14.0	16.2	13.0
	35-44	12.3	11.0	12.4	8.6	26.8	16.8	26.0	17.8	25.0	18.3
	45-54	13.5	17.4	13.1	12.5	8.9	6.6	24.0	17.1	25.0	16.9
	55-64	8	11.5	6.9	9.0	14.2	16.3	8.9	9.2	12.8	11
	Other	25.1	9.4	26.9	12.0	16	4.6	15.8	4.7	8.1	2.4
Cause of Death											
	Self-Poisoning with drugs	N/A [†]	N/A [†]	N/A [†]	N/A [†]	3.5	0.4	5.4	0.6	7.4	0.8
	Self-Poisoning with gas and vapours	18.4	2.4	15.9	1.7	12.5	1.3	6.1	0.6	6.8	0.7
	Hanging, Strangulation, and Suffocation	13.5	1.8	15.9	1.7	21.4	2.2	33.6	3.5	30.4	3.1
	Firearm Discharge	42.9	5.5	41.4	4.5	46.4	4.7	37.7	3.9	32.4	3.3
	Other	25.2	3.3	26.8	3.1	16.0	1.6	17.2	1.7	23.0	2.3

*Data unavailable because Hispanic origin was not documented at that time under the ICD-09 System

[†]Data suppressed in the event that there are not enough cases to ensure anonymity of the data. In this case, the fatalities in this category is pooled with "Other"

Table 4: Five-Year Suicide Victim Demographics in Winnebago County by Percent and Mortality Rate. Rates are per 100,000 population of that specific group.

Conclusions

This report has identified several trends and demographic issues with violence in Winnebago County. For homicides, it is clear that over the past few decades that the proportion of homicides from firearms has increased. Future studies should cooperate with the Illinois State Police and Bureau of Alcohol, Tobacco, Firearms, and Explosives (ATF) to determine whether or not there is an association between the number of gun owners or recovered illegal weapons and the number of gun-related homicides. Illinois does not enforce any type of gun registration, so it is impossible to determine how many guns are available in Illinois. The authors wish that hospitals can document the type of weapon (i.e. handgun, shotgun, rifle, etc.) and calibers involved rather than simply using the ICD code corresponding to “Unspecified Firearm” as to help better understand the influence of different types of weapons. African Americans, males, and young adults aged 15-34 are all risk groups for homicides. The age-specific disparity in homicide rates is particularly dramatic within African Americans. Furthermore, a substantially higher than average proportion of teenager homicides is attributed to firearms, and needs evaluation for potential intervention strategies. Homicides are geographically concentrated and provide for targeted intervention and other tactics intended to prevent future homicides. Potential future studies could investigate education, income, employment, etc. to identify other cultural factors that contribute to this disparity.

For intentional self-harm, Caucasians and middle-aged men reflect some of the largest risk groups. The disparity between Caucasians and other racial and ethnic groups could be a potential future area for study, along with factors leading up to

suicide. Growing methods for suicide include drug overdose and hanging/suffocation, and it remains to be elucidated which factors contribute to various causes of deaths.

This report is intended as a broad overview of the trends and demographics characteristic of homicides and suicides within Winnebago County. Several weaknesses of the analysis include the privacy constraints that were imposed by the CDC WONDER database. Future efforts could be directed towards establishing a complete database for Winnebago County and/or participating in the Illinois Violent Death Reporting System (IVDRS). The authors hope that this report can be used as a springboard for more detailed investigations into the risk and protective factors underlying violent deaths and devising appropriate intervention strategies.

Acknowledgements

This updated epidemiological assessment of homicide and suicide trends in Rockford and Winnebago County was undertaken in part because of the recently formed Rockford Police Chief's Homicide Reduction Workgroup and Winnebago County Board Chairman's Public Safety Summit (January 2013). Public health surveillance and assessment of risk and protective factors affecting health and longevity inform preventive interventions that are to the extent possible evidence-based and logical and provide a baseline from which to monitor and refine future actions.

WCHD is grateful for the work of Jeffrey Wang, the principal author of this evaluation. Mr. Wang is a Rockford native and product of the Rockford Public Schools, and now a student at Harvard University in Applied Mathematics (AB, Baccalaureate), and in Computational Sciences and Engineering (SM, Science Masters, 2015), which is a combined degree program. Mr. Wang is a young Epidemiology Scholar funded through the RWJ Foundation and College Board, with the education goal to pursue doctoral studies (PhD/MD).

Mr. Wang volunteered to undertake this study at the request of WCHD and through his resourcefulness completed this work over the 2012/2013 University holiday break. WCHD is appreciative of the epidemiological competencies Mr. Wang has exhibited in updating and expanding on the original 1979-2005 Homicide and Suicide Trends Report of Kristen Harrison, former WCHD epidemiologist. WCHD looks forward to the promising professional career of Mr. Wang and future contributions to preventive health interventions knowledge base.

This report would not have been possible without the data made available from the Rockford Police Department (RPD), Illinois State Police (ISP), and the Centers for Disease Control and Prevention (CDC). The authors would like to thank Kim Binder and Becky Bartkowicz of the Crime Analysis Unit at RPD for releasing (Freedom of Information Request) the zip code data for homicides in Rockford.

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