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AN ASSESSMENT OF INCREASED POLICE PATROL IN LOWER LONSDALE

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HIGHLIGHTS

- In the summer of 2010, a crime reduction initiative of increased police foot patrol was implemented in Lower Lonsdale
- Analysis of police data indicates that the reporting of crime has increased in the cases of robbery and drug possession
- This preliminary analysis shows that the increased police presence in Lower Lonsdale has had an impact primarily on mischief, but is also evident for residential break and enter
- There has been a substantial drop in calls for police service in Lower Lonsdale in 2010, a 16 – 17 percent, minimum
- Relatively speaking, there were fewer calls for police service for mischief, commercial break and enter, and residential break and enter in 2010, compared to 2007 - 2009

1. INTRODUCTION

In early 2010 the Institute for Canadian Urban Research Studies was contacted by the North Vancouver RCMP detachment regarding a crime reduction initiative to be implemented in the Lower Lonsdale area of North Vancouver. This initiative was to be an increase in police foot patrol in the area. The Lower Lonsdale area in North Vancouver has the highest call volume for service in the City of North Vancouver. We agreed to evaluate this crime reduction initiative.

In order to do so, we have collaborated with the North Vancouver detachment of the RCMP to design a community survey and have received police data from them. In particular, we have had tremendous direct support from the Project Commander, Sgt. Paul Duffy, and the Crime Analyst, Karin Sibilo.

The nature of the patrols is to have 10 hour shifts to patrol the Lower Lonsdale area. Wednesday through Saturday these shifts are to run from 2pm until midnight; on Sunday, the shift will be from 12pm until 10pm. The original plan was to have two sworn members of the RCMP and two auxiliary constables, if available.

The details of the data and the assessment methodology are outlined below, after a brief section on the research that investigates the impact of police patrol on crime. This provides some background and expectations regarding the increased police patrol in Lower Lonsdale.

2. PREVIOUS RESEARCH ON THE IMPACT OF POLICE PATROL

The first known systematic study to investigate the effectiveness of police patrol is Kelling et al. (1974). This study was a year-long experiment that analyzed different police patrol practices: reactive, proactive, and control groups. Fifteen police beats in Kansas were divided into these three categories. Reactive police beats received no preventative patrols and police only entered the beat because of a call

for service; proactive beats had a two to three times increase in police patrol and visibility, and the control beats received the same amount of preventative patrols as directly before the experiment began. The overall finding was that the three different areas experienced no significant differences in the following factors: level of crime, citizens' attitudes toward police services, citizens' fear of crime, police response time, or citizens' satisfaction with police response time. Needless to say, this was a surprise to the researchers and to the police. However, it was pointed out by Kelling et al. (1974) that this did not mean that a reduction in police services was in order. Rather, traditional policing has value when strategically employed, patrolling hot spots, for example. It also should be noted that it may be difficult for citizens (and potential criminals) to notice a difference in moderate changes in police presence. Consequently, it is the presence of the police that matters, not the quantity of that presence, per se.

Other more recent research studies, however, do suggest that traditional police patrol practices prevent crime, but some techniques work better than others. For example, Koper (1995) highlights the importance of patrol techniques, especially the intervals of police presence in a specific area. Koper (1995) found that police patrols cannot be merely driving in a beat or patrolling a "hot spot". Rather, the patrolling officer must proactively and unpredictably stop at different places for a minimum of ten minutes in order for the patrol to have a greater impact. More specifically, the optimal length for police stops is fourteen to fifteen minutes, after which the returns diminish (Koper, p668). As such, it is not sufficient to have naive police patrol. Police patrols must be targeted and consider the strategy for maximum impact.

One reason for the importance of targeted police patrols is the concentrations of crime in urban environments. For example, Sherman et al. (1989) found that 50 percent of police calls for service in Minneapolis were dispatched to just over 3 percent of all addresses and street intersections. Similar results have been found in Seattle, WA (Weisburd et al. 2004) and in Vancouver, BC (Andresen and

Malleson 2010). Needless to say, this research shows that crime is incredibly concentrated in urban environments. Because of this it should come as no surprise that a naive patrol would have little impact on crime and increasing police patrols in hot spots will decrease crime because crime does not simply move around the corner (Weisburd et al. 2006).

3. DATA AND ASSESSMENT METHODOLOGY

The primary source of data for assessing the impact of increased police patrol in Lower Lonsdale is police data from PRIME (Police Records Information Management Environment). These data contain the classification, location, date, and time of each police incident as well as a number of other variables not analyzed in this Report. The coverage of these data is 01 January 2007 to 20 September 2010. This provides three full years of data to provide a baseline for crime levels on the Lower Lonsdale area. As stated above, the increased police patrol continued until 30 September 2010. However, in order to complete this Report in time for a presentation to City Council the last 10 days of the intervention is excluded. Based on the questions asked in the community survey, the following crime classifications are analyzed, independently: assault, robbery, drug possession, mischief, commercial break and enter, residential break and enter, shoplifting, theft, theft of bicycle, theft of vehicle, and theft from vehicle.

In addition to these police data a local survey has been undertaken. This survey, included in Appendix I, consists of questions regarding perceptions of police and their presence, criminal victimization, and problems in the Lower Lonsdale Area. This survey was undertaken prior to the intervention of increased police patrol (May 2010) and a follow-up survey is currently being collected. Unfortunately these surveys are being returned slowly and are not available to be analyzed in this Report. After the surveys are available they will be analyzed with the results sent to the North Vancouver detachment of the RCMP. Though unfortunate, this is a reality of dealing with voluntary surveys and analyses that are needed on particular dates.

The analysis of the impact of the increased police patrol intervention is done using regression analysis. The nature of the regression analysis is to identify, statistically, any changes in the trend/trajectory of crime in the Lower Lonsdale area resulted from an increased police presence. Therefore, a number of variables are included to control for changes over time. First, an overall trend variable is included. It is well-known that crime has been declining for the past two decades and a variable representing this decline (or incline) is included. Also, two variables are included to represent the time period of the intervention. As stated above, the timing of the intervention is 09 June 2010 to 30 September 2010. However, this may be a time of increased or decreased crime more generally, not just in 2010. Most often, both property and violent crime have been found to increase in the summer months. There are a number of explanations for this that are often based on there being more people outside during the summer months—this literature can be provided upon request. As such, two variables are included that capture this time period for all years under analysis, 2007 – 2010. The first variable is a dichotomous (dummy) variable that takes on a value of one when the date is 09 June to 30 September and zero otherwise; the second variable is a trend variable for the same time period that ranges from 1 to 117 and zero outside of the 09 June to 30 September time range. Lastly, two variables are included to capture the increased police patrol: one dummy variable and one trend variable. These last two variables, however, only take on the stated values in 2010.

The purpose of all these variables is to attempt to identify the *independent* effect of the increased police patrols. For example, it may be the case that crime is trending down for the Lower Lonsdale area, in general, and a particular crime classification decreases in the summer months. Therefore, if the only variables in the analysis were related to the intervention were included one may attribute the decrease in crime from the intervention when it was simply a seasonal effect. Including these other variables allows for the identification of the effect from the increased police patrol *in addition* to the seasonal effects.

Next, an investigation is undertaken into the varying levels of police patrol. The scheduling of the patrols in the Lower Lonsdale area allows for an investigation into whether or not increased patrols further impact crime counts. As stated above, different days had different numbers of police officers. There was not much variation, but potentially enough to find out if there is a benefit to more police officers on patrol. Most often two police officers were on patrol for 10 hours. This is classified as two patrol units. On days that had more or less police officers and/or hours of patrol the variable is modified; this variable ranges from zero to three. This analysis only considers the time period 09 June 2010 to 20 September 2010. In order to control for weekly variation (crime increases during the weekend, for example) a set of dummy variables are included in the analysis. These dummy variables are not included results below, but are available if anyone is interested.

Lastly, the percentage distribution of the different crime classifications is calculated independently for each of the years during the intervention dates. This final analysis will show whether or not a change in the crime mix is occurring in Lower Lonsdale. For instance, even if there is a drop in crime overall, offenders may switch offense type because of the presence of police on foot patrol.

4. RESULTS

Before the statistical results are presented, it is instructive to view the police data over time. The graphs that show these trends are in Appendix II. The first eleven graphs show monthly data for all crime categories and the twelfth graph shows weekly data for the crime classification mischief. The weekly graphs for the other ten crime classifications and all daily graphs provide very little information because of the volatility of crime counts day to day. These graphs are available to the interested reader, however.

Clearly evident from an inspection of these graphs is that all but two (monthly and weekly counts of mischief) show virtually no impact from increased police patrol in Lower Lonsdale—drug possession does show an apparent impact but this is discussed further below. Most often there is no apparent change after the intervention date (marked with a dashed vertical line), and if there is a change it appears to be part of a pre-existing trend. Though such visualizations may be instructive at times, the impact of increased patrol may be subtle, required more sophisticated analyses. The trend change results for daily, weekly, and monthly data are shown in Tables 1 – 3.

It is expected that both Patrol Dummy and Patrol Trend have negative estimated parameters. Patrol Dummy is expected to have a negative estimated parameter as it measures the immediate effect of increased police presence—decrease crime. Patrol Trend is expected to have a negative estimated parameter because a sustained increase in police presence is also expected to decrease crime.

Table 1 shows the results for daily data. All the estimated parameters reported in this table (statistically significant, or not) are of low magnitude, but this is because daily counts for most crimes are quite low. More important is the statistical significance of the estimated parameters and their magnitude relative to other estimated parameters in the same table. The first result to note is that the trend over the past 4 years has been effectively zero for all crime classifications. Seven of the fourteen crime classifications do exhibit statistical significance for the overall trend variable (Trend), with all but one (Theft) being positive. With almost 1400 observations in the dataset, this leads to a total increase of 0.14 daily crimes over the 4 year period—mischief is up 1.4 daily crimes. Though any increasing crime trend needs to be monitored there is little cause for alarm in these increases.

The summer/intervention months, however, do exhibit regular changes for particular crimes—these changes are, however, rather moderate. For example, commercial break and enter and theft of vehicle exhibit small decreases in the summer (Summer Dummy) whereas residential break and enter

exhibits a small increase. Mischief, commercial break and enter, and residential break and enter also have small changes in their trend of the summer months (Summer Trend), but these changes are very small.

Turning to the results for increased police patrol, it is clear that increased police patrol does not impact all classifications of crime. Of the 22 estimated parameters, only 8 are statistically significant. This should come as no surprise because one form of crime reduction cannot be expected to impact all crime types.

One curiosity does emerge in this analysis: robbery, drug possession, and theft of vehicle all have positive and statistically significant estimated parameters for Patrol Dummy. The variable captures the immediate effect of the increased police patrol. The increases in these crime classifications, however, are not because of an increased police presence in Lower Lonsdale. Clearly, the increased police presence is leading to increased reporting rates for these crimes. In fact, increased reporting to police is expected in this situation because of increased police visibility—this is not expected for theft of vehicle, however, that requires a police report for insurance purposes. More important to notice is that the trends over the intervention period (Patrol Trend) for these variables are statistically significant and negative. Therefore, increased police presence leads to an increase in the reporting of these crimes but the trend during the intervention period is decreasing when it is normally increasing or remaining constant.

Lastly, mischief has a negative and statistically significant estimated parameter for Patrol Dummy, but the estimated parameter for Patrol Trend is statistically insignificant. Moreover, the magnitude of the estimated parameter for Patrol Dummy is relatively large in magnitude.

Table 1. Trend Change Results, Daily Data

	Trend	Summer Dummy	Summer Trend	Patrol Dummy	Patrol Trend	R²
Assault	0.0001	0.029	0.000	0.062	-0.002	0.006
Robbery	-0.0001	-0.011	0.000	0.121	-0.002	0.006
Drug Possession	0.0001	0.063	0.000	0.754	-0.008	0.041
Mischief	0.001	0.142	-0.003	-0.930	0.002	0.069
Commercial Break & Enter	0.0001	-0.105	0.002	-0.047	-0.002	0.010
Residential Break & Enter	0.0001	0.217	-0.002	-0.253	0.001	0.018
Shoplifting	0.0001	-0.027	0.000	-0.096	0.000	0.005
Theft	-0.0001	0.054	0.000	-0.042	-0.001	0.010
Theft of Bicycle	0.0001	-0.010	0.0001	-0.040	0.000	0.002
Theft from Vehicle	0.00001	-0.135	0.002	-0.166	-0.005	0.019
Theft of Vehicle	0.00001	-0.081	0.001	0.146	-0.002	0.005

Note. Bold indicates statistical significance at the 10 percent level.

The results for the weekly data (Table 2) are similar for Trend, Summer Dummy, and Summer Trend. The overall trend (Trend) is flat in most cases, with some increases and some decreases in the Summer Dummy and Summer Trend variables. More interesting are the results for increased police patrol.

Similar to the daily results, robbery and drug possession show increases in their counts with increased police presence, Patrol Dummy. Once again this is very likely the result of increased reporting to the police. Additionally, similar to the daily results, Patrol Trend for robbery and drug possession are negative and statistically significant, indicating that a continued increased police presence further decreases crime in Lower Lonsdale. Theft of vehicle also has a negative and statistically significant Patrol Trend estimated parameter.

And similar to the daily results, mischief has a negative and statistically significant estimated parameter for Patrol Dummy that has a relative magnitude that is greater than for all other crimes—statistically insignificant for Patrol Trend. This decrease is also present in the graph showing weekly counts of mischief in Appendix II.

The results for the monthly data (Table 3) are similar to the results for the daily and weekly data. Robbery and drug possession have positive and statistically significant estimated parameters for Patrol Dummy and negative and statistically significant estimated parameters for Patrol Trend. However, Patrol Dummy now has negative and statistically significant estimated parameters for mischief, residential break and enter, and shoplifting and the magnitudes of these parameters are relatively large. Mischief now also has a positive and statistically significant estimated parameter for Patrol Trend, but the overall effect for mischief is still a decrease in its crime count.

Table 2. Trend Change Results, Weekly Data

	Trend	Summer Dummy	Summer Trend	Patrol Dummy	Patrol Trend	R²
Assault	0.004	0.217	0.005	0.363	-0.090	0.040
Robbery	0.000	-0.103	0.020	0.881	-0.078	0.042
Drug Possession	0.001	0.325	-0.008	5.613	-0.414	0.206
Mischief	0.030	1.295	-0.169	-6.919	0.120	0.310
Commercial Break & Enter	0.003	-0.603	0.071	-0.484	-0.062	0.045
Residential Break & Enter	0.003	1.706	-0.123	-1.929	0.051	0.103
Shoplifting	0.003	-0.160	0.019	-0.747	0.025	0.024
Theft	-0.004	0.518	-0.043	-0.444	-0.043	0.065
Theft of Bicycle	0.001	-0.002	0.000	-0.096	-0.008	0.008
Theft from Vehicle	0.016	-1.123	0.110	-0.698	-0.256	0.070
Theft of Vehicle	0.000	-0.534	0.040	0.982	-0.106	0.025

Note. Bold indicates statistical significance at the 10 percent level.

Table 3. Trend Change Results, Monthly Data

	Trend	Summer Dummy	Summer Trend	Patrol Dummy	Patrol Trend	R²
Assault	0.077	0.047	0.323	2.646	-1.800	0.235
Robbery	-0.010	-0.993	0.543	3.732	-1.233	0.145
Drug Possession	0.000	3.333	-0.900	22.667	-4.800	0.529
Mischief	0.604	6.990	-3.304	-37.153	4.900	0.741
Commercial Break & Enter	0.056	-4.071	1.644	2.666	-2.300	0.130
Residential Break & Enter	0.069	6.866	-1.803	-8.829	0.933	0.236
Shoplifting	0.061	1.323	-0.261	-6.301	1.400	0.137
Theft	-0.070	4.910	-1.563	-5.475	0.833	0.330
Theft of Bicycle	0.023	-0.149	0.111	-1.375	0.267	0.039
Theft from Vehicle	0.336	-3.191	0.664	-10.055	-0.800	0.159
Theft of Vehicle	0.005	-2.548	0.495	3.891	-1.100	0.099

Note. Bold indicates statistical significance at the 10 percent level.

The next aspect of the analysis is the effect of increased patrols on the eleven crime classifications. It should be clear from the above that the increased presence of police patrol has an impact on crime. But does the amount of police patrol matter? Table 4 shows the results for increases in police patrol units, measured using daily data. These estimated parameters are expected to be negative because more police are expected to decrease more crime.

Table 4. The Impact of Patrol Units on Crime

	Police Patrol Units
Assault	-0.209
Robbery	0.011
Drug Possession	0.240
Mischief	-0.127
Commercial Break & Enter	0.000
Residential Break & Enter	-0.214
Shoplifting	-0.007
Theft	-0.023
Theft of Bicycle	0.034
Theft from Vehicle	0.102
Theft of Vehicle	-0.057

Note. Bold indicates statistical significance at the 10 percent level.

Clearly evident from Table 4 is that increases in the number of police patrol units have little further impact on crime in Lower Lonsdale. Only assault and residential break and enter have statistically significant results, though most of the estimated parameters are negative, as

expected. Furthermore, in both cases, in order to decrease one assault or one residential break and enter on a daily basis, the number of police patrol units would have to increase by five—seven members on foot patrol rather than the average of two during the intervention.¹ This would be a lot of resources dedicated to foot patrol in the Lower Lonsdale area. However, with this increased police patrol units, statistically significant results may emerge for the other crime classifications.

The last aspect of the analysis for this Report is the percent distribution of crime classifications, 2007 – 2010. The results are shown in Table 5. The first result to notice is the significant drop in total calls dealt with: 261 in 2010, versus 415 in 2009. Even if we consider 2007 and 2008 with fewer calls for police service, the calls are still down 16 – 17 percent in 2010. This alone is the strongest support found thus far for the increased police presence in Lower Lonsdale. Turning to the percent distribution of crime classifications by year, there are notable increases in assault, robbery, and drug possession that are likely due to increased reporting, as discussed above. And, there is a significant drop in the percent of mischief calls for service that is consistent with the trend results reported above. There are also drops in commercial and residential break and enters, both of which do not appear to be part of a general trend. The drops in theft and theft from vehicle, however, appear to be part of a decreasing trend in the Lower Lonsdale area.

¹ The increase is technically from 1.7 to 6.7.

Table 5. Percent Distribution of Crime Classifications, 2007 - 2010

	2007	2008	2009	2010
Assault	8.9	8.7	9.4	11.9
Robbery	2.5	2.9	1.0	3.4
Drug Possession	8.9	7.7	7.5	23.0
Mischief	24.5	25.7	26.3	17.2
Commercial Break & Enter	5.7	7.1	6.3	4.2
Residential Break & Enter	3.2	13.8	8.9	4.6
Shoplifting	3.5	4.8	4.3	4.2
Theft	16.2	11.3	11.3	9.2
Theft of Bicycle	1.0	1.3	2.4	1.5
Theft from vehicle	22.0	13.5	19.3	15.7
Theft of vehicle	3.5	3.2	3.4	5.0
Total Count	314	311	415	261

5. CONCLUSIONS

The increased police patrol in the Lower Lonsdale area appears to have had a positive effect on crime—crime has decreased. However, this impact on crime is not for all crime classifications. Reporting to the police of robbery and drug possession is up—in the case of drug possession this may simply be from police checking individuals as the daily reports indicate. If the reporting of crime to police is up for all crime classifications, then the impact of the increased police patrol in Lower Lonsdale is being under-estimated. However, prolonged police presence, measured using

Patrol Trend, indicates that these two crime classifications decreased, on average, with increased police patrol.

The effect of increased police patrol on mischief (decreases in mischief) is apparent for daily, weekly, and monthly analyses. This consistent result shows that such activity (a property crime) is sensitive to the presence of police officers on foot patrol. Perhaps most persuasive for the impact of increased police patrol is the decrease in calls for service relative to the previous three years.

6. DIRECTIONS FOR FURTHER RESEARCH

The most obvious and immediate further research will involve an analysis of the pre- and post-intervention surveys. Not only do these surveys include data regarding criminal victimization, but also perceptions of the police. Even if the increased police patrols did nothing for changing crime levels, if the public feels safer this is a significant benefit.

The next direction for further research is to search for changes in the spatial patterns of crime. Because of the nature of Lower Lonsdale, police patrols will have focused on the major arterial roadway in the area, Lonsdale Avenue. It may be the case that crime has shifted spatially in response to the increased police presence. There is a spatial point pattern test that may be used to investigate the presence of this shift.

Lastly, this Report may be used as a basis for the development of further evaluations. Most often, an analysis such as this raises more questions than it answers. The desire for more detail may lead to other analyses with currently available data, or may guide the development of other evaluations.

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APPENDIX I: Lower Lonsdale Community Survey



LOWER LONSDALE COMMUNITY SURVEY – SPRING 2010

All questions are relevant to the Lonsdale area.	1: strongly disagree; 2: disagree; 3: neutral; 4: agree; 5: strongly agree	Details
1. Graffiti is a problem	1 2 3 4 5	what/where
2. Street musicians soliciting donations are a problem	1 2 3 4 5	who/where/when
3. Panhandling is a problem	1 2 3 4 5	who/where/when
4. Skateboarding on city streets is a problem	1 2 3 4 5	where/when
5. Drinking in public is a problem	1 2 3 4 5	who/where/when
6. Smoking marijuana in public is a problem	1 2 3 4 5	who/where/when
7. Litter is a problem	1 2 3 4 5	what/where
8. Buying/selling of drugs a problem?	1 2 3 4 5	what/where
9. Have you seen any drug transactions happening in Lower Lonsdale?	Yes No #	
10. Youth crime & disorder is a problem	1 2 3 4 5	who/where/when
11. In the past year, have you been a victim of: vehicle theft ?	Yes No #	Month: Was your property recovered?
12. In the past year, have you been a victim of: theft from vehicle ?	Yes No #	Month: Was your property recovered?
13. In the past year, have you been a victim of: bike theft ?	Yes No #	Month: Was your property recovered?
14. In the past year, have you been a victim of: personal robbery ?	Yes No #	Month: Was a weapon involved?
15. In the past year, have you been a victim of: commercial robbery ?	Yes No #	Month: Was a weapon involved?
16. In the past year, have you been a victim of: break & enter ?	Yes No #	Home/Garage/Business/Other? Were you on the premise at the time? Was your property recovered?
17. In the past year, have you been a victim of: assault ?	Yes No #	Month: Was the assault by someone you knew? Was a weapon involved?
18. In the past year, have you been a victim of property damage/mischief ?	Yes No #	
19. Noise and other disturbances are a problem in Lower Lonsdale	1 2 3 4 5	
20. Do you have any concerns about traffic ?	Yes No	what/where/when
21. What is your "fear of crime" level? (low=1, high =5)	1 2 3 4 5	What crime(s)?
22. The RCMP visible presence is good.	1 2 3 4 5	
23. The RCMP accessibility is good.	1 2 3 4 5	
24. Do you live in the Lower Lonsdale area?	Own Rent Other	How long?
25. Do you lock your doors/windows (personal vehicle &/or home)	Yes No	If no, why not?
26. Do you work in the Lower Lonsdale area?	Yes No	Years: Retail outlets ignore this question
27. For visitors : what is the purpose of your visit?	Shopping Sightseeing Restaurant Visiting a friend/family Theatre Recreation Passing through to another location	
28. How often do you visit Lower Lonsdale?	Daily More than once a week Weekly Monthly Yearly	

Please indicate on the map where you have the greatest fear of crime, with the letter "F".
Please indicate on the map where crime is a problem, with the letter "C".

Please indicate on the map where you have the greatest fear of crime, with the letter "F".
Please indicate on the map where crime is a problem, with the letter "C".
(mark more than one location if applicable)



North Vancouver

LOWER LONSDALE - SPRING 2010
Area Of Interest - Aerial Photo

APPENDIX II: Monthly Trends by Crime Type











