

**Assessing the Gang-Level and Community-Level Effects of the  
Philadelphia Focused Deterrence Strategy**

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## Abstract

**Objectives:** Violence reduction initiatives based on focused deterrence strategies have gained attention in recent years due to their empirical support. The evaluations have generally assessed the impact of this intervention on trends in gun violence at the aggregate level, but not at the gang level. The current study evaluates both the community- and gang-level impacts of the Philadelphia Focused Deterrence strategy.

**Methods:** The intervention was assessed using a quasi-experimental design that measured trends in shootings over a twelve-year period, including two years after the implementation of the initiative. Propensity scoring and matching techniques were used to match neighborhoods and gangs, and a number of regression models were run to assess impact.

**Results:** Although a statistically significant reduction in total shootings across the treated neighborhoods was observed when compared to matched neighborhoods, the findings at the gang-level were mixed. Models comparing shootings around gang territories showed significant reductions when compared to shootings around the territories of matched gangs, but pre-post only models of treated gangs using the more rigorous measure of gang-involved shootings did not show evidence of impact.

**Conclusions:** The findings suggest that focused deterrence may provide a mechanism for general deterrence among a broad pool of potential offenders. Specifically, violent gangs, even when targeted, may not be affected similarly for a variety of reasons. To better understand who is receiving the deterrence message and responding to it, future evaluations of focused deterrence strategies, when assessing impact, should include measures of the dosage of the message and other components relative to individuals and their groups.

**Key words:** crime reduction, deterrence, gang violence, guns, quasi-experimental

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**INTRODUCTION**

Gun violence poses a serious threat to youth and young adults in Philadelphia, Pennsylvania. Between 2011 and 2013, roughly 1,900 individuals ages 14 to 24 were the victims of shootings (City of Philadelphia, 2013). Many of these shootings were fatal. More recently, there were between 70 and 110 homicides of individuals between the ages of 11 and 24 each year (Philadelphia Police Department, 2015; 2016). According to the 2012 FBI Uniform Crime Report, at 21.6 homicides per 100,000 individuals, Philadelphia had the 4th highest homicide rate among large U.S. cities (Federal Bureau of Investigation, 2013). Nationally, although the juvenile arrest rate for violent crimes is at a historically low point, youth violence—gun violence in particular—remains a serious social problem in North America (National Center for Juvenile Justice, 2014). Philadelphia is no exception in this regard. Within this context, local Philadelphia officials have experimented with a number of innovative and evidence-based strategies designed to curb urban violence. One of these programs was based on the focused deterrence model of violence reduction (Kennedy, Piehl, & Braga, 1996), currently known nationwide as the Group Violence Intervention.

This study employed a quasi-experimental design to assess the impact of the Philadelphia version of the focused deterrence strategy. The intervention was centered in South Philadelphia, a neighborhood with ongoing gang and gun violence problems. Our analysis examines two complementary research questions:

(1) Was Philadelphia Focused Deterrence successful in significantly reducing gun violence in the targeted community?

(2) Did the intervention significantly reduce shootings among the specific gangs/groups subjected to the intervention?

There are currently over a dozen published impact evaluations of focused deterrence when targeted to group/gang violence, but only two studies have examined changes experienced by the targeted gangs. Focused deterrence evaluations generally show strong empirical support for the intervention with regard to reductions in violence, as confirmed by two systematic reviews of these efforts (Braga & Weisburd, 2012; Braga, Weisburd, & Turchan, 2017), but the overwhelming majority of studies included in the reviews examined aggregate crime trends, showing that the strategy was associated with significant decreases in shootings and other forms of violence at both the neighborhood level and city level (Braga & Weisburd, 2015). Only Braga, Hureau, and Papachristos (2014) and Papachristos and Kirk (2015) have examined how focused deterrence strategies affect the behavior of the specific gangs targeted by the intervention.

Gang-level analyses are warranted in order to better understand the theory of change with regard to “who” is responding to the intervention—to shed light on whether the theorized messaging of deterrence aimed at group members is the primary force for behavioral change. In other words, are the groups themselves, changing their behavior or are the community-level effects seen in extant evaluations likely the result of spillover messaging or messaging that is also reaching non-gang offenders and potential offenders? In a chapter in *Police Innovation: Contrasting Perspectives* (Weisburd and Braga, 2006), the architect of focused deterrence, David Kennedy (2006), discusses how the special enforcement operations are designed to substantially influence the context of group behavior to sanction groups whose members commit serious

violence. He states: “..the salience of groups and networks is commonplace in the literature, and also a commonplace in official accounts of these problems or, frequently, in operational responses to them. Elevating their recognition and the attention paid to them [by focused deterrence] is an important development” (p. 163). In a later book chapter, Kennedy is more explicit:

*For this discussion, the real point is the prelude to the actual intervention: the express surfacing of submerged, competing norms and narratives, an explicit attempt to air them out, and the design of a strategic intervention that was expressly intended to change norms and narratives, and that took into account small-group and network dynamics. (2010, p. 219)*

In 2005, however, the National Academies’ Panel on Improving Information and Data on Firearms (Wellford, Pepper, & Petrie, 2005) criticized evaluation efforts of the intervention on grounds that there was no empirical evidence that focused deterrence modified the behaviors of those targeted. There are also practical reasons for investigating gang-level behavior change, as the intervention remains extremely popular at the national and local levels, evidenced by Federal budget priorities in Fiscal Year 2019 to greatly increase funding for Project Safe Neighborhoods (U.S. Department of Justice, 2018), which highlights the Group Violence Intervention.

In the following sections, we outline key elements found in many of the pulling levers strategies, summarize the extant evaluation literature, and introduce how the intervention was developed and implemented in Philadelphia. We then detail our data collection procedures and analytical approach. We conclude with a discussion of the nuanced effects observed in Philadelphia and offer directions for additional research and practice.

## **BACKGROUND**

In recent years, violence reduction strategies have evolved along a number of pathways. First, crime prevention models have changed from interventions run by a single entity to

partnership efforts that span government agencies, grassroots advocates, faith-based organizations, community groups, and independent research partners. Second, the strategies are increasingly focused on the systematic assessment and analysis of problems in order to target the underlying motives behind gun violence and homicide. Practitioner knowledge of these factors, often developed over years in the field, is essential. Third, replication has become more common as successful evidenced-based deterrence strategies are copied from city to city. This can be seen in the pattern of successful and repeated implementations of Boston's Operation Ceasefire (Braga, Weisburd, & Turchan, 2017).

The strategy developed in Boston in the late 1990s (see Kennedy et al., 1996) was the seminal "pulling levers" focused deterrence model. This particular working group consisted of the Boston Police Department, Massachusetts State Police, probation, parole, the District Attorney's Office, the Massachusetts Attorney General, the U.S. Attorney, the Bureau of Alcohol, Tobacco, Firearms, and Explosives (ATF), the Drug Enforcement Agency (DEA), the Department of Youth Services, Boston School Police, gang outreach and prevention street workers, and members of the faith-based community. In Boston, the problem analysis and subsequent follow-up with line officers identified gang (or group) gun violence as the focus of the intervention. Known gang affiliates were summoned to appear at notification meetings—or "call-ins"—wherein law enforcement officials would convey the message that gun violence would no longer be tolerated, and that if any subsequent shootings should occur, law enforcement would crack down on the whole gang by "pulling every lever" available to them. Levers included stiffer prosecutorial attention, such as higher bail terms, more serious plea bargains, and federal prosecution, as well as increased law enforcement activity in gang areas. If a shooting occurred, law enforcement promised to focus police attention on the specific members

of the gangs involved in the shootings by serving outstanding warrants, increasing probation and parole requirements, and seizing drug proceeds and other assets. At the same time, social service providers and community organizations would deliver the message that if the gang members wished to turn away from violence, social and educational services were available to them. Though only a portion of known gang members were invited to each call-in (usually only those under probation or parole supervision), they were instructed to share these messages with other members of their groups.

Over the years since the strategy was implemented in Boston, the developers have put more focus on the importance of community “moral voices” to assist in spreading the message and setting a clear standard that violence is unacceptable. These moral voices include well-respected community groups and faith leaders, as well as family members who have lost loved ones to gun violence. The strategy’s logic model posits that when community members expressly reject the street code of violence and show that offenders will be valued and supported if they put down the gun, the street norms and narratives that support violence will be negated. In essence, the idea is to have a multi-pronged approach—(1) law enforcement’s directed deterrence message and follow-through (i.e., formal social control), (2) offers of social services and support and (3) community moral voices employed to develop and maintain informal social control—that taken together, will strengthen the community’s capacity to prevent gun violence. As stated earlier, when the intervention is targeted to groups/gangs, the expectation is that gang members and their networks will change their behavior and stop shooting.

### **Previous Evaluations of Focused Deterrence Strategies**

The pulling levers strategies have been implemented and evaluated in many large and medium sized urban jurisdictions. To date, several evaluations of these programs have

demonstrated that focused deterrence strategies can reduce gang violence at the community level or citywide. These effects are seen in smaller and medium-sized cities such as Lowell (Braga, Pierce, McDevitt, Bond, & Cronin, 2008), Stockton (Braga, 2008), Cincinnati (Engel, Tillyer, & Corsaro, 2013), and New Orleans (Corsaro & Engel, 2015), to larger cities including Indianapolis (McGarrell, Chermak, Wilson, & Corsaro, 2006), and Los Angeles (Tita et al., 2004). These evaluations, for the most part, have focused on the effects of focused deterrence on the general rate of shootings or violence in the targeted areas. Only two studies have examined whether targeted gangs in particular experience declines in violence following implementation. Braga, Hureau, and Papachristos (2014) employed a propensity scoring and matching approach to produce a sample of comparison gangs similar to the targeted groups, but were not targeted themselves. Comparisons of these two groups showed that the shootings among the treated gangs dropped by a statistically significant 31%. Further, their analysis demonstrated temporally that declines in shootings occurred after the intervention was implemented. More specifically, 13 of the 16 treatment gangs experienced their largest statistically-significant reduction in shootings in the same quarter as, or the quarter immediately following, full implementation of the intervention (the quarter in which full implementation occurred varied by gang, and was measured as direct communications with the gang, offering of services and opportunities, and the delivery of an enhanced enforcement response). Papachristos and Kirk (2015) found similar results in Chicago, where gang factions that were present at call-in meetings experienced a 23% decline in overall shootings and a 32% reduction in firearm victimization during the year following the intervention, relative to matched control gangs.

To date, there have been two systematic reviews and meta-analyses of focused deterrence strategies—the second one building on the first, and both by Braga and Weisburd (Braga &



Weisburd, 2012; Braga, Weisburd, & Turchan, 2017). The 2012 analysis included ten studies. Included studies were those that: (a) employed the core elements of the pulling levers strategy, (b) had a comparison group, and (c) reported at least one crime outcome. They found most of the programs had a sizable effect on crime. Nine of the ten eligible evaluations reported statistically significant reductions the outcome variables employed. Six of the ten studies directly examined the effects on violence perpetrated by gangs or criminally active street groups (of the four remaining studies, two were focused on drug markets, and two on individuals only). The meta-analytic results, synthesizing the results of these studies, showed that focused deterrence has a medium-sized effect (0.604;  $p < .05$ ) in terms of lowering crime. The authors noted that all of the studies reviewed were the result of nonrandomized quasi-experimental designs. They also stressed that there was still much to learn about the program model, observing that the theoretical underpinnings of the approach merit further research because the evaluations did not shed light on which crime control mechanisms were at work.

The more recent systematic review and meta-analysis (Braga, Weisburd, & Turchan, 2017) found 24 studies to meet the criteria set forth (same as above) and 19 of the 24 reported a statistically significant reduction in at least one crime outcome. Twelve of the 24 studies had strategies focused on gangs/groups and all 12 of these achieved success in at least one of their targeted outcomes. The overall effect size was considered small (0.383;  $p < .05$ ), although it is important to note that the effect size varied by program type (i.e., gang/group, individual-focused, drug market), with the gang/group-focused programs having the largest effect (0.657;  $p < .05$ ). In addition, the overall effect was smaller as the rigor of evaluation increased. And similar to the conclusions of the first meta-analyses, the authors concluded that, “unfortunately, none of the newly-identified studies responded to the original review’s call that the next

generation of focused deterrence program evaluations needed to shed some much needed light on the theoretical mechanisms underlying focused deterrence policing” (p. 34).<sup>1</sup>

## **THE CURRENT STUDY**

### **Philadelphia Focused Deterrence**

In 2006, after violent crime rates spiked, the Appropriations Committee of the Pennsylvania Assembly earmarked dedicated funds to address gun violence in Philadelphia. Working in collaboration, the Pennsylvania Attorney General’s Office and the Philadelphia District Attorney’s Office (DAO) initially sought to combat the violence by focusing their efforts on the prevention and prosecution of straw purchases and aggressively investigating unsolved shootings. After a second, more sustained increase in violence in 2010, the mayor of Philadelphia, in conjunction with the DAO and the Philadelphia Police Department (PPD), initiated a city-wide effort to review the potential violence reduction strategies the city might implement. The resulting working group consisted of top-level assistant district attorneys, police officers, and staff from the Mayor’s Office.

By the fall of 2012, this working group had become familiar with Operation CeaseFire in Boston and began to explore the feasibility of importing that gun violence intervention model to Philadelphia. Representatives from the DAO and PDD chose the South Division (see map in Figure 1)—which includes three police districts and encompasses most of South Philadelphia—as the geographic focus of the strategy. South Division was chosen over other divisions for a number of reasons that included the entrenched street gang culture, the pre-existing interagency relationships among law enforcement in that area (including regular gang intelligence sharing between the DAO and PPD), the overall geographic area was relatively small (compared to other

police divisions) and perceived to be manageable for problem-solving, particularly because the gang territories were clustered close together.

Law enforcement leaders in South Philadelphia had been collecting detailed and systematic intelligence-related information on the gangs and associated violence (unlike some of the other police districts where the information on gangs was more informal and not regularly shared across levels and agencies). An Executive Team (or working group) was formed in late 2012, which included leaders from the DAO, the PPD, the Mayor's Office, Pennsylvania Board of Probation and Parole (i.e., state probation and parole), First Judicial District of Pennsylvania's Adult Probation and Parole (APPD) and Juvenile Probation, Philadelphia Housing Authority Police Department, social service agencies, researchers, and the local federal prosecutor's office. The Executive Team also formed three sub-committees: (1) Intelligence and Strategy, (2) Social Services and (3) Data and Evaluation.

The Executive Team sought to implement focused deterrence with strong fidelity to the original model. At least a dozen members of the Executive Team attended a two-day implementation training in New York City by the National Network for Safe Communities. After an extensive planning period, the first "call-in" notification meeting was held in April 2013. At the time, there were 16 active gangs<sup>ii</sup> that became the focus of the initiative. Two enforcements were conducted shortly after the first call-in meeting in response to shootings committed by targeted groups who had participated in the meeting. The next call-in was held on May 17, 2013, with five subsequent enforcements taking place through the end of 2013. During the first two years of focused deterrence (the evaluation period) there were four call-in meetings and 16 enforcements. Ten gangs were the objects of enforcements; some gangs were targeted more than once for enforcement efforts. Figure 2 provides a depiction of the timing of the law enforcement

components across the evaluation period. At the time the current paper was drafted, the strategy was ongoing.

The Philadelphia Executive Team was able to employ several levers that extended beyond traditional law enforcement sanctions used in most other focused deterrence jurisdictions. These included working directly with public utilities to terminate service for non-payment or illegal electric and gas connections, and facilitating a review of public housing eligibility. Convening a specialized gang task force of ten officers with extensive skills in intelligence gathering and gang enforcement who were dedicated to the focused deterrence strategy was an additional, atypical feature of focused deterrence. Specific, unique, or additional levers pulled during the enforcement actions in Philadelphia also included: prosecutorial requests for high bail after any new arrest, advocacy for longer or more restrictive sentences for new convictions, requesting the revocation probation for probationers who were arrested (but not yet convicted) of a new offense, the provision of the testimony of gang task force members at all hearings, increased intensity of probation or parole supervision, the execution of any outstanding warrants, targeted code enforcement (e.g. electricity, housing), and increased enforcement of standing child support orders.

For the first two years, the strategy was able to utilize a dedicated judge to handle all focused deterrence targeted individuals and probationers, regardless of which judge originally sentenced that offender. This aspect of the strategy—having a dedicated judge that could become familiar with the targeted individuals, their criminal history and particular cases—was seen as a strength of the strategy. However, this changed in the summer of 2015, when a Pennsylvania appellate court ruling pertaining to criminal procedure mandated that probationers must remain under the supervision of the presiding judge from their original case.

Though not explicitly the focus of the intervention, a number of juveniles were involved with the targeted gangs. Accordingly, Juvenile Probation leaders were members of the Executive Team. Although youth under 18 years of age were not invited to notification meetings, juvenile probation officers were able to deploy their own enforcement resources after shootings against named juvenile gang members. These resources were established independently of the focused deterrence intervention and were deployed within the bounds of the law.

Social services and the involvement of community-based assets also played a central role in the Philadelphia strategy. This provided an opportunity to offer a positive incentive, in addition to the threat of severe consequences, for targeted individuals. The Mayor's Office appointed a full-time Social Services Director to oversee the delivery of voluntary programming. Most individuals are recruited for services immediately after the call-in meetings, though some individuals are referred to services by their peers who were already participating. The Mayor's Office also provided a staffer to help coordinate social services and community outreach. Community outreach includes developing and distributing materials that summarize the strategy, and working with community leaders to promote an understanding that the strategy is not focused on arrest and incarceration, but instead on delivering a message of collective accountability and creating social pressure that can deter violence. For the first two years of the project, the intervention also utilized an AmeriCorps VISTA volunteer who attended community meetings and distributed information about focused deterrence. The volunteer also was instrumental in collecting data on the nature and extent of community outreach conducted.

In the second year of focused deterrence (beginning in December 2014), the DAO hired a full-time staff member as a Community Outreach Coordinator. This individual is a resident of

the area targeted by focused deterrence and he acts as the primary liaison between law enforcement and the community. The Outreach Coordinator runs monthly community meetings and developed, in conjunction with the DAO, a number of prevention efforts to reach young children, including a basketball league and neighborhood service projects. The community meetings are held in different neighborhoods of South Philadelphia to increase the diversity of community member engagement and to reach a large audience. At these meetings, members of the Philadelphia Focused deterrence team provide updates to community members and social service and community agencies pass out literature regarding upcoming events. Community members are also able to directly voice their issues and concerns.

Social services are not a required component of focused deterrence strategies, and the use of or emphasis on social services varies widely across jurisdictions that have implemented focused deterrence. In Philadelphia, social services made initial contact with roughly 112 group members across 14 street groups that had members present at call-in meetings from April 2013 to March 2015. One-third (33.0%) engaged in some level of social services, such as being referred to a GED program, drug or alcohol treatment, or job or vocational training. Individuals are required first to complete an orientation through the Mayor's Office of Reintegration Services (RISE).

The Focused Deterrence Executive Team is responsible for coordinating all components of the strategy—the team members meet monthly to discuss incidents of gun violence in South Division, as well as the status of any active enforcement actions. At each meeting, leaders from the PPD provide details regarding which groups are under enforcement, and the DAO supplements this information with details regarding prosecutorial efforts, including the status of bail revocations and appeals. In addition, the Social Services Director for focused deterrence

reports on how many targeted individuals have enrolled in services and continue to be served, and Outreach Coordinator discusses events and outreach in the target neighborhoods.

### **Implementation/Enforcement Strategies in Philadelphia**

Of the four call-in meetings held during the evaluation period, there were 45, 29, 28, and 29 gang members in attendance at each event, respectively ( $\mu=32$ ). The first call-in meeting brought in the largest representation of groups (16), and the following three call-ins had members from 13 gangs. All of the groups targeted by the intervention had a least one member present during at least one call-in meeting. In almost all cases, more than one member from each gang was present at the call-ins. Individuals invited to the call-in meetings who do not attend have warrants issued for their arrest. Across the meetings held, there were less than a dozen instances where warrants were issued.

When a shooting occurs and the PPD and DAO determine that it involved a member of a targeted South group, the DAO immediately furnishes a current list of all the members of that group and sends it to all of the law enforcement partners. From here, a number of actions occur as part of an enforcement effort, each limited only to the identified members of the targeted gangs. To provide a more detailed description of what occurs during an enforcement, Table 1 provides a summary of the levers that were applied after the first three shootings (enforcements on three different gangs). Although the application frequency of the levers naturally varied across enforcements by the extent of past court system involvement of gang members (e.g., on probation or parole, open cases, child support mandates, etc.), the types of levers employed were similar.

--Table 1 about here --

## **ANALYTICAL FRAMEWORK**

In line with other recent evaluations of focused deterrence strategies, we employed a quasi-experimental design to assess the effect of the initiative at both the community-level and the gang-level. Specifically, via propensity score matching techniques, criminal shootings in the targeted neighborhoods were compared with those of a matched set of neighborhoods outside of South Philadelphia. For the gang-level analyses, two types of models were used: (a) regression models where gangs in the target areas were matched through propensity score models to similar groups outside of the target areas and compared on shooting activity in the geographic area around each gang territory and (b) panel models that compared shootings that directly involved gang members before the strategy was implemented to gang-involved shootings after the strategy was implemented. In the following section, we first discuss the methods used to assess the impact of the intervention on community-level violence (i.e., research question 1), and then discuss the different procedures and analyses used to examine the gang-level effects (i.e., research question 2).

### **Data and Units of Analysis**

For both the community- and gang-level analyses, the key outcome of interest is criminal shootings. Shootings included fatal and nonfatal criminal shootings (which exclude officer shootings and self-inflicted shootings). Shootings were counted at the “victim” level (i.e., one perpetrator shooting three people equals three shootings). Address-level data for all criminal shootings were received from the Philadelphia Police Department for the period 2003 through March 2015.



## **Community-level Analyses**

To examine whether focused deterrence reduced criminal shootings across the targeted community, we relied on the Census block group as the unit of analyses—where aggregations of the block groups represented the target area and matched block groups represented the counterfactual. Block groups are U.S. Census units that hold populations between 600 and 3,000. There are 146 residential block groups with a total population of 163,429 that represent three Police Districts comprising the target area (one block group representing the Navy Yard was excluded). The dependent variable is modeled as the monthly rate of shootings per 1,000 residents. We use April 2013 as the period of implementation onset as the first call-in meeting was held April 17, 2013, with the first targeted enforcement action (following a gang shooting) on April 20, 2013. As stated earlier, the post implementation period consisted of 24 months.

### **Propensity Scoring and Matching of Communities**

Comparison areas were empirically derived using propensity score matching (PSM). This procedure aims to create a comparison group that is similar to the treatment group by matching them along several theoretically relevant pre-intervention characteristics (Rosenbaum & Rubin, 1985). A “matching with replacement” routine was used, which allows a given untreated block group to be included in more than one matched set. Matching with replacement was chosen as the preferred method over one-to-one matching because the unique characteristics of South Philadelphia made it difficult to find a large pool of appropriate matches. Matching with replacement eases this issue (Dehejia & Wahba, 2002; Smith & Todd, 2005). The factors used in the treatment status matching model were: the rate of shootings and robbery with a gun for the pre-intervention year (2012); policing activity measured as the level of car and pedestrian stops made by the PPD in 2012; count of street gangs in 2013; count of active probationers/parolees in

2009-2010; and four demographic variables derived from the American Community Survey (ACS) data for 2007 to 2011. The ACS variables used in matching were computed as follows: *Concentrated disadvantage* is the sum of z-scores for public assistance, unemployment, poverty, and female-headed-households divided by four; *percentage of population that identifies as any part Black*; *percentage of the population that is Hispanic*, and *total population*. Matching analyses were conducted via the PSMATCH2 function in Stata 14.0 (StataCorp, 2015).

As shown in Table 2, post-matching demonstrated that the treatment and comparison block groups were balanced, and no statistically significant differences in the factors included in the model were observed between the two groups. However, it is important to note that the balancing increased the bias statistic for three variables (count of parolee/probationers, residential stability, and total population). The matching routine identified 102 block groups for the comparison group, some of which were used more than once in the matched treatment-comparison pairs.

*--Table 2 about here --*

### **Estimation of Effects at the Community Level**

To model the community-level impact of the intervention, we relied on difference in difference estimation (DD). The method examines the change over two periods of time—before the intervention or treatment (focused deterrence) and after the intervention—in relation to changes between the treatment and comparison areas. We also ran a model to test whether the treated block groups saw significant reductions when compared to all other block groups across the city (i.e., not matched on key characteristics). If the treatment area exhibits a statistically significant change post intervention that is larger than the change for the comparison areas, then

the intervention can be considered successful. The DD approach eliminates potential problems related to the comparison group experiencing changes due to natural forces that are likely to affect the treatment area and isolates the effect of the intervention net of the natural trends and forces. The models included controls for month and year to account for potentially important fluctuations in shootings over the time series.

### **Gang-Level Analyses**

To assess whether the strategy had its intended effect on the gangs identified as the drivers of gun violence and those targeted through call-in meetings and enforcement actions, a wide-range of data was first collected to support the development of an appropriate counterfactual. The evaluators worked with the leaders in the PPD to obtain data on gangs, territory size and location, members and other characteristics of the gangs and specific members. Detailed group-level data existed in a systematic form through the PPD's Central Intelligence Unit (CIU), and starting in 2014 the evaluators worked with a diverse set of stakeholders—including the PPD, adult probation and parole, juvenile probation, state parole, and the DAO—to revalidate the CIU's citywide gang audit data and collect additional information methodically across gangs. The audit meetings took place over the course of a year, run by the research team, with separate meetings for each of the police divisions in the city. Officers at all ranks in the PPD, from patrol officers through captains, were asked to attend these meeting to confirm if existing gang information was correct and to fill in the gaps where information was missing. Members of the PPD's CIU were also present at each meeting. In addition to PPD staff, practitioners from other agencies, including juvenile probation, corrections agencies and the DAO, regularly attended. Details about each group, including members, associates, size,

activity,<sup>iii</sup> geographic location down to the block level was validated at these meetings. After the audits were completed the research team was kept abreast on any changes to gang lists over time.

Then a separate process was implemented to identify the shootings that were gang-member related. CIU analysts coded a spreadsheet of criminal shootings (2009 through March 2015) to indicate whether gang members were involved in any manner and if gang members were involved, in what capacity—shooter, victim, or witness/bystander. The coding does not capture *gang-motivated* shootings, but simply shootings that involved a gang member regardless of the reason for shooting. Figure 3 shows the quarterly counts of gang-involved shootings for the focused deterrence target area for gangs that were on the watch list for focused deterrence but not necessarily active in 2013. In this graph, “gang member-involved” includes any shooting where the active gang was the perpetrator, victim, witness or bystander. Gang member-involved shootings in South Philadelphia peaked in early 2010, then fell slightly throughout 2011 before increasing again in 2012.

### **Propensity Score Matching at the Gang Level**

PSM techniques were used to identify comparison gangs. We used Mahalanobis metric matching, one-to-one with replacement, to estimate multivariate distances between each treated gang and all active gangs outside of South as a function of several factors related to the nature of gangs and gang-related behavior. Mahalanobis metric matching has been shown to be an effective technique for achieving balance between treatment and comparison conditions in quasi-experimental evaluations (Rubin, 1976; d’Agostino, 1998). The PSM model included twelve characteristics that have been shown in theory and practice to be related to gang violence, and the type of violence that focused deterrence attempts to address. Many of these factors mirrored those used by Braga and colleagues (2014) for matching gangs. We also had many discussions with law enforcement leaders about important characteristics that distinguish the violent gangs

from other gangs and groups. These discussions took place over time during and after the gang audits were conducted by the authors for all the police districts in the city. For instance, a number of gang investigators suggested that shootings were higher for gangs that were close in distance to other gangs, and thus, we chose two measures of gang density. This factor was particularly important because it was one of the reasons South Philadelphia was chosen for the intervention. The factors selected also depended on availability of data.

1. *Gun violence in buffer area in pre-intervention year (2012)*. This measure counted the number of shootings and gun robberies that occurred within a quarter-mile buffer from the centroid of each gang.
2. *Number of members*. This is the number of people who were validated as gang members during the police audit meetings that occurred from 2014 through January 2015.
3. *Number of associates*. This is the count of people who were validated as being associated with the gang but not considered a full-fledged member as per the gang audit meetings that occurred from 2014 through January 2015.
4. *Average age of gang members in 2013*. This measure was derived from averaging age of gang members using birthdates of members (not including associates).
5. *Designated "street gang."* This measure was derived from a three-category classification of groups used by the PPD for gangs: street gangs, drug-trafficking organizations, or corner drug sales. This measure is a flag for whether the gang is considered a street gang.
6. *Gang territory in public housing*. This is a count variable capturing the number of public housing developments that fall within or touches a gang set space. The measure was created using a Public Housing Authority footprint GIS layer for 2013-2014 and ranges from 0 to 2. Law enforcement officers suggested that this factor was important because

the high density housing creates opportunities for violence and the policing strategies tend to differ with regard to intervention and investigations.

7. *Gang territory in enduring drug market.* This variable measures the number of enduring drug markets located in or adjacent to the gang's territory. The variable was derived from GIS layer that was developed using spatial concentrations of drug sale incidents across five years (2006 through 2010) (Johnson & Ratcliffe, 2013). The count variable ranges from 0 to 2. This covariate was included because law enforcement officers indicated many of the gangs that were solely motivated by money tended, on average, to *not* use guns because it was bad for business.
8. *Concentration of gangs in one quarter mile buffer area* and
9. *Concentration of gang in one-eighth mile buffer.* Two measures were created to capture the density of gangs and their proximity to each other, as a measure of competition and potential conflict. One variable counted the number of gangs that had a set space that intersected with a quarter mile buffer from the centroid of each gang and the second variable used a 1/8 of mile buffer.
10. *Count of probationers/parolees* is the aggregate count of the home location of probationers/parolees in 2009-2010. These data, obtained from the Philadelphia Adult Probation and Parole Department (APPD), were provided to a colleague under a strict data agreement. The colleague then mapped the data onto the respective geographic unit and provided the authors with aggregate counts (with permission from APPD). The count represents the number of probationers/parolees in polygons that fell within a half-mile buffer around the centroid of each gang's set space. We included this covariate because it

was probationers and parolees who were directly targeted by the strategy via the call-in notification meetings.

11. *Concentrated disadvantage surrounding gang set space* is the average of concentrated disadvantage score for any block group that overlapped or fell within a gang set space. Concentrated disadvantage is calculated as the sum of z-scores for public assistance, unemployment, poverty, and female-headed-households divided by four.
12. *Residential stability surrounding gang set space* is the average for the relevant block groups (fell totally within or partially within the set space) of a Census-derived residential stability measure calculated as the sum of z-scores for the percentage of homeowners residing in home for last five years and the percentage of households that are owner-occupied, divided by two.

The matching routine matched 14 focused deterrence treatment gangs to 14 comparison gangs.<sup>iv</sup> Table 3 shows the results of the statistical tests to examine the balance between the treatment units and the matched comparison gangs.

**---Table 3 about here---**

Matching was done only among gangs on a common support using a logit propensity score model. We attempted a number of alternative matching methods but were unable to improve on the matching. These included Mahalanobis with two nearest neighbors, PS-based nearest neighbor matching with one nearest neighbor or two nearest neighbors with or without replacement, radius caliper based matching with calipers of 0.01, 0.05, 0.1 and 0.15.

While the Mahalanobis nearest neighbor matching produced statistical insignificant differences between all the variables included in the matching algorithm, there were a number of variables where the % bias remained above the conventional 20 level. We settled on the Mahalanobis matching for two reasons. First, we were unable to improve on the % bias statistics

using alternate matching methods. Second, several of the alternative methods produced matched samples that excluded several treatment gangs and we wanted to avoid that while minimizing the risk of bad matches. Hence, the Mahalanobis matching provided the best approach for utilizing the largest number of treatment gangs while finding the best balance across the covariates. As one can see from the mean characteristics of the *unmatched gangs*, gangs in the treatment area, on average, have more members, are closer in proximity to other gangs, have territories that are *not* in drug markets and are in neighborhoods much less disadvantaged than other gangs throughout the city. The results of the Mahalanobis matching, however, yielded matched control gangs that are significantly more similar to the treated gangs, than unmatched gangs.<sup>v</sup> Note that the procedure resulted in a total of 10 unique comparison gangs matching to 14 treated gangs. As a result, frequency weights were used to augment the comparison gangs that matched to more than one treatment gang so that the weighted total number of comparison gangs was 14. The analyses described below use these weights.

### **Estimation of Gang-Level Effects**

To assess whether the focused deterrence strategy reduced shootings by the gangs that were subjected to the intervention, we utilized two distinct sets of comparisons: (1) shootings in focused deterrence gang territories versus shootings in the territories of matched comparison gangs; and (2) pre-post intervention shooting differences in South Division only gangs (i.e., the targeted gangs). We used two different sets of comparisons because after the gang member-involved shooting data were collected, it appeared that the implementation of the more-structured gang audits that included the research team (2014-2015) might have affected, for some police districts, the frequency at which shootings were deemed gang member-involved. In other words, when we viewed the trends in gang member-involved shootings across all police



divisions, three divisions outside of South experienced a dramatic increase in the quarters after the audits were completed. The structured audit process had already been in place in South Philadelphia, where focused deterrence was taking place (and before the implementation of the intervention). We erred on the side of caution and made the decision not to conduct any comparative analyses (i.e., using the matched comparison gangs) that relied on *gang member-involved* shootings. Instead, we relied on a proxy measure—any shooting in a buffer area around gang set spaces for comparative analyses. Pre-post only models using the more robust measure of gang member-involved shootings are discussed later.

Using ArcGIS, two buffer zones were created around the center of each gang's home turf: a smaller  $\frac{1}{4}$  mile buffer zone that encompassed approximately 0.2 square miles, and a larger  $\frac{1}{2}$  mile buffer zone that included about 0.8 square miles. For these buffers, we summed *any shootings* that occurred within them. We then ran two types of models to assess the gang-level effect using the shooting outcomes within each buffer-area as an outcome. First, difference-in-difference estimation was used to test the difference in pre-post change of buffer-area shootings for the treated gangs versus matched comparison gangs as of April 2013 when the first call-in was held (quarter 2 in 2013). We used average gain score comparisons as well as a growth curve models for the DD analysis. The gain score analysis compared the average gain between the pre- and post-intervention periods for the treated and matched control gangs to compute the standardized effect sizes (difference in gain scores). We used David B. Wilson's Practical Meta-Analysis Effect Size Calculator to estimate the standard mean difference effect sizes,<sup>vi</sup> Following the methods used in Braga et al. 2014, the quarterly growth curve model was set up with an indicator designating whether a street gang was in the treatment group (1) or in the comparison group and whether the period was before implementation (0) or post-implementation

(1). The differences-in-differences (DD) estimator interacted the dummy variables for an assessment of impact. The models also included the inverse of the estimated propensity score and account for seasonal variations in quarterly shootings (quarter2, quarter3, quarter4 with the reference category as quarter1) and the simple linear trend term (additive progression for each quarter over the course of the observation period) and its square. The DD analysis used the frequency weights to account for the matching with replacement.

The second set of regression models examined changes specific to the timings of the call-in meetings and enforcement efforts and were estimated using only the treated gangs. These *pre-post only* models used a negative binomial regression random effects model that includes the intervention variable, a lagged dependent variable, and a control for the time trend. These models based on timing tested the hypothesis that each gang might not be aware of the intervention and respond to it until that particular gang has representatives present at a call-in meeting or has been targeted for an enforcement action. A series of regression models were therefore run for each gang that classified the impact period as “turning on” in the quarter corresponding to that group’s call-in date. Additional models were run using the quarter corresponding to each gang’s enforcement action; and finally, models where both the call-in dates and enforcement dates were flagged (i.e., estimated with an interaction term). These pre-post only panel regression models did not utilize comparison gangs.

Because these pre-post panel models can be viewed as rigorous tests of hypotheses without relying on comparison groups, the research team also used these models to examine changes in shootings specific to the targeted gangs—(a) gang member as perpetrator, (b) gang member as the victim, (c) gang member as witness or bystander and (d) perpetrator, victim, witness or bystander (summed). As indicated earlier, these gang member-involved outcomes

capture shootings where the gang members were present; it can, but does not necessarily capture whether the shooting was gang-motivated.

## **RESULTS**

### **Model Results: Community Level**

Results from the community-level, difference-in-difference models indicate that the focused deterrence intervention was associated with a statistically significant reduction in shootings in the 24 months following the implementation of focused deterrence when compared to the matched comparison communities (see Table 4). The table also includes the mean standardized effect size ( $d = -0.347$ ; 95% C.I. =  $-.576936, -0.116$ ), which indicates that the effect was between small and medium (see Braga et al., 2018 for a discussion of effect sizes or focused deterrence). Although not shown in the table, we also compared the treated block groups to all block groups across the city and found a similar effect, although slightly smaller. In comparing the treated block groups to the matched controls, we calculated the percentage change for the target area for the 24 month period before focused deterrence was implemented compared to the 24 months after—there was a 35 percent reduction in the rate of criminal shootings post implementation (not shown). Shootings in the matched comparison areas increased 6 percent over the same time period.

*-----Insert Table 4 about here-----*

### **Model Results: Gang Level**

As discussed earlier, the gang-level models assessed the success of the strategy using two different outcome variables: (1) any shootings with a buffer area around gang set spaces and (2) gang member-involved shootings as defined by whether the shooting involved the gang as

perpetrator, victim or witness/bystander. Using these outcome variables we ran three different regression models (with different outcomes for different models). First, before we ran the more in-depth growth curve regression model specification using the buffered shootings, we conducted a simple pre-post analysis with the DD estimator to examine the standardized mean difference effect size statistics. This output tells us directly how changes in shootings in buffered territories of treatment gangs differ from that of the matched comparisons. The effects are shown in Table 5 for shootings that fell within the quarter-mile buffer and half-mile buffer. We calculated the mean treatment group gain score minus the matched comparison group gain score, the standard deviation of the gain score, and the correlation between the Time 1 and Time 2 scores for the focused deterrence and matched comparison gangs. Gain score findings also are shown in Table 5. The standardized mean difference effect sizes were large and significant ( $d = -0.747$  for the shootings in the quarter-mile buffer and  $d = -0.895$  for shootings in the half-mile buffer). For both sized buffers around the treatment gang territories, shootings decreased (i.e., the gain score is negative). Shootings in the half-mile buffer areas around *comparison* gangs decreased, but the decrease was less than that of the treatment gangs, and notably, but similar to what we found with comparison block groups in the community-level analyses, shootings in the quarter-mile buffer areas around the comparison gangs *increased* post focused deterrence.

---Insert Table 5 about here ---

Table 6 shows the results of analyses that replicated the growth curve regression models conducted in the gang-level analyses by Braga and colleagues (2014). The results indicate that, controlling for covariates, the differences between the changes in gang area shootings in the

treated area from before focused deterrence to after, compared to changes in shootings in buffers around matched gangs—for both the quarter-mile buffers and the half-mile buffers—were statistically significant in the expected direction. The IRRs for the interaction effect equate to a 33.6% reduction ( $p < .01$ ) in quarterly shootings that took place within a quarter-mile buffer around gangs and a 22.8% reduction ( $p < .01$ ) in quarterly shootings within a half-mile buffer. The smaller percentage reduction in the larger buffer area may be due to the likelihood that as shootings get further away from the centroid of gang territory, those shootings are less likely to be gang-related and/or not necessarily the type of shooting that could have been deterred or was directly targeted by the intervention. As a reminder, the outcome variable is a proxy measure for gang shootings and captures *any* shooting in the buffer area.

*--Insert Table 6 about here --*

Table 7 shows the results of the pre-post only negative binomial regression random effects models that match the timing of two intervention components (the call in meetings and the enforcements) to each gang. Significant reductions in shootings were only found for two models that assessed the changes in shootings in half-mile buffers around gang territory (Table 7: rows for “Shootings in Buffer,” Model I and II). Results were not significant in the buffer model that matched the timing of both the call-in meetings and enforcements (Table 7, Model III). The last set of panel models (Table 7: “Shootings by Gang”) moved away from the proxy measure of shootings within buffer areas to examine reductions in gang shootings using the gang-member specific shootings. These models included gang-as-perpetrator, gang-as-victim, gang-as-witness/bystander, and gang shootings with all types combined. Because these measures capture shootings specifically attributed to a particular gang, this test (assuming measurement is accurate) is generally considered a stronger test of change in gang behavior than that of the

previous tests/models using the buffer area measures. The results indicate that there were no significant reductions in shootings *attributed to the specific gangs subjected to the intervention.*

-----*Insert Table 7 about here*-----

## DISCUSSION

Looking across the results from the community-level and gang-level analyses, the findings are somewhat mixed. On the positive side, the intervention appears to be a win for public safety—there was a significant reduction in shootings across South Philadelphia as compared to matched comparison areas and the city as a whole. But as a test of change in the behavior the specific violent gangs targeted, that outcome was not clearly supported by the current results. The results do show that, in the absence of focused deterrence, the trend in shootings around gang territories was upward, and the intervention likely stopped that upward swing in the treated gangs, but not in the comparison gangs (see mean gain scores for the comparison gangs in Table 5). This is indicative of the significant findings when examining the difference-in-difference effects that compare shootings in buffer areas, but insignificant findings in the pre-post only models of gang-member shootings. To provide some context (not shown) of the gangs that had members at the call-in meetings, the pre-post differences in quarterly shootings, when counts are matched to the timing of the call-in meetings (i.e., begin counting in the quarter of the call-in through the end of the evaluation period), reveal that there are three gangs that had *increases* in gang-member perpetrated shootings and one gang with no change. (Although the majority of targeted gangs showed decreases in shootings.) These findings stand somewhat in contrast to Braga et al. (2013) and Papachristos and Kirk (2015), who found significant reductions in shootings by targeted gangs.

There are a number of potential explanations for these mixed findings. The focused deterrence intervention is believed to work because law enforcement sends a message to gang members, backed up by concrete and serious responses, that shootings will no longer be tolerated. It is expected that gang members who have participated in a focused deterrence event will return to their communities and spread this message throughout their illicit and legal networks. Formal and informal social pressures will then discourage gang members from shooting. This presents a series of complex, causal relationships that, if unfulfilled, may prevent the strategy from having the desired impact. The focused deterrence message could simply have not reached the target audience, been ignored or not communicated in a manner conducive to spurring the behavioral change being measured here.

It is possible that focused deterrence was successful in deterring shootings, but was simply not focused enough. South Philadelphia is a densely populated area of the city, with many criminal gangs operating in close proximity. During the intervention, the general community could have observed more law enforcement officers on the street and subsequently spread the word that police were increasingly focused on stopping shootings and violence. This could have made potential offenders who were not in gangs hesitant to commit crimes or, more specifically, to engage in shootings. The same could have been true for violent gangs not targeted. (Although all violent gangs active in early 2013 were targeted, there were a handful of gangs active in 2012 that were not part of the intervention.) Therefore, the overall number of shootings in those communities may have been indirectly reduced because of focused deterrence. This effect would appear, as it does in this analysis, as a reduction in the overall level of shootings across the South Philadelphia community, though no effects would be directly

attributable to the targeted gangs. Administrative data, as used here, do not reflect interactions of this nature.

But it is also important to mention that, according to the theoretical mechanisms of focused deterrence, nearby or connected gangs not directly targeted by the intervention, should also be affected by the message. Focused deterrence was, in fact, developed specifically to create this type of spillover effect (Kennedy et al., 1996). Previous research has isolated this type of an effect. In one recent instance, non-targeted gangs were affected by the application of focused deterrence, even without direct contact. This was the case for both affiliated and rival gangs, resulting in a systematic reduction in shootings (Braga, Apel, & Welsh, 2014). In the current study, it was not feasible to directly test spillover effects because law enforcement officers only noted two gangs with some reach (e.g., alliances or rivalries) outside of South Philadelphia, and within South Philadelphia, there were only three or four gangs with some shootings in 2011 and 2012 (pre-intervention years) that were not targeted by the intervention.

The results may also reflect empirical and methodological limitations of the current study. Philadelphia is a city of neighborhoods, each with a unique illegal and non-criminal character. These neighborhood-level dynamics provided for a challenging landscape for the implementation of this intervention. The data that are available to evaluate the implementation or impact of the program, however, do not reflect these characteristics or dynamics. Absent an experimental research design, which was impossible here, we simply cannot rule out competing and alternative influences on the crime rate in this neighborhood—from both law enforcement and other sources—that could have suppressed the violent crime rate in South Philadelphia independent of the intervention. While analyses of city-wide crime patterns suggest that the



results observed in this analysis are not simply an artifact of a larger trend, we cannot say so conclusively.

The presence of the evaluation may have changed the policing landscape in a significant manner. The process and outcome evaluations associated with focused deterrence required a significant amount of information to be gathered and/or generated on the targeted gangs, as well as possible comparison gangs for the propensity scoring process. This process of obtaining these data included a series of researcher-led audits of every gang in the city. It is possible that this process increased the accuracy and efficiency of gang intelligence generally, as well as around shootings. In turn, this could have led to the identification of more gang-perpetrated shootings as the intervention continued and the processes of intelligence gathering were refined. Additional data collection efforts, which were not possible as part of the evaluation, are necessary to parse out the differences discussed here.

The lack of statistical significance at the gang-level for the panel models (pre-post only) may also be attributable to the possibility that some types of gangs are simply not amenable to a deterrence message, or the message as delivered in Philadelphia. Criminal gangs are complex entities, defined by their size, activity, demographics and location (Esbensen, Winfree, He, & Taylor, 2001; Klein, 2007). It is conceivable that the gangs (or at least some of the gangs) in South Philadelphia had particular characteristics that made them less responsive to the intervention. Some of the more active gangs in the target area had multiple factions or were branching off into subgroups or new groups during the intervention period. Theoretically, these newer groups may be less cohesive (i.e., less time to solidify and reinforce a structure and code of conduct, etc.), and hence, less likely to share anti-violence messages. Gang experts for years have theorized that less cohesive gangs are more likely to fight among themselves and less

effective in regulating their behavior (Decker and Van Winkle, 1996; Hughes and Short, 2005), and some studies (but not all) have confirmed, that for gangs in some cities, that lower cohesion is related to increased violence (Hughes, 2013). However, it may be that, in Philadelphia, a high level of cohesion is not a characteristic of any gang. The Philadelphia gang audits revealed that law enforcement believed the overwhelming majority of gangs designated “street gangs” (versus “drug trafficking organizations”) were not structured or cohesive, nor organized over a central purpose like drug dealing. Recent communication with a U.S. Department of Homeland Security expert, currently based in Philadelphia, who has national-level expertise on gangs confirmed that the city of Philadelphia’s gang landscape is mostly comprised of loosely affiliated individuals with little structure to the groups (B. Morral, personal communication, Feb. 27, 2018).

In addition, in reviewing the changes in shootings among targeted gangs, officers from the South Gang Taskforce indicated that two of the groups that did not experience decreases in shootings were comprised of new, young factions and that these new, young gang members feel like they have something to prove, and perhaps are ignoring the deterrence message. Some of the new factions are comprised of juveniles—who were not subject to the call in meetings. Furthermore, within the two-year evaluation period, there were only 4 call in meetings (compared, for instance, to Chicago’s Group Violence Reduction Strategy which had roughly 5 meetings each year). The assertions of the gang taskforce officers fit with scholars’ findings on the developmental pathways of gang members and how age relates to violence. Studies of gang members have found that the commission of serious violence by gang members, particularly those who specialize in serious violence, occurs in late childhood and peaks across adolescence (Gordon, Rowe, Pardini, et al. 2014). Egley and Howell (2010) found that gangs who have subgroups based on age have higher homicide levels. Curry (2010) even suggested that given

the differences in involvement in violence by age of gang members, researchers in the U.S. should study gangs under the framework that there are two parallel gang problems in the U.S.—youth and adult. Finally, the mixed findings on gang-level outcomes remind us that some gang scholars, such as Spergel and Howell, have long posited that it is not reasonable to expect dramatic success with gang members embedded in the gang lifestyle. Howell (2010, p. 70) has said that because gang members have multiple risk factors, only small and gradual improvements in behavior are realistic. Others have warned that when gangs are in conflict with authority, they may become more cohesive (Decker, 2001; Klein, 1971), and some theorizing that because gang members have long been victims of racism and bias by the criminal justice system, the threat of suppression will be discounted and some gangs will challenge these threats rather than defer to them (Lien, 2002).

We hope that future research on focused deterrence initiatives can delve deeper into the questions that remain about the strategy. These analyses extend the scope of findings on focused deterrence, but there is much more to learn. A thorough understanding of how focused deterrence works, and more specifically—for whom it works—will require additional investigation. The focused deterrence strategy offers a number of ways beyond the call in meetings and enforcements to “focus” the message on active gang members or “impact players.” Capturing the dosage of the message relative to individuals and their groups, hence, is critical for future evaluation work assessing strategy impact. The implications of the findings from this study support the calls by many gang researchers to better understand group processes—those factors that work together to influence individuals to be part of the group, leave the group, and the group’s norms that support the group identity and attendant violence (Decker, Melde, & Pyrooz, 2013; Hughes, 2013; Klein, 2001). Research that studies group processes within the

context of ongoing interventions such as focused deterrence should be prioritized, as most gang research examines individuals rather than groups (Decker, Melde, & Pyrooz, 2013) and fewer still examine changes in group processes after an intervention is implemented. Indeed, group processes and changes in these processes deserve closer research attention due to their great potential for informing gang interventions.

Over the last decade, the focused deterrence approach to reducing gun violence has been replicated and evaluated across a number of contexts. These interventions remain a promising avenue for efforts to reduce urban gun and gang violence. Looking forward, research must move beyond replication of community-level effects to include gang-level effects, individual-level effects and a better understanding of how the components work together to achieve reductions in shootings. The need for a systematic tracking of inputs (i.e., specific resources), activities, and outputs (i.e., the products of the activities) corresponding to the law enforcement levers for each individual gang member, by gang, cannot be overstated. Although that might be a complex and giant undertaking, it is likely to yield great rewards in terms of unpacking the black box of focused deterrence.

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Figure 1. Map of Philadelphia Focused Deterrence Target Area

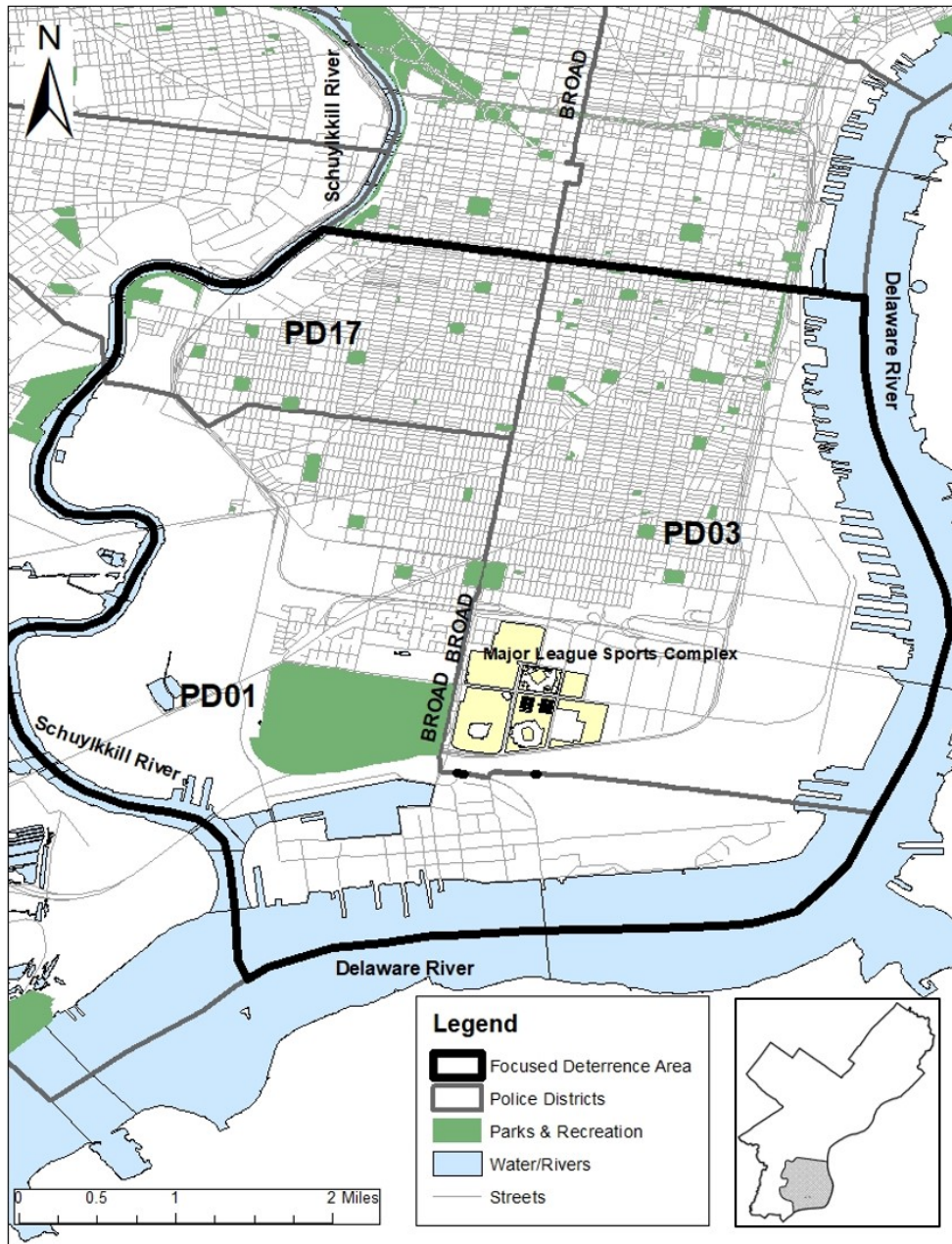
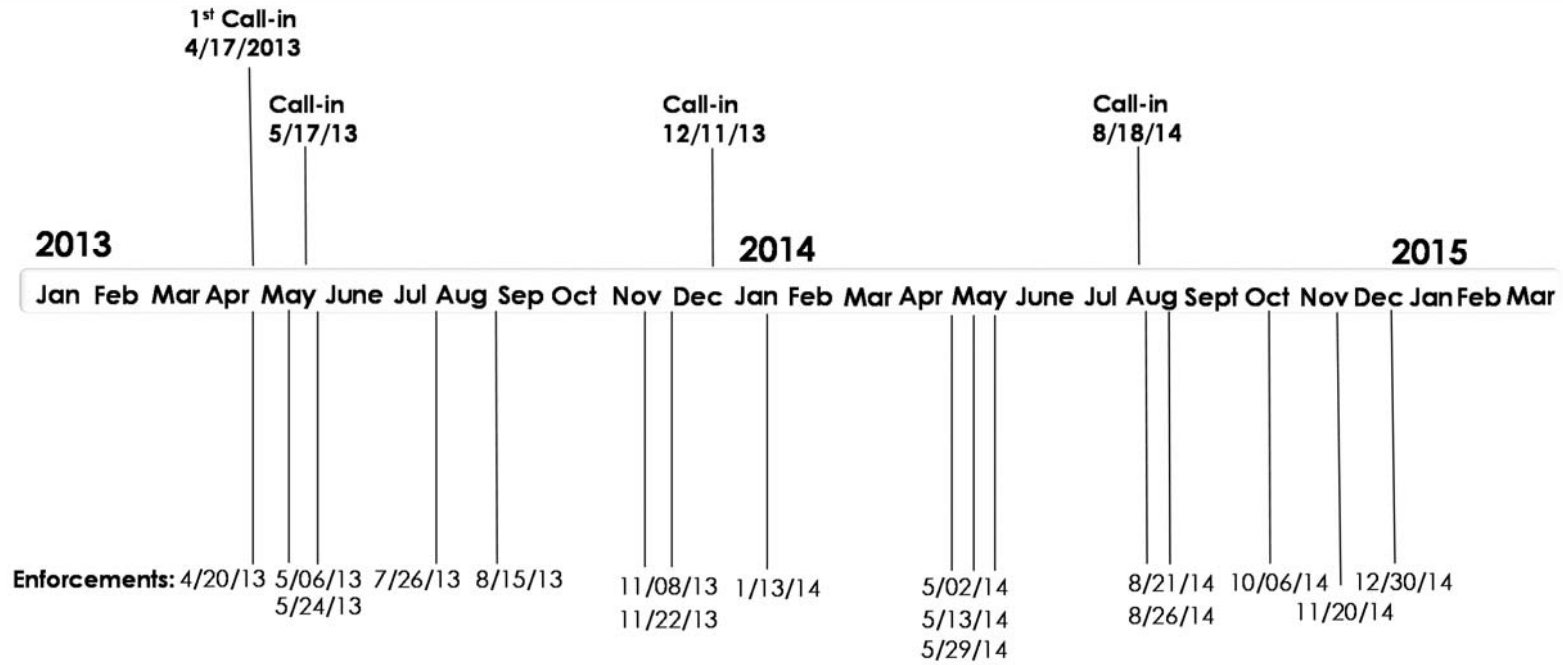


Figure 2. Timeline of Law Enforcement Components in Focused Deterrence During the Evaluation Period, Philadelphia



Treatment Period Examined in Impact Analysis  
 "Post Treatment" = April 2013 through March 2015

**2015**  
**Enforcements:**  
 4/01/15  
 4/07/15  
 5/01/15  
 8/24/15  
 10/14/15

**2015 Call-in:**  
 5/12/15

Table 1. Summary of Focused Deterrence Levers, by Agency (First Three Enforcements)

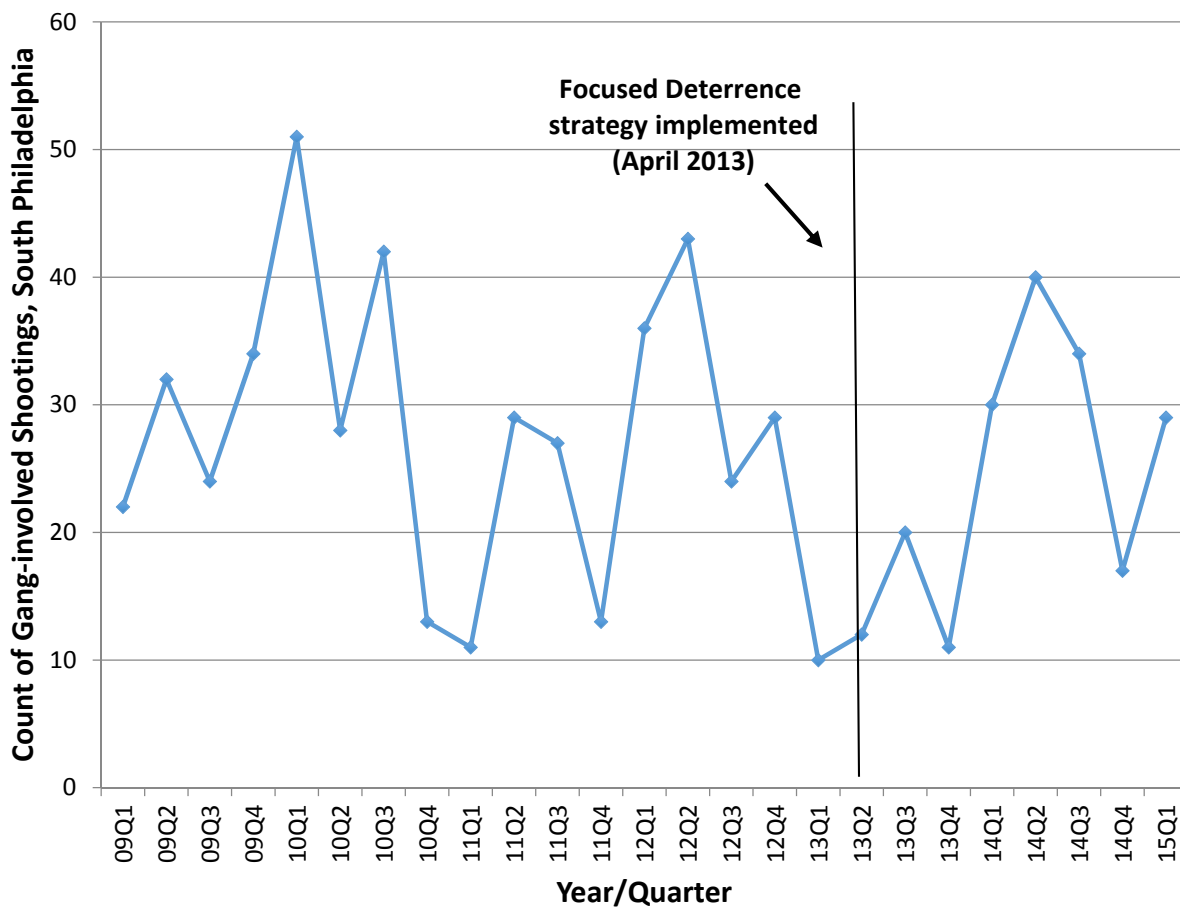
	Gang #3 (April 2013)	Gang #13 (May 2013)	Gang #9 (May 2013)
Group Size	102	57	110
<b>Type of Lever, by Agency</b>			
<b>District Attorney's Office</b>			
Daisy Kates Motions Filed	5	0	0
Bail Revocations	2	0	0
Bail Appeals	2 (was 25k; requested 100k)	None listed	None listed
Cases Reviewed For Re-Arrest	15	All members	All members
FBI Notification	8	1	14
USAO Referred/Adopted	12/1	0/0	15/1
Child Support Cases Activated	3	6 failure to pay listed, 8 initial support order, 2 paternity test	None listed
Old Cases Re-Filed/Re-Arrest	2	0	0
<b>Police Department</b>			
Arrests	6 (1 VUFA, 2 burglary, 2 narcotics, 1 other)	9 (5 scofflaw, 2 disorderly conduct, 1 narcotics, And 1 FTA)	5 (1 robbery, 1 FTA; 3 other)
Confiscated from Arrest	0	\$3,179 USC	0
Debriefings	4	0	0
Pedestrian Stops	20	2	2
Car Stops	1	1	1
Search Warrants	1 auto, 2 cell phone	1 (cell phone)	0
Confiscated from Search Warrants	1 gun	0	1 gun (JET)
Other Investigation	Prison Calls	-	-
<b>First Judicial District (Courts/Probation)</b>			
Office Visits	53	34	9
Field Visits	16	10	2
Drug Tests	31	16	2
Court Appearances	19	4	4
Technical Violations	2	1	0
Fugitive Warrants/Wanted Cards	2	1	0
JET Probation Search	0	0	2
JET Warrant Fulfilled	0	0	1
<b>State Parole</b>			
Increased Restrictions	0	1	0
<b>Joint Effort</b>			
PECO/PGW Investigations	11	8	12
Theft Identified/Service Disconnected (PECO Only)	5	3	6
Issued Notice for Further Investigation (PECO Only)	2	1	5
Comcast Investigations	All addresses sent	All addresses sent	All addresses sent

PHA Investigations	3 possible	3 possible	1 possible
DPW Investigations	All members ongoing	All members ongoing	All members ongoing

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Abbreviations are as follows: DPW: Department of Public Works; FTA: Failure to appear; JET: Juvenile Enforcement Team; PECO: PECO Energy; PGW: Philadelphia Gas Works; PHA: Public Housing Authority; USC: United States Currency; VUFA: Violation of the Uniform Firearms Act

Figure 3. Quarterly Gang-involved Shootings in South Philadelphia (FD Target Area), 2009 – March 2015



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Reduction Statistics for Propensity Score Matching at the Community Level

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	Unmatched				Matched			
	Treated	Comparison	% Bias	t-value	Treated	Comparison	% Bias	t-value
	5.95	7.14	-17.5	-1.77	5.95	6.35	-6.03	-0.59
	8.20	8.73	-6.1	-0.66	8.20	10.82	-29.9	-1.50
le	1.01	0.61	34.9	4.42	1.01	0.81	17.5	1.33
	1.80	1.41	46.7	5.47	1.80	1.78	2.4	0.19
	5.76	12.07	-42.1	-3.83	5.76	4.75	6.7	0.93
	30.85	50.51	-54.2	-5.98	30.85	289.53	3.6	0.31
e	-0.26	0.03	-42.0	-4.64	-0.26	-0.30	4.4	0.38
	1104.30	1138.2	-6.4	-0.72	1104.3	1123.6	-3.7	-0.31

ed; 102 block groups are matched comparison; \*p < 0.05; \*\*p < 0.01



Table 3. Post-Match Bias Reduction Statistics for Propensity Score Matching at Gang Level

Characteristics	<u>Unmatched</u>				<u>Matched</u>			
	Treated	Control	% Bias	<i>t</i> -value	Treated	Contr ol	% Bias	<i>t</i> - value
Number of members	47.77	22.12	87.0	4.21***	47.00	32.07	41.8	1.26
Number of associates	11.06	11.29	-1.5	-0.05	11.29	9.14	-817.8	0.59
Average age of gang	25.88	26.73	-27.9	-0.96	25.71	26.64	-30.5	-1.10
Street group flag	0.94	0.33	164.5	5.23***	0.93	0.79	38.1	1.06
Gangs within 1/4 mile buffer	2.56	2.19	20.9	0.92	1.82	1.57	14.3	0.59
Gang within 1/8 mile buffer	2.15	1.39	54.6	2.92**	1.46	1.36	7.7	0.32
Count of public housing dev.	0.12	0.14	-6.0	-0.21	0.14	0.14	0.0	0.00
Count of drug markets	0.12	0.50	-79.5	-2.58*	0.07	0.00	15.1	1.00
Count of probationers	25.71	17.74	30.2	1.38	23.93	16.00	30.1	0.78
Concentrated disadvantage	0.15	0.64	-87.1	-3.38**	0.18	0.47	-51.8	-1.48
Residential stability	-0.16	-0.15	-1.7	-0.06	-0.17	-0.12	-8.3	-0.25
Gun violence within 1/4 mile buffer	41.74	48.40	-27.4	-0.85	40.11	36.27	15.7	0.80

Unmatched N: 16 treated and 62 comparison gangs; matched N (weighted): 14 treated and 14 comparison gangs;  
 (on common support), means shown using weighted data; \**p* < .05; \*\**p* < .01; \*\*\**p* < .001

Table 4. Difference-in-Difference Test of Focused Deterrence Intervention Effects on Shooting Rates Relative to Comparison Neighborhoods

	<b>Coefficient</b>	<b>SE</b>
<b>Versus Matched Comparison Neighborhoods</b>		
FD Intervention	-0.024*	.009
<b>Cohen's <i>d</i>:</b> -0.347	C.I. (low): -0.577	C.I. (high): -0.116

Models controlled for month and year trends; Neighborhood unit is modeled at the Census block group (BG) level. There are 1,336 BGs in the city of which 146 are treated; 102 BGs are matched comparison. Cohen's *d* is the standardized mean difference effect size; C.I.= confidence interval.

\* $p < .05$ ; \*\* $p < .01$

Table 5. Two-Year Treatment Effect Estimates

	N	Mean Gain	SD Gain	Pre/Post <i>r</i>
<b>Quarter-mile buffer</b>				
Treatment	14	-0.313	1.892	0.465
Comparison	14	1.107	1.476	0.719
Treatment effect ( <i>d</i> ):		-0.747		
C.I. (Low)		-0.747		
C.I. (High)		-0.050		
v		0.127		
<b>Half-mile buffer</b>				
Treatment	14	-8.625	3.703	0.780
Comparison	14	-3.875	3.991	0.684
Treatment effect – Cohen's <i>d</i> :		-0.895		
C. I (Low)		-1.486		
C. I. (High)		-0.304		
v		0.091		

*r* = correlation coefficient; *d* = standardized mean difference; CI = confidence interval; *v* = variance.

Table 6. Difference-in-Difference Test of Focused Deterrence Intervention Effects on Shooting Rates in Buffered Territory Areas Relative to Comparison Gangs

	Quarter-Mile Buffer			Half-Mile Buffer		
	IRR	ASE		IRR	ASE	
DD (impact South x pre/post)	0.664	0.052	**	0.772	0.038	**
South groups (treated =1)	1.249	0.165	*	1.057	0.120	
Pre/post intervention (post=1)	1.664	0.164	**	1.052	0.064	
Trend	1.008	0.012		0.989	0.007	*
Trend-squared	0.999	0.001	*	0.999	0.000	**
Quarter 2	1.132	0.062	**	1.187	0.037	**
Quarter 3	1.210	0.065	**	1.324	0.039	**
Quarter 4	1.165	0.062	**	1.206	0.037	**
Inverse probability of treatment	1.002	0.004		0.996	0.004	
Constant	21.944	8.258	**	51.630	10.358	**
Log likelihood	-1606.2			-2174.6		
Wald $\chi^2$	59.9**			592.1**		
Wald $df$	9			9		
Observations (weighted gangs x q)	700			700		
Treated Gangs (weighted)	14			14		
Comparison Gangs (weighted)	14			14		

Outcome is any shooting occurring in buffer area around centroid of gang territory. Model uses weighted data. Coefficients expressed as incidence rate ratios. ASE: asymptotic standard error. Quarter 1 is the reference category for the seasonal dummy variable. \* $p < .05$ ; \*\* $p < .01$

Table 7. Panel Models Assessing the Timing of the Intervention on Gang Shootings

	<b>Model I</b>		<b>Model II</b>		<b>Model III</b>	
	Called In Only		Enforcement Only		Called in & Enforcement	
	<b>Coefficient</b>	<i>p</i>	<b>Coefficient</b>	<i>p</i>	<b>Coefficient</b>	<i>p</i>
<b>SHOOTINGS IN BUFFER AROUND GANG TERRITORY<sup>a</sup></b>						
<b>Quarter-mile buffer</b>						
Called In	0.187	0.08			0.237	0.15
Enforcement			0.054	0.68	-0.082	0.60
<b>Half-mile buffer</b>						
Called In	-0.187*	0.01			-0.157	0.16
Enforcement			-0.232*	0.01	-0.135	0.23
<b>SHOOTINGS BY TARGETED GANG MEMBERS</b>						
<b>Shooting perpetrator</b>						
Called In	0.158	0.67			0.551	0.27
Enforcement			0.340	0.38	-0.006	0.99
<b>Shooting victim</b>						
Called In	0.055	0.83			0.266	0.48
Enforcement			0.386	0.17	0.221	0.53
<b>Shooting witness/bystander</b>						
Called In	0.555	0.26			0.537	0.41
Enforcement			0.484	0.32	0.197	0.73
<b>Shooting perpetrator, victim or witness/bystan.</b>						
Called In	0.103	0.64			0.286	0.35
Enforcement			0.309	0.19	0.133	0.65

Model I: 14 gangs were called in; Models II and III: 10 gangs; Number of time periods vary by when gang was first enforced upon; \* $p < .05$ ; \*\* $p < .01$ ;

<sup>a</sup>Quarter-mile and half-mile buffer shootings are any shootings within buffer from centroid of gang territory. Perpetrator, victim, witness/bystander shootings are shootings specific to targeted gang.

## ENDNOTES

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<sup>i</sup> A study published *after* the more recent meta-analysis sought to specifically examine the importance of the notification meetings. Hamilton, Rosenfeld, Levin (2017) completed a randomized control study in which probationers and parolees were randomly assigned to attend a call-in meeting, or not. Individuals who attended the call-in meeting were less likely to be arrested in a 17-month follow-up period than individuals in the control group and individuals who were asked to attend the call-in, but did not. These results were not significantly affected by self-selection to attend the meeting (for those in the treatment group). The authors concluded that deterrence is clearly a mechanism at work via the message delivered in the call-in meetings.

<sup>ii</sup> Over the evaluation period, some gangs split into subgroups; for the purposes of the impact analyses, the subgroups were not counted as new groups.

<sup>iii</sup> “Activity” of gangs captured a variety of characteristics that included violence-activity level (hot, warm or cold) and other activity characteristics related to type of activity and specialization. The PPD had clear definitions for determining the violence-activity level. At each of the audit meanings, the research team would review the definition before validating the activity level. The audits also reviewed the gang classifications (street gang, corner drug sales, drug trafficking organization), but it is important to note that, across the audits, none of gangs changes with regard to its classification.

<sup>iv</sup> The matching routine started with 16 treatment gangs but 2 of the treated gangs were dropped because they were off the common support. It is likely these gangs were difficult to match because their gang territories were on the low end of concentrated disadvantage, but had high numbers of probationers. One of the two gangs’ territories was located in an area that was not heavily populated with residents who identified as Black. The overwhelming majority of gangs/groups in Philadelphia are comprised of members who are Black and/or based in neighborhoods made up mostly of Blacks.

<sup>v</sup> While the Mahalanobis matching made the treatment and comparison gangs more similar than the unmatched gangs, we computed the gamma statistics and Rosenbaum bounds (2002) to assess the effects of unobserved but relevant endogenous predictors of selection into treatment. Our findings for significant focused deterrence effects are more robust for the half-mile buffer shootings outcome than the quarter-mile buffer shootings outcome. For quarter-mile buffer model, the analysis suggests that an unobserved variables that increases the odds of selection into treatment by as low as 5% might question our significant findings (at a 5% significance level). A Gamma level of 1.05 might increase out p-values to above the 0.05 level and the treatment effect might reduce to -1.438. However, the unobserved predictor would need to increase the odds of selection into treatment by about 25% before it caused us to question our significant findings at the 10% confidence level (Gamma = 0.125 before the p-critical crosses the 0.1 threshold). The equivalent treatment effect would have to be reduced to -1.063 for that to happen. The findings are somewhat more robust for the half-mile buffer outcome. The Gamma level at which the p-value cross the 0.05 significance level is 1.5, suggesting that the unobserved but relevant predictor would need to increase the odds of selection into treatment by 50% before we questioned our findings at the 5% confidence level. The treatment effect would drop to -3.063. The unobserved predictor would need to double the odds of selection into treatment (Gamma= 2.0) before we questioned our finding at the 10% significance level (for a bias equivalent effect of -2.563). These data are available upon request.

<sup>vi</sup> <https://www.campbellcollaboration.org/escalc/html/EffectSizeCalculator-SMD24.php>