The Effect of Neighborhood Watch Programs on Neighborhood Crime in Medford Oregon

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SCI
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About SCI

The Sustainable Cities Initiative (SCI) is a cross-disciplinary organization at the University of Oregon that promotes education, service, public outreach, and research on the design and development of sustainable cities. We are redefining higher education for the public good and catalyzing community change toward sustainability. Our work addresses sustainability at multiple scales and emerges from the conviction that creating the sustainable city cannot happen within any single discipline. SCI is grounded in cross-disciplinary engagement as the key strategy for improving community sustainability. Our work connects student energy, faculty experience, and community needs to produce innovative, tangible solutions for the creation of a sustainable society.

About SCYP

The Sustainable City Year Program (SCYP) is a year-long partnership between SCI and one city in Oregon, in which students and faculty in courses from across the university collaborate with the partner city on sustainability and livability projects. SCYP faculty and students work in collaboration with staff from the partner city through a variety of studio projects and service-learning courses to provide students with real-world projects to investigate. Students bring energy, enthusiasm, and innovative approaches to difficult, persistent problems. SCYP's primary value derives from collaborations resulting in on-the-ground impact and expanded conversations for a community ready to transition to a more sustainable and livable future.

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About City of Medford

Medford, located in Jackson County in Southern Oregon's Rogue Valley, has a population of 75,920 within a metropolitan statistical area of 206,310 people, the 4th largest in the state. The City was founded in 1883 at its present site because of its proximity to Bear Creek and the Oregon and California Railroad, becoming the County seat in 1927.

The downtown is a National Historic District and it is flourishing today due to support from the City's Urban Renewal Agency in cooperation with business and property owners. New construction, building restorations, infrastructure improvements and community events are creating a forward-looking downtown grounded in its diverse past. Streets have been realigned and improved with with new pedestrian and bicycle amenities.

Medford is the economic center for a region of over 460,000 people in Southern Oregon and Northern California. In the past, its economy was fueled by agriculture and lumber products. Although the lumber industry has declined, three lumber mills, Boise Cascade, Timber Products and Sierra Pine, remain. The area also is home to an expanding vineyard and wine industry that includes a large assortment of varietals and over 60 wineries. Lithia Motors, the 9th largest auto retailer in the U.S., has been headquartered in Medford since 1970.

The City is a regional hub for medical services. Two major medical centers employ over 7,000 people in the region. Medford is also a retirement destination, with senior housing, assisted living and other elder care services acting as an important part of the economy.

The Bear Creek Greenway extends from Ashland through central Medford and includes a 26-mile multi-use path, linking several cities and numerous parks. Roxy Ann Peak, one of Medford's most prominent landmarks, is a 3,573-foot dormant volcano located on the east side in Prescott Park, Medford's largest city park at 1,740 acres.

Course Participants

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Executive Summary

Over the past decade Medford Oregon expanded their Neighborhood Watch program and increased the number of neighborhood watch groups they have in each section of the city. Using robust panel regression analysis we studied what effect this program had on crime rates of the treated areas. Our data included total number of crimes across 7 years from 2007 to 2013 and across the 7 areas, or beats, recognized by the Medford Police Department, each of which had a varying number of active neighborhood watches over our sample period. Our goal was to use the number of neighborhood watch groups per beat and several other proxy variables to try and estimate how much, if at all, this program is affecting crime rate in Medford. We found that one additional neighborhood watch decreases the crime rate per beat by about 3%, and one additional neighborhood watch per square kilometer decreases the crime rate by about 18%, though there is also evidence of diminishing effects as the number of watches increases in a given area.

Introduction

Neighborhood Watch is a crime prevention program that stresses education and common sense (Stegenga 2000). Launched by the National Sheriffs' Association in 1972, Neighborhood Watch teaches citizens how to help themselves by identifying and reporting suspicious activity in their neighborhoods. In addition, it provides citizens with the opportunity to make their neighborhoods safer and improve the quality of life. According to the National Crime Prevention Council's research (2008), "40 percent of Americans live in areas covered by Neighborhood Watch groups" (p.1).

This research paper is an attempt to evaluate the effectiveness of neighborhood watch programs in Medford, Oregon, which is 277 miles south of Portland, Oregon. The total area of Medford is 25.7 square miles. According to 2000 Federal Census, the population of Medford is 75,180 (2011), and the projected population for 2020 is 100,981. The demographics of Medford are mostly white, about 86.0% and Hispanic origin is 13.8%. There were 30,079 households in 2010 and the vacancy rate was 7.2% (U.S. Department of Housing and Urban Development). Medford has a variety of neighborhoods, and each neighborhood has its own distinct issues and assets.

Recognizing the need to keep Medford's neighborhoods healthy and safe, the Medford Police Department decided to start the Neighborhood Watch Program. According to the department, Neighborhood Watch is not just the formation of a neighborhood patrol group. The program is a cooperative effort among citizens and the Medford Police Department, and is not intended for civilians to stop criminal or suspicious activity. In the last few years, there has been a significant increase in the number of groups taking part in the program and organizing neighborhood watch groups in Medford. It appears to be the result of placing a new increased priority on forming, organizing, and coordinating Neighborhood Watch groups. With new leadership and increasing participation rates in mind, we have been tasked with trying to evaluate the effectiveness of the neighborhood watch groups in reducing crime.

In this research, we test whether the increase in the number of neighborhood watch groups in Medford has had an effect on crime. Geographically, MPD has organized the city into 7 areas or "beats." Every beat contains a varying number of neighborhood watch groups. The mission of the programs in Medford is to "enhance neighborhood security, heighten the community's power of observation, and to encourage mutual assistance and concerns among neighbors."

Literature Review

Research on the effectiveness of neighborhood watch programs extends back over the past 30 years. The majority of the studies originated in United States or the UK. Many of the studies were conducted by police departments or included data from police departments.

The results of previous studies are mixed; some show a significant reduction in crime rates, while others show that neighborhood watch programs are associated with a minor increase in crime, perhaps because increasing crime motivates the formation of neighborhood watch groups. These results serve as an indication of the difficulties in sorting out the true effects of watch programs. Latessa and Travis (1987) analyzed the effect of a watch program in Cincinnati, Ohio. Evaluating a community of 17,000 residents, the authors were able to identify a significant reduction in burglary rates compared to the year before the watch program was introduced in the area. The study found burglary rates in the experimental area decreased by 11%, while burglary in Cincinnati as a whole decreased by 2%.

Henig (1984) conducted research in one police district in Washington, D.C, to determine how actively blocks were participating and the effectiveness of the program in reducing crime. A sample of 25 watches were selected. Contrary to the findings by Latessa and Travis (1987), there was no clear evidence that crime had dropped more rapidly in participating blocks than in those that were not participating in the neighborhood watch program.

A possible explanation for the different results in these studies could be that neighborhood watch programs have a larger effect on certain types of crime, such as burglary, than on total crime.

In 2008, the U.S Justice Department conducted a meta-analysis "Does Neighborhood Watch Reduce Crime?" by Holloway, Bennett, and Farrington (2008) which reviewed results from previous research projects conducted from 1977 to 1994 in North America and the UK. The analysis included results from 18 different studies. The purpose of this meta-analysis was to calculate a mean effect of the efficiency of neighborhood watch programs. The majority of the evaluated studies for the analysis, 15 studies, relied on police data. The remaining three studies used survey data. However, only eight of the studies were specifically measuring the effect of neighborhood watch programs on average crime rate, while the remaining ten studies were estimating the effect of neighborhood watch programs in addition to other programs with similar purposes. While there were significant differences in effect size among the included studies, only three of the studies showed a positive relationship between neighborhood watch programs and crime. The mean effect size of this analysis showed that crime decreased by 16 percent in the experimental area compared to the control area. This means that across all studies combined, neighborhood watch was associated with a reduction in crime.

Hypothesis Development

We expect that the neighborhood watch program in Medford to decrease neighborhood's crime rate. As the number of neighborhood watch groups increases in a given beat, we expect the crime rate in that beat to decrease.

There are several factors contributing to this hypothesis. The main method by which the program is supposed to reduce crime is by having residents of an area look for and report suspicious activity to the police. This could have a direct effect on crime rate. As an increased number of potential crimes are reported, the chance of preventing those crimes increases. Additionally, as suggested in previous research, a possible indirect effect of neighborhood watch programs is that knowledge of the program being active in an area could deter potential offenders from committing a crime (Bennett 1990). Finally, participants in the program in Medford are trained to provide the police with significant and accurate information when reporting suspicious activity or potential crimes. Given this training, the neighborhood watch groups can act as a useful extension to the police force and thereby increase the efficiency of the police.

Though we expect to see an overall negative effect on crime rate, we expect that the main effect will be on crimes such as breaking and entering, vandalism, trespassing, and home burglary. We have the required data to test alternative hypotheses such as the effect on a small category of crimes.

We do not expect to see any effect on crimes such as fraud or financial crimes, violent crimes, and little or no effect on drug related crimes. We can use this expectation to test and see if the negative effect we may be seeing is really due to neighborhood watches.

Other factors we expect to have an effect on the overall crime rate of a beat are population, average income, and area. We expect that the greater the area or population of a single neighborhood watch group, the less effective the group will be in reducing the overall crime rate of that area. To address this concern, we will run analysis for not only the effect of number of neighborhood watch on crime but also the effect on neighborhood watch per square kilometer.

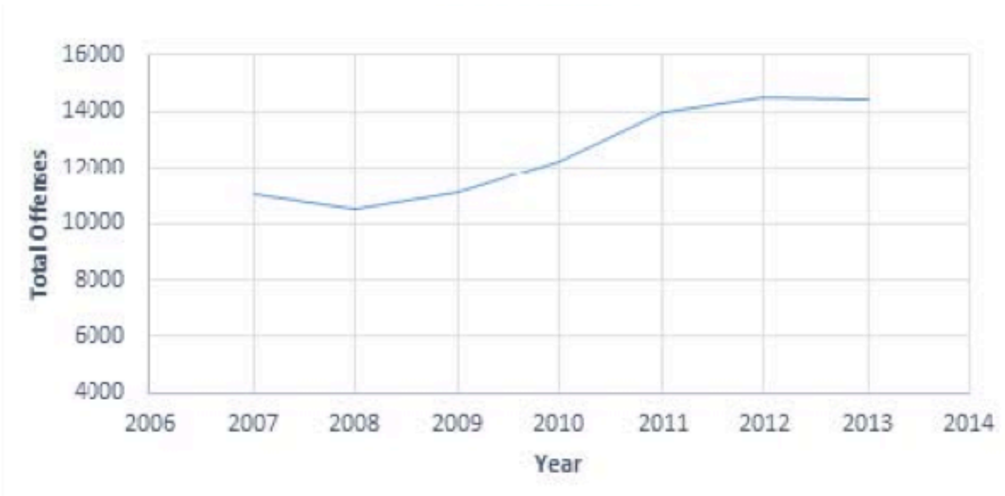
Data Description

The city of Medford is divided into seven police beats of different geographic sizes. The beats have a different number of neighborhood watch groups, founded at different times. From the Medford Police Department, we obtained crime data including total offenses in each beat from the year 2007 through 2013. This data was further divided into two subgroups based on our hypothesis that neighborhood watch groups will have a greater effect on certain crimes. Our first custom group of crimes includes crimes that are likely to be affected by additional neighborhood watch groups. We define these crimes as Type 1 crime.

This group includes a robbery, burglary, pickpocket offenses purse snatching, shoplifting, theft, vandalism, crime damage, and trespassing. Alternatively, Type 2 crime is a custom group of crimes unlikely to be affected by neighborhood watch groups. This group includes murder, negligent manslaughter, aggravated assault, restraining order violations, different kinds of fraud and financial crimes, and sex crimes. These crimes are less likely to be influenced by additional neighborhood watch groups in each beat.

The data from the Medford Police Department shows an overall increase in the crime rate in Medford between the years 2007 through 2013 as depicted in the graph below.

Total Crime Medford, OR (2007-2013)

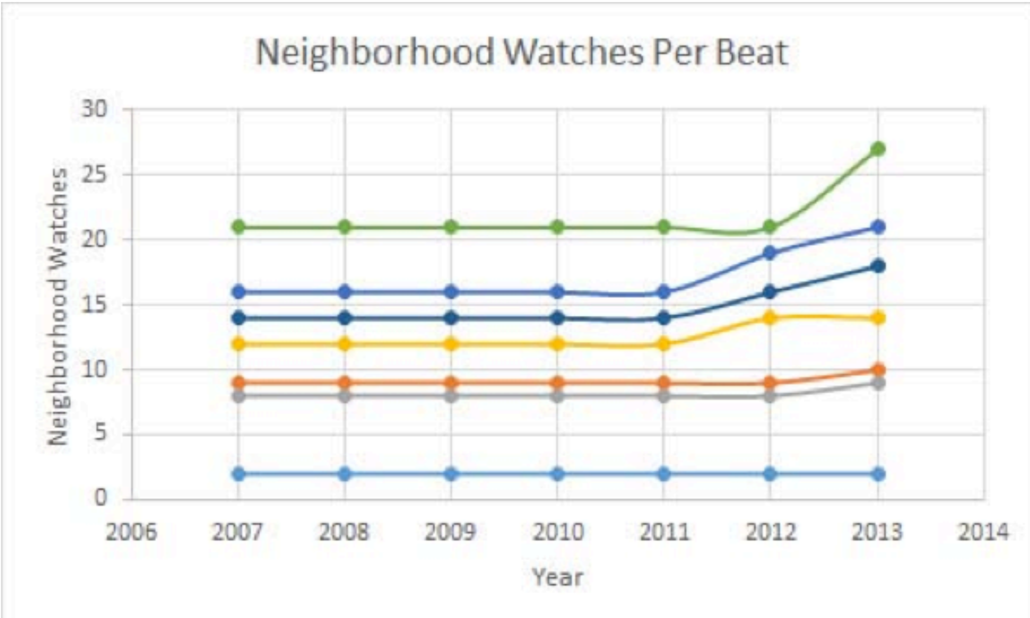


The Medford Police Department also provided us with a map (see appendix) showing how the beats are distributed across Medford along with the number of neighborhood watch groups in each beat between the years 2007 through 2013.

The number of neighborhood watch groups in a single beat shows little variation for the years 2007-2013. Most beats did not experience a significant change in the number of groups prior to 2012. However, the number of neighborhood watch groups varies across beats from a minimum of 2 (Beat 7) to a maximum of 27 (Beat 2). Overall, the number of neighborhood watch groups in Medford has increased since 2007. Table 1 shows a summary of the distribution of neighborhood watch groups per beat.

Number of Neighborhood Watch Groups per beat (2007-2013)

	Mean	***St.Dev***	***Min***	***Max***
Neighborhood Watch Groups	*12.245*	*6.163*	*2*	*27*



The data from the Medford Police Department included a total of 116 different types of offenses. However, as mentioned above we hypothesize that many of these offenses, such as fraud, will not be affected by neighborhood watch groups

Table 2 summarizes our crime data from the Medford Police Department and our two custom groups.

Table 2: Offenses per Beat (2007-2013)

	Mean	**St.Dev**	**Min**	**Max**
Total Crime	1791.653	435.691	1013	2967
Type 1 Crime	882.5	205.5	499	1303
Type 2 Crime	1033.5	212.5	436	1673

We wanted to control for the effects population and income might have on crime. To determine population changes over time, we used student enrollment data from the Oregon Department of Education website. We relied on this proxy for population changes because population and enrollment changes should be highly correlated. Enrollment also does not require mapping the police beats on to census tract information.

A few school catchment areas stretched across multiple beats. In those circumstances we estimated the number of students from each beat enrolled at a specific school by dividing the total number of students at a school by beats in the given school district.

Along with the data for student enrollment, the Oregon Department of Education also collects data on the percentage of students receiving free or reduced lunch in elementary school. We used this data as a proxy for average income in each beat, and recorded it in the same way as student enrollment.

Table 4: Variable Description

Variable	**Description**
crimeit	total # of crimes in beat i at time t
crime_type1	total # of type 1 crimes in beat i at time t
crime_type2	total # of type 2 crimes in beat i at time t
nwgroupsit	number of neighborhood watch groups in beat i at time t
enrollmentit	# of students enrolled in elementary school in beat i at tim year t (used as proxy for population in beat i at time t)
p_freelunchit	percent of students in elementary school receiving free or reduced lunch in beat i at time t (used as a proxy for average income in beat i at time t)
beatareai	approximate area of beat i in km2
nwgroups/km	(# of neighborhood watch groups in beat i at time t) / (approximate area of beat i)
crimearea	total number of crime in beat i at time t divided by area of beat i

To obtain an approximation of the area of each beat, we used Google maps software and the map of beats. With this software, we were able to obtain a close estimate of the area of each beat measured in square kilometers. This was done so that we can create a variable for neighborhood watch groups per square kilometer, and thus control for the differences in the area of the beats.

Methodology

To determine the effect of neighborhood watch groups on crime in Medford's police beats, we ran several regressions with our collected panel data. Our main regression is a semi-logarithmic model that allows us to interpret the coefficients as a percent change in crime. This model specifies the log of crimes as our dependent variable. Neighborhood watch groups, school-enrollment, and free/reduced lunch are independent variables. Additionally, dummy variables for year and beats are included giving us a total of 49 observations.

Model 1 Specification:

log_crimeit = β1 + β2nwgroupsit + β3log_enrollmentit + β4freelunchit + β5-B11yearit + β12-17beatit + uit

Using log crime allows us to interpret the coefficient on neighborhood watch groups as a percent change in crime due to a one-unit increase in neighborhood watch groups. The year effects control for all other factors that change over time in the same way for each beat, and the beat effects control for all other factors that vary across beats but are fixed over time. Together, the beat, year and time-varying effects of enrollment and free lunch tend to account for factors affecting crime other than neighborhood watch groups that differ across neighborhoods.

Due to concerns about bias resulting following from a greater increase in the formation of neighborhood watch groups in wealthier, low-crime areas, we decided to run a second regression where we excluded the variable for percentage of students receiving free or reduced lunch. If this underlies the effect we estimate, then including free lunch, a proxy for income, should diminish the effect we find.

Model 2 Specification:

log_crimeit = β1 + β2nwgroupsit + β3log_enrollmentit + β4-B10yearit + β11-16beatit + uit

None of the models above control for area of a beat in comparison to the number of neighborhood watch groups present. Including area is not possible because beat area does not change, so it is perfectly collinear with the fixed beat effects.

To determine if the difference in area among the seven beats has an effect on our results, we modified our independent variables slightly. Instead of using number of neighborhood watch groups as the independent variable of interest in the model we specified a ratio of neighborhood watch groups per km2.

Model 3 Specification:

log_crimeit = β1 + β2nwgroups/km2it + β3log_enrollmentit + β4freelunchit + β5-B11yearit + β12-17beatit + uit

As we did in our first model with number of neighborhood watch groups as the independent variable of interest, we ran an additional regression of this model where we excluded the variable for free and reduced lunch.

Model 4 Specification:

log_crimeit = β1 + β2nwgroups/km2it + β3log_enrollmentit + β4-B10yearit + β11-16beatit + uit

To test our hypothesis that neighborhood watch groups have a greater effect on certain types of crime we used a subgroup of crimes that only included crimes we believe to be affected by neighborhood watch groups. This subgroup consists of 23 different crimes, including theft, robbery, burglary, and vandalism. The model below uses the same specification as our previous models with the exception that the log of the new subgroup of crimes as the dependent variable replaces the log of total crime.

Model 5 Specification:

log_crime_type1it = β1 + β2nwgroupsit + β3log_enrollmentit + β4freelunchit + β5-B11yearit + β12-17beatit + uit

As with our earlier models, this model was tested with number of neighborhood watch groups as the independent variable of interest, and also a ratio of neighborhood watch groups per km2.

Model 6 Specification:

log_crime_type1it = β1 + β2nwgroups/km2it + β3log_enrollmentit + β4freelunchit + β5-B11yearit + β12-17beatit + uit

Similarly, we also ran these regressions with type 2 crimes as the dependent variable. These are crimes we hypothesized would not be affected by neighborhood watch groups.

Model 7 Specification:

log_crime_type2it = β1 + β2nwgroupsit + β3log_enrollmentit + β4freelunchit + β5-B11yearit + β12-

Model 8 Specification:

log_crime_type2it = β1 + β2nwgroups/km2it + β3log_enrollmentit + β4freelunchit + β5-B11yearit + β12-17beatit + uit

To test if the effects we estimated in our models experienced diminishing returns we also estimated models with squared terms of the variables for number of neighborhood watch groups and neighborhood watch groups per km2. Finally, models with lag effects were estimated to account for any delayed effects on crime.

Results

Model 1 & Model 2 Results:

Model 1 produced a significant coefficient on neighborhood watch groups equal to -.03285, suggesting that one additional neighborhood watch group decreases total crime by about 3%. When excluding the variable for percentage of students receiving free or reduced lunch the coefficient for neighborhood watch group did not change by a significant amount.

Table 5: Model 1 and 2 results

Independent Variable	**Model 1 Coef.**	**Model 2 Coef.**
nwgroups	-.0328544** (.013915)	-.0318628** (.0131248)
log_enrollment	.3674736 (.3286835)	.3676918 (.3236256)
p_freelunch	.0810751 (.1881241)	-
R_2	0.8380	0.8377
Observations	49	49

*** p < .05, * p < .10*

Model 3 & Model 4 Results:

Model 3 produced a greater negative number on the coefficient of interest than Model 1 and Model 2. The coefficient on neighborhood watch groups per km2 suggests that one additional neighborhood watch group per km2 decreases crime by about 18.8%. Once again, excluding the variable for percentage of students receiving free or reduced lunch did not have a significant effect on the coefficient of interest.

Table 6: Model 3 and 4 results

Independent Variable	**Model 3 Coef.**	**Model 4 Coef.**
nwgroups/km_{2it}	-.1884978** (.0979106)	-.1945028** (.1038726)
log_enrollment	.3674736 (.3286835)	.3676918 (.3236256)
p_freelunch	-.0989801 (.1756459)t	-
R_2	0.8150	0.8144
Observations	49	49

*** p < .05, * p < .10*

Table 7: Model 5 and 6 results

Independent Variable	**Model 5 Coef.**	**Model 6 Coef.**
nwgroups	-.0599532*** (.0163045)	-
nwgroups/km_{2it}	-	-.4191802*** (.0942644)
log_enrollment	.5488207 (.3941291)	.4634363 (.5871107)
p_freelunch	.2384008 (.2794918)	-.0677287 (.3373422)
R_2	0.7461	0.7015
Observations	49	49

**** p<.01 , ** p < .05, * p < .10*

Model 5 & Model 6 Results:

When only including crimes we hypothesized are affected by neighborhood watch groups, the coefficients for neighborhood watch groups and for the ratio of neighborhood watch groups per km2 showed greater effects compared to our models including total crime. The p-values also decreased significantly.

Table 7: Model 7 and 8 results

Independent Variable	Model 7 Coef.	Model 8 Coef.
nwgroups	-.0262462 (.0188897)	-
nwgroups/km$_{2it}$	-	-.0599532 (.0163045)
log_enrollment	.3480016 (.3544088)	.5488207 (.3941291)
p_freelunch	.1760079 (.2006231)	.2384008 (.2794918)
R_2	.8528	.7461
Observations	49	49

These models, including type 2 crimes, or crimes we hypothesized would not be affected by additional neighborhood watch groups, estimated no significant coefficients for neighborhood watch groups or neighborhood watch groups per square kilometer.

Our models with squared terms were not able to estimate the linear and squared terms precisely due to collinearity. The squared terms did however suggest that there are diminishing returns to the effects we estimate, but the terms were not independently significant. This is most likely the result of limited observations.

Additionally, our models with lagged terms were not able to estimate any significant coefficients.

Conclusion

In our base regression (Model 1) with log of crime as the dependent variable and number of neighborhood watch groups as our independent variable of interest we obtained a coefficient of -0.03285. As this is in terms of the log of crime, the coefficient suggests that for every one additional increase in number of neighborhood watch groups there is a 3.285% decrease in crime rate. This result suggests that the neighborhood watch program does have a negative effect on crime.

Our second model was run to make sure that the result we were getting were not too highly correlated with the wealth of some areas. We wanted to remove the factor of free and reduced lunch (which we used as a proxy for the wealth of each beat) to see if it had an effect on the coefficient for neighborhood watch. We ended up with a coefficient of -0.03186, which is a difference of 0.099%, compared to our original regression. This is a very small change suggesting that the results we obtained did not come from the wealth of the beats.

For our third model we wanted to test if the difference in area among the seven beats has an effect on our results, we used a ratio of neighborhood watch groups per km2 as a new independent variable. This third model is identical to Model 1, with the exception that the variable for neighborhood watch groups per km2 replaced the variable for number of neighborhood watch groups.

For number of neighborhood watch groups per km2 we got a coefficient of -0.1885. This suggests that one additional neighborhood watch group per km2 decreases crime by about 18.8%. The negative effect of this variable on log of crime is significantly greater than the variable in Model 1. Thus, one additional neighborhood watch group per km2 has bigger influence on decreasing crime rate than one additional neighborhood watch group per beat. Therefore, the difference in area among the seven beats does have an effect on our results, and the negative effect on crime for an additional neighborhood watch group is greater per square kilometer than per beat. This may be because some beats are bigger than other beats, and some beats might have greater density in population, which influences their crime rate.

Our fourth model is identical to Model 3, with the exception that we left the percentage of free/reduced lunch out of the regression. Again, this was done to make sure that the result we find is not due to spurious correlation with high-income areas. We got a coefficient on log of crime equal to -0.1945, which is similar to the coefficient in Model 3 suggesting that our results are not only coming from neighborhood watch groups being formed in wealthy areas.

Thus, neither Model 2 nor Model 4 (regressions excluding free/reduced lunch) indicates that our proxy for income has a significant effect on our results. The differences between the coefficient for number of neighborhood watch groups in model 1 and model 2 is only 0.099%, and the difference between neighborhood watch groups per km2 in model 3 and model 4 is .06%. These small differences suggest that the results we obtained are not influenced by a selection bias where more neighborhood watch groups are being formed in high-income beats with low crime.

Our fifth model estimates the effects of additional neighborhood watch groups on types of crimes we hypothesized would most likely be affected. Our model specification is identical to Model 1 with the exception that instead of total crime as our dependent variable we use Type 1 crime. Running this regression we got a coefficient of about -0.06. This suggests that the neighborhood watch program decreased crime by about 6% for the crimes that we hypothesized would be affected by the program. This coefficient is almost double the coefficient obtained for the first model.

Model 7 and Model 8 were run as a placebo test where we ran the regression for crimes that we hypothesized would not be affected by the neighborhood watch groups. The purpose of running these regressions was to make sure that the negative results on crime were coming from additional neighborhood watch groups. It was a concern that these results could have been due to some omitted variable bias. We had high R2 values, which could have implied that the regressions were missing some key variables and therefore getting a result that may not have been due to additional neighborhood watch groups. However, the results for both neighborhood watch groups and neighborhood watch groups per square kilometer were insignificant (p-values > 0.10) when using Type 2 crime as our dependent variable. In other words, neighborhood watch groups does not have a significant effect on these crimes, implying that the estimated effects on total crime and Type 1 crime are in fact valid.

Our regressions with squared terms suggests that there are some diminishing returns to the effects we estimate, but we cannot conclude the degree of this effect because the squared terms and the linear terms in this model are too collinear to estimate them both precisely. Considering the results from previous research, it is likely that the decreases in crime we estimated in our models also experience some lagged effects. We were not able to estimate any significant lagged effects in any our models.

The results from the majority of the studies included in the meta-analysis “Does Neighborhood Watch Reduce Crime?” by Holloway, Bennet and Farrington (2008) suggests that neighborhood watch groups were associated with a reduction in crime. Our results align with those results in that we have found a significant reduction in crime due to additional neighborhood watch groups in the areas of Medford included in our research. However, our models cannot provide answers to why neighborhood watch groups in Medford are associated with this reduction in crime. It might be because of the features of the neighborhood watch groups we discussed in our hypothesis development, but further research is needed to determine the factors contributing to the reduction in crime arising from the neighborhood watch groups.

References

City of Medford Planning Department, March 2004; updated June 2006, 2011
Retrieved from: http://www.ci.medford.or.us/

Holloway, Katy, Trevor Bennett, and David P. Farrington. Crime Prevention Research Review No. 3 Does Neighborhood Watch Reduce Crime? Washington, D.C.: U.S. Department of Justice Office of Community Oriented Policing Services, 2008.

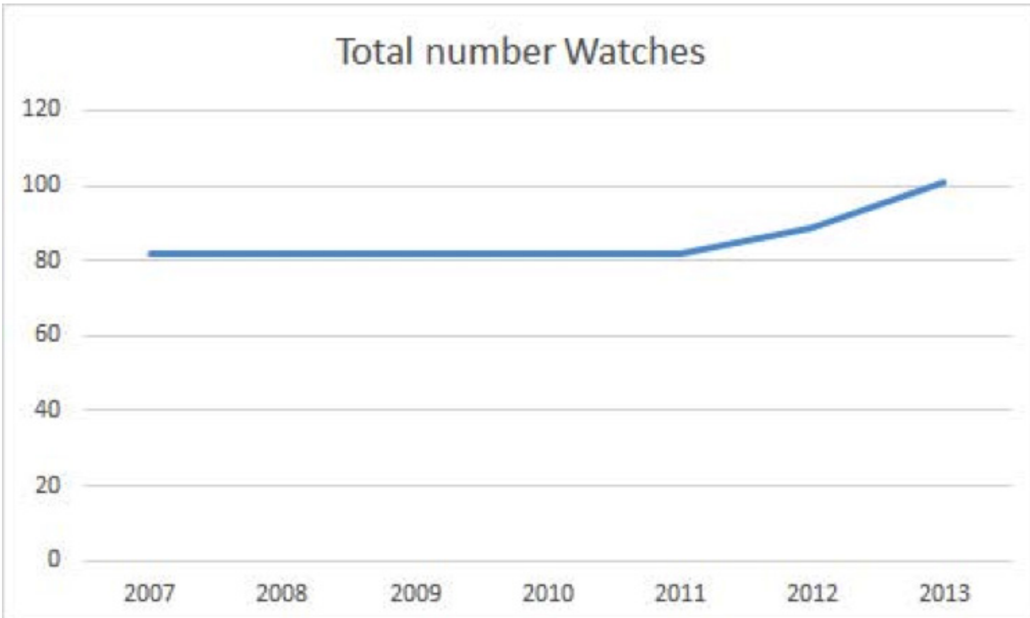
J R Henig. Citizens Against Crime - An Assessment of the Neighborhood Watch Program in Washington, DC, 1984.

Latessa, E.J. and L.F. Travis, L.F. Evaluation of the College Hill Crime Prevention Program. Cincinnati, Ohio: University of Cincinnati, 1986

Oregon Department of Education, Student Enrollment Reports, 2006-2013 10.

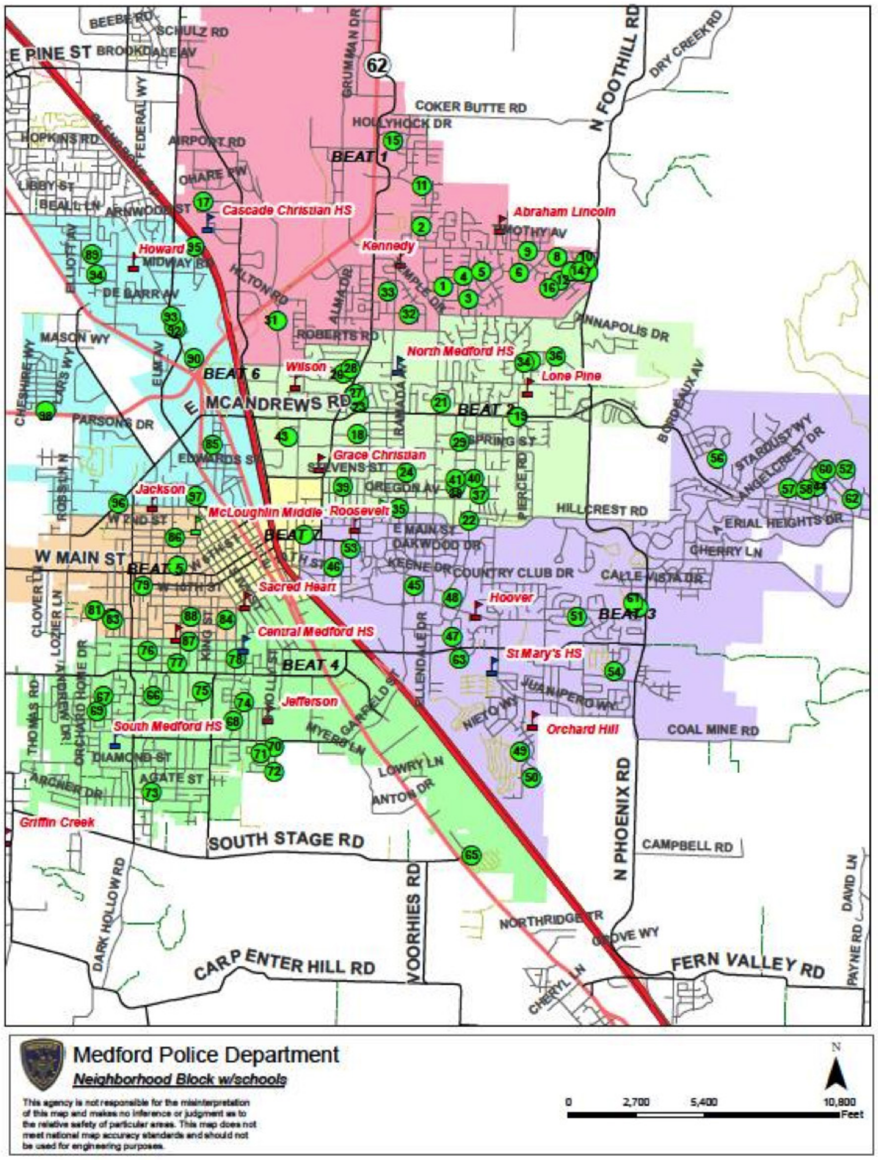
Appendix

Total Number of Neighborhood watches in Medford:



Year	Total number of Neighborhood Watches
2007	82
2008	82
2009	82
2010	82
2011	82
2012	89
2013	101

Beat Map of Medford:



Beat Areas in Medford:

Beat Number	Area (km^2)
1	11. 49
2	8.95
3	18.08
4	9.53
5	3.48
6	7. 49
7	1. 49

Models with squared terms:

Independent Variable	Model with $(nwgroups)_{2it}$	Model with $(nwgroups/km_{2})_{2it}$
nwgroups	.0319091 (.0596247)	-
$nwgroups/km_{2it}$	-	-.297398 (.7487723)
$(nwgroups)_{2it}$	-.001504 (.001198)	-
$(nwgroups/km_{2})_{2it}$	-	.0215178 (.1456795)
log_enrollment	.3997176 (.38263)	.3105844 (.4331235)
p_freelunch	.0733392 (.1243428)	-.0776894 (.1746116)
R_2	.8473	.8154