Candidate Number – POL 1506

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The Rise and Fall of Hotspots of Homicide in the Port-of-Spain Division: Changes over Time in the Characteristics of Murder.

Submitted in part fulfilment of the requirements for the

Masters Degree in Applied Criminology and Police Management

December, 2016

Abstract

Homicides are a threat to citizen security and public safety in Trinidad and Tobago. Hotspot policing has been recognized for its crime reducing capabilities in micro-places where crime is concentrated. The Port-of-Spain is the highest contributor to the national homicide total in recent years. Thus, examining the changes in the characteristics of homicides and hotspots when more patrols dosage was applied can provide significant on homicide patterns as well as the relationship between increased patrol time in hotspots and changes in homicide over time

This study aims to examine the changes in homicides and hotspots in the Port-of-Spain Division in Trinidad during a period in which police patrols were targeting identified hot spots of homicide. A descriptive analysis was conducted over a two year period, from June 2014 to June 2016. Changes in the demographic and situational characteristics were examined with quantitative methods. Regression models and qualitative information were utilized to evaluate the relationship between increased hotspot patrol dosage and declines in homicides. Spatial analyses were used to measure crime displacement and emergence of new homicide hotspots.

Increased patrol time in hotspots was found to be a predictor of decreases in homicides in the low homicide period but not in the high homicide period. Most homicide incidents were committed with guns, were gang-related and were perpetrated against males. Notable differences were seen in time frame and day of week. Findings did not support diffusion of crime control benefits but there were indications of crime displacement and emergence of one new homicide hotspot.

These findings have direct implications for the patrol theory of deterrence and patrol resource management in the Port-of-Spain Division and the Trinidad and Tobago Police Service. Effective management of patrol resources and improved knowledge of the changes in patterns of homicides by police officers can boost the deterrent effect of hotspot patrols and reduce homicides.

Acknowledgments

I would like to firstly thank my supervisor, Dr Heather Strang, whose tremendous guidance and support made this thesis possible. Special thanks are extended to Senior Superintendent McDonald Jacob for his willingness and assistance in this venture as well as to all my colleagues at the Crime and Problem Analysis (CAPA) Brach for their unending support. Finally, I would express my heartfelt thanks to my family, who anchored and motivated me during the difficult times in this process.

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Chapter 1

Introduction

Homicide in Trinidad and Tobago

Homicide is recognized as the single, most significant threat to public safety and citizen security in Trinidad and Tobago in both public and private spheres. Indeed, detection of homicides is an important gauge of police performance. Fuelling the perception of this threat is the striking increase in homicides over the last 15 years. Maguire et al (2010) state that from 1988 to 1998, the yearly average of homicides was around 106 but homicides increased considerably after 1999. Data from the Crime and Problem Analysis Branch (CAPA) showed that the yearly average of homicides rose steeply to 452 between 2008 and 2012. Furthermore, the Global Study on Homicide Report (2013) by the United Nations Office on Drugs and Crime places the global homicide rate at 6.2 per 100,000 in 2013, whereas the homicide rate for Trinidad and Tobago was slightly over 30 per 100,000 population for the same year. By comparison, the Report notes that the homicide rate in the U.S.A was 3 to 5 per 100,000 and 3 or less per 100,000 for the United Kingdom. This data strongly illustrates that the occurrence of homicide in Trinidad and Tobago greatly exceeds the averages of larger, more developed nations and poses a serious challenge to law enforcement officers.

Numerous anti-crime initiatives and plans, focused specifically on homicides and other serious, violent crimes, have been established during the above years, with varying levels of success. Policing efforts were often reactive, involved random patrolling strategies and based on officers' intuition rather than on analysis of crime patterns and evidence. In light of the growing number of homicides and limited organisational resources, there was an urgent need

to adopt a targeted, place-based approach that was preventative in nature. This was especially true in the Port-of-Spain Division as it contributed to a quarter of all homicides in Trinidad and Tobago from 2010 and 2015. Furthermore, this Division had the highest total of homicide per Division from 2011 to 2015. The frequency of homicides is compounded by the fact that is also the smallest Division, measuring approximately 90 km² with a sanctioned strength of 432 police officers across five station districts. Weisburd et al (2004) stated that the "concentration of crime in place suggests significant crime prevention potential for such strategies as hotspot patrol" (p. 285). The prevalence and concentration of homicides, stability of crime concentration in specific areas over time, as well as the restricted resources may mean that hotspot policing can hold significant benefits for homicide reduction in the Port-of-Spain Division.

The Role of Hotspot Policing in Reducing Homicide

There is considerable research on hotspots and hotspot policing that supports the crime reducing capabilities of this approach (Braga and Weisburd, 2010; Braga, Hureau and Papachristos, 2012; Sherman and Weisburd, 1995; Ratcliffe et al, 2011; Piza and O'Hara, 2014). In looking specifically at homicides in Trinidad, Sherman et al (2014) provides compelling evidence of the effects of hotspot policing. The Trinidad and Tobago Police Service Hotspot Experiment, which examined the effect of increased police patrols on reducing homicides in 20 matched pair police stations in Trinidad, found that increased patrols in hotspots resulted in a 41% decline in homicides and shootings. After nationwide implementation in 2014, homicides dropped by 45% by early 2015 when compared to the same period in 2014. It is critical to note that this was observed when the daily average patrol dosage reached 120 minutes. Thus, enhanced hotspot patrol dosage over time was seen as having substantial homicide reducing effects in micro-places with high concentrations of homicides.

Based on the findings by Sherman et al (2014), increased hotspot patrols holds great promise for reducing homicides in the Port-of-Spain Division. At present, there is no Divisional level analysis how the characteristics of homicides and hotspots changed under the condition of increased patrol dosage. It may be argued that Sherman et al (2014) already demonstrated the effect of this approach on a national level and this analysis is limited in scope. However, examining how micro-places with exceedingly high concentrations of homicide are influenced by increased patrol dosage over time at the Divisional level is beneficial. Furthermore, exploring the changes in the various characteristics of homicides can inform police officers and Commanders alike on developing patterns and trends, to which they can apply more targeted interventions.

Aim of the Study

This study aims to examine the changes in homicides and hotspots in the Port-of-Spain Division in Trinidad during a period in which police patrols were targeting identified hot spots of homicide. To accomplish this, a descriptive analysis of homicides data, hotspot patrol data and hotspots maps was conducted over a two year period from June 2014 to June 2016. The two year period was divided into a low homicide period, defined as months with six homicides or less, and a high homicide period, described as month with seven homicides or more. Both quantitative and qualitative methods were utilized to examine the data.

Overview of the Study

The following section synthesizes the literature on homicide trends and patterns as well as previous research on the main concepts related to hotspot policing. The subsequent three chapters respectively discuss the data, methodology and data analysis techniques, the results of the analyses and discussion of the findings. The final chapter proposes implications of the findings and the conclusions based on study.

Research Questions

In order to meet the aims of the study outlined above, the following research questions were used:

1. When the homicides were "low", how did the characteristics differ from when they were "high" on the following:

    i. Victim demographics
    ii. Motives
    iii. Situational characteristics
    iv. Patrol time in the targeted hot spots

2. When the homicide hotspot patrols increased,

    i. Did homicide in the targeted hot spot decline?
    ii. Did homicide in all of Port-of-Spain decline?
    iii. Was there displacement to areas outside the targeted homicide hot spots?

3. Did new identifiable homicide hotspots emerge outside the targeted hot spots, defined as two murders in one month within 1,000 meters of each other?

Chapter 2

Literature Review

This chapter will review the literature pertaining to the demographic and situational dimensions of homicide trends and patterns, over the last five decades. It will then examine the main concepts behind the crime reducing effects of hotspot patrol, with emphasis on homicides. Of particular interest in this section will be the concepts of crime displacement and diffusion of crime control benefits. Finally, the effect of enhanced police patrols in hotspots of gun-related crimes and homicides will be discussed, with specific reference to Trinidad.

Homicide: Characteristics, Trends and Patterns

Over the last five decades, research on homicide has been primarily aimed at examining existing and emerging macro-level trends and patterns at the city, national and cross-national levels. Traditionally, aggregate levels of homicide have been utilized as the measure of crime and violence occurring within a jurisdiction or country. Cao et al (2008) stated that, from an empirical perspective, most of the early research into homicides tended to amalgamate the different types of homicides together, despite the differences in patterns based on the types. However, more recent studies have disaggregated homicides according to a number of variables specific to the victim, such as age, ethnicity and gender. These have been done to examine homicides from a micro-level where changes in patterns and trends are much more sensitive and can be more readily identified. Utilising such methods to analyse homicide data was an important step gaining some basic, quantifiable knowledge to assist police agencies solving these crimes.

Demographic Characteristics

Arguably, one of the pioneering and most influential works in this area was done by Marvin Wolfgang in 1957 entitled 'Patterns in Criminal Homicide'. He examined 588 homicides that occurred in Philadelphia between 1948 and 1952, using a comprehensive set of variables, such as age, race, sex and interpersonal relationships between the victim and offender, among many others. Jensen (1959) argued that this study was significant because of the extensive scope of analysis, the strength of its methodology, the precision with which variables were defined and for presenting new narratives to homicide research. Among the most significant findings by Wolfgang (1957) was that 76.4% of victims were male and 23.6% were females. African American males were disproportionately involved in homicide events as victims (56.3%) and as offenders (85%).

This finding has been replicated in other of current studies and reports on homicide trends in modern, suburban cities. For example, the U.S. Department of Justice Report on Homicide Trends in the United States between 1980 and 2008 published in 2011 stated that the victimization rate for Blacks was 27.8 per 1000,000, which was six times greater than for whites at 4.5 per 100,000. The Report also noted that males accounted for 77% of homicide victims, representing a victimization rate of 11.6 per 100,000. By comparison, the victimization rate for females was 3.4 per 100,000. Watkins and Decker (2007), in their analysis of patterns of homicides in East St. Louis, showed that male victims contributed largely to the rise in the homicide rate in East St. Louis in the late 1990s. Moreover, the researchers, drawing on Fox and Zawitz (2003), asserted that climb in the U.S. homicide rate in the late 1980s and early 1990s was mainly due to the increasing number of Black victims.

With regard to age, 26% of victims in Wolfgang's (1957) study were between 20 and 30 years old. However, between 1980 and 2008 in the U.S., around 34% of homicide victims

were under 25 years old, with the rate per 100,000 culminating at 17.1 per 100,000 in the 18 to 24 year old group (U.S. Department of Justice, 2011). Pridemore (2006) maintained that the age range of Russian homicide victims extended from the mid-20s to mid-50s, while U.S. victims were mainly in their mid-20s.

Findings from the Caribbean also illustrated that younger persons were more likely to be homicide victims. The Caribbean Human Development Report (2012) measured rates of victimization between persons of African and East-Indian descent in Trinidad and Tobago and Guyana and found that age was a predictor of violent crime victimization. More importantly, the 18 to 30 year old group were at the highest risk of victimization. It should be noted that persons of African descent represent the single, largest racial group in the Port-of-Spain area, accounting for 52% or persons living in the area (Census Demographic Report, 2011). Thus, this group would be disproportionately represented in homicides. Based on data from the Homicide Register, 95% of all the victims in the Port-of-Spain Division between January 2014 and June 2016 were of African-descent.

Situational Characteristics

Similar to the demographic variables, there are multiple situational variables that have been examined in the literature within and across various jurisdictions and countries. One of the most significant characteristics was means of death. Wolfgang (1957) discovered that most of the homicide victims were either stabbed or shot. Out of the 588 victims in his analysis, 228 or 39% were killed with a knife whereas 194 victims were shot, which represented 33% of the total. Beatings only accounted for around 22% of homicides and 6.4% were murdered via other methods. More recent analyses in the Global Study on Homicide Report (2013) by the United Nations Office on Drugs and Crime (UNODC) have revealed a significant change in method and weapon types. In the North American region, which included the U.S. and

Canada, approximately 55% of all homicides were firearm-related, 15% were stabbings and 30% were committed by other means in 2012. For the same period, roughly 66% of homicides were committed with firearms in the Caribbean region, 20% with sharp objects and 14% through other means.

The Report also found that other countries fell considerably below the benchmarks in Wolfgang's (1957) study. Between 2001 and 2012, Australia consistently had a gun-related homicide rate of around 0.2 per 100,000. Surprisingly, homicide by other means was the most prominent, ranging from 1.3 to 0.5 per 100,000 while death by sharp objects fluctuated between 0.3 and 0.5 per 100,000. Homicide data for 2001 to 2012 for England and Wales showed that 49% of deaths were caused by sharp instruments, 24% by other or unknown means while a mere 4% were gun-related.

With regard to motives, Wolgang (1957) stated that General Altercation and Domestic Quarrels were the most dominant. Forty-two percent of the killings or 205 were attributed to General Altercations and 14% or 83 were the results of Domestic Quarrels. Geleri and Demirbelik (2005) had similar category findings in their study of homicide victims in Istanbul. The majority of murders, 22%, were due to disputes/fights, 14% lover related and 11% domestic related. However, this trend is not present in the North American region, which included the U.S., Canada, Caribbean countries and South America, as an estimated 30% of homicides are gang-related (Global Study on Homicide Report, 2013).

An examination of temporal patterns of homicide in Chicago by Voss and Hepburn (1968) revealed that almost 60% of the recorded criminal homicides occurred during the weekend, that is, Friday, Saturday and Sunday. Most of the homicides, 26.2%, were perpetrated on a Saturday. The authors further noted that the largest incidence of homicides were committed between 8:00 p.m. and midnight. Other violent crimes, such as assaults, threats and offences

against persons, were shown to occur in greater proportion on weekends (Uittenbogaard and Ceccato, 2012; Andresen, 2014; Newton and Hirschfield, 2009). Ceccato and Uittenbogaard (2014) stated that violent crimes in Stockholm's underground transit were concentrated between 4:00 p.m. and midnight, peaking between 8:00 p.m. and 9:00 p.m. Thus, temporal patterns of homicides and other violent crimes appeared to be similar over time.

Based on the above sections, it is clear that the characteristics of homicides have changed over time. Wolfgang's analyses brought about a deeper understanding of the trends, patterns and variables involved in homicides, which led to his findings being seen as conventional knowledge on homicide. Nonetheless, not only are homicides becoming more frequent but are influenced by factors that vary by place, time and context. Previous studies and research have demonstrated the significance of examining these homicide characteristics. Taking into consideration the troubling homicide trends in the Port-of-Spain Division in Trinidad, this current study aims to investigate changes in these characteristics over a two year period, from June 2014 to June 2016. The following section examines the main concepts related to the hotspot patrols and their relation to homicides.

Defining Hotspot Policing

Hotspot policing has found considerable favour across numerous police agencies and departments in the reduction of crime and disorder. Braga and Weisburd (2010, p. 9) defined hot spot policing as the "application of police interventions at very small geographic units of analysis." Hotspots have been conceptualized in a number of ways and have been subject to fluid definitions over time. A more solid description came after the first scientifically rigorous spatial analysis of police call data and predatory crime was conducted in Minneapolis by Sherman, Gartin and Buerger (1989). It was found that significant concentrations of both calls for service and crimes occurred in a few places or "hotspots".

More specifically, a little over 50% of calls to police were originated from only 3.3% of addresses. Predatory crimes displayed an even higher geographic concentration with all rapes/ criminal sexual assault concentrated at 1.3% of places, robberies occurring at 2.2% of places and auto thefts at 2.7% of all places. These findings did not support the idea that crime happens randomly in time, space and place.

In a subsequent analysis, Sherman and Weisburd (1995, p. 630) defined hot spots "operationally as small clusters of addresses with high concentration of hard crime calls." Similarly, Telep et al. (2012) describe hotspots as small geographic areas where there are high volumes of crime. Ratcliffe et al (2011) proposed a more extensive definition, stating that a hotspot consists of multiple intersections, all of which were not visible from a single epicenter. Regardless of the heterogeneity in definition, hotspots became an important unit of analysis for police to focus their strategies and resources as well as to examine what works to reduce crime in specific places.

The Effect of Policing Interventions in Hotspots

Hotspot policing provided police commanders and officers with innovative and tested interventions to prevent and reduce crime that, as Braga and Weisburd (2010) pointed out, had both theoretical and research foundations. There is substantial empirical evidence that using intensive police interventions in hotspots is an effective crime reduction strategy. In their meta-analysis on police enforcement interventions studies, Braga, Hureau and Papachristos (2012) reported that 20 out of the 25 tests of hotspot policing had marked reductions in crime and disorder across a variety of police interventions or combination of such; raids, crackdowns, increased presence of uniformed officers, problem-oriented policing, among others. It was also observed that in relation to the main outcome variables in treatment areas, there was a small but statistically significant mean effect size ($d=0.184$, $p<$

.001) in support of the effects of hotspot policing in reducing crime in comparison to the control areas.

Increased police patrol was perhaps one of the most widely used and effective crime control interventions employed in hotspots to reduce crime. The Minneapolis Hot Spots experiment by Sherman and Weisburd (1995) found that doubling the patrol dosage in the experimental groups resulted in a 6% to 13% total decrease in calls for service. There was also a 66% reduction in Robberies and 50% decline in anti-social behaviour in the treatment hotspots (Sherman and Weisburd, 1995). Similarly, the Birmingham South PCSO Hot Spot Experiment also known as "Operation Savvy" showed a significant reduction in reported crime. In the treatment hotspots, three visible 15 –minute patrols in hotspots from 2 p.m. to 10 p.m. were used as well as interaction with the community. In the control hot spots, PCSOs conducted regular patrols and also interacted with the community. As a result, victim reported crime dropped by 40% (Sherman, 2015). Crimes in experimental high level hot spots as well as medium level hot spots also dropped by 53% and 30% respectively.

Utilizing a randomized controlled trial, Ratcliffe et al (2011) investigated the effect of enhanced foot patrol on violent crime in Philadelphia. More than 200 patrol officers were randomly assigned to either 30 control hotspots or 30 treatment hotspots that received more foot patrol. Targeted hotspots saw a 23% decrease over the control hotspot in violent crimes, which amounted to 53 crimes prevented. In a similar thread, Piza and O'Hara (2014) found that intensive foot patrols resulted in a 42% drop in violent crime events in targeted areas compared to control areas in Newark, New Jersey. Overall, all of the above studies indicate that increased police patrols have a positive impact on reducing serious and violent crime in hotspots.

Police Crackdowns: Traditional Police Crackdown

Crackdowns have been widely used in policing for decades, well before any scientific or systematic examination of policing became popular. Arguably, the most influential modern examination of police crackdown case studies was done by Sherman (1990). Indeed, Sherman (1990) suggests that the history of American policing is indelibly linked to what he refers to as the "permanent crackdown strategy". Continuous police presence and enforcement were extensively employed to combat growing crime and disorder witnessed in early American society. Regardless of the type of crime/ disorder, Sherman (1990) noted all police crackdowns represented a marked increase in the application of law enforcements efforts to poorly enforced laws. The main goal of this technique was to strongly apply the principles of general deterrence to reduce the instances of crime and disorder. He goes on to say that police crackdowns boost law enforcement capacities in two ways; it is both an offense-specific policy and a geographically focused strategy. The former informs police officers about how to treat with particular incidents while the latter refers to rise in the amount of police presence in a particular area, representing greater enforcement of laws on a provisional basis. This description is quite useful in understanding how, as Sherman (1990) states; both aspects convey a more distinct threat of being apprehended and punished that regular policing.

Despite the apparent efficacy of this strategy, Sherman (1990) identifies two main issues that undermine the general deterrence capacity of permanent police crackdowns; temporary crime reduction capability and predictability of punishment. Drawing on Whyte (1943), Sherman (1990) argues that "crackdowns were a recurring political necessity but never an effective long term strategy" (p. 5). Periodic use of crackdowns may quell a crime problem but only for the length of the increased police presence or sanctions. Police officers tend to prioritize specific types of crimes and focus most of the police resources in those areas, which essentially starves other areas until they too reach crisis proportions. Furthermore, criminals

may learn to assess the risk of punishment for different types of offences. This may result in certain offences proliferating while keeping out of police attention. It is important to note the above limitations of "traditional" police crackdowns, as Sherman addresses both issues in presenting a more comprehensive definition.

Contemporary Definition of Police Crackdown

Police crackdowns, as defined by Sherman (1990), is "a sudden change in activity, which is usually proactive…and intended to drastically increase either the communicated threat or actual certainty of apprehension for a specific type or types of offence that has been highly visible or widely committed in certain identifiable places or situations" (p.8). Although this definition is similar to the customary one with regard to increased police resources directed to crime problems, Sherman (1990) further disaggregated both the tactics used within crackdowns and the deterrent effect. The tactical aspects of crackdowns are presence, sanctions and media threats. "Presence is simply the increased ratio of police officers per potential offender…sanctions denote any coercive police imposition on offenders or potential offenders …[and] media threats are announced intentions to increase the sanctioning certainty" (Sherman 1989, p. 8). Wright and Pease (1997) further asserted that the publicity of a crackdown transfers the fear from the victim to the lawbreaker.

Crackdowns were focused on permanent targets. In other words, police have used crackdowns to target specific types of offences or problems for extended periods of time. Sherman (1990) argued that it is more effective for crackdowns to be short-term and to regularly change the offences or problems targeted. This is the basis of his hypothesis that "police can create more general deterrence through rotating crackdowns than through permanent priorities" (Sherman 1989, p.7). Sherman (1990) made the critical point that a significant increase in the perception of risk, through crackdowns, may result in offenders

becoming so uncertain of the risk that they overestimate it and refrain from offending. Therefore, the threat of punishment is far less predictable and can be lurking around every corner for the criminal. An additional benefit of crackdowns is that they can deliver immediate punishment, especially in comparison to other criminal justice avenues. In essence, crackdowns can fulfil, in theory and practice, all the tenets of deterrence theory; punishment that is severe, swift and sure.

Linking Hotspot Policing and Police Crackdowns

There are distinct parallels between the hotspot policing approach and police crackdowns. Both are geographically focused, target small, high crime places, involves intense policing efforts and are founded on deterrence theory. Drawing on previous work on deterrence and hotspots (Sherman and Weisburd, 1995), Sherman et al (2014) noted that the "initial conceptualization of deterrent effects of hotspot patrols defined each appearance of a police patrol in a hotspot as a mini-crackdown" (p. 6). Police officer patrols within hotspots satisfied two requirements of crackdowns; presence and sanctions. Each visit represented increased presence and a greater risk of sanctions through being captured. By considering the linkages between police crackdowns and hot spot policing, one can look more intimately at their deterrent effects and how these work to reduce crime, rather than basing it broadly on general deterrence.

Deterrence Theory: Initial and Residual Deterrence

Early examinations of crackdowns failed to differentiate between initial deterrence, residual deterrence and decay, which are essential to understanding the length and strength of the deterrent effect. Initial deterrence refers to crime being reduced while the crackdown is in effect. Based on Sherman's review of police crackdowns in 1990, Sherman et al (2014) note that crime reduction is greatest immediately after the beginning of a crackdown. Furthermore,

initial deterrence was seen across a variety of locations and crime types. On the other hand, if crime reduction is maintained after the crackdown has stopped or diminished, this indicated a residual deterrent. Sherman (1990) found in his review of five studies on police crackdowns where crime was measured after initial deterrence that the incidence of crime remained below pre-crackdown levels.

Mediating these two is the concept of a backoff, which Sherman et al. (2014) said is "most easily defined as the end of a crackdown, gradually or suddenly reducing the dimensions of increased threats the defined the crackdown" (p.7). A backoff can be done purposefully, as police rotate the priorities, or may happen due to other reasons, such financial and/or manpower restraints. In any case, it is important to observe and evaluate the rate of deterrence decay. Decay denotes a steady decline in offender's perceived level of threat, such that they think it is safe to begin committing crimes again. As Sherman and his colleagues noted in the context of hotspots, deterrence decay may occur quickly when the overt threat of police presence and sanctions decrease temporarily while they are attending other matters. Conversely, as he pointed out in Koper (1995), the deterrent effect may be more gradual. So how long should police patrol be present in a hot spot before decay sets in?

Dosage

Targeting hot spots with unlimited or unstructured amounts of time would be surely be less helpful to police commanders than finding the total time or dosage required to elicit deterrent effects in hot spots. Sherman and Weisburd (1995) in the Minneapolis Hotspot experiment were the first to systematically measure dosage. During the hot times, 11pm to 7am and 7pm to 3am, the average amount of patrol time doubled from 7.5% to 15% of the minutes observed. More specifically, .7 or .8 minutes per 10 minutes of observation were spent in 40 of the control hot spots while the 50 experimental hot spots received between 1.3 and 1.7

minutes per 10 observation minutes (Sherman and Weisburd, 1995). This resulted in minor reductions in crime calls and significant declines in reported disorder.

Koper (1995) analyzed the observational data collected in the Minneapolis experiment to examine if longer police presence in hot spots leads to stronger residual deterrent effects. If this was found to be the case, an additional goal of the study was to determine of there was an optimal dosage of police presence at hot spots before the onset of residual deterrence decay. It was found that the optimal dosage for police presence was 10 to 15 minutes. After 30 minutes, residual deterrence decay was much higher when police drove through hot spots (16%) in comparison to 10 to 15 minute stops in a hot spot (4%). Residual deterrence peaked at 14 to 15 minutes, with longer periods of police presence having diminishing effects (Koper 1995). Telep, Mitchell and Weisburd (2012) also conducted a rigorous examination in Sacramento of the focused direct patrol strategy as suggested by Sherman and Weisburd (1995) and Koper (1995). The findings revealed that police presence in hot spots lasting between 12 and 16 mins, rotated every 2 hours resulted in a 25% drop in serious crimes, adding support to Koper's work. However, an essential issue surrounding increases in patrol presence in hot spots and finding optimal dosage is whether this affects displacement, and if so, how strong is the effect.

Crime Displacement

Mazeika (2014) stated that one of the main criticisms of hotspot policing is the potential for geographic crime displacement, which is described as "a spatial shift in crime from the target location(s) to untreated areas" (p. 26). Sherman et al (2014) referred to this phenomenon as regional deterrence. Drawing on Reppetto (1976), Mazeika (2014) noted that there are five types of displacement; temporal, tactical, functional and territorial. Although each one is important, territorial displacement, which refers to a shift in the location of crime, has been

the focus of research within recent years. The place-based application of this type of displacement has given it significant bearing in analyses of hotspot policing interventions. Mazeika (2014) also pointed out that Reppetto (1976) clearly distinguished between interventions that have a greater chance of displacement and those that do not. It was found that the "interventions which target the root causes of crime, such as social welfare, can reduce crime in an absolute sense; however, those which merely reduce the opportunities or increase risk do not offer the same security of absolute crime reduction" (Mazeika 2014, p. 27). Since enhanced police patrol in hotspots speaks directly to the latter, even greater precedence should be given to crime displacement in hotspot literature.

Measuring Displacement

The majority of academic efforts to measure crime displacement have focused on the use of buffer zones. These zones are usually drawn around the targeted areas to capture any crimes that may have shifted out of the treatment area/s and into nearby ones as a result of the specified intervention. While this method has been consistently and successfully applied, Mazeika (2014) highlighted 2 main challenges. Firstly, the size of the buffer zone is important; it must be sufficiently large to capture any displaced crimes but not too large where any displacement would become undetectable. Secondly, Weisburd and Green (1995) stated that "displacement contamination" must be avoided by assigning experimental and control areas far away from each other. Otherwise, it would be extremely difficult to discern the effects of displacement, diffusion and intervention in the individual target hotspots and buffer zones. Therefore, particular attention must be given when measuring displacement around adjacent hotspots whose buffer zones may overlap.

Findings on Crime Displacement

Strong evidence has been produced in a number of studies which examined targeted interventions in hotspots that does not support the displacement theory. Weisburd and Green (1995) conducted an experiment in the Jersey City drug market based on the movement of crime calls outside of the drug hotspots to buffer zones. Displacement was measured within a two block radius around each hotspot. In both the experimental and control areas, no significant displacement of calls for crime or disorder was found. Braga, Hureau and Papachristos (2011) examined the effect of problem-oriented policing initiatives in Boston dubbed the Safe Street Teams Program. The treatment street units reported a statistically significant 14% decline in violent crime in comparison to the control street units. Displacement was measured in two-block catchment areas around both the control and treatment street units and no evidence of displacement was found. Likewise, the Kansas City Gun Experiment by Sherman and Rogan (1995) likewise found no significant displacement between the experimental and control beats.

Conversely, there is a substantial body of evidence that indicates that police interventions in hotspots can result in crime displacement. Ratcliffe et al (2011) employed a randomized controlled trial to determine the effects of increased foot patrol in 30 control hotspots and 30 experimental hotspots. Significant displacement effects were seen in the catchment areas; however, the total crime prevented exceeded the amount of displacement observed. In a study by Maher and Dixon (2001), one of the adverse consequences of police crackdowns on heroin market in an area of Sydney was the spreading of the drug market to new neighbourhoods. Based on interview data and field observations, there had been substantial expansion of the drug trade into adjacent neighbourhoods. Street-based dealers had re-located their trade to shopping arcades, near schools and within secured apartments.

Diffusion of Benefits and Shortcomings of Displacement Research

Weisburd et al (2006) argued that some studies have found a positive, yet unexpected outcome from hotspot interventions. Researchers observed reductions in crime in areas near to, but not directly targeted by police strategies. Drawing on Clarke and Weisburd (1994), Weisburd and his colleagues called this "diffusion of crime control benefits". Essentially, "diffusion is the reverse of displacement…it refers to the diffusion of crime control benefits to contexts that were not the primary focus of crime prevention initiatives" (Weisburd et al 2006, p. 555). Farrell, Chenery and Pease (1998) reported a diffusion of benefits, leading to a drop in burglary and other offences in nearby areas in addition to no spatial displacement of burglaries or tactical displacement of other crime types from the anti-burglary project in Boggart Hill. Similarly, Caeti (1999) found no evidence of displacement resulting from the Targeted Beat Program in Houston, Texas and the pre/post analyses of reported crimes showed that beats surrounding three treatment areas had a diffusion of benefits. Weisburd et al (2006) also conducted a randomized controlled trial of street crime and disorder related to dug markets and prostitution in Jersey City, New Jersey to measure displacement and diffusion effects. Results from the two catchment areas suggested that there was a diffusion of benefits rather than displacement in both the prostitution and drug market areas.

Weisburd et al (2006) advised caution when assessing the results of displacement in research in three main points. The first concerns the amount of displacement; the extent of displacement is partly based on the type of intervention that is utilized. Thus, some interventions would produce higher levels of displacement than others. Additionally, the amount of displacement is dependent on the type crime or disorder being prevented. Referring to Eck (1993), displacement may be more likely for drug markets than other types of crime. Finally, a methodologically rigorous research design should be used to examine it to ensure measures are robust and reliable. In the end, the crime control benefits of hotspot

policing can be seriously undermined if careful consideration is not given to crime displacement. Mixed results have been seen based on the studies discussed above, which brings some uncertainty regarding the specific interventions and circumstances that cause this phenomenon. Nonetheless, measuring displacement should be an inherent part of any analysis on hotspot policing interventions.

Enhanced Police Presence in Hotspots: Serious Gun Crime and Homicides.

Braga, Papachristos and Hureau (2012) note that police interventions in hotspots mainly target serious crimes, such as firearm related offences. One noteworthy test of police intervention on hotspots of gun crime was the Kansas City Gun Project by Sherman and Rogan (1995). Treatment included intensive enforcement of illegal gun carrying laws and lasted for 29 weeks in matched-pair police beats with almost equal incidents of drive-by shootings. Police beats that received the intensive enforcement experienced a 65% increase in gun seizures and a 49% drop in gun crimes. In contrast, the control police beats had a 15% reduction in gun seizures and a 4% increase in gun crimes. Moreover, a survey of citizens in the treatment areas found that they believed the quality of life was enhanced in comparison to residents from the control groups.

Another study of targeted intervention on hotspots of violent gun crimes was conducted by Rosenfeld, Deckard and Blackburn (2014). The experiment examined the effects of increased patrols and self-initiated activity (arrests, pedestrian checks, occupied and unoccupied vehicle checks, building checks and foot patrol) on non-domestic firearm assault and firearm robbery. Experimental hotspots were split into two categories; treatment 1, where there was enhanced patrols and limited self-initiated activity and treatment 2, with enhanced patrols and more self-initiated activity. Firearm violence, which included both firearm robberies and nondomestic assaults, dropped by approximately 44% in the control hotspots and by 45% in

the treatment 1 hotspots. On the other hand, treatment 2 hotspots had a considerable drop of almost 64%. Interestingly, while non domestic firearm assaults declined considerably in the treatment 1 and treatment 2 hotspots by 56.6% and 78.6% respectively, the decrease in both treatment hotspots for firearm robberies was surpassed by that of the control group. This finding does not support previous research on enhanced patrols and crime reduction and was not anticipated by the researchers. However, firearm robberies were declining before the hotspots intervention was implemented. From 2009 to 2012, firearm robberies declined by 38.4%, whereas firearm assaults dropped by 20.2%. It was not possible to discern the local or extra-local factors were reducing firearm robberies in St. Louis Missouri at that time, but they may have overwhelmed the effects of the hot spots intervention (Rosenfeld, Deckard and Blackburn, 2014).

Hotspots and Homicides in Trinidad and Tobago

Nevertheless, as useful as these studies are in developing a greater understanding of police intervention on gun crime, the findings cannot be extrapolated to homicides. This is especially true for cross-jurisdictional or cross-national purposes, as inherent contextual differences can result in different outcomes. Research on homicide, the most serious gun-related crime, has been relatively absent from literature on police crackdowns and hotspot policing. One possible reason for this is that unlike Trinidad and Tobago, homicides and the prevalence of firearms used to commit this crime are rare events for many police departments and districts. Therefore, any reliable analysis or application of the principles of police crackdowns and hotspot policing would be difficult in those places.

Evidence supporting the use of enhanced patrols to reduce homicides can be found in the Trinidad and Tobago Police Service Hot Spot Experiment by Sherman et al (2014). This was a randomized controlled trial that ran for 90 days. Forty station districts with the highest

levels of serious violent crime between January 1st, 2012 and July 15th, 2013 were selected. Using a pairwise random assignment, the station districts were paired in descending order according to the number of serious violent crimes. The 20 experimental police districts were treated with more patrol time, especially during the homicide "hot times" and more directed patrols in identified hot spots. During the same period, the 20 control station districts conducted regular patrols with no fixed locations. Results showed a decrease of 41% in homicides and shootings and woundings in the treatment districts in comparison to the control districts (Robinson-Regis, 2016). Subsequent to the experiment, the strategy was implemented across all Divisions in Trinidad and Tobago. As the average number of hotspot patrol minutes per day increased, the number of homicides declined. When the daily average patrol time surpassed 120 minutes by early 2015, homicides fell by 45% over the comparative period (Robinson-Regis, 2016). The current thesis is based on this study, albeit on a small, descriptive level, in the Port-of-Spain Division only.

Conclusion

Identifying the characteristics and associated changes in homicides provided deeper insight into this type of crime over time. Hotspot policing and police crackdowns were founded out of the necessity for police to target crime and disorder in problem places. Both share strong theoretical and practical linkages to deterrence, dosage, diffusion of benefits and displacement. Out of the various types of interventions used in hotspot policing, evidence suggested that enhanced police patrols can reduce violent and gun-related crimes were applied. There is limited but convincing evidence of the crime reducing effects of enhanced patrols on homicides in Trinidad. The following chapter will describe the data and methodology that will be utilized in this study.

Chapter 3

Data and Methodology

Introduction

This study examines the changes in the characteristics of homicide in the Port-of-Spain Division during a period in which police were targeting identified hotspots of homicide. This will be achieved by conducting a descriptive analysis over a two year period, June 2014 to June 2016. This chapter will describe the data sources, limitations and methodology. Ethical considerations will also be discussed.

Data Sources

Hotspot Patrol Minutes Data

The data for the hotspot patrol minutes was obtained from two sources. The first set of data was received from the project manager of the Trinidad and Tobago Police Service (TTPS) Hotspot Project for the period April to December, 2014. The spreadsheet contained the weekly averages of hotspot patrol minutes for each of the five station districts in the Port-of-Spain Division as well as the overall weekly average for the Division itself. The second data source was derived from Commissioner's Compstat Reports for the period January 2015 to June, 2016. This bi-weekly report was used by the Commissioner of Police and senior-level police officers at the weekly Commissioner's Compstat meetings to track weekly changes in homicides and other serious crimes across all station districts and Divisions in Trinidad and Tobago. It was also used to track the average weekly delivery of patrol minutes to hotspots on both station district and Divisional levels. However, the hotspot patrol minutes data in Commissioner's Compstat Reports were captured in tables and graphs in PDF format. In order to covert the data into a more suitable format for analysis, the weekly hotspot patrol

data from each corresponding Reports for stated period was transcribed to an Excel spreadsheet for each of the five station districts. It was not possible to obtain hotspot data for some weeks as the I.T. system responsible for tracking and compiling the GPS data from patrol vehicles was not functional, thus no data was available. As a result, four months were omitted from the hotspot patrol analysis; February 2015, March 2015, July 2015 and February 2016.

Geographic Information System (GIS) Crime Mapping

All crimes reported in each police Division are geocoded and plotted on crime maps with GIS software, which is one of the primary functions of the Crime and Problem Analysis Branch (CAPA). This branch is responsible for the collection, collation, processing and analysis of crime data in the Trinidad and Tobago Police Service (TTPS). Crime maps enable spatial and temporal analyses of incidents inside and outside of hotspots in all police Divisions. Several procedures are required to transform a homicide incident into geo-coded information. Firstly, each incident is given a General Occurrence (GO) number, which is generated by the Record Management System (RMS) database. Secondly, the GIS analyst used the addresses of the homicides to geocode each incident, thus giving it x and y coordinates. The coordinates are then utilized to populate the homicide maps and to generate GIS reports. Crime maps illustrating hotspots were also done at the CAPA Branch.

Hotspots are currently defined by the TTPS as small geographic areas where five or more serious crimes have occurred within one year. These areas are geo-fenced or demarcated on maps to distinguish the areas where serious crimes are concentrated from other surrounding areas. For the purpose of this study, serious crime hotspots will be called targeted hotspots (THS) since these areas are subjected to increased police patrols. There are approximately 50 THS in the Port-of-Spain Division at present.

There were limitations with this data source. It was not possible to assign accurate geographic coordinates to some incidents due to vague addresses in the initial and/ or follow up reports taken by police officers. Vague addresses refer to those where no street/house/building number, building name or landmark were provided. Secondly, the terrain of some areas in the Port-of-Spain Division consists of numerous streets, traces, alleys and other such features that were not recognized by the GIS software. Finding the closest, most accurate location would be reliant on the GIS analyst's personal knowledge of the area, which may not result in the accurate location being plotted.

The Homicide Register Dataset

The total number of homicides recorded for each month in the Port-of-Spain Division for June 2014 to June 2016 was obtained from the Homicide Register. The data on the Homicide Register is compiled on an Excel spreadsheet by the CAPA Branch. The main purpose of the Homicide Register is to provide a centralized, up-to-date repository of information on all homicides that occur in Trinidad and Tobago. Information on each homicide is received via reports from the Homicide Bureau, the unit mandated to investigate all homicides in Trinidad and Tobago, which is then entered onto the Homicide Register. There are 34 pre-determined fields, representing multiple variables such as race, age, sex, address, motive, weapon, victim occupation, location, offender name, offender occupation, among others. The dataset is highly accurate as it is obtained from the initial reports from the Homicide Bureau, which is mandated to investigate all homicides. Given that it contains the most reliable and up-to-date data on homicides across Trinidad and Tobago, it is the best dataset from which to obtain demographic, situational and other incident related data. In the few cases where offender information was present, it was limited to basic demographic characteristics (name, age, sex, ethnicity, address).

Qualitative Data

This data source was used to gain greater insight into the possible reasons and contexts behind the fluctuations in homicide between June 2014 and June 2016. While the quantitative sources above will describe *how* these changes occurred, the qualitative data will seek to uncover *why* they did. It must be reiterated that this study does not aim to find causal linkages among the variables examined. However, the underlying mechanisms of the rise and fall of homicides in the Port-of-Spain Division have many implications for patrol deterrence and management as well as the characteristics of homicides. The data was obtained from an unpublished report by the TTPS as well as personal communications with administrative personnel from the Port-of-Spain Division. It should be noted that this information must be used with caution as these sources may not be fully reliable.

Data Analysis Methodology

Low Homicide and High Homicide Monthly Categories

In order to examine the changes in the characteristics in homicides in the Port-of-Spain Division, the two year period under review was divided into a high homicide period and a low homicide period. The high homicide period was defined as any month within the two year period with a total of seven or more homicides whereas the low homicide period was described as any moth with six or less homicides. Initially, there were 12 non-consecutive months in each category but missing hotspot patrol data resulted in four months being omitted, as previously mentioned. The low homicide period comprised of 11 months namely; August 2014, September 2014, October 2014, December 2014, January 2015, May 2015, June 2015, November 2015, December 2015, March 2016 and May 2016. The high homicide category consisted of 9 months; June 2014, July 2014, November 2014, April 2015, August 2015, September 2015, October 2015, January 2016 and April 2016. In the high homicide

period, there were 81 homicides, with 29 occurring in THS. Forty-eight homicides were recorded during the low homicide period category, 20 of which were in the THS.

Once this initial categorisation was completed, the data was analysed using pivot tables in Excel. This method provided a concise and objective summary of how victim demographics, homicide motives and situational characteristics differed between the low and high homicide periods in the THS. Following this, the information was converted and presented in pivot charts. The weekly hotspot patrol data described earlier in this chapter was used to calculate the daily average hotspot patrol minutes for each month delivered to the THS. Pivot charts in Excel were employed to initially examine if increased patrol time coincided with homicides in the high and low homicide periods as well as within and outside of the THS in general for the two year period. Further analyses will be described in the following section.

In order to understand the underlying mechanisms regarding the changes in homicides, both quantitative and qualitative were necessary. Referring to Ragin (1994), Neuman and Wiegand (2000) noted that qualitative methods are data enhancers, which makes it possible to understand the main aspects of the data more clearly. Thus, the qualitative data was used to examine possible reasons for the peaks and valleys in homicides observed over the two year period.

Statistical Analyses

Regression analyses have been applied to estimate the relationship between the daily average hotspot patrol minutes in the THS and homicides. This was conducted to determine if higher daily mean patrol times in THS was a predictor of decreases in homicides in both homicide periods. In addition, to ascertain the presence of diffusion of crime control benefits in the Port-of-Spain Division, regression analyses were used to evaluate if higher daily mean patrol time in the THS was a predictor of declines in homicides in areas outside of the THS.

Unit of Analysis

The principal aim of this study is to examine the changes in homicides over a two year period where police officers have targeted hotspots of homicide in the Port-of-Spain Division. To achieve this, two units of analysis were proposed in the regression analyses. The first unit of analysis is the targeted hotspot (THS), which allows for the examination of changes in the characteristics of homicide only within these areas over time. The second unit of analysis is month, referring to each month in the two year period where the variations in patrol dosage are measured against the number of homicides. Thus, identifying the changes in homicide can be measured on two levels.

Spatial Analyses

The homicide maps were used to evaluate two potential consequences of increased patrols within THS in the Port-of-Spain Division; crime displacement and emergence of homicide hotspots. Establishing sufficiently large buffer zones around the THS to capture displacement of homicides was not possible due to their close proximity, which would have resulted in displacement contamination. To address this limitation, the study opted to measure crime displacement through a visual examination of the spatial distribution of homicide incidents on the immediate outskirts of the THS. Additionally, a spatial analysis was conducted to examine the emergence of homicide hotspots in the Port-of-Spain Division. For the purpose of this study, a homicide hotspot was defined a small geographic area where two or more homicides occurred in one month within 1,000 metres of each other, that is geographically distinct from other THS. Using the same GIS software, the homicides that occurred during the two year period were geo-coded and plotted on maps. The homicide maps generated were then used to measure the distance between incidents that took place within the same month.

Ethics and Dataset Considerations

The research used homicide data from the CAPA Branch of the TTPS. Access to all of the data and information was granted by Commissioner of Police and the Acting Superintendent in charge of the CAPA Branch, both of whom supported this study. No identifying information was used from any of the data sources or in any subsequent analyses to ensure that confidentiality was retained. With regard to the unpublished report and hotspot patrol data collated, it was utilized strictly for the academic purposes stated in this study. Furthermore, none of the homicide or hotspot patrol data was used to create or add to any existing or new database or document.

The strength of this study lies in the reliability of the data from the Homicide Register, GIS technology and hotspot patrol data for the Port-of-Spain Division. All of these datasets consist of factual information that is used by the TTPS for crime analysis, investigations and other related purposes. While no dataset is completely error free or without limitations, these sufficiently meet the standard required for the context and purpose of this research. The data from the various sources were checked and verified to ensure better during collation and analysis to ensure precision and quality. Therefore, the findings of the study are expected to reflect an accurate picture of the phenomenon being explored.

One weakness of the study was generalisability. Due to the fact the current research design is descriptive and not experimental; conditions cannot be manipulated to replicate the findings of this study in another policing Division. In the context of homicides and hotspot patrols, the data was based from Port of Spain Division only, which possessed attributes that distinguishes it from other Divisions. Historically, the city of Port-of-Spain, which is also the nation's capital, has recorded the highest incidence of serious crimes in the country. This is also compounded by the fact that it is the smallest of the nine police Divisions in Trinidad

and Tobago, thus having a comparatively high concentration of serious crimes. Therefore, generalizing the findings to other Divisions must be done with a high degree of caution in light of the contextual differences. However, the implications can be broadly applied across all police Divisions in Trinidad and Tobago.

Chapter 4

Results

Introduction

The main goal of this study is to examine the changes in the characteristics of homicide in the Port-of-Spain Division during a period in which police patrols were targeting identified hotspots of homicide. This was done through a descriptive analysis of homicide data, hotspot patrol data and hotspot maps over a period of two years, from June 2014 to June 2016. The following results are presented in the order of the three research questions posed in this study;

1. When the homicides were "low", how did the characteristics differ from when they were "high" on the following:

i. Victim demographics
ii. Motives
iii. Situational characteristics
iv. Patrol time in the targeted hot spots

2. When the homicide hotspot patrols increased,

i. Did homicide in the targeted hot spot decline?
ii. Did homicide in all of Port-of-Spain decline?
iii. Was there displacement to areas outside the targeted homicide hot spots?

3. Did new identifiable homicide hotspots emerge outside the targeted hot spots, defined as two murders in one month within 1,000 meters of each other?

The results will be presented in the order of the research questions above.

Research Question 1

When the homicides were "low", how did the characteristics differ from when they were "high" on the following:

v. Victim demographics
vi. Motives
vii. Situational characteristics
viii. Patrol time in the targeted hot spots

Changes in Characteristics of Homicide

Four variables were analyzed to determine the differences, if any, in the characteristics of homicide between the high homicide period and low homicide period within the THS in the Port-of-Spain Division. Comparisons were based on victim demographics, motives, situational characteristics and patrol time in THS and were focused on determining whether or not the characteristics of homicide varied according to the monthly categories (high or low).

Age

For both the high and low homicide periods, as seen in Figures 1 and 2 below, persons under 30 years old contributed to more than half of the victims. Although there is a higher proportion of victims over 30 years old in the high homicide period, the 15% unknown age group in the low period means that no conclusions can be made about the differences in the age groups between the two periods.

Figure 1 – Homicides by Age Group for the Low Homicide Period, June 2014 to June 2016

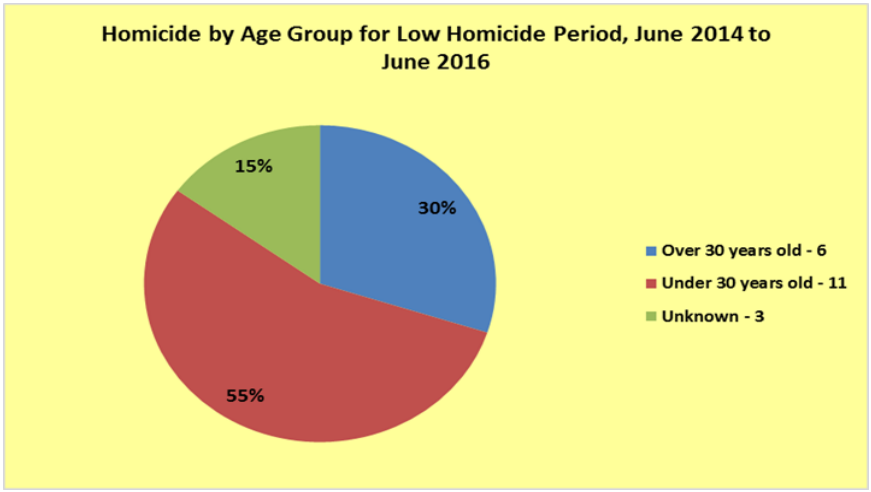
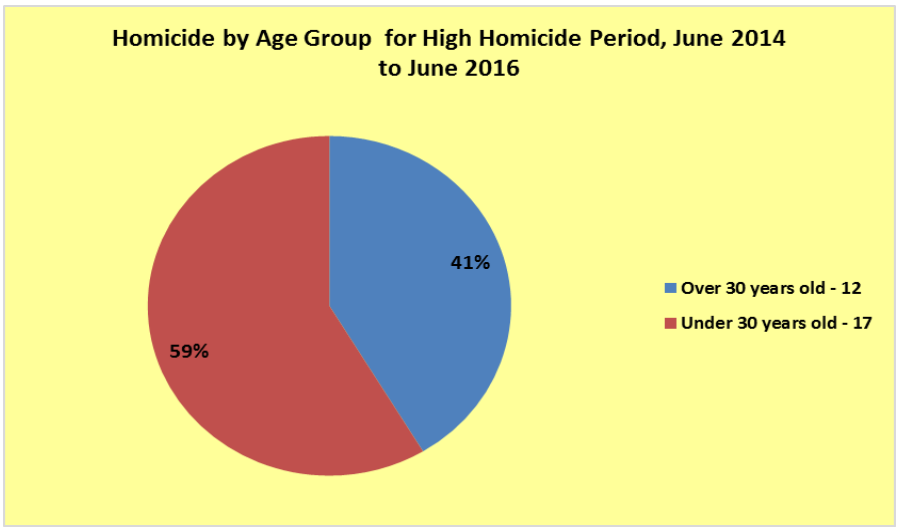


Figure 2 – Homicide by Age Group for High Homicide Period, June 2014 to June 2016



Gender

The distribution of victims by gender was similar for both periods, with the vast majority of them being male, as seen in Figures 3 and 4. It should be noted that in the high homicide period, the proportion of male victims was 5% larger than the low homicide period. The proportion of female victims was 5% lower in the low homicide period compared to the high homicide period. Nevertheless, the percentage of male to female victims in the Port-of-Spain Division reflected the gender distribution of homicide victims for Trinidad and Tobago as a whole from January 2014 to September 2016. Males accounted for 91% and females, 9% during this period.

Figure 3 – Homicide by Gender for the Low Homicide Period, June 2014 to June 2016

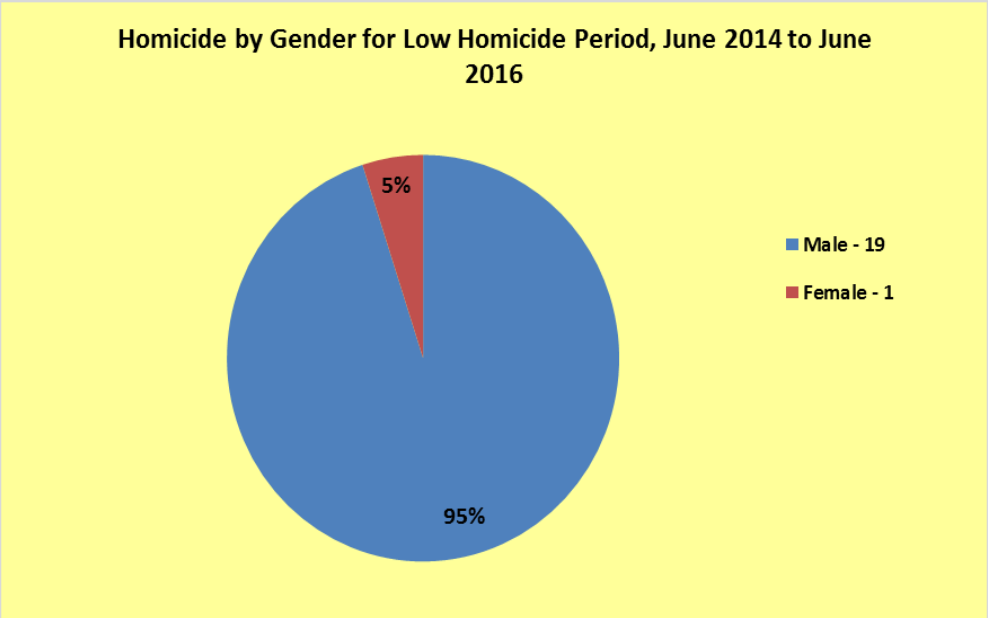
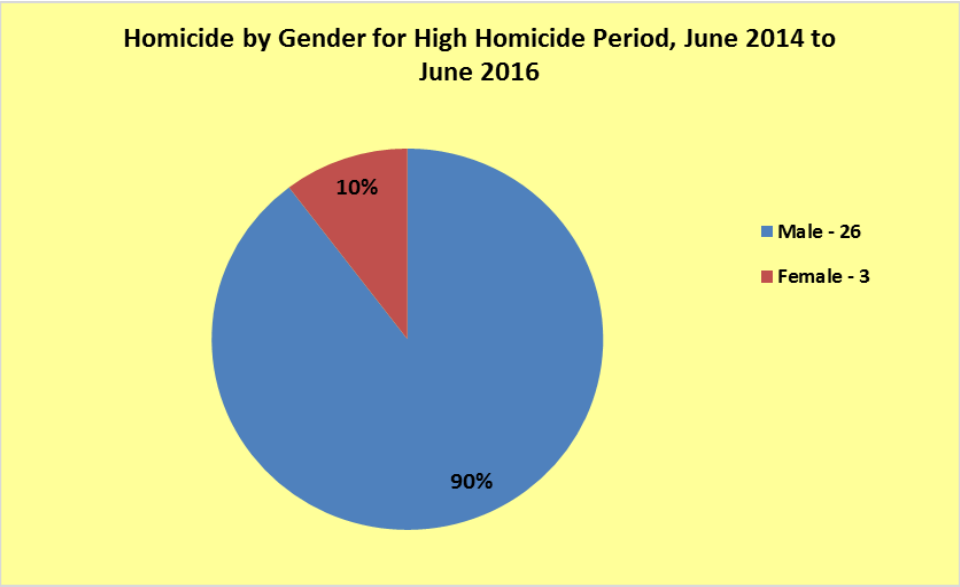


Figure 4 – Homicide by Gender for the High Homicide Period, June 2014 to June 2016



Motives

Over the two year period, gang related murders accounted for the majority of incidents for both the high homicide and low homicide periods. It was observed that there were 5 less gang related murders in the low period, yet the proportion of this motive was higher than the high period. This was due to the presence victims in other categories, such as domestic violence and altercations, which were not present in the low homicide period.

Figure 5 – Homicide by Motive for the Low Homicide Period, June 2014 to June 2016

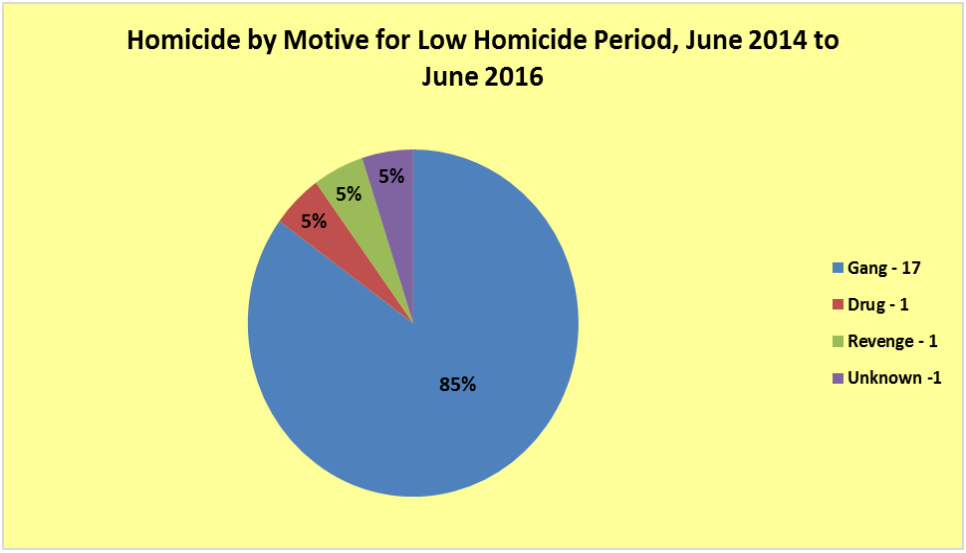
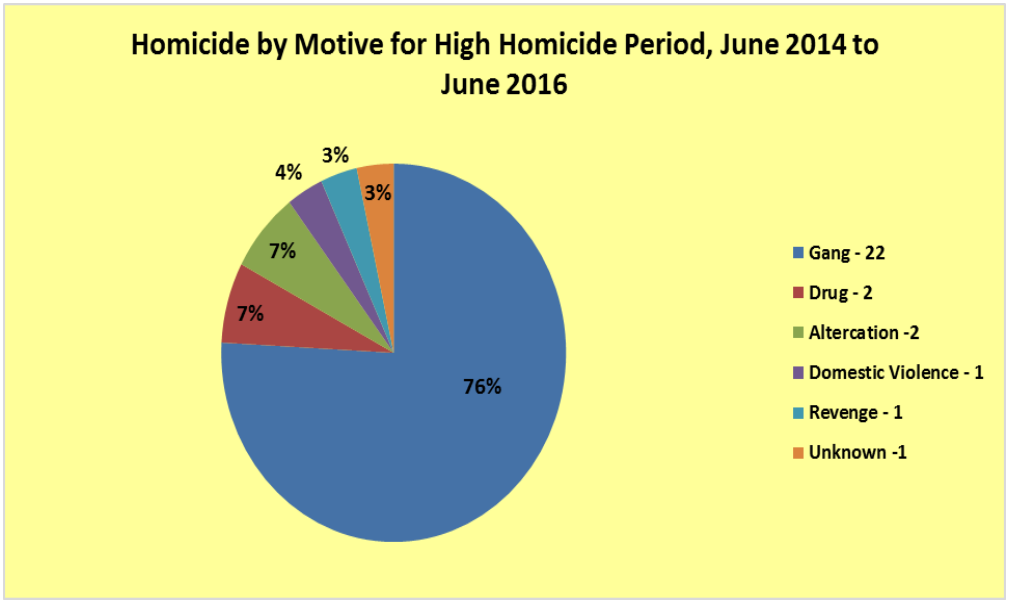


Figure 6 – Homicide by Motive for the High Homicide Period, June 2014 to June 2016

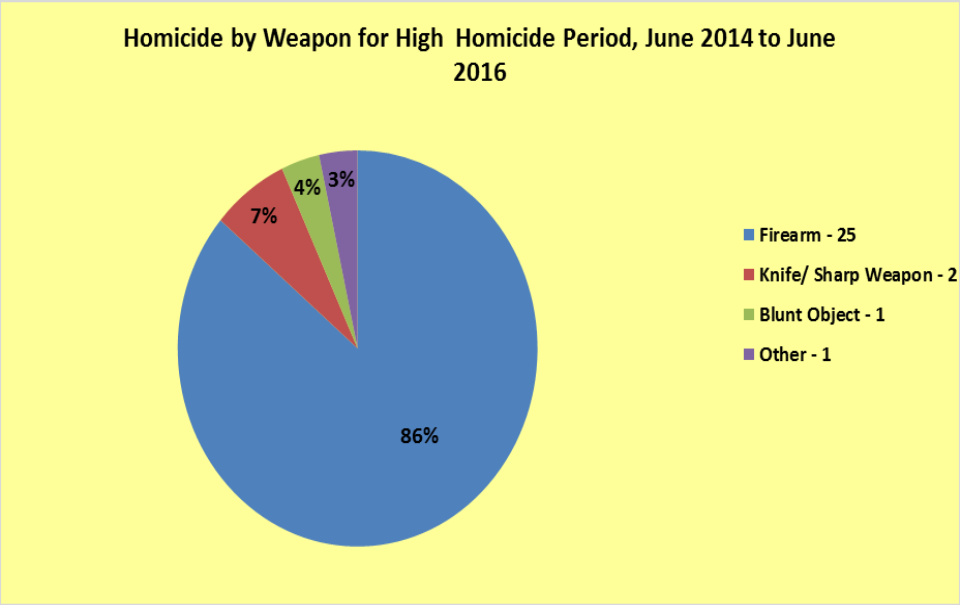


Situational Characteristics

Weapon Type

All of the homicides were committed with firearms during the low homicide period. More variation was seen in the high homicide period. While firearms still accounted for the majority of the weapons used in killings with 86%, 7% of deaths were caused by a knife/ sharp weapon while blunt objects and other means accounted for 4% and 3% respectively.

Figure 7 – Homicide by Weapon Type for the High Homicide Period, June 2014 to June 2016



Day of the Week

A considerably larger proportion of homicides occurred between Friday and Sunday during the high homicide period than in the low homicide period, as displayed in Figures 8 and 9. More than twice the number of homicides recorded during these days in the low homicide period was observed in the high homicide period. Despite having the same number of

homicides committed from Monday to Thursday in both periods, these days accounted for a greater proportion in the low homicide period.

Figure 8 – Homicide by Day of the Week for the Low Homicide Period, June 2014 to June 2016

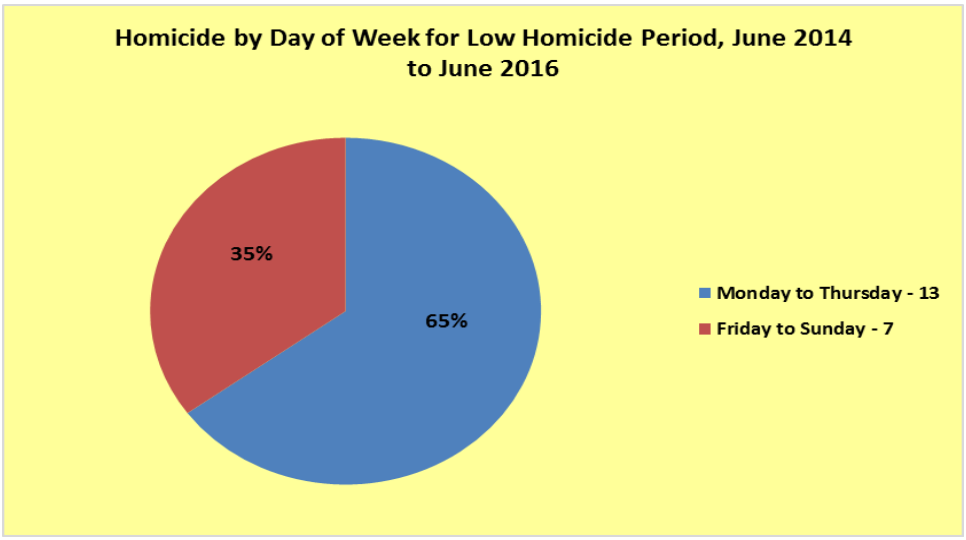
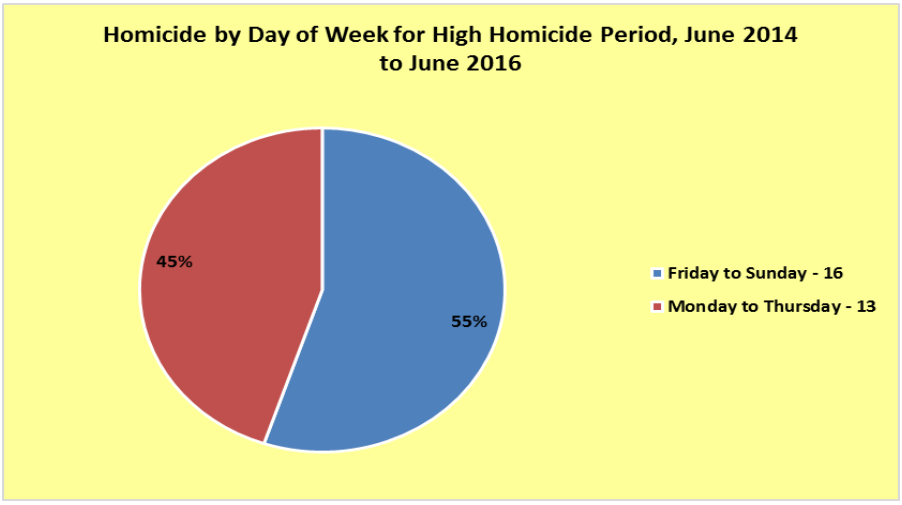


Figure 9 – Homicide by Day of the Week for the High Homicide Period, June 2014 to June 2016



Time of Day

Figures 10 and 11 illustrate the timeframes when homicides were perpetrated. Overall, most of the homicides happened from 6 a.m. to 12 midnight in both the high homicide and low homicide periods. However, the highest proportion of homicides in the high homicide period was committed in the late evening to late night hours; 6 p.m. and 12 midnight. Interestingly, for the low homicide period, two time frames contained the largest proportions of homicides, 6 a.m. to 12 midday and 6 p.m. to 12 midnight. Unlike the high homicide period, murders took place both in the early morning and late evening/nighttime hours for the low homicide category.

Figure 10 – Homicide by Time Frame for the Low Homicide Period, June 2014 to June 2016

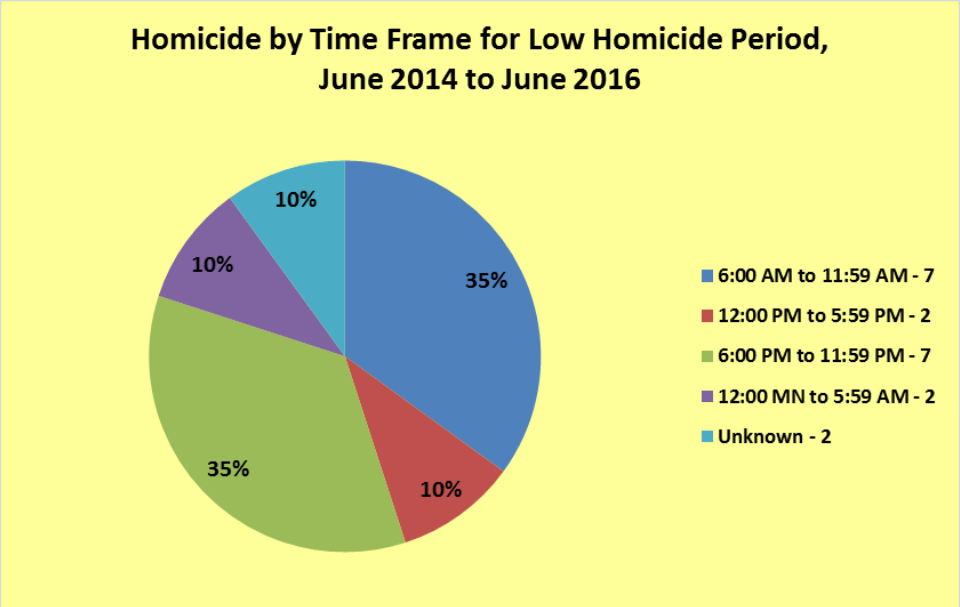
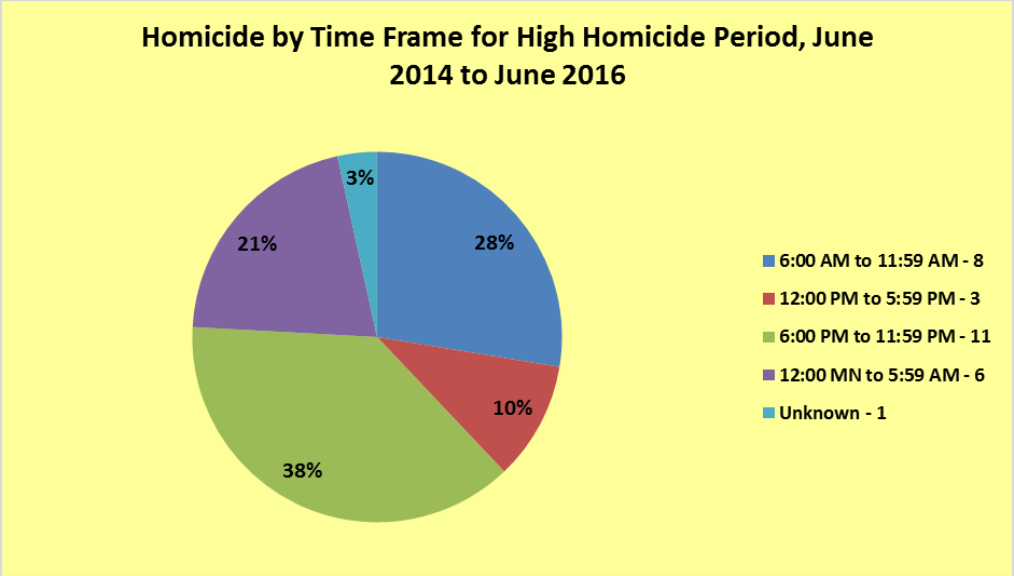


Figure 11 – Homicide by Time Frame for the High Homicide Period, June 2014 to June 2016



Patrol Time in Targeted Hotspots (THS)

Figures 12 shows a bar graph representing daily mean hotspot patrol minutes and the number of homicides in the THS in the low homicide period. The data for the two year period generally showed that that the months with higher daily hotspot patrol averages also appeared to have lower incidences of homicide. However, there were some months where this was not observed. In order to investigate this further, a simple linear regression was done, as seen in Table 1 below.

Figure 12 – Daily Mean Patrol Minutes in THS for the Low Homicide Period, June 2014 to June 2016

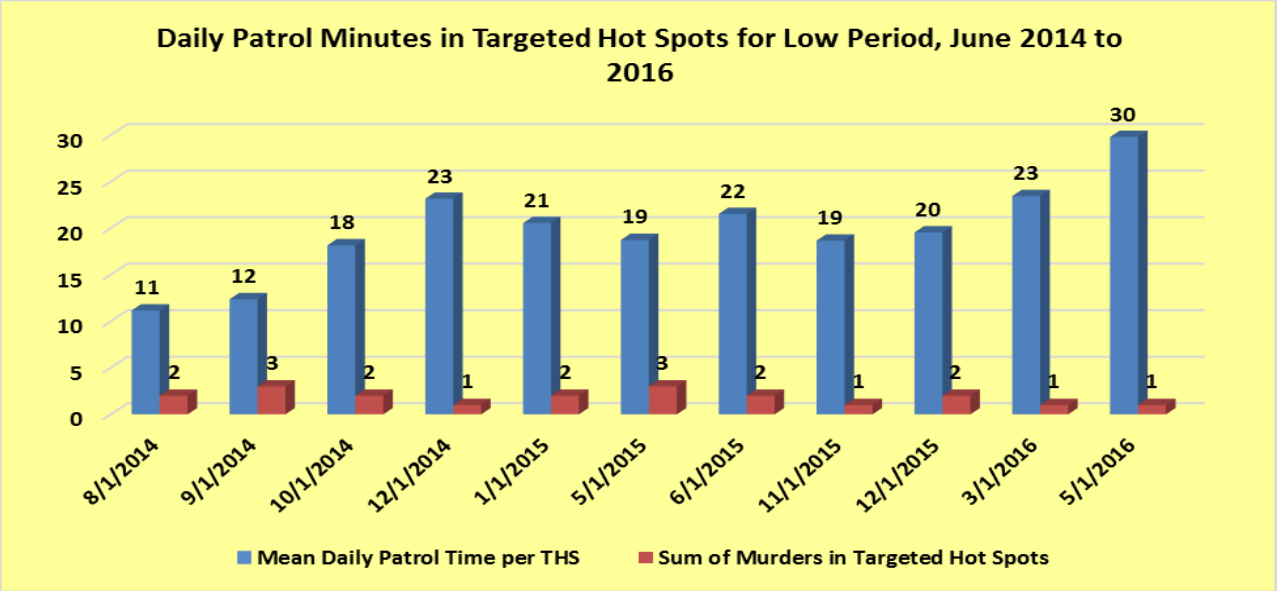


Table 1 – Simple Linear Regression of Daily Hotspot Patrol Minutes and Homicides in THS for Low Homicide Period, June 2014 to June 2016

Regression Statistics	
Multiple R	0.635848807
R Square	0.404303706
Adjusted R Square	0.338115229
Standard Error	0.610788282
Observations	11

ANOVA	*df*	*SS*	*MS*	*F*	*Significance F*
Regression	1	2.278802706	2.278802706	6.108369967	0.035482162
Residual	9	3.357560931	0.373062326		
Total	10	5.636363636			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	3.654600622	0.765516324	4.774033562	0.001009657	1.922882387	5.386318856
Daily Mean Patrol Time	-0.093027202	0.037639799	-2.471511677	0.035482162	-0.178174342	-0.007880062

The above test found a result of $F(1, 9) = 6.10$, $p < 0.05$, with an R^2 of 0.404. This result indicates that increases in the daily mean patrol time was a significant predictor of declines in

homicides in the THS. The number of homicides decreased by 0.09 for each minute of hotspot patrol during the low homicide period.

Similar to the low homicide period, in general, it was observed that months in the high homicide period with higher daily mean patrol time also recorded lower numbers of homicides (Figure 13). However, since this trend was not noted for all the months in this category, it was necessary to further examine the relationship between these two variables in Table 2.

Figure 13 – Daily Mean Patrol Minutes in THS for the High Homicide Period, June 2014 to June 2016

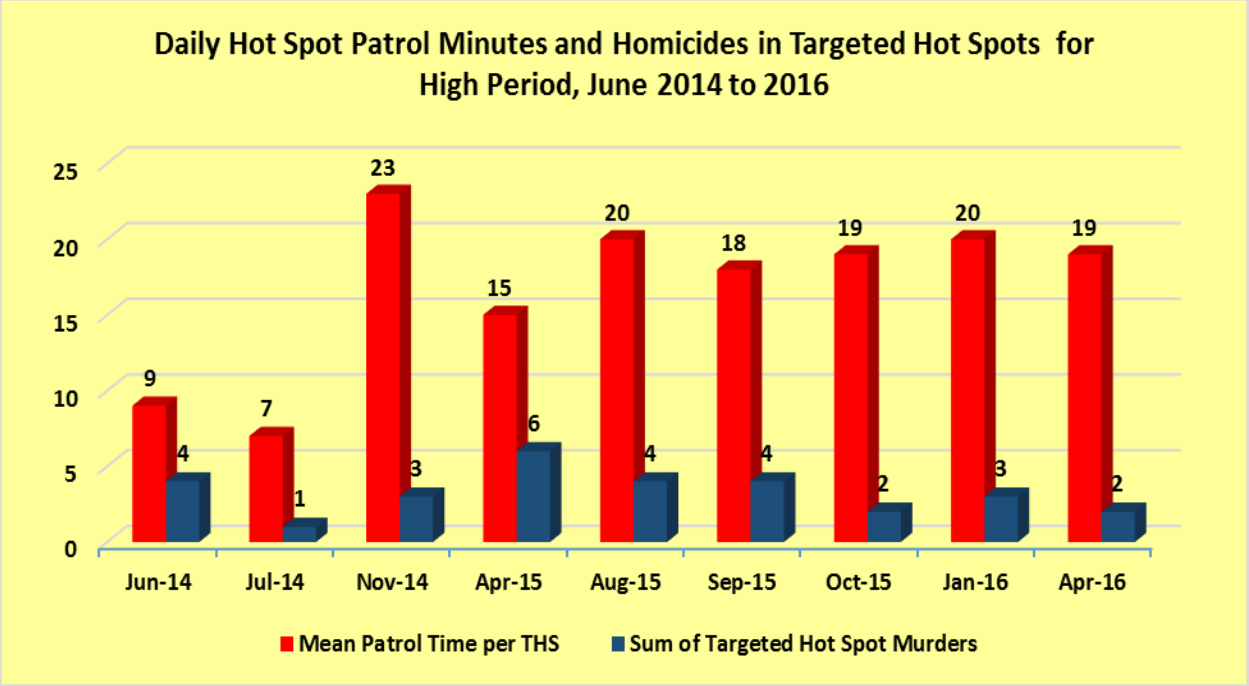


Table 2 – Simple Linear Regression of Daily Hotspot Patrol Minutes and Homicides in THS for High Homicide Period, June 2014 to June 2016

Regression Statistics	
Multiple R	0.104914988
R Square	0.011007155
Adjusted R Squa	-0.130277538
Standard Error	1.574906747
Observations	9

ANOVA	*df*	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.193236715	0.193236715	0.077907624	0.78821972
Residual	7	17.36231884	2.480331263		
Total	8	17.55555556			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	2.739130435	1.808635265	1.514473641	0.17367767	-1.537612374	7.0158732
Daily Mean Patrol Time	0.028985507	0.103846276	0.279119372	0.78821972	-0.216571915	0.2745429

The results of the analysis found that $F(1, 9) = 0.077$, $p > 0.05$, with an R^2 of 0.011. This result indicates that increased daily mean patrol time was not a significant predictor of the number of homicides during the high homicide period.

Summary of Results – Research Question 1

When the homicides were "low", how did the characteristics differ from when they were "high" on the following:

i. Victim demographics
ii. Motives
iii. Situational characteristics
iv. Patrol time in the targeted hot spots

Males account for the overwhelming majority of victims for both periods, with 95% in the low homicide period and 90% in the high homicide period. Women contributed minimally to the percentage of victims, which ranged between 5% and 10%. This distribution is reflective of nationwide distribution of homicide victims by gender within recent years. The gang-

related motive is the most prevalent motive for both the low homicide and high homicide period, with 85% and 76% respectively. However, there were two additional motive categories in the high homicide period, namely "domestic violence" and "altercation". It can be cautiously stated that most of the victims were under 30 years for both homicide periods old but with 15% of the age category missing in the low homicide period, any comparison would be limited.

While guns were the weapons of choice for all of the homicides in the low homicide period, this weapon type accounted for 86% of deaths in the high homicide months. At 65%, murders were more likely to be committed between Monday and Thursday during the low homicide period; in contrast, homicides tended to occur between Friday and Sunday in the high homicide months (55%). Furthermore, 38% of murders in the high homicides months were committed in the late evening to late night hours, 6:00 p. m. to 12 midnight. Conversely, both the 6:00 a.m. to 12 midday and 6:00 p.m. to 12 midnight timeframes accounted for the majority of homicides (35%) in the low homicide period. Declines in the number of homicides were found to be significantly associated with increases in the daily mean hotspots minutes during the low homicide months, while increases in the daily mean hotspot patrol minutes were not found to be significantly associated with changes in the number of homicides in the high period months.

Research Question 2

When the homicide hotspot patrols increased,

i. Did homicide in the targeted hot spot decline?
ii. Did homicide in all of Port-of-Spain decline?
iii. Was there displacement to areas outside the targeted homicide hotspots?

This research question sought to examine whether increases in the hotspot patrols were associated with decreases in homicides within and outside of the targeted hotspots (THS) in

the Port-of-Spain Division. Using simple linear regression analysis, the results focused on the daily mean hotspot patrol dosage per month and the number of homicides recorded in the THS as well as all other areas in the Division for the two year period. Additionally, spatial analyses of maps were utilized to determine if the increase in the hotspot patrols in the THS were connected to the displacement of homicides outside of the THS in the Port-of-Spain Division.

Figure 14 illustrates a temporal analysis of the daily mean hotspot patrol minutes per month in relation to homicides that occurred in the THS for the two year period under review. The monthly number of homicides within the THS ranged from one to six, while the daily hotspot average ranged from seven to 30 minutes. It can be seen that increases in mean hotspot patrol time in the THS generally coincided with declines in homicides. Conversely, there were more homicides when the daily hotspot patrol average went down. In order to statistically asses the nature of this relationship; a simple linear regression was conducted with these two variables, as shown in Table 3.

Figure 14 – Daily Mean Hotspot Patrol Minutes per Month and Homicides in the THS in the Port-of-Spain Division, June 2014 to June 2016

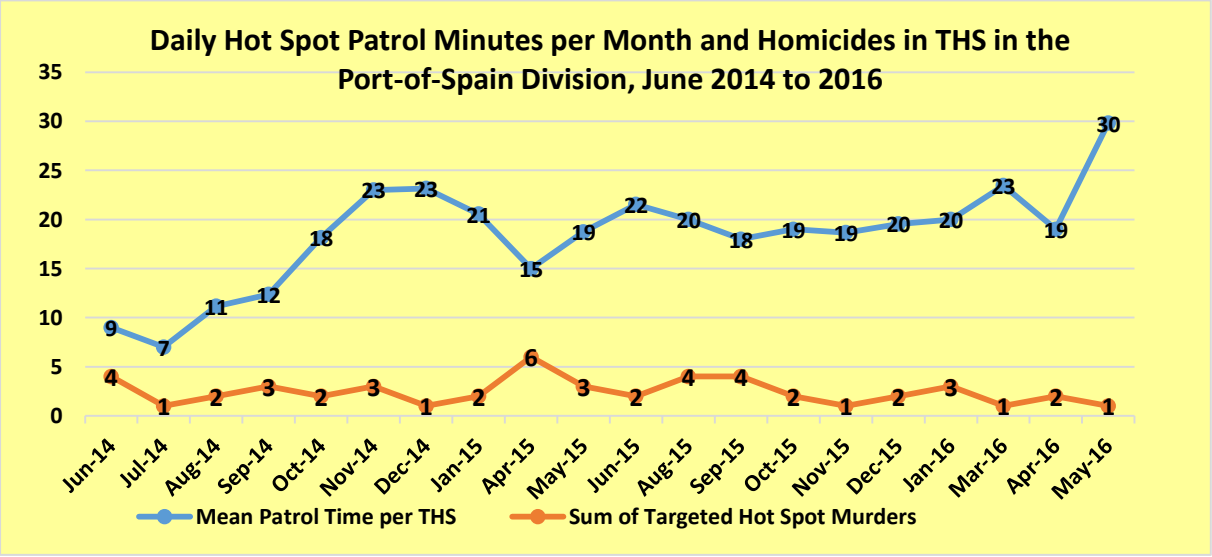


Table 3 - Simple Linear Regression of Daily Hotspot Patrol Minutes and Homicides in THS, June 2014 to June 2016

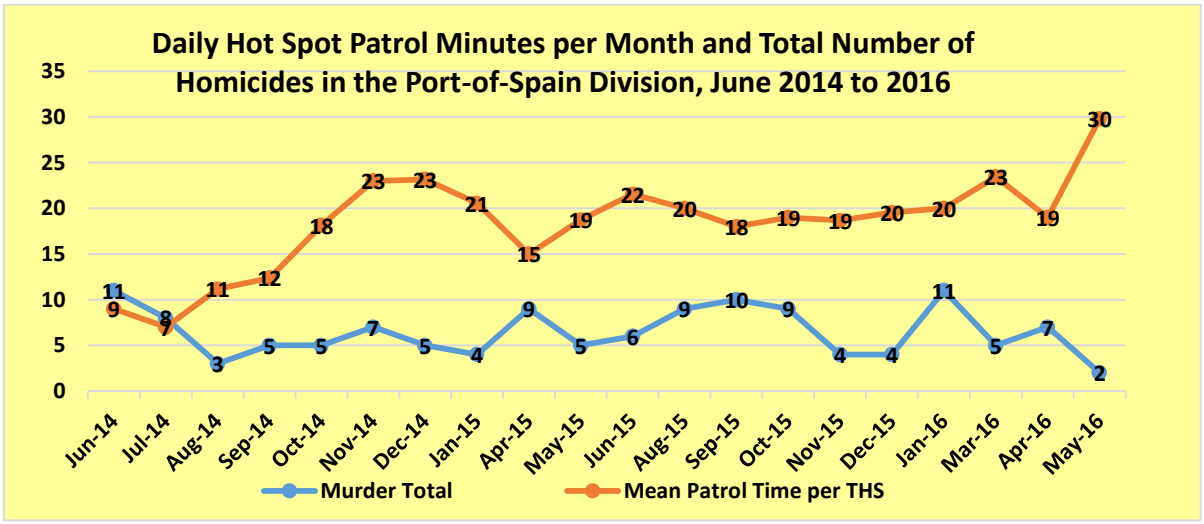
Regression Statistics	
Multiple R	0.293800765
R Square	0.08631889
Adjusted R Squ	0.035558828
Standard Error	1.293268739
Observations	20

ANOVA	*df*	*SS*	*MS*	*F*	*Significance F*
Regression	1	2.844207418	2.844207418	1.700527677	0.208649573
Residual	18	30.10579258	1.672544032		
Total	19	32.95			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	3.782156507	1.061701334	3.562354484	0.002225963	1.551604775	6.012708239
Daily Mean Patrol Time per THS	-0.072567956	0.055648446	-1.30404282	0.208649573	-0.189481003	0.04434509

Based on the results above, $F(1, 18) = 1.70$, $p > 0.05$, with an R^2 of 0.086, increase in daily mean patrol time per month was not a significant predictor of declines in homicides within the targeted hotspots in the Port-of-Spain Division.

Figure 15 – Daily Mean Hotspot Patrol Minutes per Month and Homicides outside the THS in the Port-of-Spain Division, June 2014 to June 2016



The temporal analysis in Figure 15 shows that homicides in all other areas outside of the THS in the Port-of-Spain Division reflected a comparable trend to those within the THS. Homicides ranged from two to 11 per month. As the daily hotspot patrol average per month grew, the number of homicides outside of the THS tended to decrease. The reverse was also observed; lower daily hotspot averages per month corresponded with higher monthly homicide counts. An additional analysis in the form of a simple linear regression utilized to examine the variables more closely, as seen in Table 4.

Table 4 - Simple Linear Regression of Daily Hotspot Patrol Minutes and Homicides outside the THS, June 2014 to June 2016

Regression Statistics	
Multiple R	0.354217695
R Square	0.125470176
Adjusted R Square	0.076885185
Standard Error	2.579479485
Observations	20

ANOVA	*df*	*SS*	*MS*	*F*	*Significance F*
Regression	1	17.18314055	17.18314055	2.582488439	0.125451203
Residual	18	119.7668594	6.653714414		
Total	19	136.95			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	9.724355952	2.117608449	4.592140702	0.000226123	5.275425688	14.17328622
Daily Mean Patrol Time per THS	-0.178367421	0.110993191	-1.607012271	0.125451203	-0.411555463	0.054820622

The analysis obtained the results of $F(1, 18) = 2.58$, $p > 0.05$, with an R^2 of 0.125. Thus, increases in the daily mean patrol time per month was not a significant predictor of decreases in homicides in areas outside of the THS in the Port-of-Spain Division.

In order to address the final part of this research question, spatial analyses of homicides in the Port-of-Spain Division were conducted using homicide maps, which outlined all of the THS as well as the locations of homicides for the two year period. Figure 16 shows the spatial distribution of homicides for the high homicide period in 2015 and 2016 in the Port-of-Spain

Division. The map also displays all of the THS currently in use by the TTPS. It was not possible include the homicides from the high homicide period in 2014 here since the hotspots were changed. Based on the visual examination of the map, seven areas with clusters of homicides in the areas directly outside the THS have been identified and highlighted in red. These clusters represent homicides that transpired at different months during the high homicide period. Closer examination showed that these concentrations of homicide are located between the boundaries of adjacent hotspots or near to them. Five out of the seven areas contained homicides from both 2015 and 2016. In hotspots where there were few homicides recorded (1-2), the presence of "inter-hotspot homicides", that is, homicides that occurred between the boundaries of adjacent hotspots, may have also indicated that enhanced patrols could have pushed the homicides to outer, nearby streets.

Figure 17 displays the spatial distribution of homicides for the low homicide in 2015 and 2016 in the Port-of-Spain Division along with the THS. A visual examination of the map showed that most of the homicides were situated in or very near to these hotspots. The pattern of distribution outside of the hotspots does not show any concentration of incidents. There was only one identifiable area contained a homicide cluster. Caution must be taken when interpreting these results in light of the limitations of the GIS software discussed in the Chapter 3.

Figure 16 - Map of Homicides and Hotspots in the Port-of-Spain Division for High Homicide Period, Jan 2015 to May 2016

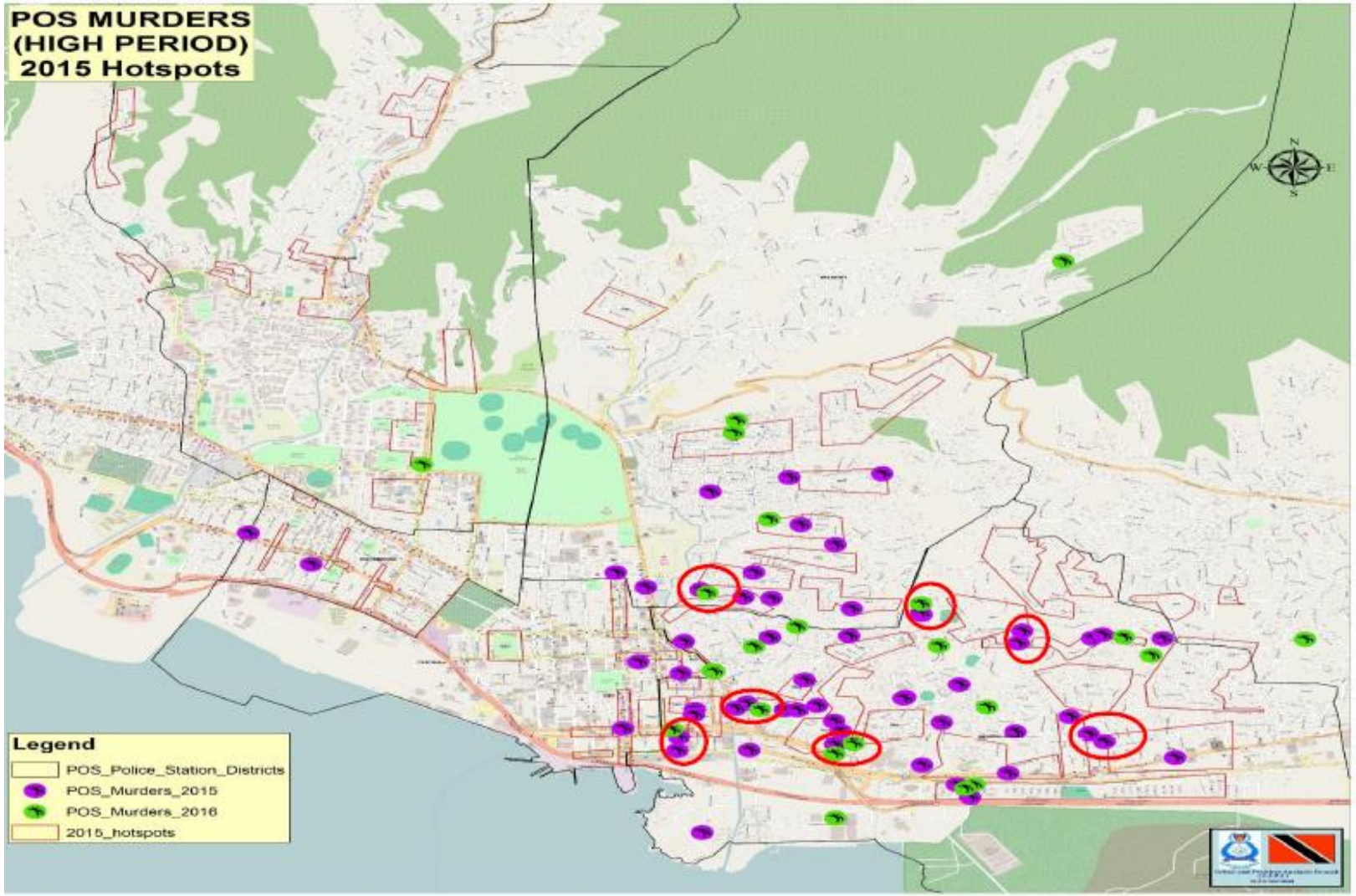
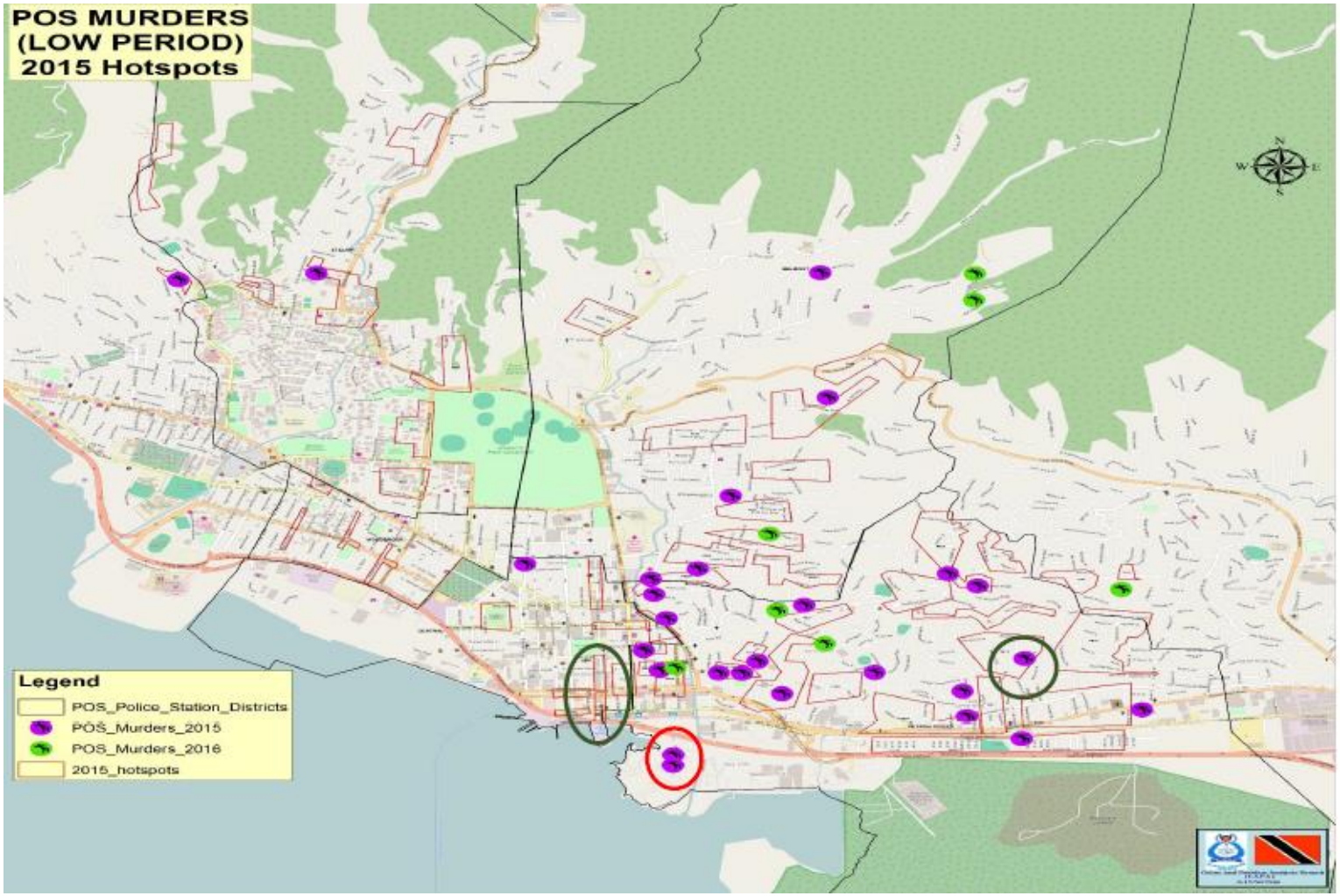


Figure 17 - Map of Homicides and Hotspots in the Port-of-Spain Division for Low Homicide Period, Jan 2015 to May 2016



Figures 18 and 19 illustrate the spatial distribution of homicides for June to December 2014 in the Port-of-Spain Division as well as the THS for the high homicide and low homicide period respectively. The hotspots appearing here were those utilized before adjustments were made in 2015. Based on a visual examination of the maps, it was found that for both homicide periods, the homicides tended to occur inside or very near to the hotspots. There was also one area identified in each period where a concentration of homicides occurred. Closer scrutiny of the new 2015 hotspots revealed that the boundaries of two hotspots were extended to include the locations of homicides that occurred specifically within the green circles, as shown in Figure 17.

Figure 18- Map of Homicides and Hotspots in the Port-of-Spain Division for High Homicide Period, June to December 2014

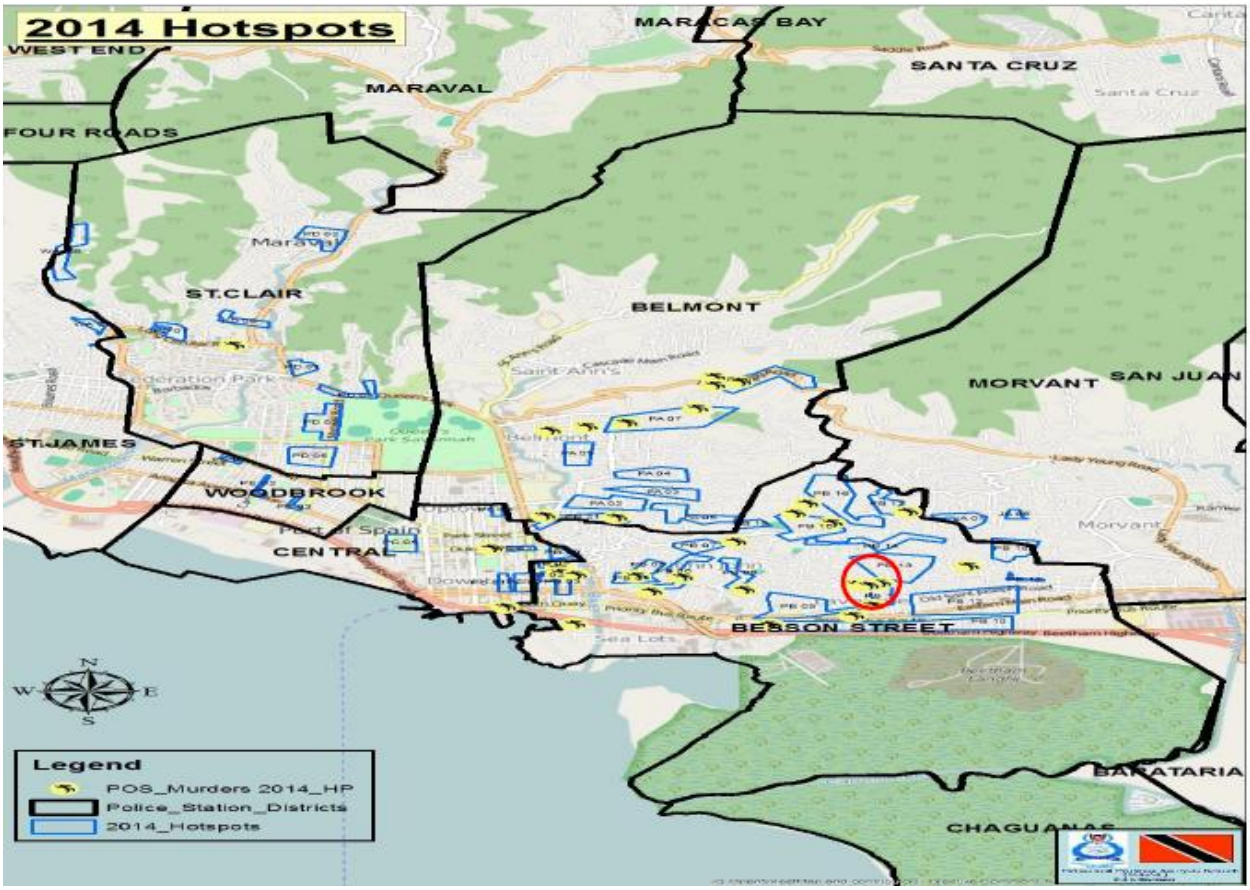
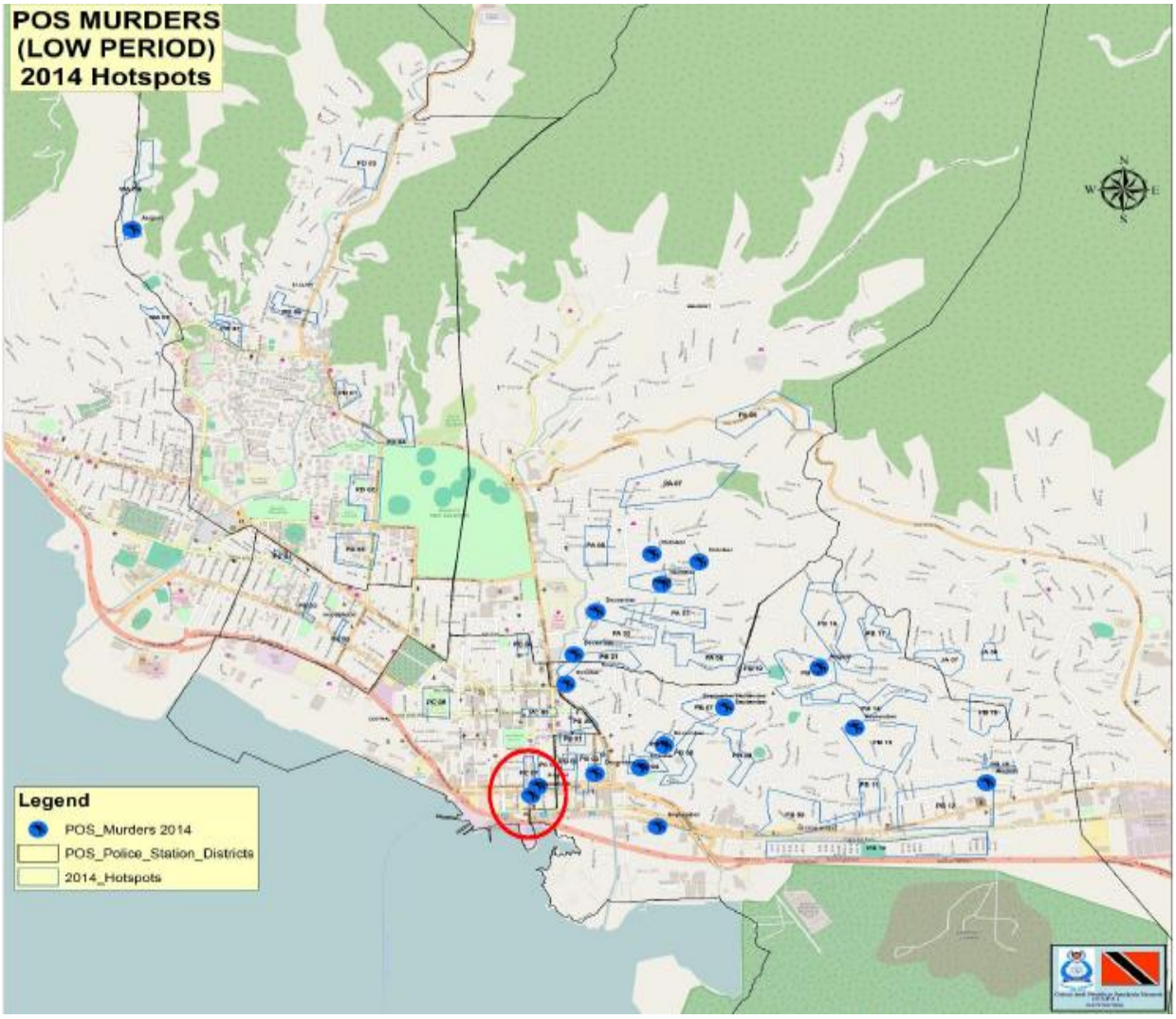


Figure 19 - Map of Homicides and Hotspots in the Port-of-Spain Division for Low Homicide Period, June to December 2014



Summary of Results – Research Question 2

When the homicide hotspot patrols increased,

i. Did homicide in the targeted hot spot decline?
ii. Did homicide in all of Port-of-Spain decline?
iii. Was there displacement to areas outside the targeted homicide hotspots?

There were some notable findings in this section. The temporal analyses showed that increases in daily mean hotspot patrol minutes per month coincided with lower homicides in and out of the targeted hotspots (THS). However, both regression analyses did not support these observations as they were not significant ($p>0.05$). The spatial distribution of homicides in high period in 2015 to 2016 may be indicative of some displacement, given that seven clusters of homicides were observed between the boundaries of adjacent hotspots where enhanced patrol was put into effect. By comparison, the corresponding periods in 2014 only had one such cluster each. Finally, it was seen that the boundaries of two hotspots utilized in 2014 were expanded in 2015 to specifically include the locations of homicides that occurred near to their borders.

Research Question 3

Did new identifiable homicide hotspots emerge outside the targeted hot spots, defined as two murders in one month within 1,000 meters of each other?

This section aimed to determine whether any new homicide hotspots developed in the 2 year period in the Port-of-Spain Division. For the purpose of this study, homicide hotspots were defined as an area where 2 or more homicides occurred in one month within 1,000 meters of each other that are distinct from existing hotspots in the Port-of-Spain Division. It was important that these new homicide hotspots be geographically distinguished to avoid matching or overlapping with other THS in the Division.

Again, the results must be interpreted with some caution, given the challenges discussed in Chapter 3 in relation to measuring the precise distance between homicides. Close inspection of the homicide maps presented in Figures 20 and 21 found that no new homicide hotspots developed for the period under review in 2014 and 2015. The location and month of death

information from the Homicide Register was used to cross-reference the locations on the map and the distance between locations in any given month. Interestingly, some homicides that occurred within the same month did not meet the criteria for a homicide hotspot; they were either more than 1,000 meters from each other or the distance between the incidents overlapped greatly with established hotspots. The latter was influenced by the presence of "inter-hotspot" homicides, that is, homicide that happened on or between the boundaries of neighboring hotspots.

Figure 20 - Map of Homicides and Hotspots in the Port-of-Spain Division for High Homicide and Low Homicide Periods, June to December 2014

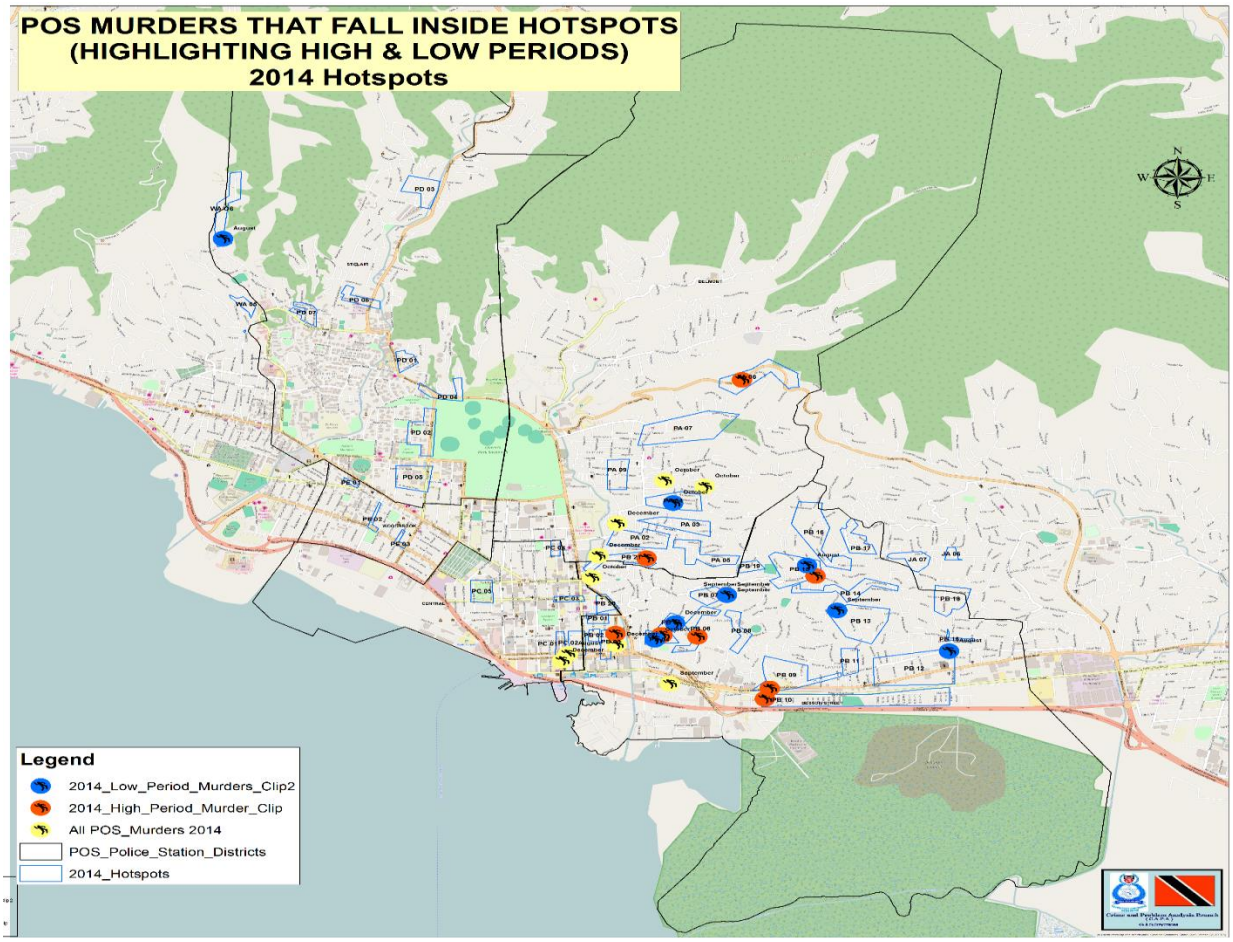
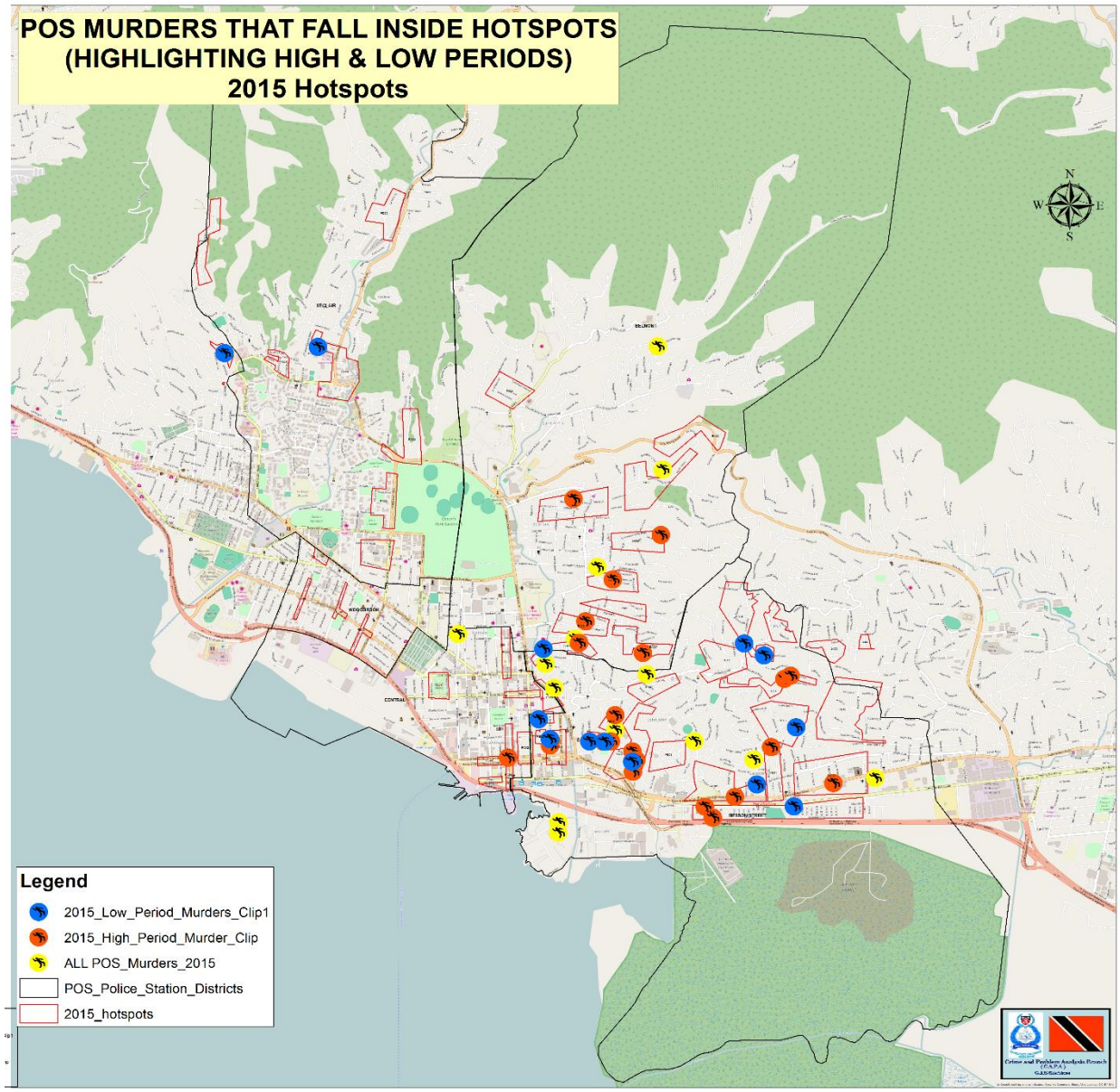


Figure 21 - Map of Homicides and Hotspots in the Port-of-Spain Division for High Homicide Period, January to December 2015

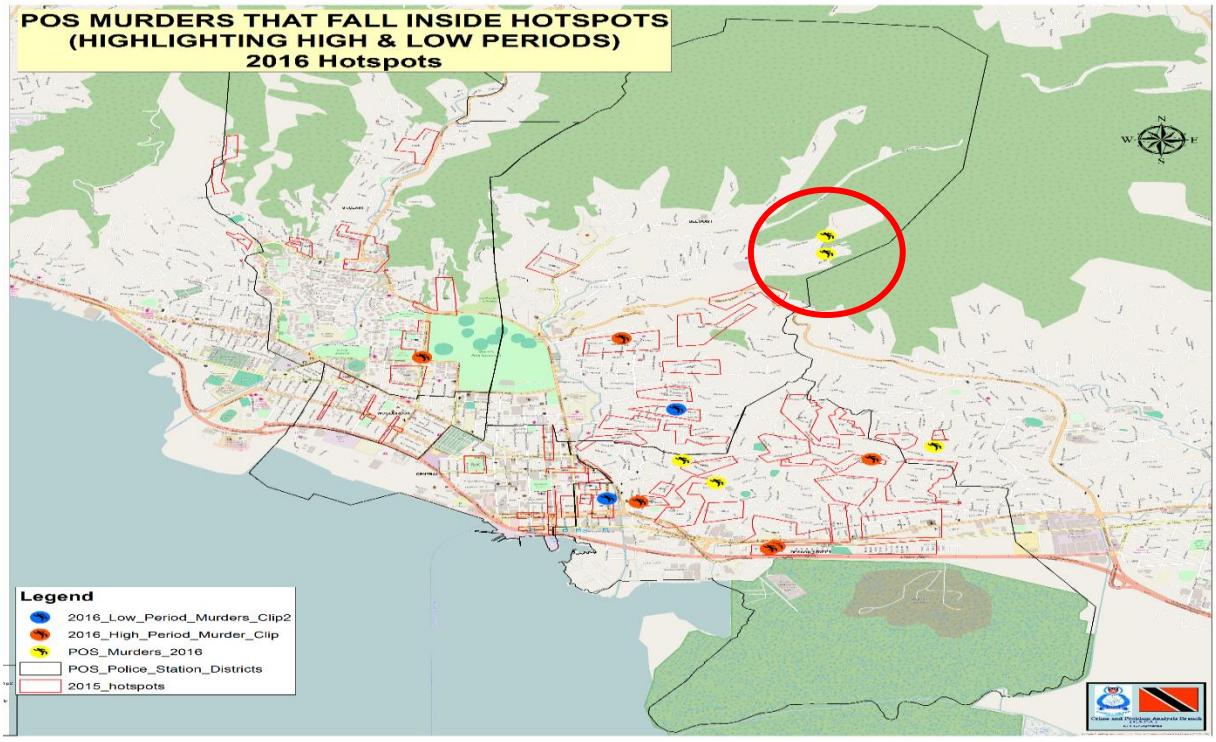


One new homicide hotspot was identified in 2016, as shown in Table 5 below. Both victims were males, over the age of 30 years old and had gang listed as the motive. The incidents took place approximately 300 meters away from each other. The hotspot is also highlighted on the map in Figure 21.

Table 5 – Homicide Incidents within New Homicide Hotspot

MONTH OF DEATH	DATE OF DEATH	DIVISION	STATION	LOCATION
March	3/22/16	Port of Spain	Belmont	Upper Cascade Valley Road, Cascade
March	3/31/16	Port of Spain	Belmont	Lp.No.1 Upper Hislop Trace, Upper Cascade Road Cascade

Figure 22 - Map of Homicides and Hotspots in the Port-of-Spain with New Homicide Hotspot, 2016



Summary of Results - Research Question 3.

Did new identifiable homicide hotspots emerge outside the targeted hot spots, defined as two murders in one month within 1,000 meters of each other?

This section had two main points of interest. The first was that no homicide hotspots emerged in 2014 and 2015 in the Port-of-Spain Division. The criteria were not met due to distance between incidents and overlap with existing THS. Secondly, one homicide hotspot was observed in the Belmont Station District in 2016, where two homicides occurred in March within 300 meters of each other.

Conclusion

In summary, there were noteworthy differences in day of the week, time frame and patrol time between the low homicide period and the high homicide period. Comparable patterns in weapon type, motive, gender and to a lesser extent, age were observed as well. Although temporal analyses strongly suggested that increases in the average patrol dosage in the THS per month was associated with decreases in homicides both in and outside of the THS, regression models did not support these analyses. Despite the limitations in measuring displacement, there was considerable clustering of homicides in seven areas in the immediate vicinity of the THS in the high homicide period for 2015 and 2016. Based on the criteria for homicide hotspots, one new homicide hotspots emerged in the Port-of-Spain Division for the two year period. The following chapter will discuss these findings, with the intention of adding greater depth and context to the findings.

Chapter 5

Discussion

Introduction

The purpose of this study was to examine the changes in homicides and hotspots in the Port-of-Spain Division in Trinidad during a period in which police patrols were targeting identified hot spots of homicide. A descriptive analysis of homicides data, hotspot patrol data and hotspots maps was conducted for a two year period from June 2014 to June 2016. Based on the monthly homicide totals, the two year period was divided into a low homicide period, defined as months with six homicides or less, and a high homicide period, described as month with seven homicides or more. Additionally, the daily hotspot patrol average was calculated for each month. Homicide data was used to analyze the differences in characteristics of homicide between the 2 homicide categories. Further analyses were done with the hotspot patrol minutes and homicide maps to examine changes in homicides regarding crime displacement and diffusion of crime control benefits. These were also utilized to assess the development of homicide hotspots.

Changes in the Characteristics of Homicide

One of the most noteworthy results of this study was the difference in the relationship in daily mean patrol time and homicides between the low homicide period and the high homicide period within the targeted hotspots (THS). In the low period, these two variables were positively and strongly correlated ($r=0.63$) and the R^2 value (0.404) was moderate. The results also indicated that for every additional minute the daily patrol average increased the number of homicides decreased by 0.09. In contrast, daily mean patrol time in THS in the high homicide period did not predict falls in homicides. It should be noted that despite the modest R^2 value, higher daily mean

patrol time in the THS was still a statistically significant ($p<0.05$) predictor of declines in homicides. This finding supports those of previous studies (Sherman and Weisburd, 1995; Ratcliffe et al, 2011; Robinson-Regis, 2016), which found that enhanced hotspot patrols can predict declines in homicides.

Response to Gang Violence

The results suggest that more hotspot patrols were associated with decreases in homicides during the low homicide period but not for the high homicide period. There were a number of possible reasons for this. One may be police officers' response to gang violence. The Divisional Gang Review (2014) noted that there were 23 gangs operating in the Port-of-Spain Division. This was the largest number of gangs in a single Division for the entire country. Most gang related homicides were believed to result from disputes over the status of the gang, drug territory and revenge, which fueled retaliatory attacks. The Divisional Gang Review also suggested that in recent years, these disputes have been extended to control of Government contracts for public work and construction projects under programs such as Unemployment Relief Program (URP) and the Community-based Environmental Protection and Enhancement Program (CEPEP). According to the Divisional Gang Review (2014), these groups were responsible for intensifying gang warfare, prompting more murders, shootings and revenge killings.

Attempts to quell the continuous outbursts of murders and shootings may have led police officers in the Division to amplify their hotspot patrols, coupling these with more strong-arm strategies. Ultimately, shootings and homicides were only briefly reduced during high homicides periods as "the suppression strategies (were) typically reactive in nature and (made) use of criminal law to control behavior" (Caribbean Human Development Report 2012, p. 84). While there would be definite increases in the hotspot patrols recorded in the THS during the high periods, these would

have been unlikely to correspond with fewer murders. However, this information should be interpreted cautiously as the reliability of the information contained in the Gang Review cannot be fully ascertained.

The observed fluctuations between the low periods and high periods of homicides regarding hotspots patrol dosage may cautiously be attributed to inconsistent patrol resource management at the station and Divisional levels in the Port-of-Spain Division. This would have negatively impacted the police officers' ability to reliably and effectively conduct patrols in THS. Furthermore, the structure of the hotspots patrols plays a crucial role in patrol dosage and the potential crime reducing effects of the enhanced patrols. For example, vehicle patrols alone would quickly fill the patrol dosage quota but may not have the same deterrent effect as foot patrols, combined with street checks and community engagement.

The following sections were based on information provided by Acting Senior Superintendent McDonald Jacob, who was appointed as the commander of the Port-of-Spain Division in January 2016. Since this information was not formally documented or assessed, concerns about reliability may arise. Concerns about the time frame may also be expressed as these measures were only instituted from January 2016 and were not applicable to prior months in the low homicide period. Nevertheless, data from the Crime and Problem Analysis Branch (CAPA) supported their prospective merits in relation to increased daily mean patrol time and decreases in homicides in the THS. There was an 82% decline in murders between January and June 2016. The daily patrol average was 20 minutes in January and culminated at 30 minutes per THS by May 2016, the highest for the two year period in the Port-of-Spain Division.

Improved Patrol Resource Management

Operational and tactical changes precipitated by improved patrol resource management may have contributed to the observed relationship between daily mean patrol time and homicides in the low homicide period. Better patrol management facilitated longer and more effective patrols in the THS, which this study found to be a predictor of decreases in homicide. These measures included Firearm and Survival Training (F.A.S.T) training, Directed Patrolling Strategy and Shift Management and provision of tactical clothing for foot patrols in areas inaccessible to patrol vehicles. This was a critical step as intensive foot patrols have been shown to result in significant drops in serious, violent crimes (see Ratcliffe et al, 2011 and Piza and O'Hara, 2014). Further, the number of patrol drivers was increased from 1 to 3 and the allotted sleeping time for police officers on night shifts was reduced from 4 hours to 2 hours. Both measures were concentrated on boosting the availability of patrols officers.

Anti-Crime Initiatives

Intensive patrols in the THS were also combined with specific interventions aimed at reducing homicides, in the form of new anti-crime initiatives. Two specific interventions described by Jacob (2016) are worth noting here. The first was Project Hope, which was revamped in direct response to the escalation in homicides in early 2016. It involved 24 hour foot and mobile patrols and the return of joint patrols between police officers and the Trinidad and Tobago Defence Force in 11 "patrol zones". Patrol zones were identified as the most criminally active areas for murder and other serious crimes that encompassed the most active THS. The second was targeting priority offenders. Persons recognized as priority offenders, specifically "shooters" - known firearm offenders suspected to be involved in shootings and murders - were arrested and charged. In addition, other priority offenders were interviewed. Incapacitation through arrest and

greater surveillance of activities may have worked to reduce the number of murders in the Port-of-Spain Division. In summary, the homicide-reducing capacity of increased patrols in THS may have been augmented by improved patrol resource management and interventions designed to address homicides specifically.

Day of Week and Time of Day

There were several interesting findings related to the differences in the day of the week as well as the time of the day between the low homicide and high homicide periods. Homicides were most prominent from Friday to Sunday for the high homicide period. When the most prevalent time frame was also considered, it was concluded that the majority of homicides occurred on weekends between 6 p.m. and 12 midnight. Using the same criteria for the low homicide period, a clear distinction was seen. Most (65%) the homicides occurred during the week, that is, Monday to Thursday. Perhaps most striking of all was that an equal proportion of victims (35%) were killed from 6 a.m. to 12 midday and 6 p.m. to 12 midnight.

Further examination of the homicide data revealed that 41% of the incidents occurred during the first week of the month while 31% took place during the third week of the month in the high homicide period. Homicides were equally distributed in the first, second and last week of the months within the low homicide period, with 30% for each week. Based on the patterns in the high homicide period, it was possible that these incidents were driven by economic factors. The first and the third week corresponded with fortnightly and monthly salary payments in the public sector. Heightened levels economic activity and access to cash in these weeks may have also generated more activity among illegal market networks and their participants, such as drug trafficking and criminal gangs. This was especially likely given the relationship between criminal gangs, Government contracts and murders described in the Divisional Gang Review

(2014). Consequently, disputes and rivalries between these groups over money and related property may have resulted in more murders. Moreover, it was probable that offenders had greater opportunities to successfully target victims as they may be more inclined to engage in leisure activities during the observed days and times. Similar dynamics may have been present in the low homicide period as well, but to a lesser extent. Alternatively, other unknown community-level or individual factors were possibly influencing the patterns, which would require further investigation in future analyses.

Motive and Weapon Type

The findings in relation to motive were similar for both homicide periods as the majority of incidents were categorized as gang-related. It was noted that the proportion of gang related murders was 9% higher in the low homicide period when compared to the high homicide period. This was attributed to more homicide categories in the latter period, namely Altercation (7%) and Domestic Violence (4%). Drug and revenge motives contributed minimally to both periods, accounting for between 3% and 7%. This trend deviated significantly from those identified by Wolfgang (1957) who found that 42% of murders were classified as General Altercation as well as Geleri and Demirbelik (2005) to a lesser extent, with 22% labelled as dispute related. More importantly, gang-related homicides in the Port-of-Spain Division greatly surpassed the proportion for the North American region, which included the U.S. and Canada, found by the Global Study on Homicide Report (2013) by the UNODC. Data from the Crime and Problem Analysis Branch (CAPA) also found that the proportion of gang-related homicides in the Port-of-Spain Division exceeded the overall percentage contribution on the national level. In 2013, 49% of homicides nationally were classified as gang-related, whereas 83% of murders in the Port-of-Spain Division were categorized as such. Gang related murders in the Division were double the

national proportion of 35% in 2014. In 2015, 36% of homicides were attributed to gangs throughout Trinidad and Tobago, while a startling 86% of murders were labelled as gang related in the Port-of-Spain Division.

The prevalence of gang-related homicides may be connected to the concentration of gangs in the Port-of-Spain area. With an area of only 90km² and a reported population of 23 gangs, there were nearly four criminal gangs for every square kilometre in the Port-of-Spain Division. Undoubtedly, this was the highest gang-to-Division ratio in the country as all other Division contained less gangs and covered larger areas. It was not surprising therefore, given the history of lethal rivalries for territory, illicit markets and Government contracts, that gangs were responsible for a disproportionate number of murders. It can even be argued some of the other motives, such as Revenge and Altercations, were triggered by disputes related to gang-related activity, such as drug sales or persons' affiliation with a gang. In any case, criminal gangs negatively influenced homicides in the Port-of-Spain Division.

Unlike Wolfgang's (1957) analysis and homicide data from England and Wales based on the Global Study on Homicide Report (2013) where the majority of homicides were done with knives, this study found the most prominent weapon type was firearms for both periods. All of the victims were killed with firearms in the low homicide period, while 86% were murdered with the same weapon type in the high homicide period. Knives/ sharp weapons accounted for 7% and blunt objects and other weapons contributed 4% and 3% respectively. This finding was exceeds those for the Caribbean region as a whole in the Global Study on Homicide (2013), where most (66%) of the deaths were caused by firearms. It should be noted that the percentage of gun-related deaths in the Port-of-Spain Division were greater in both homicide periods than

those identified in the Global Study on Homicide Report. The percentages for knife, blunt object and other were lower by between 13% and 15% in the high homicide period.

This finding was consistent with observed trends in gun-related homicides in previous years in Trinidad and Tobago. Data from the Crime and Problem Analysis Branch (CAPA) revealed that most of the homicides nationally between 2005 and 2014 were committed with firearms. In 2005, 72% of homicides were committed with firearms. By 2008, this climbed to 79%, dropped slightly to 71% in 2011 and rose to 75% in 2014. Therefore, gun-related homicides remained persistently high, despite the changes in the number of homicides over the years. Easy access to illegal firearms by criminals was the most plausible explanation for the continued trend. Despite comprehensive firearm legislation, Firearms Act Chapter 16:01, and rigorous implementation by law enforcement, "deaths and injuries because of gun violence have been exacerbated by the ready availability and misuse of firearms" (Caribbean Human Development Report 2012, p. 22). In addition, criminals were more disposed to using guns since they can be easily concealed, carried and exponentially increased the lethality any interaction with rivals. Thus in the Port-of-Spain Division, gang-related and gun-related homicides were a clear manifestation of the intensified levels of violence over the period of the study.

Gender and Age

The results in this section reflected those typically seen in previous studies with regard to gender and homicide victims to some extent. Males overwhelmingly accounted for homicide victims in the Port-of-Spain Division, with 95% in the low homicide period and 90% in the high homicide period. This finding was expected but surpassed previous analyses on males as victims by almost 20%, as seen in the literature review (Wolfgang, 1957; U.S. Department of Justice Report on Homicide Trends in the United States, 2011). Although it was intuitive that most of the offenders

were also male, data on homicide offenders was not reliably present on the Homicide Register to make any useful analysis in the Port-of-Spain Division.

Age of the victims was the least reliable variable in the characteristics of homicides examined in light of 15% unknown category in the low homicide period. Nevertheless, the findings indicated that of the known victims, almost 60% were under the age of 30 years old in both homicide periods. Similarly, Pridemore (2006) highlighted that homicide victims were mainly in their mid-20s. Age, specifically between the ages of 18 to 30 years old, was shown to be a predictor of violent crime victimization in Trinidad and Tobago based on findings from the Caribbean Human Development Report (2012). Wolfgang's (1957) study as well as those from U.S. Department of Justice Report on Homicide Trends (2011) generally supported that the largest proportion of victims were under 30 years old, although to a far lesser extent then in the Port-of-Spain Division. Thus, it can be cautiously concluded that this study supported the observation that homicide victimization was concentrated among persons below the age of 30 years old.

Decline in Homicide outside targeted hotspots (THS) Results

a) Diffusion of benefit: In examining police interventions in hotspots and crime displacement, Weisburd et al (2006) posited that diffusion of crime control benefits can occur in areas close to, but not directly targeted by, police interventions. As seen in the regression analysis results, increases in the daily mean patrol time in the THS was not a significant predictor of decreases in homicides in areas outside the THS. This finding was particularly striking since it contradicted results displayed in prior studies (Farrell, Chenery and Pease, 1998; Caeti, 1999; Weisburd et al., 2006). Weisburd and his colleagues noted that the amount of displacement can be influenced, in part, by type of intervention and the type of crime targeted. In the same way, it can be argued that diffusion of crime benefits can be affected by these factors. Enhanced patrols may have

interrupted the routine activities of homicide offenders or increased the perceptions of risk involved only in areas where patrols were directly applied. However, given the history and dynamics of homicides in the Port-of-Spain Division, the deterrence effect of increased patrols may have diminished considerably in areas outside the THS. Additionally, if other reactive interventions were combined with hotspot patrols, the deterrence effect would have weakened even further. Alternatively, it may have been possible that there was diffusion of crime control benefits but it was too small to be detected by the regression analysis. In summary, increased patrols was not associated with a diffusion of crime control benefits to areas outside the THS in the Port-of-Spain Division.

b) **Displacement outside THS:** In Reppetto's (1976) analysis of crime displacement in 1976, he made a clear distinction between interventions that were more likely to result in displacement from those that did not. Interventions that sought to reduce opportunities or risk had a higher chance of displacement than those that addressed the root causes. Since enhanced police patrols certainly fell into the former category, it was necessary to measure displacement in this study. However, these results, as stated in Chapter 3, must be prefaced by the challenges met in measuring displacement in this study. Due to the close proximity of many of the THS to each other in the Port-of-Spain Division, establishing buffer zones greatly risked displacement contamination, as described by Weisburd and Green (1995). Therefore, displacement was measured by identifying small areas that contained concentrations of homicides on the immediate outskirts of THS, as seen on the homicide maps in Chapter 4. While the reliability and validity of this approach may be called in question, it was a practical method given the aforementioned difficulties.

Based on the results presented, it appeared that there was displacement during the high homicide period from January 2015 to May 2016. As stated before, the homicide periods from June to December 2014 were analyzed separately as the THS were changed in 2015. Seven areas with clusters of two to three homicides directly outside the boundaries of THS were identified. The term inter-hotspot homicide was used to describe those homicides that occurred between the boundaries of neighboring THS. Five out of the seven areas contained homicides from both 2015 and 2016. Only one such homicide cluster was seen in the low period for the corresponding months in 2015 and 2016. Furthermore, one homicide cluster was observed in both the low homicide and high homicide period from June to December, 2014.

Two main conclusions can be cautiously drawn from the above results. Firstly, increased hotspot patrols during the high homicide period seemed to displace homicides out of some THS and into nearby streets. It was plausible that increased police presence, sanctions and strong suppression forced homicide offenders to find opportunities just beyond the parameters of the THS to target their victims. In this way, offenders escaped the risk of detection by taking advantage of the non-targeted areas between neighboring THS. If criminal gangs were considered in this scenario, gang members who committed murder in the non-targeted areas had the added benefit being able to quickly retreat to their own territory to avoid retaliation by rivals. In the low homicide period, displacement may have been less evident due to more preventative and more effective interventions combined with enhanced hotspots patrols in the THS.

Secondly, the location of the homicide clusters suggested that some adjacent hotspots may need to be combined to capture the shifts in homicides seen over time. This would be especially relevant for locations between THS that contained homicides from 2015 and 2016. In the 2015 hotspots maps, the boundaries of two hotspots were extended to include the locations of

homicides that occurred specifically at the locations in 2014. Likewise, some THS in the Port-of-Spain Division for 2016 should be updated to accommodate the shift in homicides that occurred in 2015.

Emergence of New Homicide Hotspot Results

Another interesting finding this study revealed was the development of one new homicide hotspot. A homicide hotspot was defined as an area where two or more homicides occurred in one month within 1,000 meters of each other that are distinct from existing THS in the Port-of-Spain Division. It should be noted that any new homicide hotspots had to be geographically separate from other THS in the Port-of-Spain and there were limitations with measuring the precise distance between homicides. However, results of spatial analyses indicated that only one homicide hotspot emerged in the Belmont Station District, where two homicides occurred within 300 meters of each other in March 2016. The demographic and situation characteristic of these homicides matched those found in this study to a large extent. Both victims were male, were killed between Monday to Thursday either in the night or early morning hours. They were classified as gang related, with one victim being stabbed while the other was shot. Surprisingly, both victims were over 30 years old.

Identifying homicide hotspots was a crucial step in this study in order to observe any new movement or clusters of homicides that may have occurred in the two-year period in the Port-of-Spain Division. Future analysis of homicides and hotspots in the Port-of-Spain Division would certainly benefit from further exploring the emergence of new homicide hotspots.

In summary, this study has found several notable changes in trends and patterns related to hotspots and homicides in the Port-of-Spain Division between June 2014 and June 2016.

Demographic and situational characteristics of homicides as well as daily hotspot mean patrol times in the low homicide and high homicides periods had a number of distinctions and shared attributes. Findings on diffusion of crime control benefits, crime displacement and the emergence of homicide hotspots may have offered significant insight into the dynamics of homicides in the Port-of-Spain Division and how these are related to enhanced patrols in targeted hotspots. The subsequent chapter will look at the implications of the findings and providing a closing note for this study.

Chapter 6

Implications and Conclusion

Introduction

In answering the research questions set out in Chapter 1, several notable findings emerged with respect to changes in hotspots and homicides in the Port-of-Spain Division in Trinidad during the period June 2014 to June 2016. The most striking finding was that higher daily mean patrol time in targeted hotspots (THS) was found to be a predictor of declines in homicides in the low homicide period, which was defined as any month with a total of six or less homicides, but not in the high homicide period (more than six homicides in the month). When amalgamated with the changes in the demographic and situational characteristics of homicide as well as the findings on diffusion of crime control benefits, crime displacement and homicide hotspots, a deeper, more evidence-based understanding of reducing homicides in the Port-of-Spain Division emerges.

Patrol Theory of Deterrence

In contrast to the police patrol theory of general deterrence where, as Sherman et al (2014) suggest, police patrols convey a threat to all citizens that committing a crime results in arrest and punishment, police patrols in hotspots are far more specific. Sherman et al (2014) note that it is more accurate to refer to this as local deterrence, since the police patrols target all persons, both those with previous convictions and those without, within a hotspot. Moreover, "whether or not criminal events are displaced by police patrols in hotspots, the reduction of crime at hotspots can still be considered local deterrence" (Sherman et al 2014, p. 5).

The finding that higher daily mean patrol time in THS is a predictor of decreases in homicides within THS during the low homicide period has significant implications in the context of local deterrence in the Port-of-Spain Division. Given the high homicide densities in THS, concentration of criminal gangs and low police resources, increases in the daily mean patrol time delivered to THS were still found to predict declines in homicides. This speaks directly to the strength of the patrol theory of local deterrence, especially when facilitated by strong management of patrol resources and evidence-based police actions. Furthermore, the finding implies police patrols must be applied specifically and consistently to THS to impress the threat of sanctions and reduce opportunities for homicides in those areas.

Local deterrence must be coupled with the concept of dosage, as police patrols cannot continue indefinitely within a hotspot. Optimal dosage for police presence in hotspots for crime reduction is usually said to range between 10 and 16 minutes (Koper, 1995; Telep, Mitchell and Weisburd, 2012), after which, deterrence decay commenced. However, these analyses only establish association and not causation. Sherman et al (2014) raises two essential issues on the optimal patrol dosage to reduce crime; the amount and structure of patrol. In the current study, it was observed that when the daily average patrol time climaxed at 30 minutes per THS in May 2016, there was only one homicide in the THS. This by no means suggests that 30 minutes is the optimal patrol time for hotspot patrol in the Port-of-Spain Division. However, it implies that THS where homicides are particularly concentrated may require larger dosages of police presence to reduce these incidents. The rate of deterrence decay may also be slower in the THS in the Port-of-Spain Division, since the dosage for depressing homicides may be greater than the 10 to 16minutes found in previous studies. Further research is needed to examine the dosage-

deterrence decay relationship. The structure of patrol will be addressed in the section on patrol resource management.

Finally, there are important issues brought to light regarding diffusion of benefits. Sherman et al (2014) state that potential offenders may avoid areas around hotspots due to the threat of police presence, resulting in regional deterrence or diffusion of benefits, as termed by Clarke and Weisburd (1994). No indication of regional deterrence was found in this current study, instead, findings suggest the presence of displacement in the areas immediately outside the THS. Therefore, it is necessary for patrol officers to be aware of the potential homicide displacing effects of local deterrence in THS so as to understand or even anticipate spatial shifts in incidents over time.

Patrol Resource Management

Sherman et al (2014) note that a police management strategy is needed to "cause police to do what a criminological theory says is required to reduce crime" (p.3). In this case of patrol resource, the management strategy should be designed to operate patrols in a manner conducive to effective hotspot patrols aimed at reducing homicides in THS. Based on the findings presented in this study, one can infer that the dynamics of homicides in the Port-of-Spain Division to the warrants more efficient patrol resource management. With a sanctioned strength of 432 police officers, covering five station districts over a 90 km^2, poor patrol management may result more homicides in the Division.

The Divisional and Station commanders need to employ what Rousseau (2006) described as evidence-based management. That is, "translating principles based on best evidence into organizational practices…moving professional decisions away from personal preferences and

unsystematic experience toward those based on the best available scientific evidence" (Rousseau 2006, p. 256). Therefore, reducing homicides in THS and in Port-of-Spain as a whole would necessitate the use of evidence-based patrol tactics and interventions to inform operational and administrative strategies. Jacob (2016), the former Commander of the Port-of-Spain Divisions alluded to this approach in the patrol strategies he implemented to tackle homicides and serious crimes. This approach also makes reference to the structure of the patrols; type of patrol (foot, vehicle or both), other evidence-based interventions included on the patrol, number of officers, beat distribution and so on. Thus, the quality of hotspot patrols is as important as dosage. Rousseau (2006) argues that managers often did not practice evidence-based management because they were either not familiar with the evidence or felt that this approach threatened their ability to manage as they saw fit. One can infer that advanced training in evidence-based policing strategies and management practices for police officers, especially as it relates to hotspot patrols, may increase their knowledge base and lessen the resistance to using such strategies.

Limitations of the Study

One of the main limitations of this study concerned the imprecise locations of homicide incidents on the homicide maps and restricted buffer zones. Additionally, small sample size (N=20) may have affected the ability of the regression model to detect the relationship between increases in daily mean patrol time and decreases in homicides inside and outside of the THS due to statistical power. It may have been that increased patrol dosage was a predictor of declines in homicides but the effect was not large enough to detect given the sample size. Thus, future research would require a larger sample size over a longer period of time to avoid this problem. The omission of four months as a result of missing hotspot patrol data meant this it was no possible to analyse all months in the two year period. However, the study sought to maintain

validity through using previously validated measures and a rigorous methodology. The findings can be generalized to some extent to other Divisions in the Trinidad and Tobago Police Service (TTPS) but the inherently unique characteristics and dynamics present in the Port-of-Spain Division would require that this be done with some caution.

Conclusion

In general, this research is immensely valuable to the Trinidad and Tobago Police Service (TTPS). It provides in-depth and critical insight into how homicides have changed in the Port-of-Spain Division over a two year period, June 2014 to June 2016 at least partly because of changes in police patrol policies. The literature review examined the characteristics, trends and patterns of homicide from one of the earliest empirical works (Wolfgang, 1957) to more recent analyses. Additionally, the principal concepts of hotspot patrols were explored, namely; hotspot policing, police crackdowns, deterrence theory, dosage, crime displacement and diffusion of benefits. Research on the effect of hotspot policing on different types of crime targets demonstrated that there was relatively little evidence explicitly concerning hotspots of homicides. Moreover, there was a deficit of Trinidad-based research that evaluates the impact of enhanced police presence on homicides or any other crime. To date, Sherman et al (2014) Trinidad and Tobago Police Service Hotspot Experiment is the only randomized controlled trial that has examined the effect of increased patrol time on hotspots of violent crime in Trinidad.

The main finding of this study was that higher daily mean patrol time in targeted hotspots (THS) was a significant ($p<0.05$) predictor of decreases in homicides in the low homicide period over the two year period. It was not clear why a similar result was not observed in the high homicide period but this may have been attributed to enhanced patrols employed in response to outbreaks

of homicides and shootings rather than proactively working to reduce these incidents in the Port-of-Spain Division. Nonetheless, the finding in the low homicide period was an immensely important outcome for both the station and divisional commanders in the Port-of-Spain Division involved in patrol management and implementing preventative measures for homicides. The results further supported Sherman et al (2014) "hotspots patrol theory of causing crime reduction effects" (p.3). Although establishing cause and effect was not the aim of this study, the predictive power of higher dosages of patrols minutes in THS on fewer homicides during the low homicide period is in line with this theory. Place-based policing strategies can impact considerably on homicide concentrations, especially with other interventions and patrol management procedures that help facilitate it.

Notably, both homicide periods exhibited similar demographic and situational characteristics, especially gender, motives and less reliably, age. Differences were found, however, in the temporal characteristics, such as time of day and day of week. These challenge the notions that some police officers foster that the characteristics of homicide are universal and static over time and highlights the need to re-examine conventional knowledge about homicide in Trinidad and Tobago.

Substantial research has focused on crime displacement and diffusion of crime control benefits in relation to hotspot policing. Enhanced hotspot patrols appeared to produce unique patterns of spatial displacement for homicides, as they were found to occur on the immediate outskirts of the THS. This suggested that while enhanced hotspot patrols can provide significant opportunity to reduce homicides, more research needs to be conducted on these concepts to fully understand how they influence homicide in the Port-of-Spain Division and Trinidad and Tobago as a whole. According to Trinidad and Tobago Police Service (TTPS) Operating Plan 2016, fiscal constraints

and severe reduction in financial resources appropriated to the Trinidad and Tobago Police Service (TTPS) has challenged the organization to deliver higher quality policing services with less resources. Since reducing homicides are a top priority for policing and public safety, it is critical that more effective methods of using limited resources are employed. Improved knowledge on the changes in the characteristics and spatial shifts in homicides as well as enhanced police patrols in targeted hotspots can yield considerable reductions in homicides over time.

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