GIS and Statistical Analysis of Winona County Underage Alcohol Offenses in the Wake of Judicial Policy Change

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Abstract

A Judicial Council policy implemented January 1, 2009 changed the way Winona County, Minnesota USA District Court responds to underage alcohol consumption offenses. Since that time it is believed the criminal justice system is responding to more serious offenses, more repeated offenses, and in different locations than before the policy. Data were gathered for underage consumption offenses occurring in the two years preceding and two years after the policy change (2007-2010) and analyzed statistically as well as using ArcMap's kernel density tool. Results indicate that offenders were not charged with more offenses following the policy change; actually being charged with fewer, with the majority of offenders being charged with no further alcohol offenses. Location of offenses did shift, with offenses becoming more concentrated in a smaller area than earlier. Most strikingly, though average alcohol concentration levels remained constant between the two periods, a greater proportion of adult underage consumption offenses were high severity offenses following the policy implementation. The criminal justice system has seen changes in recidivism, location, and severity since the Judicial Council policy was implemented—all of which would benefit from further research into the factors contributing to those trends.

Introduction

Alcohol is the most widely used substance of abuse among underage persons in the United States (U.S. Department of Health and Human Services, 2012). More underage persons use alcohol than use tobacco or other drugs combined (U.S. Department of Health and Human Services). Underage consumption prevalence has been the subject of much research.

Research shows underage persons generally consume alcohol less frequently and in less quantity overall than legal drinkers, though they are more likely to binge drink (U.S. Department of Health and Human Services, 2012). Survey results show 43 percent of legal drinkers report at least one occasion of heavy drinking within the past month, compared to 50 percent of 12- to 14-year-old drinkers and 72 percent of 18-20 year-old drinkers (Pacific Institute for Research and Evaluation, 2002). Ninety-six percent of the alcohol consumed by 18- to 20-year-olds is consumed by those engaging in heavy drinking (Pacific Institute for Research and Evaluation). Eighty-two percent of college students, most of whom are under the age of 21, report consuming alcohol, with 37 percent consuming five or more alcoholic beverages on at least one occasion in the preceding two weeks (Johnston, O'Malley, Bachman, and Schulenberg, 2011).

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In Minnesota, 27.3 percent of persons 12- to 20-years-old reported alcohol consumption within the preceding month, with 19.9% reporting binge alcohol use (U.S. Department of Health and Human Services, 2012). For persons aged 18 to 20, the numbers are 53.1 percent and 43.4 percent, respectively (U.S. Department of Health and Human Services).

When it comes to evaluating public health policy, the minimum legal drinking age (MLDA) is the most well studied (Wagenaar and Toomey, 2002). In a review of all research relating to the minimum legal drinking age, Wagenaar and Toomey determined research showed the most successful effort in reducing underage consumption of alcohol has been the increase in legal drinking age to 21 years of age.

Underage alcohol consumption "threatens the immediate and long-term development, well-being, and future mental development of young people" (U.S. Department of Health and Human Services, 2012). Consequences of underage consumption include: alcohol-related traffic crashes and fatalities, other unintentional injuries such as burns and drowning, increased risk of suicide and homicide, physical and sexual assault, academic and social problems, inappropriate and/or risky sexual activity, and adverse effects on the developing brain (U.S. Department of Health and Human Services). Alcohol is the leading contributor to fatal injuries in underage persons (U.S. Department of Health and Human Services). In particular, motor vehicle crashes are the single greatest mortality risk for underage drinkers (Johnston *et al*., 2011).

The age at which a person begins consuming alcohol has been found to affect whether they will at some point be classified as alcohol dependent. Grant and Dawson (1997) found more than 40 percent of those who consumed their first alcoholic beverage before age 13 were classified as alcohol dependent later. Rates decreased to 24.5 and 16.6 percent for those who did not consume alcohol until the age of 17 or 18, respectively, with only 10 percent who consumed their first alcoholic beverage at age 21 or older later being deemed alcohol dependent (Grant and Dawson, 1997).

Society as a whole also feels the consequences. In 2009, 40 percent of those killed in traffic crashes with a 15- to 20-year-old driver who had a blood alcohol concentration of 0.08 or more were persons other than the drinking driver (U.S. Department of Health and Human Services). Between 2001 and 2005 in Minnesota, 63 deaths of persons under the age of 21 were attributable to alcohol (U.S. Department of Health and Human Services). In 2006, nearly $27 billion was spent as a result of excessive underage alcohol consumption (Bouchery, Harwood, Sacks, Simon, and Brewer, 2011).

Over the past century, the federal, state, and local governments in the United States have passed numerous laws attempting to quell issues that arise from consumption of alcohol. On December 17, 1917, the 18th Amendment to the United States Constitution was passed by Congress, prohibiting the manufacture, sale or transportation of intoxicating liquors for beverage purposes within the United States (United States Constitution, Amendment XVIII). The 18th Amendment was ratified by the states as of January 16, 1919, and became effective one year later (United States Constitution, Amendment XVIII). In 1933 the 18th Amendment was repealed by the 21st Amendment, allowing transportation of intoxicating liquors

throughout the country, unless an individual State passed a law to the contrary (United States Constitution, Amendment XXI).

On July 1, 1971, the 26th Amendment to the United States Constitution was ratified by the States, lowering the age for a citizen to vote from 21 to 18 (United States Constitution, Amendment XXVI). Following this Amendment, 29 states also decided to lower the MLDA to 18, 19, or 20 years old (Voas and Fell, 2010).

Less than a decade later, research began to show the decision to reduce the MLDA to 18 increased the number of impaired-driving crashes. In response, many states began to raise their MLDA. However, the changes were not uniform. States set different ages as their MLDA. Some states simply placed restrictions on the type of alcohol that could be consumed by those below the MLDA (Voas and Fell, 2010; U.S. Department of Health and Human Services, 2012). When research further showed impaired-driving crashes were reduced in states with a MLDA of 21, the Federal Government passed a law providing incentive for all states to follow suit (Voas and Fell). In 1984, Congress passed the National Minimum Drinking Age law, which withheld 10% of federal highway funds from states where it was legal for a person under the age of 21 to purchase or possess an alcoholic beverage (23 U.S.C.A. § 158). By 1987 all states had raised their MLDA to 21 (U.S. Department of Health and Human Services, 2012).

In 1985, the State of Minnesota complied with federal law and passed a State law making it a crime for a person under the age of 21 to consume or possess alcoholic beverages, unless the person was at their parent's home and doing so with their parent's consent (Minnesota Statutes Annotated § 340A.503). This offense was added to the Statewide Payable List, a uniform fine schedule setting fines for petty misdemeanor and certain misdemeanor-level offenses (Minnesota Rules of Criminal Procedure, Rule 23.03, subd. 2(1)).

However, not all jurisdictions limited underage consumption consequences to the payment of a fine. Some counties treated them as misdemeanor-level offenses. In those counties, convicted offenders were placed on probation for up to one year, even for a first offense. Repeat offenders were sentenced to serve a weekend or more in jail. Winona County was one such county (J. Thompson, personal communication, January 30, 2014). That changed as of January 1, 2009, the effective date of Minnesota Judicial Council Policy No. 506.1, which required all counties to adhere to the Statewide Payable list (K. Jaszewski, personal communication, January 30, 2014).

In the years following the policy implementation, criminal justice system practitioners began to believe changes to underage consumption had also taken place. Anecdotally, it seemed offenders were being charged with not only more offenses, but more serious offenses, and that the location of those offenses had shifted. These beliefs began to drive decision-making within the criminal justice system.

This project explored the question of whether there were differences in the location of offenses, offender recidivism, or offense severity between the two year period before and the two year period after the implementation of a Judicial Council policy changing the criminal justice system's response to underage alcohol offenses.

Methods

Definition of Terms

Several terms used in this section, as well as throughout the research, would benefit from definition:

Petty Misdemeanor: an offense punishable by no more than a $300 fine (Minnesota Statutes § 609.02, subd. 4a).

Misdemeanor: an offense punishable by up to 90 days in jail and a $1,000 fine (Minnesota Statutes § 609.02, subd. 3).

Payable: an offense for which an offender may elect to pay a fine in lieu of making an appearance in court (Minnesota Judicial Council Statewide Payable Offense Policy Quick Reference Guide and FAQ). Payable offenses include all statutory petty misdemeanor offenses and misdemeanor offenses specified by the Minnesota Judicial Council (Minnesota Rules of Criminal Procedure, Rule 23.03, subd. 2(1); Minnesota Judicial Council Policy 506.1).

Minor or juvenile: a person under the age of 18 years old.

Underage Person: a person who has not attained the age necessary to engage in specified conduct. In the State of Minnesota, consumption or possession of alcohol requires a person to be at least 21 years old (Minnesota Statutes § 340A.503).

Alcohol Offense: includes underage consumption of alcohol (Minnesota Statutes § 340A.503, subd. 1(2)), underage possession of alcohol (Minnesota Statutes § 340A.503, subd. 3), underage drinking and driving (Minnesota Statutes § 169A.33, subd. 2), driving while impaired (Minnesota Statutes § 169A.20) where alcohol was used, criminal vehicular operation or homicide (Minnesota Statutes § 609.21) where alcohol was used.

Data Collection

This project includes data on 2,257 alcohol-related offenses charged against underage persons in Winona County, Minnesota. Specifically, data relating to the alcohol concentration level and location of the charged offense, as well as the age of offender and offender's alcohol offense history were utilized. All information obtained as to adult offenders was public information, but information as to minor offenders is confidential. Therefore, the final spreadsheet for this project does not include all information gathered—names, dates of birth, and other information unnecessary for analysis were removed from any material that could be published.

The first step in the process was to gather a list of cases filed in Winona County District Court between January 1, 2007, and December 31, 2010, where an underage person were charged with an alcohol offense. A list of all cases filed during that time period was compiled in a Microsoft Excel spreadsheet, and all cases not including an alcohol offense were removed. Each alcohol offense was looked up in the court's records management system (Odyssey) and available details were entered into the spreadsheet.

Next, each case was looked up in the law enforcement records management system (CIS), which contains records for all Winona County Sheriff's Office, Winona Police Department, and St. Charles Police Department cases. Available details contained in CIS were entered into the spreadsheet.

Cases where details were not available through Odyssey or CIS were looked up in the Winona County Attorney's Office records management system (MCAPS), to determine whether a file had been opened within the office. Where files had been opened, details were

gathered from MCAPS (as available), or the physical file was retrieved and reviewed and the details were entered into the spreadsheet.

For cases not handled by the Winona County Attorney's Office, the physical court file was required. Winona County District Court files were retrieved and reviewed, with details entered into the spreadsheet. In fourteen cases the court file could not be located and not all details were obtained.

Finally, each offender was looked up in Odyssey to determine the number of Minnesota alcohol offenses the offender was charged with before and after the present offense. Only Minnesota data was available, so offenses charged in other states were not included in the count.

Data Analysis

Once the data was collected, each individual offense was manually plotted as a point in an ArcGIS shapefile. The FID automatically assigned by ArcMap during this process was entered into a column on the spreadsheet. The location of each point was determined based on the information provided regarding the offense location, information contained within the roads layer as to address ranges for road segments, the researcher's knowledge of the area, and internet research as to address and/or location (business web pages, MapQuest, and GoogleMaps were utilized). The final spreadsheet was then imported into ArcMap and joined with the shapefile based on the FID. A total of 2,247 points were mapped, with the remaining ten offenses having no location information available.

A new field was created to assign an alcohol concentration severity of low, medium, or high based on alcohol concentration test results or reason that a test was not administered to the offender. Test results lower than 0.08 were assigned "low" severity, results between 0.08 and 0.19 were assigned "moderate" severity, and results 0.20 or higher were assigned "high" severity. The thresholds used are consistent with those found in DWI law to determine presumptive impairment (0.08) or enhanced penalties (0.20).

In some cases an alcohol concentration was not available. For cases where the offender was unconscious or otherwise unable to provide a test due to the level of impairment, a "high" severity was assigned. Where the offender was uncooperative or refused to provide a test to law enforcement, a "medium" severity was assigned. Where there is no indication of a test result or reason for the lack of test, a "low" severity was assigned.

New shapefiles were created to separate 2007-2008 offenses from 2009-2010 offenses, to compare the two time periods. For each shapefile kernel density analysis was performed to determine the density and "hot spots" of offenses. Side-by-side graphics were prepared to compare Winona County as a whole and the City of Winona for each time period studied.

Statistical analysis of the Excel spreadsheet yielded counts, averages, and percentages to be compared between the two time periods in question. These statistics were then used to create tables and whisker box plots to summarize the results for comparison and discussion. A whisker box plot shows the median (horizontal line in the middle of the box), interquartile range (boxes on either side of the median, showing the middle 50% of the dataset and eliminating the influence of outliers), upper and lower quartiles (vertical lines with short horizontal lines indicating the highest and lowest numbers, excluding outliers), and any outliers (asterisks, indicating extreme values that may skew data).

IBM's SPSS (Statistical Package for the Social Sciences) software was then used to further analyze the data to determine whether any significant difference between the time periods could be determined. Data relating to measured alcohol concentration levels and recidivism of offenders were also analyzed using the Mann-Whitney nonparametric test, which does not assume standard distribution of data. In all analyses, H_o: the data during the time periods is the same, and $\alpha = 0.05$. Statistically significant differences were determined to exist where the test result probability was less than 0.05.

Sources of Potential Error

Nearly all of the data collection for this project was a manual process, requiring individuals to look at information in one place, make a determination, and enter the information into another. As a result, the potential for human error was significant. Cases filed with the court involving an underage person using alcohol may have been missed by the person working on the initial list, or the fact that a person was underage at the time of the alcohol-related offense may have been missed. Items of information may have been incorrectly entered into the spreadsheet. Prior and future alcohol offenses may have been inaccurately counted. Working with the data (copying and pasting, sorting, filtering, etc. within the database) could mix up, delete, add, or change information.

Further, each of the data sources also had the potential for human error—incorrect data may have been entered into the court, law enforcement, and County Attorney records management systems, or included on the citation. Incorrect information in the data source would have been transferred to the spreadsheet.

Finally, points indicating offense location may have been inaccurately mapped, either due to incorrect placement into ArcMap or vague location description within data sources.

However, efforts were taken to minimize errors. Though time-consuming, looking at each case in more than one records management system or physical form led to the discovery and correction of errors within the spreadsheet. A final review of mapped points allowed for verification (or correction) so that each point was where it was purported to be. Copies of the final spreadsheet were used for analysis, to minimize the possibility of inadvertent changes to the final data.

Results

In 2007-2008, a total of 974 underage alcohol offenses were committed for which citations were issued. 195 of those offenses were committed by juveniles, 789 by adults. In 2009-2010, the total number of citations issued for underage alcohol offenses jumped to 1,282, with 144 by juveniles and 1,128 by adults.

Offense Severity

At first glance, it appears as though there is not a significant difference between the severity of offenses charged before and after the change in policy. In 2007-2008, the average alcohol concentration for offenses was 0.109. In 2009-2010, it was slightly higher, at 0.114. For minors, the average alcohol concentration actually reduced from 0.089 to 0.087 (Figure 1), with the average alcohol concentration for adult offenders increasing from 0.112 to 0.118 (Figure 2). In neither case is the difference between the two time periods statistically significant ($P = 0.996$ for juveniles; $P = 0.079$ for adults).

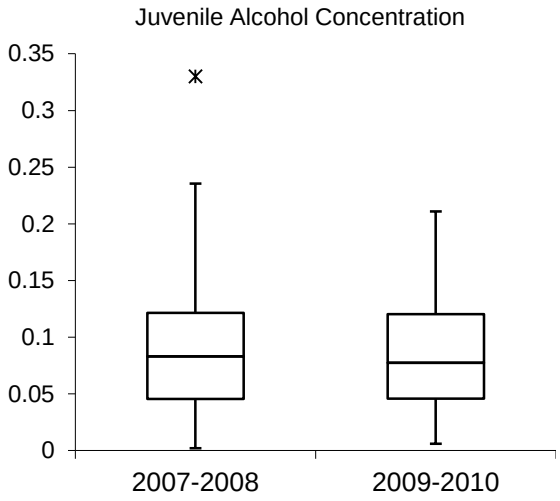

Figure 1. Alcohol concentration level distributions for juvenile offenders during the two time periods.

Figure 2. Alcohol concentration level distributions for adult offenders during the two time periods.

Further analysis, however, provides a better understanding of trends during each time period. For adult offenders there was a noticeable difference between first-time offenders and repeat offenders (Figure 3). First-time adult offenders averaged a 0.105 alcohol concentration during the 2007-2008 time period, increasing to 0.108 during the 2009-2010 time period (P = 0.345), which is not a statistically significant difference between the two time periods. Repeat offenders, on the other hand, averaged 0.125 alcohol concentration in 2007-2008, with a jump to 0.137 in 2009-2010, a significant difference between the time periods (P = 0.032).

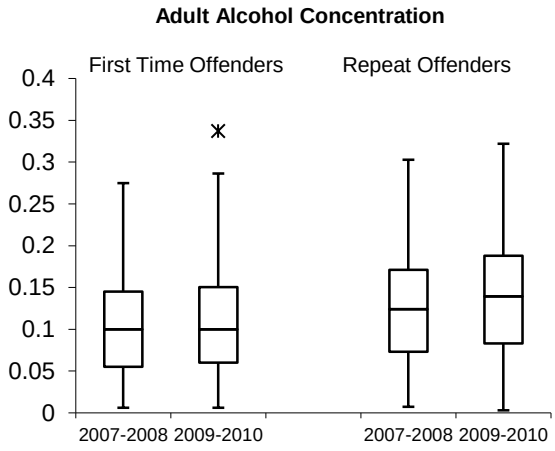

Figure 3. Adult first time and repeat offender alcohol concentration levels during the two time periods.

Where alcohol concentrations were not available, numbers for adult offenders also increased from 2007-2008 to 2009-2010 (Table 1). Total number and percentage of total offenses increased for offenders who possessed alcohol or had an unknown test result, were uncooperative with testing by law enforcement, or who were so intoxicated they were unable to submit to an alcohol concentration test.

Table 1. Number of offenses and percentage of total cases during the two time periods for adult offenders for which no alcohol concentration level was available.

	2007-2008	**2009-2010**
Unknown or Possession	35 (4.44%)	61 (5.41%)
Uncooperative	16 (2.03%)	28 (2.48%)
Unable to Test	5 (0.63%)	16 (1.42%)

For juveniles, the same was true (Figure 4). In 2007-2008, the average alcohol concentration for juvenile offenders was 0.089, with first time offenders averaging 0.08 and repeat offenders averaging 0.114. During 2009-2010, however, those averages reduced to 0.087 for all juveniles, 0.078 for first time offenders, and 0.106 for repeat offenders. As with their adult counterparts, there was

no statistically significant difference between the time periods for first time offenders (P = 0.781), but there was for repeat offenders (P = 0.008)

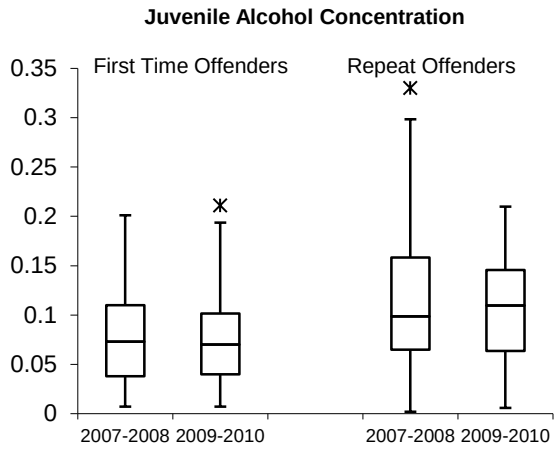

Figure 4. Juvenile first time and repeat offender alcohol concentration levels during the two time periods.

Similarly, the total numbers of juvenile offenses where alcohol concentration was not available also reduced in number or remained constant (Table 2). Particularly concerning with the juvenile offenses for which alcohol concentration levels were not available was that all of the juveniles who were unable to submit to a test during either time period were first-time offenders.

Table 2. Number of offenses and percentage of total cases during the two time periods for juvenile offenders for which no alcohol concentration level was available.

	2007-2008	**2009-2010**
Low	**380 (39.01%)**	**444 (34.93%)**
Juvenile	92 (47.18%)	71 (49.31%)
Adult	288 (36.5%)	373 (33.07%)
Medium	**512 (52.57%)**	**678 (53.27%)**
Juvenile	92 (47.18%)	67 (46.53%)
Adult	420 (53.23%)	612 (54.17%)
High	**92 (9.45%)**	**150 (11.8%)**
Juvenile	11 (5.64%)	6 (4.17%)
Adult	81 (10.27%)	144 (12.77%)

When offenses were assigned severity levels based on alcohol concentration level or reason for unavailable test results, the trends became clearer (Table 3). For juveniles, the total number of offenses reduced from 195 to 144, with an increase in the percentage of offenses classified as low severity. Adult offenses not only increased significantly in total number (from 789 in 2007-2008 to 1128 in 2009-2010) but high severity offenses were more frequent, with low severity offenses being less than 1/3 of total offenses.

Table 3. Offense severity for adult, juvenile, and all offenses (bold) for both time periods. Includes number of cases followed by percentage of total cases of that type (adult, juvenile or all).

	2007-2008	**2009-2010**
Unknown or Possession	6 (3.08%)	4 (2.78%)
Uncooperative	7 (3.59%)	7 (4.86%)
Unable to Test	3 (1.54%)	1 (0.69%)

Future Offenses

This study also looked at the number of alcohol offenses each offender was charged with before and after the current offense. These numbers were further broken down by whether the offender was a juvenile or adult, and whether they were a first time or repeat offender (Table 4). Contrary to the criminal justice system perception that offenders continue to commit crimes, nearly 2/3 of offenders during the four years studied were first time offenders (64.58%).

Juvenile offenders in 2007-2008 were charged with an average of 2.88 total offenses. In 2009-2010, they averaged 2.81 total offenses. First time offenders in 2007-2008 were charged with an average of 2.16 total offenses, while repeat offenders averaged 4.78 total offenses.

Table 4. Juvenile and adult first time, repeat, and total offenders during both time periods. Table presents the total number of offenses of that type, the average age of offender committing those offenses, and the average number of prior, future, and total offenses committed by offenders of that type.

	Juvenile						Adult					
	2007-2008			2009-2010			2007-2008			2009-2010		
	First Time	Repeat	All	First Time	Repeat	All	First Time	Repeat	All	First Time	Repeat	All
Offenses	141	54	195	95	49	144	485	304	789	736	392	1128
Age	16.67	16.81	16.71	16.85	16.97	16.89	19.43	19.69	19.53	19.47	19.77	19.58
Prior Offenses	N/A	1.5	0.42	N/A	0.74	0.6	N/A	1.92	0.74	N/A	1.86	0.65
Future Offenses	1.16	2.29	1.47	0.79	2.02	1.21	0.43	1.08	0.68	0.39	0.77	0.52
Total	2.16	4.78	2.88	1.78	4.78	2.81	1.43	4.00	2.42	1.39	3.63	2.17

First time offenders in 2009-2010 were charged with an average of 1.78 total offenses, with repeat offenders averaging 4.78 total offenses. Nearly all first time offenders in 2007-2008 were charged with fewer than 6 total offenses, and those in 2009-2010 were charged with fewer than 3.5 (Figure 5). Repeat offenders in 2007-2008 were charged with between 2 and 11 offenses, and those in 2009-2010 were charged with between 2 and 9 offenses.

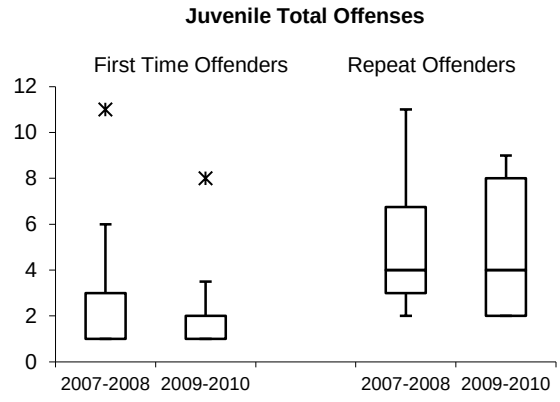

Figure 5. Distribution of total number of alcohol offenses committed by first time and repeat juvenile offenders during the two time periods.

First-time juvenile offenders in 2007-2008 were charged with an average of 1.16 future offenses, while those in 2009-2010 were charged with an average of 0.79 future offenses (P = 0.149, therefore H_o was not rejected). Repeat offenders during these same time periods were charged with an average of 2.29 and 2.02 future offenses respectively (P = 0.476, therefore H_o was not rejected). First time offenders in 2007-2008 were charged with fewer than 5 future offenses (with one exception), and those in 2009-2010 were charged with fewer than 3 future offenses (with one exception) (Figure 6). Repeat offenders for the same time periods were charged with fewer than 9 and 7 future offenses, respectively.

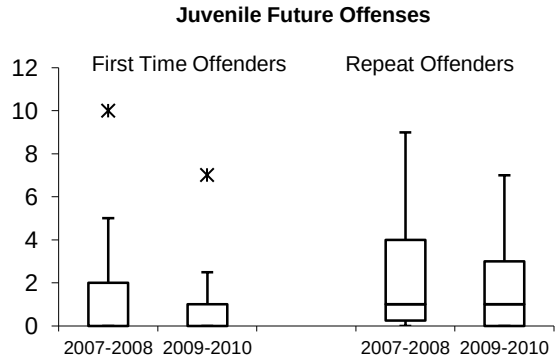

Figure 6. Distribution of future alcohol offenses committed by first time and repeat juvenile offenders during the two time periods.

For adult offenders the differences between first time and repeat offenders are even more noticeable. Figure 7 summarizes total offenses charged against

first time and repeat adult offenders. Adult offenders in 2007-2008 were charged with an average of 2.42 total offenses. Those in 2009-2010 were charged with an average of 2.17 total offenses. First time offenders in 2007-2008 averaged 1.43 total offenses, while first time offenders in 2009-2010 averaged 1.39 total offenses (P = 0.559, not a statistically significant difference). Repeat offenders during those same time periods averaged 4.00 and 3.63 total offenses, respectively (P = 0.015, a statistically significant difference). Of particular note is the 2007-2008 repeat offender outlier—a single offender who was charged with a total of 33 alcohol offenses. No other 2007-2008 offenders were charged with more than twelve total offenses. Similar distributions exist for future offenses charged against adult offenders. The majority of offenders—whether first time or repeat—were charged with two or fewer total offenses, with notable outliers (Figure 8).

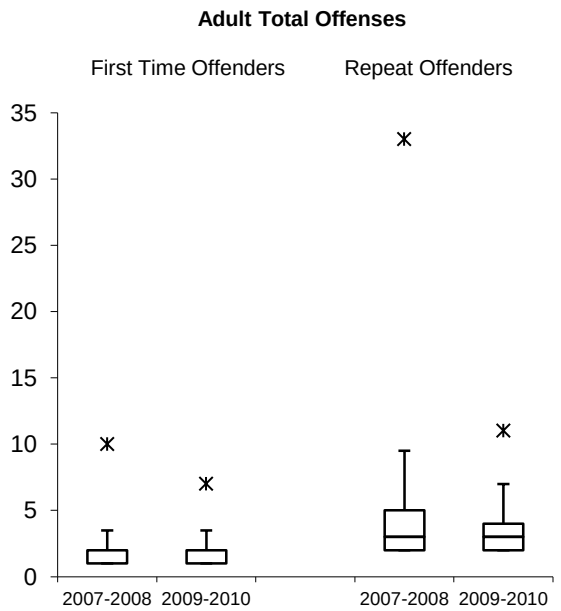

Figure 7. Distribution of total number of alcohol offenses committed by first time and repeat adult offenders during the two time periods.

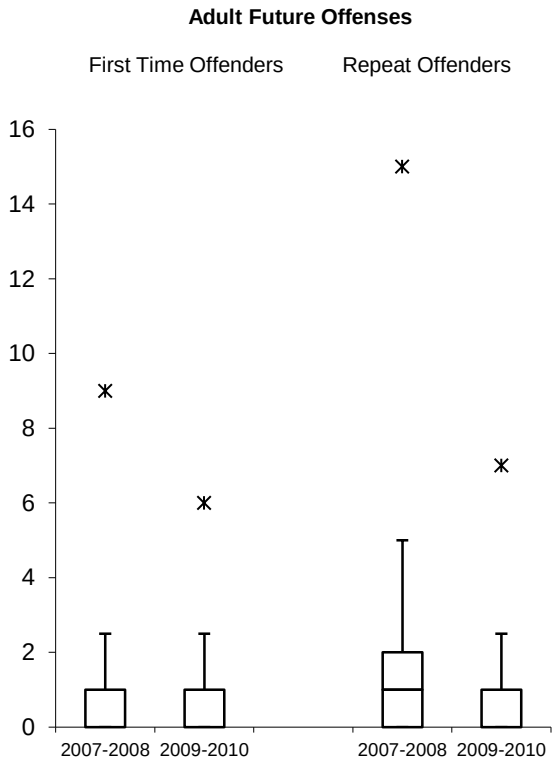

Figure 8. Distribution of total number of alcohol offenses committed by first time and repeat adult offenders during the two time periods

Of particular note, both for juvenile and adult offenders, is that most offenders were first time offenders that were charged with no further offenses. Repeat offenders, though being charged with the largest number of offenses, are in the minority (Table 5 and Table 6). Of the 2007-2008 offenders, just over a third were repeat offenders who were charged with nearly 60% of the total offenses. For 2009-2010, over a third of offenders were repeat offenders who were charged with nearly 70% of total offenses. First time offenders appear less likely to be charged with future alcohol offenses. More than half of first time juvenile offenders and nearly three-quarters of first time adult offenders had not been charged with another alcohol offense during the period of this study.

Table 5. Number of juvenile offenders charged with no future offenses (#), total number of first time or repeat offenders, and the percentage of offenders of that type that were not charged with a future offense (%) during each of the two time periods.

	#	Total	%
First Time Offenders			
2007-2008	74	141	54.48
2009-2010	56	95	58.95
Repeat Offenders			
2007-2008	14	54	25.93
2009-2010	19	49	38.78

Table 6. Number of adult offenders charged with no future offenses (#), total number of first time or repeat offenders, and the percentage of offenders of that type that were not charged with a future offense (%) during each of the two time periods.

	#	Total	%
First Time Offenders			
2007-2008	346	485	71.34
2009-2010	535	736	72.69
Repeat Offenders			
2007-2008	138	304	45.39
2009-2010	219	392	55.87

Location

The final area for which data were gathered was that of offense location. Kernel density analysis of all points for which location was available yielded county-wide maps that showed very slight differences between the two time periods studied (Figure 9).

The 2007-2008 Offense Density map shows slightly darker shading in St. Charles, Minnesota (left side of the image) and a slightly larger darker area over Winona, Minnesota, and its surrounding communities (middle of the image). Offenses are scattered sparingly throughout the rest of the County. This result is unsurprising, as the population of the City of Winona (27,592) comprises more than half of the total County population (51,461) (2010 Census), and contains two universities.

Also unsurprising was the density of offenses along the major roads within Winona County—specifically, Interstate 90 (horizontal, just south of St. Charles), Highway 61 (eastern border of Winona County, along the Mississippi River), Highway 14 (between St. Charles and Winona), and Highway 74 (vertical, north of St. Charles). These roads are the most heavily traveled, and most heavily patrolled for DWI enforcement. Between the two time periods, the density of offenses along these four major roads was consistent.

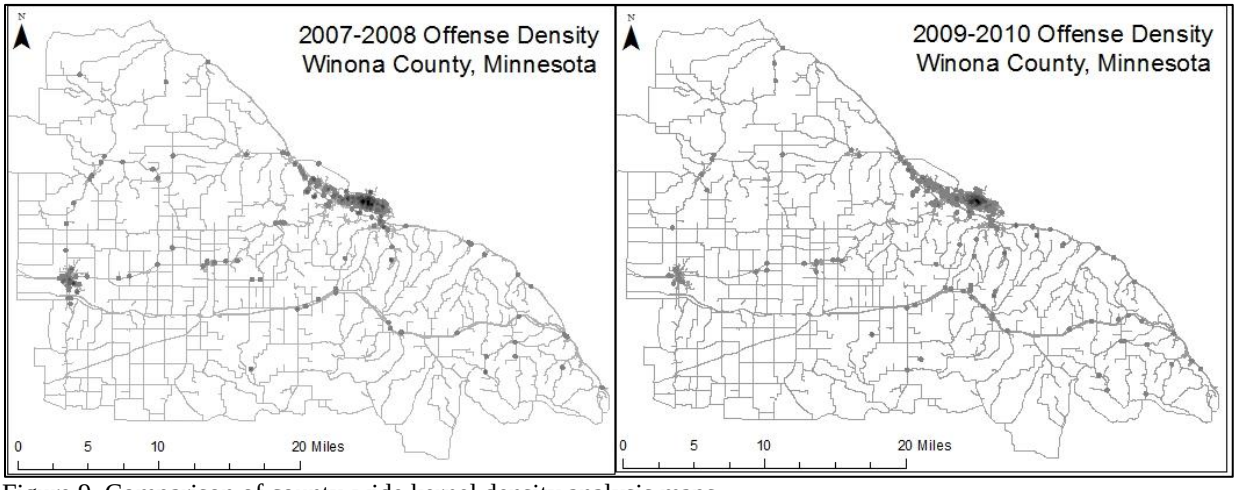

Figure 9. Comparison of county-wide kernel density analysis maps.

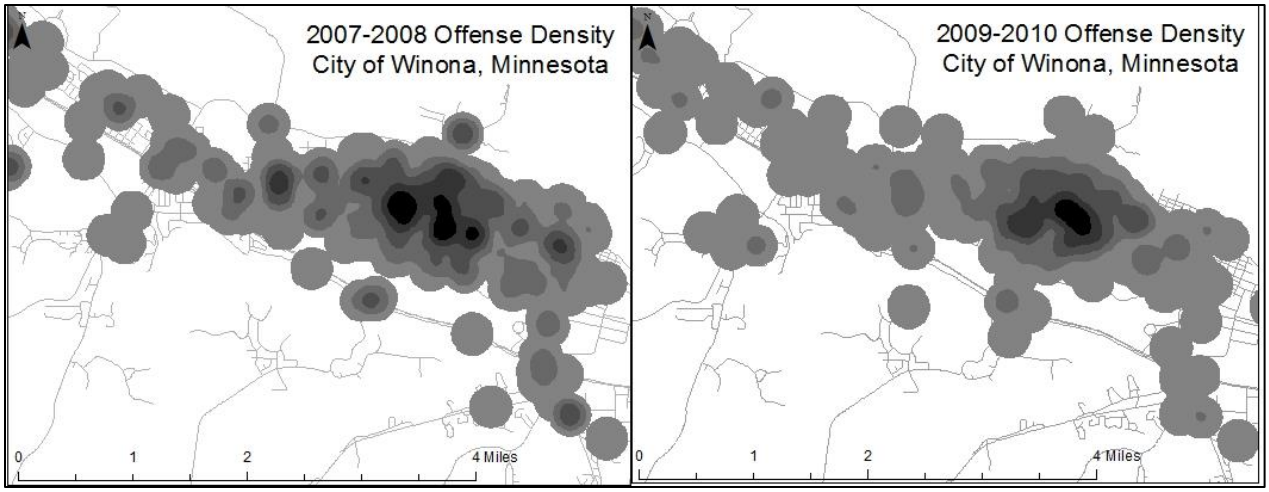

Figure 10. Comparison of City of Winona kernel density analysis maps.

However, by zooming in to the level of the City of Winona, some shift in offense location between 2007-2008 offenses and 2009-2010 offenses were observed (Figure 10). In 2007-2008, dense areas of underage consumption offenses were spread throughout the city. For the 2009-2010 period the offenses were more centralized, near the campus of Winona State University.

Discussion

At first glance, there appeared to be little difference between the two time periods. Statistically, the time periods were similar overall, with some differences observed regarding repeat offenders. However, trends in the data should be taken into account, even though they were not shown to be statistically significant through this study.

Alcohol concentration levels were consistent, and little difference could be seen in offense location at the County level. However, by digging deeper into the analysis, it became clear that differences exist between offenses filed with Winona County District Court in 2007-2008 versus those filed in 2009-2010, after the implementation of the Judicial Council policy. Though the initial hypothesis was supported, the changes were not quite as expected.

The results support the hypothesis that adult offenses filed after the policy implementation appear to be more serious. Although the average alcohol concentration levels for offenders remained constant, a much higher number and proportion of adult incidents were for high severity offenses. Offenders whose charges were filed after the implementation of the policy were not more likely to be charged with future offenses. The results showed the majority of offenses were first time offenders and that the majority of offenders were not charged with any further offenses, so any statistical significance indicated is for a small portion of the data. The location of offenses did change, consolidating into a smaller area of the City of Winona.

A potential issue with this research is whether the different time frames used for recidivism played a role. All future offenses were attributed to an offender. However, this means that for 2007-2008 offenses there was a longer period to look at than for 2009-2010 offenses. An alternative would have been to use a set time period, such as three years from the offense date.

While each offender's history is accurately reflected as of the date the information was gathered, given another two years it is likely that the recidivism for the 2009-2010 group would increase from the levels included here, because the time period for the recidivism rate would be greater. Having a consistent recidivism period would alleviate this issue.

Readers should be alerted to the limitations of the results described above. The data cannot be used as a basis for concluding that the majority of offenders did not *commit* more offenses. The research supports that the majority of offenders were not *charged* with future offenses. Offenders may have committed future offenses for which they were not caught, or law enforcement may have issued warnings rather than citing offenders for future offenses. Neither of those outcomes were included in this study. Put another way, although differences between the charges filed were observed, no conclusions about underlying behaviors can be drawn.

Furthermore, although differences between the two time periods were found, the reason(s) for those differences was not part of this study. The fact that the Judicial Council policy was implemented at the same time may simply be a coincidence, or it may be only one of many other factors contributing to the differences observed, but further research may be able to help determine that.

Further Research

Although this research answered the question raised initially, it also brought to light many potential questions for further research. The main question that still lingers is what factors contributed to the differences between the two time periods outlined above. Why were there so many more offenses charged in 2009 (731) compared to the other three years (558, 414, and 537)? Were there changes in law enforcement or university policy that contributed? What were the demographics of offenders? Was there a change in zoning or rental properties that contributed to the difference in location? Are there other trends that would be shown by breaking down the time periods further?

Particular areas that could not be included in the current research included whether offenders with multiple offenses showed trends in progression from relatively minor offenses to more serious offenses. An offshoot of that line would include what impact, if any, the sentence received by first time alcohol offenders has on the likelihood of future offenses. Similarly, further study could include whether sanctions through the universities affected the likelihood of future offenses.

Another public policy question that could be addressed is whether the City of Winona's Social Host ordinance, which was implemented in 2010, affected underage consumption trends. With party-holders now exposed to criminal penalties, the question becomes whether the underage drinkers simply moved outside, committing more nuisance offenses within neighborhoods.

A final future research area is to look at trends relating to hospitalization or the need for detoxification centers. In gathering data for this research, numerous instances of underage persons requiring hospitalization or detoxification due to the level of intoxication, particularly during 2010 were observed. Future research should look at whether this is a consistent issue or a changing one.

Conclusions

This project explored the question of whether there were differences in the location of offenses, offender recidivism,

or offense severity between the two year period before and the two year period after the implementation of a Judicial Council policy changing the criminal justice system's response to underage alcohol offenses.

Statistically, the only differences between the time periods related to repeat offenders—specifically juvenile and adult repeat offender alcohol concentration levels and adult repeat offender total alcohol offenses committed.

Results indicate that offenders were not charged with more offenses following the policy change; actually being charged with fewer, with the majority of offenders being charged with no further alcohol offenses. The location of offenses did shift, with offenses becoming more concentrated in a smaller area than in the earlier time period. Most strikingly, though overall average alcohol concentration levels remained constant between the two periods, a greater proportion of adult underage consumption offenses were high severity offenses following the policy implementation and statistically significant differences were observed for repeat offenders. The criminal justice system has seen changes in recidivism, location, and severity since the Judicial Council policy was implemented—all of which would benefit from further research into the factors contributing to those trends.

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