

# **The Effectiveness of the Dunbar Neighborhood Association**

*A 79 Month Examination of Criminal Activity in Lexington, Kentucky*

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## **Executive Summary**

The purpose of this research project is to evaluate the Dunbar Neighborhood Association's ability of reducing crime for its residents. In November of 2002, a resident of Dunbar Neighborhood in Lexington, Kentucky established the Dunbar Neighborhood Association (DNA) to counter the perceived growing amount of criminal activity in her community. The DNA held monthly meetings and relayed information about perceived and known criminal activity to the Lexington-Fayette Urban County Police Department. The police in turn promised to provide a beat officer who could be contacted by the DNA Chairwoman when she became aware of potential future crimes. The following study uses an interrupted time series (ITS) to measure the number of calls for service made from the Dunbar Neighborhood to the police department, from January 1999-November 2002 and May 2003-January 2006 as a way of measuring perceived crime. Phone calls fell into two categories, proactive or reactive calls for service, and then into five subcategories (calls for violent, nonviolent, narcotic, suspicious, and follow-up activity). Total calls for reactive and proactive service as well as arrests made from phone calls were also studied. Results show that since the establishment of the DNA, reactive calls for service have reduced, proactive calls for service have increased, and the number of arrests made per call made has increased. Regression models show an 80% correlation between the number of calls made and the number of arrests made in Dunbar. Regression models also show little evidence to suggest that negative displacement effects have occurred. Evidence is consistent in finding a clear causal relationship between creation of the DNA and change in crime; however, because few social variables were controlled for, this study cannot conclusively state a clear causal relationship exists.

## **Purpose of the Study**

The purpose of this research project is to evaluate the Dunbar Neighborhood Association's (DNA) ability of reducing crime for its residents. To determine if crime has been reduced because of the DNA, this study examines the how residents in the Dunbar Neighborhood have changed their phone calling habits to the police department and if arrests per call have changed. Specifically the study focuses on change in what criminal activity was being reported, by phone, to the police department and how often those calls for service were made. Finally, the study explores the possibility of displacement effects of crime by examining a nearby neighborhood's same calling habits. By analyzing these phone call statistics, the researcher hopes to determine if there is a clear causal relationship between establishment of the DNA and the amount of crime in Dunbar.

## **Problem Statement and Background**

The First District of Lexington, where the Dunbar Neighborhood is located, is characterized by poverty and an active underground economy. The average income for a full-time professional employee in Lexington is just above \$34,000, while those living in the First District earn just above \$10,000.<sup>i</sup> Only 25% of people in the First District have a high school diploma or above.<sup>ii</sup> The Dunbar Neighborhood consists of 185 housing units and on four different streets (Kenton, W. Fifth, Toner and Campbell streets) and two different courts (Harken and Sheila Court). Housing units are primarily owned by residents and landlords who rent to interested tenants. Even though Dunbar is only a block away from Transylvania University, tenants are typically poor and uneducated.

In November of 2002 Dorothy Porter, a long time resident and homeowner of the area established the Dunbar Neighborhood Association (DNA). The DNA was created

because Porter wanted to take action towards reducing crime, reducing drug use and beautifying the neighborhood. Prior to the DNA's establishment, Porter believed that citizens of Dunbar were knowledgeable about the criminal activity taking place, however, they were either afraid to call the police or thought that calling would not make a difference.<sup>iii</sup> Because of this, Porter announced that a gathering of concerned Dunbar residents would meet monthly, beginning in November of 2002, to discuss ways of improving the neighborhood. During the first meeting, the DNA established a relationship with the Lexington-Fayette Urban County Police Department (LFUCPD). The police department became aware that a community effort to reduce crime was starting and promised to do two things. First, the police department would prepare to respond to more calls. Second, the police department would provide a beat officer to work proactively with the DNA against crime. The beat officer could be contacted by Dorothy Porter regarding recurring problems or troublemakers in the neighborhood, which the officer could then address personally. For example, if a neighbor was known to drink heavily every Friday night and become disorderly, the officer may talk to him earlier in the week to let him know that people would be anticipating unruly behavior and would call the police accordingly. Since November 2002, the DNA has grown slightly but only sees limited participation at its monthly meetings. Porter describes the DNA as a group with a handful of regular attendees and a place where other residents come for assistance.

The DNA has focused its efforts on building a relationship with the police, informing landlords of the DNA's existence, and trying to beautify the neighborhood. From November 2002 until January 2006, there have been three different beat officers, each of whom established positive a relationship with the DNA. The DNA's relationship

with the police has also been strengthened because other officers have communicated with Porter and other residents. This ongoing communication between the police department and the DNA is aimed at unifying the understanding of all neighborhood criminal activity.

The second focus of the DNA has been to build a better relationship with those who are landlords of Dunbar properties. According to Porter, in the past, landlords would rent to anybody as long as they were able to make a profit on the property. This led to landlords accepting tenants who were prone to criminal activity. When complaints were brought to the landlords of their tenants' actions, the landlords would claim ignorance and rarely take substantial action. Because of the DNA, landlords are pressured to be more responsible for their tenants' actions by residents and the police.

The third component of the DNA is to beautify the neighborhood. In November 2002, according to Porter, residents were inclined to leave various articles of trash, old tires, or parked cars on their lawns. This debris made Dunbar a less aesthetically pleasing neighborhood. The DNA has since organized multiple clean-up days where residents clean and help each other clean their yards to beautify the neighborhood. Porter is planning on planting flowers in her yard this spring and will encourage others to do the same. She and the DNA believe a clean neighborhood will lead to less criminal activity.

The researcher's primary aim is to determine whether there is a clear causal relationship between establishment of the DNA and the amount of crime in Dunbar. The researcher also aims to determine if arrests made per calls has changed since the creation of the DNA and to determine if displacement of crime has happened as a side effect. To achieve these aims, a proper measure of criminal activity must be used which can show both changes in both reactive and proactive methods of reducing crime. This measure must

then be applied to the Dunbar Neighborhood, a control neighborhood, and a neighborhood that can measure the effects of possible displacement.

## **Literature Review**

Most major city or metropolitan police departments have some breakdown of crime statistics on their website. Each department provides crime statistics in its own way, but there are many methods that overlap, such as listing annual violent crimes or traffic violations. Some police departments, such as New York City<sup>iv</sup> and the City of Phoenix,<sup>v</sup> also include the number crimes for specific categories compared to the number of arrests that were made. However, the Lexington-Fayette Urban County Police Department does not provide such a breakdown.

There are other methods used in reporting crime. In the United Kingdom, crime statistics are broken down into three categories: reporting a crime; recording a crime; and detecting a crime.<sup>vi</sup> An independent organization in the UK goes a step further and conducts the yearly British Crime Survey, which actually interviews individuals about their victim experiences.<sup>vii</sup> The US Department of Justice measures violent crime in three categories: Total violent crime; victimizations reported to the police; crimes reported to the police; and arrests for violent crime.<sup>viii</sup> These examples show that people measure crime in different ways. This realization is not surprising considering that crime levels are not an exact science. Because no judicial system is perfect, it is impossible to assure that convictions or acquittals are all true. Crime statistics cannot just be based exclusively off of arrests either, because not all arrests are of a guilty party and often, arrests are not always able to be made because a person may flee the scene.

This study uses the number of phone calls for service made to the LFUCPD as its data, because the aim is to determine if Dunbar Neighborhood residents have changed their reactive and proactive calling habits to the police since creation of the DNA. This method is not without fault, because exclusively measuring phone calls does not include every attempt by citizens to contact police. Citizens are able to obtain police assistance in a number of ways like flagging down a passing police cruiser or even using the internet to contact police. For example, in Arlington, Virginia, the police department allows citizens to report crimes on its website.<sup>ix</sup> Even in Lexington, Kentucky a resident can email the police if they have information regarding past homicides.<sup>x</sup> Therefore, while this method is not an exact science, it is advantageous because it can indicate reactive and proactive efforts by the community and police to fighting crime. Because the DNA specifically uses community policing, which has both a proactive and reactive element, studying phone calls will help to determine if there is a clear causal relationship between establishment of the DNA and crime levels.

In order to determine how best to fight crime, residents and police need to understand what breeds crime. The three main reasons that crime exists in a neighborhood are because there of social disorganization, an opportunity to commit a crime<sup>xi</sup>; and an overall lack of care for properties.<sup>xii</sup> The two components needed for significantly reducing neighborhood crime are community policing and sustained police partnerships.<sup>xiii</sup> Success of these components, especially in poor and high crime areas, depends greatly on substantial and continued police assistance. When these components of community policing and police partnerships are implemented, environmental and enforcement efforts are then needed for reducing crime. Environmental strategies are efforts aimed at



improving the physical appearance of the neighborhood, while enforcement strategies are community efforts to work with police, landlords, and store owners to help enforce laws and ordinances.<sup>xiv</sup>

Community policing is a relatively new method for fighting crime. While its origins go back to the mid 20<sup>th</sup> Century, it became a national effort in 1994 when federal legislation funded 100,000 police officers specifically for community policing. Whereas, traditional police departments reactive to calls for service, community policing however, involves a proactive approach to solving crime. Consisting of three parts, crime prevention, problem solving, and police partnerships, success of this method depends on constant trust and communication between the police and the community members.<sup>xv</sup> An example of community policing is when a resident was constantly calling the police because of loud music coming from his neighbor's stereo. However, instead of continually ticketing the violator, the police suggested moving the stereo to another part of the house, allowing the violator to listen to low music in a part of the house that wouldn't disturb his neighbor. Community policing has become a national way of fighting crime. At Eastern Kentucky University, the Kentucky Regional Community Policing Institute works to "encourage and enhance the implementation of community policing in Kentucky"<sup>xvi</sup> which relies on constant citizen input to inform police departments of problems and potential problems in a neighborhood. The City of Chicago has established the Chicago Alternative Policing Strategy (CAPS) which relies on partnerships between the police and community to reduce crime. The Chicago Police Department website touts a number of achievements and strategic plans for fighting crime related to CAPS.<sup>xvii</sup> North Carolina Wesleyan College Professor of Justice Studies Thomas O'Connor cites a list of over 200 community

policing programs on his class website.<sup>xviii</sup> From coast to coast, cities are starting to implement community policing strategies.

Though community policing is a national way of fighting crime, it has not always been proved reliable. Research shows that any effort will succeed at some level, but individual program lasting success depends on circumstances particular to that neighborhood.<sup>xix</sup> Past studies show policing and resident surveillance techniques on average will have some positive effect on reducing crime. However, that effect drops to little/no effect when public sector housing neighborhood associations were examined. The conclusion was that crime reduction only with citizens who are willing to establish a long term relationship with local police.<sup>xx</sup> For those communities that do establish long term relationships with the police, it follows that police gain a connection to their community which results in increased job satisfaction.<sup>xxi</sup>

On the issue of displacement, the general conclusion is that it exists, but only in limited quantities and only in neighborhoods that are a short distance from where the treatment was applied. In 1994, the Ministry of Justice in Holland contracted Professor Rene Hesselting to studying the phenomenon of displacement by reviewing all available literature with studied the various crime prevention measures where researchers had previously looked for evidence of displacement. Over a year later, a review of 55 published articles found little evidence that displacement of crime was a hard and fast occurrence. There were 22 studies that found no displacement at all, and six of those actually helped reduced crime in surrounding areas. There were 33 studies which found limited displacement, however no study found a total displacement of crime. In 1999, three evaluations in England that assessed a new police scheme to fight crime concluded that

crime was not displaced to the neighbors. The results led all three researchers to believe that the new scheme did not “displace crime to the neighbors.”<sup>xxii</sup>

Displacement, if it happens is often “difficult to predict and often impossible to measure in all its form”<sup>xxiii</sup> because it depends on what “whether offenders resort to any combination of alternative targets, times, places, methods, and offenses and whether these alternatives are familiar to the offender.”<sup>xxiv</sup> For example, “drug dealing has been found to be susceptible to displacement.”<sup>xxv</sup> However, other than that displacement does not seem to happen in areas that require an offender to travel far. “The most general and consistent finding is offenders do not appear to travel very far.”<sup>xxvi</sup> Studies have shown that the average distance traveled to commit a domestic burglary was 1.8 miles.<sup>xxvii</sup>

## **Method**

The researcher’s aim is to determine whether there is a clear causal relationship between establishment of the DNA and the amount of crime in Dunbar. Crime, in this study, is defined as any action which a neighborhood resident is witness to subsequently calls the police. To determine the amount of crime, the researcher obtained a list of the number of calls from residents living in Dunbar to the Lexington Police Department over an 85 month period (January 1999 until January 2006). The researcher then broke down calls into three main categories (reactive calls, proactive calls, and arrests) and eight subcategories (violent crimes, nonviolent crimes, narcotic crimes, suspicious activity, follow-up activity, total reactive and proactive calls for service, and arrests made as a result of calls made). Reactive calls refer to those calls made for violent, nonviolent, and narcotic activity. Proactive calls refer to those calls made for suspicious and follow-up activity. For a complete list of what constitutes violent, nonviolent, narcotic, suspicious or follow-up

calls, reference Appendix A. Arrests refer to calls made that resulted in an arrest. Once data were classified and tallied on a month by month basis, the numbers were placed into a Microsoft Excel file and a Stata 9 computer system to determine the average amount of calls per category, per month for both before and after establishment of the DNA. Also calculated were line of best fits for data both pre and post November 2002.

This method, known as an interrupted time series, is a strong design and is only susceptible to internal validity threats of history or instrumentation, exactly at the time of treatment.<sup>xxviii</sup> This design can be strengthened by also examining a control and a displacement neighborhood. Therefore, the researcher obtained a list of the number of calls from a neighborhood located less than a mile away, called York (referred to in this study as “Displacement”), and a neighborhood located roughly five miles away, called Hedgewood (referred to in this study as “Control”). Both neighborhoods, picked at random, have between 180 and 215 housing units and would be considered congested areas by an average onlooker. By selecting Hedgewood as the Control, the researcher is able to focus on how the treatment of the DNA is specific to Dunbar and Lexington’s First District, and not to the rest of Lexington. Because the goal of this study is to evaluate the DNA’s ability of reducing crime for its residents, the control did not need to possess similar economic or social demographics. The treatment of the DNA is unique to Dunbar, and the literature review shows that a displacement will not travel five miles. Therefore, because Hedgewood did not establish a crime prevention program at anytime during the months studied, and was also affected by all the same city wide changes, legislative and otherwise, it makes for a good Control. The only criterion that was needed for selecting a displacement was that it was within 1.8 miles of Dunbar. The selection of York as the

Displacement was random expect for its close proximity to Dunbar and location in the First District of Lexington. The same criminal activity tallying method used for Dunbar was used on these two neighborhoods.

There were multiple calculations made by the researcher. There were 46 observations prior to the treatment and 33 observations after. The six month period of November 2002 through April 2003 was not calculated to allow for Dunbar residents to become accustomed to using the DNA. This omission of these six months is very important in measuring how crime has changed. Generally, people's habits will not instantly conform to every new social situation. Most people go through an emotional change curve<sup>xxix</sup> when experiencing a new situation. A person's attitude goes from denial, to resistance, to resentment, to exploration, to responsibility, and then finally to commitment. In this example, the change curve that the researcher is concerned with is that of the residents. Residents need to time to become habituated to the belief that proactively calling the police will help reduce crime. This phase in period is essential to make this study accurate.

After measuring 46 observations (for each of the three neighborhoods) prior to creation of the DNA and 33 observations post creation, the researcher compared the pre and post means of the each of the eight categories (violent, nonviolent, narcotic, suspicious, follow-up activity, reactive and proactive calls made, and arrests made from calls made). If the post May 2003 mean fell outside of the 95% confidence interval of the pre November 2002 numbers, then it was determined that calls for police service or number of arrests made had a experienced a statistically significant change.

A regression analysis was then run to determine how the number of arrests in each neighborhood was affected by the number of calls made to the police department. By calculating these numbers, the researcher could determine if arrests per call had changed and how each type of call for service affected the number of arrests made. For example, did calls for violent activity lead to more arrests than calls for nonviolent activity?

Two regression analyses were also run to determine the effects of displacement. First the researcher ran a regression of how calls for service in Dunbar affected the number of arrests in the Displacement Neighborhood. The purpose of running this regression was to determine if the number of arrests in the Displacement was negatively affected by the calls for service in Dunbar. A fear is that an increase in calls for service in Dunbar would occupy more police resources, leading to fewer arrests that could be made. Displacement was also measured by running a regression to determine if the number of calls for each specific category (violent, nonviolent,) in Dunbar was correlated with the number of calls made for that same category in the Displacement Neighborhood. The purpose of running this regression was to determine if calls for perceived criminal activity in Dunbar had an affect on calls for perceived criminal activity in the Displacement. Evidence that displacement existed would be aided if reactive crime calls declined in Dunbar and simultaneously increased in the Displacement. A finding for positive effects of displacement would exist if proactive calls for service in Dunbar affected positively affected proactive calls for service in the Displacement. Equations for these regressions are listed in the findings section of this paper.

With the establishment of the DNA as an integral part of a community policing program, success is based on change in the amount and change in the type of resident

phone communication with the police department. Success would be indicated by statistically significant decreases in reactive calls for service, increases in proactive calls for service, and increases in the number of arrests made from the number of calls made. Success is measured this way because a decrease in reactive calls for service would indicate that fewer new crimes are taking place, while increases in proactive calls for service indicate a more efforts to take preventative crime fighting measures. Also, more arrests are being made relative to the number of calls being made, indicates that the police have been able to apprehend a suspect more efficiently than prior to November 2002.

### **Findings – ITS**

Through an interrupted time series design, the researcher found there to be many significant impacts across all three neighborhoods. The Dunbar Neighborhood saw statistically significant changes in seven of eight areas (violent, narcotic, suspicious, follow-up activity, total reactive and total proactive calls for service, and arrests made from calls).<sup>1</sup> The Control Neighborhood saw statistically significant changes in three of eight areas (calls for violent, nonviolent, activity and total reactive calls for service). The Displacement Neighborhood saw statistically significant changes in four of eight areas (calls for violent, nonviolent, and narcotic activity and arrests made from calls). A more detailed breakdown is listed in the chart below and graphs are presented in Appendix E.

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<sup>1</sup> This was determined by taking the averages of each variable from January 1999 – November 2002 and comparing them with the average for May 2003 until January 2006. If the latter average fell outside the 95% confidence interval of the former, then the finding was deemed statistically significant.

## Averages for Criminal Activity Before and After November 2002

Dunbar Neighborhood	BEFORE		AFTER		Difference	95% significant
	no./mo	Confidence Interval	no./mo	Confidence Interval		
Violent	5.49	4.65	6.32	3.39	-2.1	x
Nonviolent	10.04	8.45	11.63	8.55	-1.49	
Narcotic	0.98	0.5	1.45	2.36	1.38	x
Suspicious Activity	1.98	1.32	2.63	5.18	3.2	x
Follow-up Activity	1.89	1.24	2.54	5.21	3.32	x
Reactive Total	16.5	14.41	18.59	14.3	2.2	x
Proactive Total	3.87	2.86	4.88	10.39	6.52	x
Arrests Made	1.39	1.01	1.78	4.15	2.76	x

### Control Neighborhood

Violent	3.89	3.2	4.58	2.49	-1.4	x
Nonviolent	8.7	7.41	9.98	4.58	-4.12	x
Narcotic	0.35	0.06	0.64	0.27	-0.08	
Suspicious Activity	1.44	0.99	1.89	1.18	-0.26	
Follow-up Activity	1.22	0.85	1.58	1.3	0.08	
Reactive Total	12.93	11.19	14.68	7.33	5.6	x
Proactive Total	2.65	2.05	3.25	2.48	-0.17	
Arrests Made	0.7	0.44	0.95	0.91	0.21	

### Displacement Neighborhood

Violent	4.91	4.18	5.65	3.46	1.45	x
Nonviolent	10.48	9.15	11.81	12.21	1.73	x
Narcotic	0.33	0.17	0.48	0.88	0.55	x
Suspicious Activity	3.26	4.14	2.38	3.64	0.38	
Follow-up Activity	4.04	3.33	4.76	4.15	0.11	
Reactive Total	15.72	14.01	17.43	16.55	0.83	
Proactive Total	7.43	6.18	8.43	7.79	0.36	
Arrests Made	2.41	1.8	3.03	4.09	1.68	x

### Findings – Regression

A regression analysis was then run to determine how the number of arrests in each neighborhood was affected by the number of calls made to the police department. The equation used was:



$$Y = b + B_1V + B_2W + B_3X + B_4S + B_5Z$$

Where, when studying one neighborhood, Y is the number of arrests made from calls in a neighborhood, V is the number of calls for violent activity, W is the number of calls for nonviolent activity, X is the number of calls for narcotic activity, S is the number of calls for suspicious activity, Z is the number of calls for follow-up activity, B is the coefficient, and b is the intercept. The regression determined that there was a significant correlation between the number of calls made and the number of arrests made in three of five categories for the Dunbar Neighborhood (calls for violent, suspicious, and follow-up activity). Arrests in the Control Neighborhood had a statistically significant correlation to one of five categories (calls for follow-up activity). The Displacement Neighborhood had a statistically significant correlation at the 95% level in one of five categories (calls for nonviolent activity) and a statistically significant correlation at the 90% level in another category (calls for follow-up activity). These coefficients show how much a call from a particular category had on the likelihood of a subsequent arrest being made.

The researcher then determined how calls for service could explain the number of arrests by looking at the R-squared. The R-squared, which shows how strong the regression model is, increased substantially in the Dunbar Neighborhood, from .36 pre November 2002, to .80 post May 2003. This means that after May 2003 there is a 44% more likelihood that a call from the Dunbar Neighborhood will lead to an arrest. Also, by looking at the coefficients, one can determine how the number of arrests made from calls was affected by calls for each category of service. For example, there is a .44 coefficient for both calls for violent activity and calls for suspicious activity, and that means if one call

for violent activity was made and one call for suspicious activity was made in a given month, there would be .88 arrests made. The R-squared for the Control Neighborhood increased from .08 -.28 and the Displacement Neighborhood's R-squared increased .15 - .48 for the same time periods. A complete chart of this model for each neighborhood and its coefficients is listed below.

### # of Arrests as Affected by # of Calls

$$\text{Dunbar Arrests} = B_1\text{Violent} + B_2\text{Nonviolent} + B_3\text{Narcotic} + B_4\text{Suspicious} + B_5\text{Follow-up}$$

	1/99- 11/02	5/03- 1/06	Difference	SE Post 5/03	z Post 5/03	95%
R-Squared	0.28	0.8	0.52			
Adjusted R-Squared	0.36	77	0.41			

#### Coefficient

	1/99- 11/02	5/03- 1/06	Difference	SE Post 5/03	z Post 5/03	95%
Violent	0.07	0.44	0.37	0.15	2.99	x
Nonviolent	0.02	-0.03	-0.05	0.06	-0.45	
Narcotic	-0.08	0.15	0.22	0.08	1.18	
Suspicious Activity	0.33	0.44	0.11	0.08	5.25	x
Follow-up Activity	-0.04	0.39	0.43	0.13	8.13	x
intercept	0.26	-1.76	-2.02	0.94	-1.83	

### Control Neighborhood

	1/99- 11/02	5/03- 1/06	Difference	SE Post 5/03	z Post 5/03	95%
R-Squared	0.08	0.28	0.2			
Adjusted R-Squared	-0.03	0.17	0.2			

#### Coefficient

	1/99- 11/02	5/03- 1/06	Difference	SE Post 5/03	z Post 5/03	95%
Violent	-0.01	-0.4	0.03	0.12	-0.3	
Nonviolent	-0.02	0.9	-0.11	0.08	1.16	
Narcotic	0.08	-0.06	-0.14	0.41	-0.14	
Suspicious Activity	0.03	-0.03	0.6	0.22	1.26	
Follow-up Activity	0.19	0.39	0.2	0.2	1.96	x
intercept	0.55	0.1	-0.54	0.58	0.17	

### Displacement Neighborhood

	1/99- 11/02	5/03- 1/06	Difference	SE Post 5/03	z Post 5/03	95%
R-Squared	0.15	0.48	0.33			
Adjusted R-Squared	0.05	0.4	0.35			

#### Coefficient

	1/99- 11/02	5/03- 1/06	Difference	SE Post 5/03	z Post 5/03	95%
Violent	0.18	0.15	-0.03	0.2	0.75	
Nonviolent	-0.01	0.18	0.19	0.08	2.48	x
Narcotic	0.3	0.26	-0.04	0.44	0.58	
Suspicious Activity	0.14	0.11	-0.03	0.19	0.58	
Follow-up Activity	0.21	0.15	0.6	0.08	1.91	
intercept	0.26	0	-0.26	1.2	0	

When measuring for displacement effects, the researcher ran a regression of how calls for service in Dunbar affected the number of arrests in the Displacement Neighborhood. The equation used was:

$$Y = b + B_1G + B_2H + B_3I + B_4J + B_5K + B_6L$$

Where Y is the number of arrests in the Displacement, G is the number of calls for violent activity in Dunbar, H is the number of nonviolent activity calls in Dunbar, I is the number of narcotic activity calls in Dunbar, J is the number of suspicious activity calls in Dunbar, K is the number of follow-up activity calls in Dunbar, L is the number of arrests in Dunbar, B is the coefficient, and b is the intercept. There was no statistically significant correlation between the two. A complete chart is listed below.

**Displacement Arrests as Affected by # of Dunbar Calls**

	1/99- 11/02	5/03- 1/06	Difference	SE Post 5/03	z Post 5/03	95%
R-Squared	0.2	0.15	-0.05			
Adjusted R-Squared	0.08	-0.01	-0.09			
<b>Coefficient</b>						
Violent	-0.05	-0.1	-0.05	0.23	-0.31	
Nonviolent	0.04	0.03	-0.01	0.09	0.24	
Narcotic	-0.15	-0.17	-0.02	0.19	-0.64	
Suspicious Activity	0.47	0.28	-0.19	0.14	1.26	
Follow-up Activity	-0.24	0.21	0.35	0.92	0.95	
Arrests	-0.21	-0.26	-0.06	0.41	-0.65	
intercept	2.21	3.04	45	1.42	1.53	

Displacement was also measured by running a regression to determine if the number of calls for each specific category (violent, nonviolent,) in Dunbar was correlated with the number of calls made for that same category in the Displacement Neighborhood. For example: did the number of calls for violent activity in Dunbar affect the number of

calls for violent activity in the Displacement Neighborhood. The researcher found that there was a positive statistically significant correlation between calls made for follow-up activity in Dunbar and calls made for follow-up activity in the Displacement Neighborhood. An example of the equation used is:

$$YV = b + B_1M + B_2cN + B_3O + B_4cP + B_5Q$$

Where YV is the number of displacement neighborhood calls for violent activity, M is the number of Dunbar calls for violent activity, N is the number of Dunbar calls for nonviolent activity, O is the number of Dunbar calls for narcotic activity, P is the number of Dunbar calls for suspicious activity, Q is the number of Dunbar calls for follow-up activity, B is the coefficient, and b is the constant. This equation was then modified for each of the five categories of calls that are studied. The only category that showed a statistically significant result was follow-up calls in Dunbar having a positive effect on the number of follow-up calls for the Displacement. The results for follow-up activity are listed below and all charts are listed in Appendix B.

**Displacement Calls for Follow-up Activity as Affected by # of Dunbar Calls for Follow-up Activity**

	1/99- 11/02	5/03- 1/06	Difference	SE Post 5/03	z Post 5/03	95%
R-Squared	0	0.18	0.18			
Adjusted R-Squared	-0.02	0.16	0.18			
<b>Coefficient</b>						
Violent(Dunbar)	0.31	-0.18	-0.49	0.46	-0.38	
Nonviolent (Dunbar)	-0.1	-0.17	-0.07	0.24	-0.71	
Narcotic (Dunbar)	0.06	0.03	-0.03	0.43	0.07	
Suspicious Activity (Dunbar)	-0.24	0.06	0.3	0.35	0.17	
<b>Follow-up (Dunbar)</b>	<b>1.87</b>	0.21	<b>-1.66</b>	0.1	<b>2.14</b>	<b>x</b>
Intercept	3.5	4.79	1.29	1.93	2.48	

## Trends in Calling Activity

The researcher examined the trendlines of calls made in each neighborhood and in each category from January 1999 – November 2002 and from May 2003 – January 2006. By looking at these lines, one can gain a better sense of criminal activity trends both before and after the treatment. This information can then be used to help determine whether or not establishment of the DNA may have had any affect on community criminal activity as well as help determine how the Displacement Neighborhood was affected.

In examining trends before and after the treatment of the DNA, there is evidence of district wide social changes post May 2003. The findings are listed below and interpretation of them is explained in the “Discussion” section. In three of the eight categories studied, there were six changes in trendline slopes above 19% a month. Those areas were Dunbar calls for nonviolent activity, Dunbar and Displacement calls for follow-up activity, total number of reactive calls for service in Dunbar and the Displacement, and total number of proactive calls for service in Dunbar and the Displacement. A chart is listed below:

### Monthly Trendline Slopes for Pre and Post Intervention

# of Calls for Violent Activity	1/99-11/02	5/03-1/06	Difference
Dunbar	-0.08	-0.02	0.06
Control	-0.07	0.03	0.1
Displacement	0.03	-0.04	-0.07

# of Calls for Follow-up Activity	1/99-11/02	5/03-1/06	Difference
Dunbar	0.04	0.31	<b>0.27</b>
Control	0	-0.02	-0.02
Displacement	-0.03	0.22	<b>0.25</b>

# of Calls for Nonviolent Activity	1/99-11/02	5/03-1/06	Difference
Dunbar	0.04	-0.29	<b>-0.33</b>
Control	-0.14	-0.12	0.02
Displacement	0.13	0.04	-0.09

# of Total Reactive Calls Service	1/99-11/02	5/03-1/06	Difference
Dunbar	0	-0.23	<b>-0.23</b>
Control	-0.21	-0.08	0.13
Displacement	0.18	-0.01	-.19

# of Calls for Narcotic Activity	1/99-11/02	5/03-1/06	Difference
Dunbar	0.06	0.08	0.02
Control	-0.01	0.01	0.02
Displacement	0	0	0

# of Total Proactive Calls Service	1/99-11/02	5/03-1/06	Difference
Dunbar	0.14	0.41	<b>0.27</b>
Control	0.04	-0.02	-0.06
Displacement	0.09	0.29	<b>0.2</b>

# of Calls for Suspicious Activity	1/99-11/02	5/03-1/06	Difference
Dunbar	0.09	0.1	0.01
Control	0.03	0	-0.03
Displacement	0.11	0.07	-0.04

# of Arrests Made From Calls for Service	1/99-11/02	5/03-1/06	Difference
Dunbar	0.01	0.18	<b>0.17</b>
Control	0.01	-0.02	0.03
Displacement	0.07	0.03	-0.04

This means that within one year, on average, there was at least a 2.28 change in the number of calls or arrests made as compared to pre November 2002 trends for the listed categories. For example calls, for nonviolent activity in Dunbar fell .33 per month. This means that on average, there were 10.89 fewer calls in January 2006 than there were in May of 2003. A visual depiction in graphs can be found in Appendix E.

### **Weaknesses of the Study**

There are six main weaknesses in this study 1) The study only measures criminal activity, not specifically crimes that were committed 2) This interrupted time series study was completed with less than the standard 100 observations 3) The LFUCPD changed its instrumentation of data gathering prior to the treatment 4) Duplicate calls are not controlled for 5) National standards for what constitutes violent, nonviolent, narcotic, suspicious, and follow-up activity were not used 6) A lack of complete data prevented some statistics from being entered 7) Other possible reasons for a changes in proactive and reactive calls were not controlled for.

The primary goal of this study is to determine if the DNA has reduced crime, however this study does not specifically measure total crime. Instead, perceived crime is used as the measurement. As stated in the literature review and method sections, the measuring of perceived criminal activity does not incorporate every crime that has been committed. Merely calling the police to report a crime does not account for all crimes that have been committed. This is because the police can be contacted about crime from sources besides the phone. Therefore, this study does not measure all crimes that have been committed and it is impossible to determine whether or not crime totals have fallen since November 2002. Instead, it can only be determined how a neighborhood's perception of crime, and subsequent reaction to it, has changed. This is a major weakness because calls for service reporting criminal activity is not interchangeable with actual crime.

Second, this study only included 85 months of observation which is 15 short of the standard 100<sup>xxx</sup> that is generally accepted when conducting an interrupted time series. An addition of 15 observations would have brought more statistical power to calculating averages prior to the treatment.

Third, the LFUCPD changed the way it kept records of phone calls in November of 2001. The data that the researcher received both prior and post November 2001 contained the same categories for recording data, however, data post November 2001 was more detailed in its description of why the call was made. For example, post change, the charge "criminal mischief" was more often associated with a crime, such as property damage or disorderly. This may mean that data were not completely entered before the change in instrumentation, which may have skewed the pre November 2002 results for the "suspicious activity" category.



Duplicate calls were not controlled for in this study either. Though uncommon, these calls do constitute a statistical problem which may have unfairly swayed results.

Another weakness lies in the arbitrary categorization of criminal activity. These categories were decided upon by a novice researcher and there may have been errors in judgment as to what constitutes a particular crime. For example, drunkenness was omitted as a crime because the researcher did not initially believe that public intoxication could be adequately quantified. There are many people who have been publicly intoxicated, however, rarely do criminal implications follow. Upon further reflection though, it may have been appropriate to add drunkenness to the nonviolent criminal activity list because it is a crime and a call for that crime was made by a concerned citizen. The researcher temporarily forgot that his stated question was to measure the amount of criminal activity as determined by neighborhood residents, not true criminal activity. Therefore the omission of drunkenness, along with wanton endangerment, counterfeiting, forgery, animal complaint, and others, could potentially have skewed data results, particularly when looking for a relationship between calls made and arrests from calls made.

The sixth major weakness of this study deals with how the LFUCPD recorded different criminal activity. There were a number of phone calls for “assist other agency” which were not fully specified. The assistance could have been given to help the fire department, or it could have been made to help a federal enforcement agency apprehend a suspect. This ambiguity prevented addition of this type of call and unknown/unwanted person, and lost/found/damaged property from being included. Also, post change in instrumentation, child abuse and child neglect were often listed as one call. Rarely were

the two specified, forcing the researcher to assume child neglect instead of child abuse. Had the record been more specific, more accurate results would have been produced.

The final major weakness of this study is that other potential reasons for rises in proactive calls and declines in reactive calls were not controlled for. The aim of the following study is to determine if perceived criminal activity has changed in Lexington, Kentucky's First District, since the creation of a neighborhood association in November 2002. However, this study does not specifically link change in calling habits to the creation of the DNA. There are many other possibilities as to why calling habits may have changed. Reactive calls for service could have decreased because the economy improved and less people wanted to commit crimes, or because criminals had moved out of their houses between November 2002 and May 2003. Proactive calls could have risen because more proactive people had moved into the neighborhood, or because criminals allowed themselves to be more visible during and after committing a crime. This study does not take any steps to control for these factors.

### **Strengths of the Study**

The three strengths of this study are 1) how calling habits have changed since creation of the DNA 2) how perceived criminal activity is categorized and 3) how criminal activity has changed in two other neighborhoods 4) that it debunks a 2004 public report claiming more significant decreases in calls for service.

This study is strong in its ability to show how many calls for services related to criminal activity have been made both prior to and post creation of the DNA. The interrupted time series design is able to show, with certainty, what change has occurred

post May 2003. While the interrupted time series did not have the recommended 100 observations, it is still a strong study because change and trends are clearly measurable.

The second strength of this study is that it breaks down criminal activity in reactive and proactive categories. By breaking down observed criminal activity into two broad categories, one can have more evidence to determine if a clear causal relationship between the DNA and crime exists. It follows that when evaluating community policing tactics, changes in reactive calls should differ than changes in proactive calls. Without these specific categories, the researcher and audience may have reached faulty conclusions. Also, categorization of the number of arrests made as a result of these calls indicates the relationship between Dunbar residents and the LFUCPD. This is because the LFUCPD may have forewarned repeat offender, thanks to Dunbar residents who have provided earlier information.

The third strength of this study is that criminal activity is compared across three neighborhoods. An ITS design is strengthened by adding multiple groups to the overall examination. By studying three neighborhoods, the results of the study are strengthened because statistical information can be shown as being, or not being unique to the neighborhood which received the treatment.

Finally, this study improves upon a study conducted by the LFUCPD in 2004 that showed a decrease in the number of calls for service. In that 2004 report, the author only tallied the total number of calls for service (which included calls for missing persons, assisting citizens, traffic violations...) which were not proved to be related to criminal activity. The police and First District Councilman George Brown used this report to demonstrate the DNA's effectiveness to the public, which some could argue was ethically

wrong. This study is a more comprehensive examination of calls for service than what was previously available to the public.

## **Discussion**

Between November 2002 and January 2006, there were been a lot of change in Lexington. This was shown by the many statistically significant changes that the ITS displayed. This city wide change in crime habits can be accredited to any number of reasons not studied in this examination. However, through the use of regression, it has become clear that in Dunbar, a significant majority of arrests were correlated with proactive measures. The regression model which determines how the number of calls for service affected the number of arrests explains 80% of the correlation between the dependent and independent variables. The same model from January 1999 until November 2002 only explains 36% of the correlation. This means that when crime related calls from Dunbar are made, there is a greater likelihood of an arrest being made. Coefficients for proactive crime fighting measures increased substantially as well. For suspicious and follow-up activity, the coefficients were .44 and .39 respectively. This means that since the creation of the DNA, if one call was made for suspicious activity in May and one call was made for follow-up activity in May, there would be almost one (.83) arrest made in May, specifically due to proactive calling. Also notable in the models is the substantial .37 increase in the effect of calls for service due to witnessed violent activity. The new coefficient, (.44) accounts for almost a half more arrests pre month since the DNA's creation, when all other factors are held constant. Simply put, more arrests are happening in Dunbar when calls for service to the police department are made.

There was a substantial change in the amount of calls for service in the displacement and control neighborhoods as well. Even though there were significant changes in calls for service, this study cannot conclusively determine why there was a change. It appears that other variables are necessary to explain why the amount of calls for service changed at statistically significant rates across three different neighborhoods in Lexington. It is not apparent, through this study, what those variables could be.

Reactive calls for service can be explained in a number of ways. The police force may have created a community outreach program in the past two to four years, resulting in a greater trust among all residents of Lexington. The studied neighborhoods (other than Dunbar) could have established an unofficial watch program resulting in more proactive and reactive efforts to communicate with the LFUCPD. It could also follow that there was a high turnover in the number of Dunbar residents prone to criminal activity, meaning all the criminals left Dunbar. Whatever these factors are, there are simply not known.

Proactive calls for service could have changed because of a number of reasons as well. For example, during the six month phase in period, was there a high turnover of Dunbar residents who had historically not reported crimes for citizens who are more likely to call the LFUCPD when a crime is witnessed? After May 2003, were more crimes made during the day, when making criminals more visible to residents? If so, did this cause more people to call the police for suspicious activity or for follow-up activity? Did the economy improve during the six month phase in period, causing more people to have greater assets and thus be more likely to take the proactive measure of calling the police when a suspected criminal was seen? Was there an effort by members of the nearby Transylvania University to proactively fight crime near campus? Was there a change in human

instrumentation at the police department where a person prone to misreporting data was switched with a person who was more accurate at fully reporting data? Any of these possibilities could account for the data changing the way it did.

When studying for effects of displacement, the results were surprisingly positive. Through the regression models used, the only significant effect that number of calls in Dunbar had on the number of calls in the Displacement is a positive effect on follow-up calls made. This means that when more calls for follow-up activity were made in Dunbar, more calls for follow-up activity were made in the Displacement. The question remains though, why the increases in proactive calling? Did the example of the DNA prompt the Displacement Neighborhood to change their proactive ways, or was it because of a totally unrelated variable? Through this study, it just can't be concluded. However the data does give evidence to support the notion that the DNA has had a positive effect on displacement.

Regressions also show that the number of calls for criminal activity in Dunbar have no statistically significant effect on the number of arrests made in the Displacement. This means that as the police were involved with calls in Dunbar, their ability to make arrests in the Displacement Neighborhood was not statistically changed.

By examining the trendlines in this study, a few questions about the effectiveness of the DNA are raised when examining Dunbar calls for violent activity, Dunbar calls for narcotic activity, and Dunbar calls for suspicious activity. However, these negative questions are countered when looking at the Dunbar trendlines for nonviolent and follow-up activity, total reactive and proactive calls for service, and number of arrests made from calls for service.

Trendlines tell us that calls for violent activity were already decreasing in Dunbar and Control areas prior to establishment of the DNA. This, combined with a downward trend in number of violent calls for service in the Displacement (post May 2003), raises the question of the DNA's true effect. Did this reduction come from the DNA, or was it just a continuation from before? An answer for this may lie partly in examination of the Control, which saw a change in slope direction post May 2003. However, we cannot be sure simply by using this model.

Trendlines of narcotic activity also raise a concern about the effectiveness of the DNA. Post May 2003, Dunbar saw a continued increase in the number of calls for narcotic activity. It is not clear what this means because there was only a .02 change in slope. These results may suggest that narcotic activity (which is usually less easily visible than violent and nonviolent activity) takes a longer time to find and report than other crimes. This may mean that the DNA is actually working, just slower with regards to narcotics. However, it could also mean that those involved in narcotic activity have not been deterred by the DNA's establishment. A further examination of this should be conducted.

Finally, trendlines of calls for suspicious activity also seem to have been on the rise before the DNA's establishment. Post May 2003, there was only a .017 adjustment in slope for this trend and only a slight change in intercept. This evidence suggests that with or without the DNA's creation, the neighborhood was becoming more active about calling the police. However, a possible counterpoint to this question may be in the examination of both the Control and Displacement Neighborhoods. Prior to November 2002, all three neighborhoods saw a positive slope in calls for suspicious activity, however, Dunbar had the only positive slope difference when looking at calls made post May 2003. This

comparison is evidence that Dunbar had become more proactive at stopping crime compared to the Control and the Displacement. However, why they became proactive cannot be conclusively determined.

The trendlines for nonviolent activity are the most dramatic example of change post May 2003. The Dunbar neighborhood had 1/3 less calls per month than it had prior to November 2002. In comparison, this dwarfs the 1/10 less calls for nonviolent activity per month for the Displacement neighborhood and the 9/400 increase seen at the Control. There was clearly a social change post May 2003. What is responsible for this social change cannot be conclusively determined here.

An examination of follow-up activity trendlines also shows a significant change in slope for both the Dunbar and Displacement Neighborhoods post May 2003. Both saw dramatic increases (.27 and .25 respectively) while the Control saw a slight decline (.02). This is evidence of the proactive steps taken by the both neighborhoods to prevent crime by turning in repeat offenders. The fact that nearly identical dramatic increases happened in both Dunbar and the Displacement raise more questions. Was there another social variable particular to the first District that caused such a change, or did the example of the DNA have a positive effect on those in the Displacement? Further research needs to be conducted to determine the answer.

The trendlines for both total reactive and proactive calls for service also show substantial changes in Dunbar and Displacement neighborhoods. Two neighborhoods respectively saw .23 and .19 decreases in total reactive calls for month. These numbers are impressive, however, they are made more so by a .13 slope increase seen at the Control. So as calls for nonviolent activity in Dunbar and the Displacement are falling, calls for



nonviolent activity in the Control are rising. Again, this finding shows evidence that a significant social change occurred in the First District, a change felt greater in Dunbar and at the Displacement. Similarly, there was an increase in Dunbar and the Displacement in total proactive calls with a .27 and .20 increase respectively. Further, there was a decline in total number of monthly proactive calls for the control, which strengthens the argument for a positive social change in Lexington's First District

The last trendline to be examined is the number of arrests made from calls for service. Dunbar saw a .17 slope increase in arrests per month whereas the Control and Displacement saw .02 and -.04 slope changes. This number shows that when people from Dunbar call the LFUCPD, there is a greater likelihood that an arrest is going to happen. Though this is encouraging, it is still not conclusive evidence that the DNA is responsible for this change. While it would make sense that the DNA is responsible for the change, a more complete study needs to be conducted which controls for more variables to make any definitive conclusions.

## **Conclusion**

It seems that the establishment of the Dunbar Neighborhood Association may have been partly responsible for a change Dunbar crime from May 2003 - January 2006. Since the establishment of the DNA, there have been statistically significant changes in seven of the eight categories that measure one specific form of community reactive and proactive forms of crime fighting. Through regression analysis and trendline analysis, there is evidence that supports these changes did not happen by chance, but this evidence is not conclusive. Regression models show that the number of arrests from calls for service made in Dunbar can be 80% explained by the number of specific calls made. An examination of

trendlines gives evidence that a change in calling activity particular to the Lexington's First District did happen, however, this analysis cannot conclusively state whether or not that change is due to the DNA. When measuring possible for displacement effects of the DNA, evidence suggests that there may have actually been a positive effect in the Displacement Neighborhood. Evidence thus far is consistent in finding that there is a clear causal relationship between establishment of the DNA and the change in crime. However, this study needs to be furthered in the future to include 100 or greater observations, control for many more variables that could account for the change in proactive and reactive calling trends both pre and post establishment of the DNA.

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<sup>i</sup> Personal Interview, George Brown, Lexington Kentucky, February 2006

<sup>ii</sup> Interview, Brown, 2006

<sup>iii</sup> Personal Interview, Dorothy Porter, Lexington Kentucky, February 2006

<sup>iv</sup> <http://www.nyc.gov/html/nypd/html/pct/cspdf.html>, accessed March 2006

<sup>vi</sup> [www.phoenix.gov/police/uchistmisc.pdf](http://www.phoenix.gov/police/uchistmisc.pdf), accessed March 2006

<sup>vii</sup> [www.homeoffice.gov.uk/cirme-victims/crime-statistics/](http://www.homeoffice.gov.uk/cirme-victims/crime-statistics/), accessed March 2006

<sup>viii</sup> [www.crimstatistics.org.uky/output/Page63.asp](http://www.crimstatistics.org.uky/output/Page63.asp), accessed March 2006

<sup>ix</sup> <http://www.ojp.usdoj.gov/bjs/glance/cv2.htm>, accessed March 2006

<sup>x</sup> <http://www.arlingtonva.us/Departments/Police/PoliceMain.aspx>, accessed March 2006

<sup>xi</sup> <http://www.lexingtonpolice.lfucg.com/Invest/Unsolved1stpage.asp>

<sup>xii</sup> Stephen Town, "Crime Displacement: The Perception, Problems, Evidence, and Supporting Theory," Bradford District.

<sup>xiii</sup> Jan Roehl, *Civil Remedies for Controlling Crime: The Role of Community Organizations* Justice Research Center, Crime Prevention Studies Col 9, 1998, p. 241-259.

<sup>xiv</sup> Roehl, 1998

<sup>xv</sup> Steven Godfrey, *Assessing the Success of Community Policing*, Detroit Police Department, Detroit, 1999?

<sup>xvi</sup> <http://www.kycops.org/mission.htm>, accessed March 2006

<sup>xvii</sup> <http://egov.cityofchicago.org/city/webportal/portalEntityHomeAction.do?entityName=Police&entityName> accessed March 2006

<sup>xviii</sup> <http://faculty.ncwc.edu/TOConnor/comlist.htm>, accessed March 2006

<sup>xix</sup> Barry Poyner "What Works in Crime Prevention: An Overview of Evaluations" Research Consultancy, Criminal Justice Press

<sup>xx</sup> Poyner "What Works in Crime Prevention"

<sup>xxi</sup> Jack Greene, *Policies, Processes and Decisions of the Criminal Justice System* "Community Policing in America: Changing the Nature, Structure and Function of the Police," p.299

<sup>xxii</sup> Town, "Crime Displacement"

<sup>xxiii</sup> Hesseling, Renee "Displacement: A review of the empirical literature", *Crime Prevention Studies*, vol. 3 Criminal Justice Press, Monyer, New Jersey, pp. 197-230, 1994.

<sup>xxiv</sup> Poyner, "What Works in Crime Prevention" pg. 199

<sup>xxv</sup> Renger 1990, Sherman 1990, Caulkins 1992, Eck 1993)

<sup>xxvi</sup> "Home Office Research Study 207, The Road to Nowhere: The Evidence for Traveling Criminals" Paul Wiles and Andrew Costello (2000)

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<sup>xvii</sup> Wile sand Costello, 2000

<sup>xviii</sup> Shandish, Cook and Campbell, “Quasi-Experiments: Interrupted Time Series Designs” Ch 6

<sup>xix</sup> Michael Fulton, “Leading in a Culture of Change” 2001

<sup>xxx</sup> Shandish, Cook and Campbell,