Spatial Patterns Of Methamphetamine In North Dakota

Alex Feidler
Department of Geography
University of North Dakota
Grand Forks, ND 58202
E-mail: alex.feidler@gmail.com

Roni Mayzer
Department of Criminal Justice
University of North Dakota
Grand Forks, ND 58202
E-mail: roni.mayzer@und.nodak.edu*

Kevin Romig
Department of Geography
Texas State University-San Marcos
San Marcos, TX 78666
E-mail: Kevin_Romig@txstate.edu*

Douglas Munski
Department of Geography
University of North Dakota
Grand Forks, ND 58202
E-mail: douglas_munski@und.nodak.edu

* Corresponding Authors

ABSTRACT

In the last decade, the methamphetamine situation has become critical in North Dakota, which has the third-highest rate of clandestine meth lab seizures in the country. This study addresses two questions: 1) What is the spatial pattern of meth-related arrests in North Dakota? and 2) What geographic factors account for the increased prevalence of meth use and production in the state? This study employs GIS overlay and multiple regression analysis to determine the spatiality of the phenomenon. The findings reveal that meth-related arrests tend to take place in the more urban southeast and central counties while meth lab seizures tend to be concentrated in the more rural northwest counties. Methamphetamine is a problem in North Dakota because of the accessibility of chemicals needed to manufacture the substance and the unusual remoteness of the landscape.

Key Words: North Dakota, methamphetamine, crime, GIS, multiple regression, drug use

INTRODUCTION

North Dakota is a rather quiet, sparsely populated, rural Midwestern state that historically has experienced low crime rates. According to the Federal Bureau of Investigation’s 2000 Uniform Crime Report, North Dakota is the safest state in the nation. North Dakota is ranked 50th (the safest ranking) in overall crime, violent crime, robbery, and aggravated assaults. However, North Dakota has the third-highest rate of clandestine methamphetamine lab seizures in the country. This is no insignificant statistic; methamphetamine production is a major problem facing many parts of the country today. The U.S. Department of Justice reports that “methamphetamine is the most significant drug threat to North Dakota and is the drug-related investigative priority for federal, state, and local law enforcement officials” (2002). According to North Dakota Attorney General
Wayne Stenehjem, methamphetamine abuse is, “the single most serious law enforcement issue North Dakota is facing- and has ever faced” (Kolpack 2006).

Methamphetamine, an illegal drug that can be produced from common household products, over-the-counter medicine, and chemicals commonly found in rural agricultural environments, is a threat to many people and communities in the United States. Commonly referred to simply as “meth,” this drug is a powerful central nervous system stimulant. Meth is a synthetic form of amphetamine that is chemically similar to adrenaline; it can be smoked, snorted, orally ingested, or injected; it produces in users a sense of euphoria and an increase in energy and attentiveness. Abusers often experience delusions, anxiety, convulsions, extreme paranoia, mood swings, hallucinations, and homicidal and suicidal thoughts (Herz 2000). Although meth was once largely confined to the West Coast, in the last twenty years it has marched its way into Middle America and penetrated even isolated and rural communities, places once thought to be relatively free of the drugs that have ravaged many of America’s urban environments (Jefferson 2005).

The production, sale, and use of illegal drugs stress a community in a number of different ways. Meth use is a particularly serious problem in some rural areas, many of which lack the infrastructure necessary to deal with a major drug problem. For example, many rural jurisdictions do not have decent access to local treatment providers or the expertise to adequately respond to meth abusers. Similarly, law enforcement officials in rural areas often lack the training and financial resources to deal with laboratory cleanup costs associated with methamphetamine manufacturing in their communities (U.S. National Institute of Justice 2000).

The distribution and sale of illegal drugs has much in common with general retail characteristics: producers of raw materials are often located in foreign countries, manufacturers convert raw materials into consumable products, and distributors create networks to transport product to consumers (Rengert 1996). While many of America’s drugs are manufactured in off-shore locations, methamphetamine generally has a different geography associated with its commodity chain. Small quantities of methamphetamine are often produced and consumed locally, reducing the need for grand distribution networks.

There are two general types of clandestine meth labs. One is the super lab, which is a large, highly organized lab that can manufacture ten or more pounds of methamphetamine in a day. To date, most super labs are concentrated in Mexico, and to a lesser degree in California (Scott 2002). The other type consists of smaller labs, often referred to by narcotics officials as “mom and pop” or “Beavis and Butthead” labs. These labs can manufacture only one to four ounces of methamphetamine per production cycle. Their operators typically produce enough drugs for their own and close associates’ use and just enough extra to sell to others to finance the purchase of production chemicals (Scott 2002). Over 80 percent of all the methamphetamine consumed by U.S. citizens is produced in super labs and supplied by major Mexican drug organizations. However, between 10 and 20 percent of meth production is produced in the smaller scale labs, which are more prevalent in rural areas (NCASA 2000). Such small-scale labs present more problems to communities and law enforcement because they are often haphazardly run, with a high incidence of explosions, fires, chemical burns, and toxic fumes, as well as extensive amounts of wastes produced (Scott 2002).

Meth usage is not evenly distributed through the state of North Dakota. Some counties have unusually high meth-related arrest rates, while others do not have a single documented meth-related arrest (most often possession) or a clandestine lab seizure. Certain counties are more prone to production, while others seem to be more prone to distribution and usage. To better understand the meth phenomenon in North Dakota, this article will explore two questions: 1) What is
the spatial pattern of meth production and usage in North Dakota? 1) What accounts for these patterns? These questions will help us to understand the spatial patterns of methamphetamine production and consumption across the state’s landscape.

**EXPLAINING METH**

Methamphetamine production and abuse is often poignantly described in popular media sources. The 8 August 2005 edition of *Newsweek* ran a cover story entitled “The Meth Epidemic: Inside America’s New Drug Crisis.” The article is a vivid description of the rise of meth abuse across America. Law enforcement officials are described as “fighting a losing battle” and officials wonder if the federal government is doing all it can to contain the “epidemic” (Jefferson 2005, 41). The article referred to meth as “America’s most dangerous drug.” Twelve million Americans have tried meth at some point in their lives, 1.5 million are regular users, and all 50 states have uncovered meth lab operations (Jefferson 2005). Although there are many illegal drugs on the market today, law enforcement officials nationwide rank methamphetamine as the number one drug they battle today, according to a 2005 survey by the National Association of Counties of 5000 law enforcement agencies in forty-five states (Jefferson 2005). In January 2006, the *Grand Forks Herald* reported that meth is increasingly being imported into North Dakota from outside sources, predominately from “super labs” located primarily in California, Texas, and Mexico. The article reported that in cities such as Fargo, Valley City, and Bottineau, violent crime has increased due to meth abuse (Kolpack 2006).

An important factor in explaining the rapid growth of meth in North Dakota is the state’s rural nature. The only city in North Dakota with more than 100,000 people is Fargo. Of North Dakota’s fifty-three counties, thirty-nine are classified as 100 percent rural meaning they do not include a cluster or urbanized area with a population of over 50,000 persons (U.S. Census 2000). Many of the problems faced by the major urban metropolises, like crime and drug-related issues, are also found in smaller urban places. According to Ackerman and Murray (2004, 423), “Crime has an inordinately strong influence in the social and economic performance of small cities and hinders economic recovery efforts.” Warner and Leukefeld (2001) have argued that rural areas have more severe drug abuse problems than their urban counterparts. This is due to people’s inability to grasp that drugs are a problem in their community. O. G. Davidson has discussed the process of “rural ghettoization.” He claims that after a rural economic crisis, towns often experience a class-selective migration, in which more prosperous residents move, leaving behind a community in which poverty is even more concentrated. The rural community adapts to economic shock (such as rapid employment or population loss) in ways that accelerate and ultimately lock into place the downward cycle of ghettoization (Davidson 1996).

A number of studies have attempted to explain and predict meth activity. In response to the growing epidemic of meth in their state, the Illinois State Police embarked on a statewide mapping initiative to identify trends and patterns of methamphetamine manufacturing and use (Butler 2000). They created a Methamphetamine Risk Model to identify potential “hot spots” in the state that could be at risk. By integrating known characteristics of meth users and Illinois county demographics into a geographical model, high-risk areas that had the characteristics conducive to meth use and production could be identified. The risk model served as a strategic tool that could assist law enforcement personnel and communities in forming proactive rather than reactive strategies to combat the drug (Butler 2000).

According to past research, several social variables serve as general predictors of crime rates: socio-economic status, population mobility, ethnic heterogeneity, and the rate of single-parent families among them (Meithe and Meier 1994). Lloyd Weber applied
the Illinois model of methamphetamine patterns to Franklin County, Missouri, on the far outskirts of Saint Louis. However, he could only implement six of the Illinois Risk Model’s eight independent demographic variables because of data limitations (Weber 2006). Weber concluded from his analysis that his meth risk-assessment model was able to pick up the general trend of meth activity despite data limitations. Although predictive models are seldom 100 percent accurate, Weber’s study has helped to validate the Illinois State Police Methamphetamine Risk Model as a worthy predictive and explanatory tool for meth-related activity. Weber’s study also showed that the demographic variables chosen for the Illinois State Police Methamphetamine Risk-Model can also be valid outside of Illinois. We decided to test and apply a similar model to the considerably more rural state of North Dakota to find if the Illinois model has wider applicability in different geographic settings.

METHODS

Following Butler’s lead (2000), we used multiple regression to examine the relationship between various meth-related variables and socio-economic variables. While spatial autocorrelation has been used in much of the crime mapping literature (Rengert 1996), we decided to use multiple regression due to its wide use within criminal justice studies. Additionally, because of data issues and limitations of the data—especially counties not reporting any significant meth-related activity, we felt a change in method would not significantly illuminate crime patterns beyond the results uncovered by regression.

Our first model (Model A) focused on the following independent demographic variables: 1) percent of the population that is white, 2) percent of individuals between 25 and 29 years of age, 3) percent of individuals 25 years old or more who have less than a high school diploma, 4) percent of unmarried individuals over 25 years of age, 5) per capita income, 6) percent of the population that is rural, 7) males per 100 females, 8) percent of vacant households, 9) percent households that are owner occupied, and 10) percent single-parent households. Our dependent variables were 1) total arrests (for possession or intent to distribute meth), 2) arrest rate, 3) total seizures (of clandestine labs), and 4) seizure rate (lab seizures per 1000 population).

The data from this study were obtained from three sources: the U.S. Census Bureau, the North Dakota Bureau of Criminal Investigation, and the FBI Uniform Crime Report (UCR). Because the North Dakota Bureau of Criminal Investigation only has county-level meth data, we employed county-level data from the U.S. Census Bureau and Uniform Crime Report. All demographic measures were taken from the 2000 U.S. Census and the 2000-2003 UCR databases. The North Dakota Bureau of Investigation supplied data documenting the number of meth-related arrests and clandestine meth lab seizures for each county from 2000 to 2003.

One of our major obstacles in understanding meth crime distribution is the granularity of the data. The state of North Dakota only provides county-level data on methamphetamine arrests, which precludes us from using more geographically precise data sets in our analysis. We firmly believe that the county level data mask some of the underlying social processes that engender meth-related crime in the state.

We also slightly modified the model to create a second multiple regression model (Model B) in order to better understand the meth phenomenon. Model B uses poverty rate as an independent variable instead of per capita income, because we concluded that it might be a better indicator of poverty in rural counties. In areas with low population totals, a few persons with very high incomes might abnormally skew aggregate per capita income. Poverty rate gives us a better predictor for the number of poor people within the county. In addition, Model B adds two additional independent variables to the regression. The first is percent population change from 1990.
to 2000; since those who leave rural communities often do so for economic reasons, which can lead to strain in the community (Merton 1957). The second is percent police per population since we were interested in finding out how law enforcement numbers might influence meth crimes.

In order to visually show meth activity over space and time, we created two choropleth maps with overlaying temporal histograms from 2000 – 2003. The first map depicts total meth-related arrests per county displaying both aggregate and yearly data (Fig. 1). The histogram clearly illustrates a rise in the more urbanized Eastern Counties (Grand Forks, Cass) which are home to the cities of Grand Forks and Fargo, respectively. The histograms also highlight a plateau or small decline in possession arrests over the four-year period. The second map depicts total meth lab seizures per county and the annual data highlights the rapid growth of clandestine seizures reported across different parts of the state (Fig. 2). Figures 1 and 2 show where and when meth activity was taking place and how it has fluctuated over space and time.

When studying crime-related data it is oftentimes better to look at crime rates as opposed to crime totals, since rates will give a better comparison of impact a criminal activity has on an area. In order to better understand which counties are most affected by meth production and usage, two simple choropleth maps were created to show meth lab seizure rates (Fig. 3) and meth-related arrest rates (Fig. 4). In addition, major highways and cities were also mapped in order show the spatial relationship between meth activity, population centers, and major transportation routes. As George Rengert has

---

![Figure 1. Total Meth Arrests, 2000-2003. Sources: North Dakota Bureau of Investigation and US Bureau of the Census. Map by Alex Feidler.](image-url)
Figure 2. Total Meth Lab Seizures, 2000-2003. Sources: North Dakota Bureau of Investigation and US Bureau of the Census. Map by Alex Feidler.

Figure 3. Meth Lab Seizure Rate per 100,000 persons, 2000-2003. Sources: North Dakota Bureau of Investigation and US Bureau of the Census. Map by Alex Feidler.
argued, major transportation arteries are likely near important meeting points and strange vehicles and activity may be less noticed along these arterials, thus making them primary sites for criminal activity (1996). We wanted to know if counties along the major highways may have higher propensity for meth activity than counties not served by an Interstate Highway.

Since persons operating clandestine labs wish to be more hidden, it is no surprise to see a weak inverse relation between the location of highways (particularly the two Interstates) and frequency of laboratory seizures (Fig. 3). Conversely, the pattern of possession arrests shows a positive relationship with major highway routes, which increase the availability of non-regionally produced meth (Fig. 4). The one significant outlier is Mercer County and the City of Beulah—a lignite coal mining community. We believe that the demand for stimulants, in this environment where twelve-hour shifts are very common, is high enough to counteract its rural location.

To better understand which counties are more afflicted by meth related-arrests or meth lab seizures, it is important to be able to examine both phenomena simultaneously. In order to do this, a graduated pie chart map was created (Fig. 5). This figure illustrates two things: 1) the total meth activity rate, and 2) the relative proportions of meth-related arrests and meth lab seizures. The bigger the pie, the larger the total level of meth-related activity is. The subdivisions reveal the balance between arrests (a rough measure of usage) and lab seizures (a rough approximation of production). This proportional pie chart was overlaid on a choropleth map showing levels of urbanization. We classified a county as “predominantly rural” if its population was more than two-thirds rural according to the U.S. Census Bureau (2000). A county was classified as a “mix of urban and rural” if its population was between two-thirds and one-third rural

Figure 4. Meth Arrest Rate per 100,000 persons, 2000-2003. Sources: North Dakota Bureau of Investigation and US Bureau of the Census. Map by Alex Feidler.
and “predominantly urban” if its population was less than one-third rural. The purpose of overlaying the proportional pie charts over the urban/rural choropleth map was to see if there was a correlation between rural counties and counties with higher meth lab seizure rates.

RESULTS

The results from the multiple regression analysis for Model A (Table 1) showed that the selected independent variables could significantly explain total meth-related arrests, total meth lab seizures, and meth arrest rates. However, the selected independent variables were unable to reliably or accurately predict or explain meth lab seizure rates. Model A explained 72.2 percent (R-squared value of 0.722) of the total meth-related arrest variance. The demographic characteristics (with beta coefficient strength in parentheses) that proved to be the best predictors were percent between the age of 25 and 29 (0.677), percent of population that is rural (-0.431), per capita income (0.397), and percent of households vacant (0.288). Interestingly, as per capita income went up, so did the total number of meth-related arrests, which implies that many arrestees who possessed meth may have been able to afford it without adding to other local petty crime.

Model A explained 61.5 percent of the meth arrest rate variance. The demographic characteristics (again with beta coefficient in parentheses) that proved to be the best predictors were percent of population that is rural (-0.864), and per capita income (0.513). Again, it was interesting to find that as per capita income increased, the meth arrest rate also increased.

Multiple regression Model A explained 44.2 percent of the total meth lab seizures
Table 1.

Multiple Regression Model A Results

<table>
<thead>
<tr>
<th></th>
<th>Total Arrests</th>
<th>Total Seizures</th>
<th>Arrest Rate</th>
<th>Seizure Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>R Squared (Percent of dependent variable explained)</td>
<td>72.2%</td>
<td>44.2%</td>
<td>61.5%</td>
<td>9.0%</td>
</tr>
<tr>
<td>Adjusted R Squared (Conservative explanation)</td>
<td>65.6%</td>
<td>31.0%</td>
<td>52.4%</td>
<td>-12.7%</td>
</tr>
</tbody>
</table>

Strength of each independent variable in explaining the methamphetamine phenomenon (Beta Coefficients)

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Total Arrests</th>
<th>Arrest Rate</th>
<th>Total Seizures</th>
<th>Seizure Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Males per 100 Females</td>
<td>0.034</td>
<td>0.155</td>
<td>-0.110</td>
<td>0.002</td>
</tr>
<tr>
<td>2. % between the age of 25 and 29</td>
<td>0.677</td>
<td>-0.226</td>
<td>0.323</td>
<td>-0.416</td>
</tr>
<tr>
<td>3. % with less than a HS diploma</td>
<td>0.069</td>
<td>0.026</td>
<td>-0.040</td>
<td>-0.026</td>
</tr>
<tr>
<td>4. % of pop that is white</td>
<td>-0.283</td>
<td>-0.461</td>
<td>-0.217</td>
<td>-0.043</td>
</tr>
<tr>
<td>5. % of households vacant</td>
<td>0.288</td>
<td>-0.022</td>
<td>0.165</td>
<td>-0.042</td>
</tr>
<tr>
<td>6. % of pop that is rural</td>
<td>-0.431</td>
<td>-0.864</td>
<td>-0.628*</td>
<td>-0.354</td>
</tr>
<tr>
<td>7. % of households that are owner occupied</td>
<td>0.137</td>
<td>0.231</td>
<td>0.292</td>
<td>0.034</td>
</tr>
<tr>
<td>8. Per capita income</td>
<td>0.397*</td>
<td>0.513*</td>
<td>0.082</td>
<td>-0.020</td>
</tr>
<tr>
<td>9. % single parent households</td>
<td>-0.395</td>
<td>0.139</td>
<td>-0.024</td>
<td>0.316</td>
</tr>
<tr>
<td>10. % unmarried over 25 years of age</td>
<td>0.327</td>
<td>-0.110</td>
<td>0.042</td>
<td>-0.247</td>
</tr>
</tbody>
</table>

**Bold** values are significant at $p \leq 0.05$

* indicates counterintuitive correlations

Gray values are not significant at $p \leq 0.05$

variance. Surprisingly, the only demographic characteristic that proved to be a good predictor was percent of population that is rural (-0.628). One would expect the opposite for percent of the population that is rural, since meth production is associated with more rural communities. However, Model A could not significantly explain meth lab seizure rate variance. Because the model did not prove to be significant ($< 0.05$ significance level), its regression equation could not be relied upon. Although Model A did have some predictive capabilities for three of the four dependent variables, the results fell short of expectations. We initially thought that more independent variables would prove to have predictive capabilities for each equation. We had also hoped that meth lab seizure rates could be explained using the model. However, neither of these proved to be the case. Because of this, a second multiple regression analysis was run with a few adjustments.

Multiple regression Model B (Table 2) also showed that the selected independent vari-
Table 2.  

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Total Arrests</th>
<th>Arrest Rate</th>
<th>Total Seizures</th>
<th>Seizure Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Males per 100 Females</td>
<td>-0.018</td>
<td>0.209</td>
<td>-0.158</td>
<td>-0.056</td>
</tr>
<tr>
<td>2. % between the age of 25 and 29</td>
<td>0.697</td>
<td>-0.113</td>
<td>0.374</td>
<td>-0.377</td>
</tr>
<tr>
<td>3. % with less than a HS diploma</td>
<td>-0.012</td>
<td>0.128</td>
<td>-0.027</td>
<td>0.030</td>
</tr>
<tr>
<td>4. % of population that is white</td>
<td>0.001</td>
<td>-0.481</td>
<td>-0.111</td>
<td>0.058</td>
</tr>
<tr>
<td>5. % of households vacant</td>
<td>-0.011</td>
<td>-0.029</td>
<td>0.119</td>
<td>-0.114</td>
</tr>
<tr>
<td>6. % of population that is rural</td>
<td>-0.331</td>
<td>-0.794</td>
<td>-0.622*</td>
<td>-0.356</td>
</tr>
<tr>
<td>7. % of households that are owner occupied</td>
<td>-0.054</td>
<td>0.160</td>
<td>0.279</td>
<td>0.017</td>
</tr>
<tr>
<td>8. % single parent households</td>
<td>0.107</td>
<td>0.223</td>
<td>0.047</td>
<td>0.491</td>
</tr>
<tr>
<td>9. % unmarried over 25 years of age</td>
<td>-0.189</td>
<td>-0.138</td>
<td>0.006</td>
<td>-0.304</td>
</tr>
<tr>
<td>10. % of pop below poverty level</td>
<td>-0.090</td>
<td>-0.632*</td>
<td>0.008</td>
<td>0.018</td>
</tr>
<tr>
<td>11. % absolute population change</td>
<td>0.492</td>
<td>0.096</td>
<td>-0.059</td>
<td>-0.066</td>
</tr>
<tr>
<td>12. % police per population</td>
<td>-0.013</td>
<td>-0.090</td>
<td>0.174</td>
<td>0.307</td>
</tr>
</tbody>
</table>

* indicates counterintuitive correlations

**Bold values are significant at p ≤ 0.05**

**Gray values are not significant at p ≤ 0.05**

Variables could significantly explain total meth arrests, total meth lab seizures, and meth arrest rates. However, the selected independent variables for Model B were equally unable to reliably or accurately predict or explain meth lab seizure rates. Model B explained 81.0 percent (R-squared value of 0.810) of the total meth-related arrest variance. The demographic characteristics that proved to be the best predictors were percent between the age of 25 and 29 (0.697), absolute percent population change (0.492), and percent of population that is rural (-0.331).

Model B explained 60.9 percent of the meth arrest rate variation. The demographic characteristics that proved to be the best predictors were percent of population that is rural (-0.794) and percent of population...
below poverty level (-0.632). Interestingly, as poverty rate went down, the total number of total meth lab seizures went up. One might expect the opposite for this variable, since drug abuse (depending on the substance) is oftentimes associated with places with higher levels of poverty. Multiple regression Model B explained 45.9 percent of the total meth lab seizure variation. Like Model A, the only demographic characteristic that proved to be a good predictor was the percent of population that is rural (-0.622). Multiple regression Model B also could not reliably or accurately explain meth lab seizure rate variation.

When comparing Models A and B, it is best to use the more conservative adjusted R-squared values instead of R-squared values because a different number of independent variables were used for each model (Tables 1 and 2). Of the three dependent variables that could be significantly explained, only total meth arrests could be explained noticeably better by Model B. Model B’s adjusted R-squared value was 75.3, whereas Model A’s adjusted R-squared value was 65.6. This means that Model B could explain about 10% more of the total meth arrests in North Dakota.

Although Model A and Model B yielded somewhat different results, both regression models had similar predictive (R-squared values). The best variable for explaining total methamphetamine possession arrests was percent of population that is rural. However, in both model runs, percent of the population that is rural had counterintuitive results for explaining total meth lab seizures. The literature suggests that rural areas are likely to have more lab seizures due to lesser police and neighbor presence (Scott 2002; Weber 2006). Statewide, there are only eleven counties with no documented meth activity (arrests or lab seizures). However, those eleven counties also happen to be predominantly rural counties (each is classified by the U.S. Census Bureau as being 100 percent rural). This greatly influences the multiple regression models because the data suggests that “rural counties = no meth activity” for one-fifth of the counties in North Dakota. This may be grounded reality, but it also might suggest that meth activity simply has not been identified by local rural law enforcement. This slight data anomaly might help to explain why the variable for percent of population that is rural negatively correlates with total meth lab seizures, and is not as highly correlated with meth lab seizure rate as one might expect. Counterintuitive results were also found for per capita income (Model A) and poverty rate (Model B) when trying to explain meth arrest rates.

A second multiple regression model (Model B) was run because the results of the first multiple regression model (Model A) seemed to be unable to fully explain the meth phenomenon in North Dakota. However, Model B also proved to be inadequate at significantly explaining the phenomenon. The dependent variable which was of most interest to this research was “meth lab seizure rates”, which happened to be the only dependent variable that neither regression model was able to explain. The reason lab seizures were of so much interest to this project is that North Dakota ranked third out of fifty states in per capita lab seizures during this four-year period. It is very rare for North Dakota to rank that high in any crime statistic. Although each model had limitations, they both helped to identify demographic variables that may lead to a better understanding of the landscape of meth in North Dakota.

The temporal histogram of total meth-related arrests, 2000-2003 (Fig. 1) shows the greatest number of arrests taking place in counties with the highest populations and largest cities of Fargo, Grand Forks, and Bismarck. The county with the most total arrests was Cass, home county of Fargo, at 419. The county with the most arrests in one year was also Cass, with 152 in 2002. There were more lab seizures in the rural counties than arrests. The county with the most total lab seizures was Williams (where Williston is located), with 143. The county with the most lab seizures in one year was also Williams, with seventy in 2003. The general trend on both temporal histogram maps is of increasing meth activity between 2000 and 2003.
The meth arrest rate was higher in the southeast and center portions of the state (Fig. 3). However, there were noticeably high rates in a number of other parts of the state, such as Williams, Grand Forks, Pierce (Rugby), Sargent, and Stutsman (Jamestown) Counties. Mercer County, where the city of Beulah is located, had the highest arrest rate at 613 per 100,000. This means that about one out of every 200 people were arrested for a meth-related charge.

High lab seizure rates were particularly prevalent in the northwest corner of North Dakota (Fig. 4). There were also high rates of lab seizures in the northeast corner. Another area with high lab seizure rates was in and around Sheridan and Eddy Counties. Williams County, where the city of Williston is located, had the highest lab seizure rate at 724 per 100,000. This means that there was about one lab seized for every 150 people in the county.

The nature of meth arrests varies dramatically depending on the level of urbanization of the county. In counties classified as predominantly rural, especially in the northern and western portions of the state, lab seizures predominate, while in the more urbanized counties of the southern and eastern regions, the majority of arrests are for possession (Fig. 5).

There also seems to be a relatively meth-free zone in the state, which runs from the southwest to just west of the southeast corner. All of these counties happen to be 100 percent rural. It is possible that there was less meth activity in these parts of the state, or it could simply mean that the meth operations in these counties have gone undetected.

**NORTH DAKOTA’S RESPONSE**

North Dakota is proactively responding to increased methamphetamine crime through a number of programs and policies. In the northeast counties of Pembina, Walsh, and Cavalier Counties, locks have been provided for farmers to place on their anhydrous tanks so that anhydrous ammonia cannot be stolen from farms to manufacture meth. Another ingredient cracked down upon was ephedrine, commonly found in the over-the-counter drug pseudoephedrine. On 1 June 2005, North Dakota HB 1346 took effect, which limits the amount of methamphetamine precursor drugs that can be sold at one time and requires written documentation of the purchase in a retail log book (Indiana Criminal Justice Institute 2005). Although more organized groups of meth manufacturers can find ways around this, either by obtaining the ingredients illegally or using a number of people to buy the precursors at a number of different locations, it has proven to be successful in terms of reducing numbers of meth lab seizures. In addition to the restriction placed on many of the chemicals needed to manufacture meth, North Dakota’s Organized Drug Enforcement Task Force (ODETF), along with local drug task forces, battle the trafficking of meth within the State (Indiana Criminal Justice Institute 2005). These combined crackdowns on meth have actually reduced the number of clandestine meth lab seizures from 297 in 2003 to 260 in 2004, and most recently to 163 in 2005.

**CONCLUSION**

This study attempted to better understand the meth phenomenon in North Dakota by answering two questions: 1) What is the spatial pattern of meth in North Dakota? and 2) What geographic factors account for the increased prevalence of meth use and production in the state? Based on the results of this study, the general trend is that meth possession arrests in North Dakota are more likely to take place in counties that are urban, closer to or containing a larger city, and highly populated. These counties in general tend to be located in the southern, eastern, and southeastern areas of the state. Counties with higher per capita income, large portion of vacant houses, higher percentage of the population in their late 20’s, and population that has dramatically reduced in size from 1990 to 2000 are environments more prone to meth-related possession arrests.
The general trend for meth lab seizures in North Dakota is that they are more likely to take place in counties that are more rural, further away from larger cities, but they are generally not the most rural areas in the state. These counties tend to be located in the northern, western, and northwestern areas of the state. The multiple regression analysis indicated that counties that are somewhat less rural (Williams, Ward, and Walsh with respective cities of Williston, Minot, and Grafton) tended to be the breeding grounds for higher meth production. These results are not what one would expect to find. These counterintuitive results are due to the fact that so many completely rural counties had no documented meth activity. Most of the counties that are both 100 percent rural and have no documented meth activity tend to be clustered together, particularly in the southwestern corner and southern border of the state (Fig. 5). There are two possible explanations for this anomaly. The first is that meth production is taking place in these counties, but that it has gone undetected thus far. The second explanation is that not all rural communities are prone to meth production. It is most likely that meth use is taking place, but has not been identified in crime data as of yet.

Why is meth such a problem in North Dakota? We believe that the meth phenomenon in North Dakota can be explained by three different factors. The first is the relatively easy access to the chemicals needed to physically manufacture meth, particularly anhydrous ammonia. The vast majority of communities in America do not have readily available access to an abundant source of anhydrous ammonia left in fields that are not under any surveillance. The second reason is the unusual remoteness of the North Dakota landscape relative to other American landscapes. This remoteness is important for a two reasons. First, remote or isolated areas are difficult for law enforcement to efficiently monitor for clandestine criminal behavior. Second, the remoteness of the North Dakota landscape, in addition to the long harsh winters lends itself to a landscape where certain people are susceptible to idleness, boredom, and despair. This is a common way persons in North Dakota begin drug experimentation and abuse and is a common narrative among arrestees according to task force officials (Ness 2005).

The final reason why meth is such a problem in North Dakota is due to the social and cultural unpreparedness of the state as a whole to confront and combat the problem. First of all, North Dakota does not have a history of drug problems. Because of this, the state as a whole was largely unprepared for the meth outbreak at the dawn of the new century. As mentioned earlier, North Dakota is ranked extremely low in the Uniform Crime Reports indexes for criminal violations. In fact North Dakota is considered to be the state with the lowest crime rates (FBI 2000). Finally, North Dakota’s rural communities are facing an ongoing exodus. Of North Dakota’s fifty-three counties, forty-eight saw a decrease in population from 1990 to 2000 (U.S. Census Bureau 2000). The result of this exodus has meant that many North Dakota communities, particularly rural ones, have been hit hard economically. Because of a lack of local employment opportunities in the primary sector due to large-scale, mechanized farming operations, many of the young and educated are leaving the state or residing in the more prosperous urban areas like Fargo (Cass County) and Bismarck (Burleigh County), both of which saw 15 to 20 percent increases in their population from 1990 to 2000. Those that are left behind find themselves in depressed rural communities with little to offer. Sadly, the end result has possibly led to involvement in the clandestine world of methamphetamine.

REFERENCES


