CLEANING UP DRUG HOT SPOTS IN OAKLAND, CALIFORNIA: THE DISPLACEMENT AND DIFFUSION EFFECTS*

LORRAINE GREEN
University of Cincinnati

This paper examines the displacement and diffusion of a civil remedy program in Oakland, California. Coined the "SMART" (Specialized Multi-Agency Response Team) approach, the program uses municipal codes and drug nuisance abatement laws to control drug and disorder problems. The study finds that the SMART program not only decreases drug problems at the target sites, but also leads to a "net diffusion of benefits" in the areas surrounding targeted places.

Since the beginning of the crack epidemic in the mid-1980s, many cities in the United States have increased the number of police officers assigned to street narcotic units, have focused enforcement efforts on arresting drug users and dealers, and have introduced harsher penalties for persons arrested on drug charges (see U.S. Department of Justice 1992). Other cities have implemented drug control strategies that specifically target drug hot spots (see Kennedy 1993; Weisburd and Green 1995b). In one type of hot spot control effort, police focus on cleaning up the places where drugs are sold (see, e.g., Ferguson and Fitzsimons 1990; Green 1996; Hope 1994; Snyder 1990; Ward 1987). This type of place-oriented strategy generally assumes that opportunities for drug dealing can be reduced by targeting the situations and places that facilitate drug sale or use, rather than the people who use or sell drugs.

In 1988 the Oakland, CA Police Department began a place-oriented drug control program that relied on police coordination of multi-agency task forces to decrease the level of drug-related

* The author wishes to thank David Weisburd, Lawrence Sherman, and Edna Erez and the anonymous reviewers for their helpful comments and suggestions. Thanks also to the Oakland Police Department for making this study possible, to John Eck, Michael Buerger, and to my colleagues from the Center for Crime Prevention Studies at Rutgers University.

JUSTICE QUARTERLY, Vol. 12 No. 4, December 1995

problems and to improve habitation conditions of targeted sites. Coined the "SMART" (Specialized Multi-Agency Response Team) approach, the program worked with a team of city agency representatives to inspect drug nuisance properties, coerced landowners to clean up blighted properties, posted "no trespassing" signs, enforced civil law codes and municipal regulatory rules, and initiated court proceedings against property owners who failed to comply with civil law citations. While the SMART program emphasized these alternative intervention tactics, traditional enforcement methods also were used at the targeted businesses, homes, or rental properties. These traditional tactics included arresting drug dealers and increasing police patrol presence at drug problem sites.

A recent evaluation of Oakland's SMART program demonstrated that enforcing municipal code violations and cleaning up drug nuisance sites significantly reduced levels of narcotics activity at target places (Green 1996). This evaluation concluded that police can have an impact on drug problem places when they selectively apply traditional enforcement methods in combination with problem-solving tactics that coerce landlords and tenants to clean up the physical appearance of target sites. On the basis of these results, some observers might label the SMART program a success; others, however, would question the utility of such a program if the intervention merely displaced problems to nearby locations. Accordingly the central purpose of this paper is to explore the wider spatial effects of the SMART program.

In this paper I examine offenders' movement patterns that result from SMART program intervention at a sample of 321 targeted sites. In the first part of the paper I discuss other studies that have examined spatial displacement and diffusion effects of crime control efforts. Then I describe the SMART program and the types of places targeted by the program. In the next section I present a theoretical and methodological framework for measuring spatial displacement and diffusion effects. The following section contains the research findings. I conclude the paper by discussing some implications of the research.

DISPLACEMENT AND DIFFUSION EFFECTS

Displacement of crime problems is an issue that challenges the effectiveness and value of place-oriented police interventions. Displacement is generally defined as the extent to which the blocking of opportunities will cause problems to be displaced to nearby places (spatial displacement), to be displaced to some other time (temporal displacement), to be committed in another way (tactical displacement), or to be transformed into some other kind of offense

(target displacement) (Gabor 1978; Reppetto 1976). These negative effects occur when crime prevention measures block opportunities at some places or in some situations, but fail to protect other nearby places or situations from offenders who are either not discouraged or not deterred from committing a crime.

Unintended negative side effects of crime prevention interventions have been demonstrated empirically across an array of crimes in various contexts (see, e.g., Gabor 1990). For example, Press (1971) found that a large increase in manpower in one New York City precinct caused a reduction in street crimes, but also led to an increase in such crimes in surrounding precincts. Similarly, Tyrpak's (1975) evaluation of a street lighting program in Newark, New Jersey showed that the program shifted crime to precincts not covered by the new measures.

More recent evaluations, directly measuring the wider spatial impacts of opportunity-reducing measures, have demonstrated that crime could be reduced with little displacement (Clarke 1992). Spatial displacement was not found, for example, in Laycock's (1985) study of the deterrent effect of a property-marking program on burglaries in three villages in South Wales. Similarly, Matthews (1990) found that efforts to clean up a prostitution-plagued area in England did not affect the surrounding streets, and that the women did not generally move to new locations.

Given the general skepticism toward criminal justice interventions that demonstrated a positive impact, evaluators began to carefully scrutinize the wider effects of more "successful" crime control efforts (see Clarke 1992). Perhaps it is this skepticism that caused evaluators to identify deterrent influences beyond the original target of crime control efforts. For example, researchers have measured the extended benefits of opportunity-reducing efforts implemented in parking lots (Laycock and Austin 1992; Poyner 1992a), in city center markets (Poyner and Webb 1987), on public buses (Poyner 1992b), and in retail stores (Masuda 1992). On the basis of this growing body of research discounting the threat of displacement, researchers now are exploring further the positive effects of crime prevention measures. Known as "diffusion of benefits" (see Clarke and Weisburd 1994), these positive effects occur when crime prevention measures reduce opportunities not only at treated places or situations, but also at other, untreated locations (also see Chaiken, Lawless, and Stevenson 1974; Clarke 1989; Miethe 1991; Pease 1991; Scherdin 1986; Sherman 1990).

Clarke and Weisburd (1994) suggest that diffusion of benefits can be classified into two groups based on the underlying processes

of offender decision making. First, they propose that diffusion effects can be achieved through deterrence, whereby crime control strategies include tactics that increase offenders' estimations of the risks of being caught. For example, a crackdown at a street drug market could increase offenders' expectations of arrest and, in some instances, could deter them from future involvement in the drug trade. For this group of offenders, the decision to desist derives from a perception of the probable *future* factors influencing the risks of drug selling or buying. If the offender perceives, however, that increased levels of enforcement are merely temporary (e.g., a one-time crackdown), the deterrent effect will most likely be short-lived.

The second process of diffusion involves discouragement, whereby offenders themselves come to believe that the increased trouble of committing an offense is not worth the extra effort. For example, for drug users who must seek out a new supplier when their regular source has gone out of business, the increased inconvenience of finding a new supplier may be an impetus to decrease their drug use. In this second group of offenders, the decision to desist derives from a reaction to *past* events that have made involvement in the drug trade increasingly less attractive. A comparison of these two processes—deterrence and discouragement—suggests that the latter is likely to have a more lasting effect on controlling crime because it does not anticipate future levels of police activity.

Examining the wider spatial impact of crime control interventions is extremely important in understanding the types of police efforts that succeed in controlling crime and the types of conditions that augment the chances of success. Moreover, with a growing number of studies that show the deterrent effects of police efforts concentrated at hot spots (see Green, 1996; Sherman and Weisburd, this issue), integrating programmatic evaluations of the main effects of crime control interventions with studies that examine the wider spatial effects will become increasingly necessary in future evaluations of the impact of hot spot policing (see also Weisburd and Green 1995a).

OAKLAND'S "SMART" PROGRAM

Since its inception in October 1988, the Oakland Police Department has used the SMART approach at more than 2,000 places throughout the City of Oakland, targeting an average of 330 cases per year. Police officers "open" a case after making a preliminary site visit to a place that has generated emergency calls, a number of

narcotics arrests, or special requests from community groups for police assistance. Police begin by visiting nuisance locations and establishing working relationships with citizens, apartment superintendents, landlords, and business owners living or working both at the target address and in the immediate surroundings. During the early stages of the intervention, police communicate landlords' rights and tenants' responsibilities, provide ideas for simple crime prevention measures, and gain the citizens' confidence that the police are supporting them in their efforts to clean up the problem location.

The key element of Oakland's SMART program is the site visit by a multi-agency response team, which involves a series of coordinated visits to problem locations by a group of city inspectors. Depending on preliminary assessments made by the police, representatives from agencies such as housing, fire, public works, Pacific Gas and Electric, and vector control are invited to inspect a problem location and, where necessary, to enforce local housing, fire, and safety codes. About two-thirds of the cases are cited for at least one code violation from a city inspector. The most common type is a housing code violation. Nearly half of the properties receive two or more municipal code citations. The police department also draws on its in-house legal expertise and, as needed, uses a variety of civil laws[1] to bring suit against the owners of properties with drug problems. For example, the Uniform Controlled Substances Act makes every building where drug use occurs a nuisance; it allows the city to use the civil law to eliminate the problem by fining the owner or by closing or selling the property. About 2 percent of SMART cases result in formal court action against a property owner.

The study sample in this paper draws on the population of places undergoing SMART intervention during calendar year 1991 (N = 321). About half of these targeted sites had multiple problems; drug problems were stated most frequently (n = 275). Blight (n = 133), squatters (n = 56), abandoned cars (n = 42), and prostitution

---

[1] For example, Section 11570 of the California Health and Safety Code states: "Every building or place used for the purpose of unlawfully selling, serving, storing, keeping, manufacturing, or giving away any controlled substance, precursor or analog specified in this division, and every building or place wherein or upon which those acts take place, is a nuisance which shall be enjoined, abated and prevented, and for which damages may be recovered, whether it is a public or a private nuisance."

In addition, Section 11366.5 (a) stipulates that persons managing or controlling a building who allows the unlawful manufacturing, storing, or distributing of any controlled substance can be imprisoned for up to one year.

Some of the local municipal codes that are enforced include obstructions (6-1.09), building constituting a menace to public safety (2-4.09), unnecessary noises (3-1.01), unsecured buildings (2-4.09), and dumping garbage (4-5.12).

(n = 28) were also cited frequently. Most of the targets during 1991 were residential properties (87 percent); 13 percent were commercial properties such as hotels, garages, and stores. The median value of the targeted properties was $69,824; five of the properties were valued at more than $1 million. By contrast, the median value of properties in the City of Oakland was $185,000. About three-quarters of the targeted locations were rented or leased rather than owner-occupied; the condition of nearly 90 percent was classified as substandard before SMART intervention. More than 80 percent of the SMART locations were situated on arterial roads. The other SMART sites were located on feeder streets to arterial thoroughfares and on culs-de-sac. The great majority (84 percent) were situated within three blocks of a bar or liquor store.

Although the SMART approach focuses on cleaning up the physical conditions of targeted sites, police also increase the levels of patrol presence. During routine patrol drive-bys, police either arrest or stop and talk to people who frequent the location (termed a "field contact" in Oakland). SMART sites averaged about 38 arrests and 34 field contacts per site in the year preceding the start of the intervention program.

The Landlord Training Program is another important component of the SMART program. Landlords are encouraged to screen prospective renters and are informed about the processes for evicting troublesome tenants. In nearly 40 percent of the cases, an eviction notice was served against a tenant. Because only three-quarters of the locations were rented or leased, SMART intervention involved about a 50 percent chance of a tenant eviction at some time during the treatment.

On the basis of narcotics arrest, emergency call, and field contact data from January 1990 to December 1992, an evaluation of the SMART program showed significantly lower levels of narcotics activity at SMART targeted sites than at drug locations in the city receiving traditional police interventions (see Green 1996). At the SMART sites, the mean number of arrests decreased by 34 percent, compared with a 19 percent decrease at other drug sites. The changes in field contacts revealed an even greater difference between SMART sites and other drug locations in the city. At SMART sites, field contact activity was nearly 60 percent less in the postintervention period than in the pre-intervention period. Moreover, although citizens reported more drug problems at the SMART sites during the six-month intervention phase, the mean number of calls at SMART sites was 4 percent less in the postintervention than in the pre-intervention phase.

The SMART sites also showed improvements in physical appearance, both inside and outside the target locations. Photographs taken before and after the intervention revealed a dramatic reduction in the number of sites with drug paraphernalia lying around, and with blight and rodents. For example, 134 locations showed evidence of blight before the intervention; only 15 sites had this problem after the SMART treatment. Similarly, photographs showed far fewer places with broken windows, graffiti, abandoned cars, and overgrown bushes after the intervention than before (see Green 1996).

Overall these results suggest that the SMART approach had a positive and significant effect in alleviating drug problems at targeted sites. Yet the question remains: Did the intervention merely shift the problem, or were the benefits of the intervention diffused to areas directly surrounding the targeted site?

THEORETICAL AND METHODOLOGICAL FRAME WORK FOR MEASURING DISPLACEMENT AND DIFFUSION EFFECTS

The wider spatial effects of a crime control intervention can be measured at the local, city, regional, and even national levels. At the local level, Caulkins and Rich (1991), for example, report that a crackdown on a drug market in Hartford, CT moved the market only a few blocks away. Other research shows that crime can be displaced to other parts of a city (see Press 1971; Trypak 1975) or even to other jurisdictions (Caulkins 1991).

While units for tracking spatial displacement vary, so too do techniques for measuring spatial patterns. For example, Markov chain models have been used extensively in geography and urban planning to examine relocation patterns and diffusion of innovations (Wilson and Bennett 1985:108-109). Time-series models also have a wide range of application to dynamic geographic processes (see Wilson and Bennett 1985), and are well suited to predicting spatial patterns of displacement and diffusion in response to crime control efforts targeting drug markets. Perhaps one of the most important recent developments in geographical modeling has been research into the diffusion of communicable diseases, in which spatial processes of contagion and spread are mediated by spatial structures of contact between individuals. These contagion models are another alternative technique for measuring displacement and diffusion patterns of police enforcement at hot spots of crime.

Geographic profiling of offenders, whereby an individual offender's probable spatial behavior is derived from information

about the context of crime locations, is another, related area of research with implications for measuring spatial displacement and diffusion (see Brantingham and Brantingham 1981, 1984, 1993; Rossmo 1993). Other observers propose measures of displacement drawing from either market-level or individual-level data (see Caulkins 1991). For market-level analyses, one detects displacement simply by looking for concurrent increases in the size of other markets in the area (Caulkins 1991:14). Data on individual offenders, by contrast, examine where individual dealers dealt at different points in time.

This study uses individual offender data to examine how people moved about in small catchment areas surrounding the SMART intervention sites. Persons arrested or contacted are related both spatially and temporally to these geographic areas. A catchment area is created for each targeted location, and the sequence of contact locations for each person is tracked.

Development of the study method was premised on several basic assumptions. First, I proposed that offenders' movements were not static activities occurring only after a defined intervention. Alternatively, this study assumes that offenders are motivated to move about in space and time as a result of various social control measures. For example, I expected that other social controls would be operating at targeted locations before SMART program intervention: these social controls could include community-based informal tactics, such as pressures by apartment superintendents on drug dealers to stop selling, or formal control tactics by general patrol officers making arrests.

Second, the study assumes variability in the way offenders at different sites react to SMART intervention. Some offenders at some sites could move to another, nearby place to sell drugs as a result of the intervention. At other places, offenders could desist entirely from selling or buying drugs. I did not want to limit the study only to an examination of displacement or only to diffusion, and I did not know a priori, whether a place would experience either a displacement or a diffusion effect. Thus the research design had to be flexible enough to measure offenders who displaced their activities from some places and also to measure the desistance of activity in other places.

Third, this study assumes that although the research design should be constructed to detect either a displacement or a diffusion effect, it also had to be flexible enough to identify both displacement and diffusion occurring within the same SMART-treated location. This need for flexibility stemmed from my belief that offenders do not respond uniformly to crime control interventions: at some

places the SMART intervention could displace some offenders to nearby drug locations, while either discouraging or deterring others from frequenting such locations. For example, I expected that individuals at some sites would decide to sell or buy drugs elsewhere as a result of SMART intervention; meanwhile, in the same area, other individuals who originally sold from a nearby site not targeted by SMART could be discouraged or deterred from selling. Accordingly, this study assumes that displacement and diffusion effects are not necessarily mutually exclusive events, and that a mix of spatial displacement and diffusion could occur within some individual SMART sites.

Drawing on these assumptions, the study sought not only to examine the levels of change within the wider area surrounding SMART locations but also to identify the variety of individual movement patterns within that area. To capture the baseline levels of offenders' mobility, the analysis also measured movement patterns before the treatment.

On the basis of prior research that examines geographic displacement effects (see Weisburd and Green 1995a), I created a two-block boundary[2] around the target location. Although this area size was somewhat arbitrary, it represented a compromise between the potential washing out of displacement or diffusion effects across a broad area and the possibility that I might miss such effects if the catchment area were restricted to one block (also see Barnett 1988; Barr and Pease 1990).

Using computerized crime-mapping software, I drew a two-block catchment area for each SMART intervention site for the 321 targeted cases in the sample. On mapping the 321 sites it became apparent that some catchment areas overlapped because of their proximity. This problem of proximal overlap presents a methodological challenge that other studies of spatial displacement have also encountered (see Weisburd and Green 1995a). The problem stems from an inability to decide on the catchment area in which an incident should be counted if it appears in two (or more) areas.[3] I deal with this measurement problem in the second stage of analysis in this paper by tracking the temporal and spatial movements of

---

[2] Offenders, however, may have gone further that the two-block catchment area. These cases were lost with the design of the present analysis.

[3] Of the 70,783 cases used to examine individual persons' movement patterns, 13 percent (9,071) were duplicate cases. A duplicate case occurs when the same event is counted in two or more catchment areas because of overlap in these areas. Because it is not possible to decide in which catchment area the case should be counted and because the overall number of duplicates is relatively small, I decided that the "noise" created by the duplicate cases was not large enough to suggest that these cases should either be removed or assigned randomly to one catchment area rather than another.

individuals either arrested or contacted within SMART catchment areas. In this second stage analysis duplicate cases,[4] which inflate the aggregate measures of the spatial effects of an intervention, are taken into account by tracking movement patterns for individual persons.

In the first stage of analysis in this paper, I present aggregate counts of people arrested or contacted in the catchment areas. As in other studies of displacement that report aggregate counts surrounding target locations, these figures conceal the individual influences that make up the whole effect.[5] In the second stage, I disentangle these individual influences to reveal the breakdown between competing displacement and diffusion influences.

The study draws from all information on narcotics arrests and field contacts from the Oakland Police Department from 1990 through 1992 (N = 117,917).[6] Just over half of these contacts (52.5%) were classified as arrests. During this period, 22,335 people were either contacted or arrested inside the SMART catchment areas, generating a total of 70,783 contacts within those areas. Of these contacts, 41,903 were classified as occurring before SMART intervention, and 28,880 as occurring after intervention.[7] About 50 percent of the people contacted or arrested during the study period were found in just one catchment area, 23 percent in two catchment areas, and the remaining 27 percent in more than two. The mean number of catchment areas frequented per person was 2.5 (median = 2).

---

[4] These are the cases that are captured in two catchment areas and thus are counted twice in the first part of the analysis (n = 9,071).

[5] Less accurate than reporting numbers of persons counted in catchment areas would be reporting numbers of arrests or field contacts. Although reporting "persons" still conceals the individual effects, reporting the aggregate numbers of arrests (or any other official data) inflates the numbers even more severely because of the possibility of event duplication.

[6] This study recognizes the potential reactivity and limitations of using officially recorded police data to represent the complexities of offenders' movement patterns. Nonetheless, the use of field contact information in this study, in addition to arrest information, provides a somewhat fuller representation of people's movements than does relying solely on arrest information. Moreover, even if one argued that decreases in arrests and field contacts were merely a function of police enforcement patterns (e.g., that police moved to other sites after SMART intervention and no longer patrolled the SMART targets), there is no reason to suggest that enforcement patterns were altered in any way in the catchment areas surrounding the SMART sites.

[7] For each site, I recorded the intervention commencement date. All contacts and arrests in the one year preceding that date were classified as "before the intervention," and all contacts and arrests occurring in the one year after that date were classified as "after the intervention." In this study I chose to include all movements occurring immediately after the start of the intervention in the "after" period (rather than allowing for an intervention buffer period) for two reasons: first, the multiagency response team visits, in most cases, were scheduled during the first week of "opening" a case, thus making a visible statement that the place was being targeted; second, tracking the movement patterns immediately after the start of the intervention prevented losing the immediate effects of the intervention.

RESULTS

The first stage of the analysis reports the overall rate of change in the catchment areas before and after the intervention. Although this aggregated result somewhat conceals the individual effects of the intervention, the second stage of the analysis reveals more of these effects by analyzing the movements of persons arrested or contacted in the areas. Table 1 presents a cross-tabulation of the number of individual SMART sites and catchment areas that grew worse, stayed the same, or improved after the SMART intervention, as measured by the number of narcotics arrests and field contacts in the one year preceding the intervention and the one year following the intervention.[8]

Table 1. Numbers of SMART Sites and Catchment Areas, by Type of Change in Narcotics Activity

Catchment Areas	SMART Sites			
	Grew Worse	No Change	Improved	Total
Grew Worse	17	30	19	66
No Change	1	7	1	9
Improved	24	95	127	246
Total	42	132	147	321

Spearman's correlation = .77, $p<.001$
Kendall's Tau-b = .167

As this table shows, nearly half of the actual addresses that were treated by the SMART program improved (n = 147; 45.8 percent); only 42 (13 percent) grew worse. By contrast, more than three-quarters of the catchment areas surrounding SMART locations showed evidence of improvement (n = 246; 76.6 percent). This table also shows the paired outcomes as a result of SMART intervention. In a paired outcome that demonstrates a clear beneficial effect, both the site and the catchment area improved. Table 1 shows that about 40 percent (n = 127) of the places demonstrated improvement both at the site and in the catchment area. At 95 places (29.6 percent) that showed no change in narcotics activity, the catchment areas improved. Conversely, for 19 sites that improved as a result of SMART intervention, the catchment area grew worse, suggesting a possible displacement effect for about 6 percent of targeted sites. Similarly, 30 sites (9.3 percent) that showed no

[8] For each site, I calculated arrests + contacts before minus arrests + contacts after. If the results was a positive number, the site was classified as improved; if the result was negative, the site was classified as growing worse. I used a similar calculation to derive the overall result for each catchment area.

change demonstrated worsening narcotics activity in the catchment area.

When I examine the statistical relationship between the catchment areas and the target sites as measured by the changes in narcotics activity, the results suggest a statistically significant relationship between what happens at the site and what happens in the surrounding area (Spearman's correlation, $p<.001$; Kendall's tau-b = .167). This relationship suggests that police efforts which succeed in affecting the target site often spill over into the catchment areas. Conversely, it is possible that police failure to control drug activity at the target site may cause problems to grow worse in the surrounding area.

When we examine the total and the mean numbers[9] of people contacted at the SMART locations and in their catchment areas, the data show that both the addresses and the catchment areas contained fewer people after the intervention. Table 2 summarizes the number of people contacted in the one year before and the one year after SMART intervention at each site, and presents the percentage change from the year before to the year after.

Table 2. Total and Mean Number of People Arrested or Contacted at SMART Sites and Catchment Areas Before and After Intervention[a]

	Before		After		Percentage
	N	Mean	N	Mean	Change
Site	1,177	3.7	486	1.5	–59*
Area	13,469	42.0	10,284	32.0	–24*
Total	14,646		10,770		

[a] Some persons were contacted both before and after the intervention. The total N of persons contacted was 22,335.
* $p < .001$

As this table shows, the mean number of people contacted at SMART locations decreased significantly from 3.7 in the year before the intervention to 1.5 in the year after ($p<.001$). For each catchment area, an average of about 32 people were contacted after the intervention, compared with 42 in the year before ($p<.001$). Overall this table shows that the total number (and the mean number) of people contacted at the target sites decreased by 59 percent before to after the intervention; in the catchment areas, the results show about a 24 percent decline in the number of people contacted after the SMART treatment.

[9] This figure is the mean across the population cases. It represents the total number of people contacted, divided by the total number of sites (N = 321).

These absolute changes in the numbers of people contacted and arrested suggest a reduction of problems in these catchment areas following the SMART intervention. Nonetheless, as Weisburd and Green (1995a) observe elsewhere, the relatively large numbers of arrests and contacts in the catchment areas make it difficult to define any changes due to displacement or desistance of offenders stemming directly from enforcement activities at target locations. More generally, Barr and Pease suggest that the wider the study, in terms of types of crimes and places, the more thinly the displaced crime could be spread across those crimes and places (1990:23-24; also see Barnett 1988). To address this problem, and the problem of counting some events twice in overlapping catchment areas, the second stage of the analysis examines the wider displacement and diffusion effects of the SMART program by tracking the time sequence and the points of arrest and field contact for people moving around within these areas.

A total of 22,335 people were arrested, contacted, or both within the catchment areas from 1990 through 1992, generating a total of 70,783 contacts, for a mean of 3.2 arrests and/or contacts per person. Table 3 presents the movement patterns of persons identified as active before and after the intervention. Contact locations are also summarized for "one-timers" (persons arrested or contacted only once from 1990 through 1992).

Table 3. Percentages of Persons Contacted and Arrested, by Movement Pattern Classification

	Type of Effect (N = 22,335)		
Harmful Effect	Percentage	Beneficial Effect	Percentage
Persistence		Desistance	
SMART → SMART	.37	SMART → No contact	3.96
Address → SMART	.71		
Address → Address	10.58		
Displacement		Diffusion	
SMART → Address	1.17	Address → No contact	49.46
New Entries			
No contact → SMART	1.35		
No contact → Address	35.15		
Total Percentage	49.33		53.42

Note: N = 611 persons were classified into more than one movement category; therefore the total percentage does not total 100.

This table suggests that the SMART program resulted in a small but overall "net diffusion of benefits" effect when we examine the movement patterns of all 22,335 persons arrested or contacted within the boundaries of the 321 SMART intervention sites. More

than half (53.42 percent) of the people tracked in this study moved in a manner consistent with a beneficial effect of the intervention: these people either desisted from being present at the SMART site after the intervention (3.96 percent) or were contacted or arrested before the intervention but did not appear within the catchment areas after the intervention (49.46 percent). By contrast, slightly fewer than half of the people tracked within the catchment areas moved about in a manner that has been classified as a harmful effect (49.33 percent). These people either "persisted" (11.66 percent) after the SMART intervention or "displaced" (1.17 percent). A further 36.5 percent were classified as new entries: these included people not contacted or arrested before the intervention, but identified after the intervention.

The absolute difference between the percentage of persons who moved about in a manner seemingly consistent with a beneficial effect (53.42 percent) and the percentage of those who moved in a "harmful" manner (49.33 percent) is 4.09 percent. If this figure is taken as the net difference between the two broad categories of movement patterns, one could argue that the SMART intervention not only decreased the levels of narcotics activity at the target sites but also caused a small net diffusion of benefits in the catchment areas surrounding these sites.

Although these results capture the temporal elements of the movement patterns of persons contacted in and around the targeted sites, the changes occurring from before to after the intervention are limited in meaning unless we know the baseline levels of offenders' movements. To provide context for the offenders' movement patterns described in Table 3, I created a baseline estimate using the movements of persons arrested or contacted more than once before the intervention. I then compared these baseline rates with those of persons contacted or arrested more than once after the intervention. Table 4 presents these results.

Table 4. Movement Patterns of Persons Arrested or Contracted More Than Once: Before-and-After Comparisons

Movement Classifications	Before	After	Percentage
SMART → SMART	83	30	–64*
SMART → Address	124	80	–35*
Address → SMART	107	26	–76*
Address → Address	3,543	2,283	–36*
Multiple at Same Address	2,696	1,500	–44*
Total	6,553	3,319	–40*

* $p < .01$

I identified five basic movement patterns: people who had multiple contacts at one particular SMART site; persons who moved from an address within a catchment area to a SMART site; people who moved from a SMART site to another address within the catchment area; people who moved from one non-SMART address in the catchment area to another non-SMART address in the catchment area; and people who had multiple contacts at a non-SMART catchment area address. In the year preceding the intervention, 6,553 persons were identified as having records of multiple contacts; 3,319 had multiple contacts in the year after the intervention.

Table 4 shows that 83 persons were contacted or arrested at the same SMART site before the intervention. This figure can be taken as a baseline estimate of the stability of persons frequenting target sites, and can be compared with the 30 persons identified as having more than one contact at a SMART site during the postintervention period. This represents a significant decrease ($p<.01$) of 64 percent in the numbers of persons choosing to remain at targeted sites. Table 4 also shows that 124 persons appeared to "displace" from a SMART site to an address in the catchment area during the year before SMART intervention. This figure provides a baseline estimate for the level of movement away from the SMART site, perhaps because other social control factors were operating at the site before the SMART intervention, or maybe because these persons simply chose to move away from the site. In the period after the intervention, the number of persons moving away from SMART sites declined significantly to 80, a 35 percent decrease in the number of persons moving away from SMART sites.

Another important movement pattern is the number of persons attracted to a SMART site. Table 4 shows that 107 persons gravitated to a SMART site during the year before the intervention. By contrast, in the year after the intervention, only 26 people moved from a non-SMART address to a SMART location. This represents a 76 percent reduction ($p<.01$) from the number of persons attracted to SMART sites before the intervention to the number attracted after the intervention. Overall the analysis shows a 40 percent reduction in the number of persons with multiple records contacted in the catchment areas before the intervention (N = 6,553) compared to the number contacted after the intervention (N = 3,319). This result supports the argument that the small "net diffusion of benefits" observed across time periods was not simply a function of movement patterns already existing in the catchment areas, but resulted from the SMART intervention efforts.

CONCLUSION

This paper has presented an analysis of the spatial movement patterns of persons arrested or contacted in catchment areas surrounding a sample of 321 SMART intervention sites. Overall these results suggest that fewer people were contacted in the catchment areas after the SMART intervention than before, and that when the individual effects of this finding were examined, I detected a small net diffusion of benefits effect. Moreover, after I examined the baseline levels of offenders' movements, the study shows that this net diffusion effect was not merely symptomatic of existing movement patterns.

These results suggest that cleaning up drug nuisance places by enforcing city codes, in concert with traditional enforcement efforts (arrests and field contacts), not only reduces drug problems at targeted sites but also improves surrounding areas. It is difficult to ascertain whether these results represent a direct deterrent effect of the intervention or whether people were simply discouraged from engaging in drug activity at the SMART sites. Possibly the program discouraged drug buyers and sellers, and decreased the total number of persons involved in drug activity. For example, if intervention at a SMART site involved cleaning up blight at the site or removing abandoned autos, drug buyers may have felt that their customary location for buying was no longer in operation simply because it looked different. Because SMART sites are often located on main thoroughfares, a quick glance at the drug house or business location may have been enough to make prospective drug buyers think the market was out of business. The results presented here suggest that changing the appearance of a place may be an important element in sending a message that drug dealing is not tolerated.

Overall the examination of the wider impact of the SMART program in Oakland generates several suggestions for future efforts to measure the spatial displacement and diffusion effects of crime control interventions. First, researchers examining displacement and diffusion effects of criminal justice interventions should know baseline levels of activity before making any claims about the wider spatial effects of those interventions. Second, evaluation studies must have flexible designs that allow for examination of both displacement and diffusion effects. Finally, although this study makes some suppositions about the differences between deterrent and discouragement effects, I could not disentangle these two types of effects. Future studies may help us to understand what types of

interventions produce the "best" results by their ability to distinguish between deterrent effects and more lasting discouragement effects.

REFERENCES

Barnett, A. (1988) "Drug Crackdowns and Crime Rates: A Comment on the Kleiman Report." In M. Chaiken (ed.), *Street-Level Drug Enforcement: Examining the Issues*, pp. 35-42, Washington, DC: National Institute of Justice.

Barr, R. and K. Pease (1990) "Crime Placement, Displacement and Deflection." In M. Tonry and N. Morris (eds.), *Crime and Justice: A Review of Research*, Vol. 12, pp. 277-318, Chicago: University of Chicago Press.

Brantingham, P.J. and P.L. Brantingham, eds. (1981). *Environmental Criminology*, Beverly Hills: Sage.

——— (1984). *Patterns in Crime*. New York: Macmillan.

——— (1993). "Nodes, Paths and Edges: Considerations on the Complexity of Crime and the Physical Environment." *Journal of Environmental Psychology*, 13:3-28.

Caulkins, J. (1991). *"Thinking about Displacement in Drug Markets: Why Observing Change of Venue Isn't Enough."* Working Paper 91-08, School of Urban and Public Affairs, Carnegie Mellon University.

Caulkins, J. and T. Rich (1991). *"Geography's Impact on the Success of Focused Local Drug Enforcement Operations* or 'Crackdowns.'" Mimeographed document.

Chaiken, J., M. Lawless and K. Stevenson (1974). *The Impact of Police Activity on Crime: ; Robberies on the New York City Subway System*. Santa Monica: Rand.

Clarke, R.V. (1989). "Theoretical Background to Crime Prevention through Environmental Design (CPTED) and Situational Prevention." In S. Geason and P. Wilson (eds.), *Designing Out Crime: The Conference Papers*, pp. 1-8. Canberra: Australian Institute of Criminology.

——— (1992). "Introduction." In R.V. Clarke (ed.), *Situational Crime Prevention: Successful Case Studies*, pp. 3-36, New York: Harrow and Heston.

Clarke, R.V. and D. Weisburd (1994). "Diffusion of Benefits." In R. V. Clarke (ed.), *Crime Prevention Studies*, Vol. 2, pp. 165-84. Monsey, NY: Criminal Justice Press.

Ferguson, H. and P.S. Fitzsimons (1990). "Drug Abatements: An Effective Tool in the War on Narcotics." *The Police Chief* 57:46-49.

Gabor, T. (1978). "Crime Displacement: The Literature and Strategies for Its Investigation." *Crime and Justice* 6:100-107.

——— (1990). "Crime Displacement and Situational Prevention: Toward the Development of Some Principles." *Canadian Journal of Criminology* 32:41-74.

Green, L. (1996) *Policing Places with Drug Problems*. Thousand Oaks, CA: Sage.

Hope, T. (1994). "Problem-Oriented Policing and Drug Market Locations: Three Case Studies." In R. V. Clarke (ed.), *Crime Prevention Studies*, Vol. 2, pp. 5-32. Monsey, NY: Criminal Justice Press.

Kennedy, D. (1993). *Closing the Market: Controlling the Drug Trade in Tampa, Florida*. Washington, DC: U.S. Department of Justice.

Laycock, G. (1985). *Property Marking: A Deterrent to Domestic Burglary?*. London: Home Office.

Laycock, G. and C. Austin (1992). "Crime Prevention in Parking Facilities." *Security Journal* 3:154-60.

Masuda, B. (1992). "Displacement vs. Diffusion of Benefits and the Reduction of Inventory Losses in a Retail Environment." *Security Journal* 3:131-36.

Matthews, R. (1990). "Developing More Effective Strategies for Curbing Prostitution." *Security Journal* 1:182-87.

Miethe, T.D. (1991). "Citizen-Based Crime Control Activity and Victimization Risks: An Examination of Displacement and Free-Rider Effects." *Criminology* 29:419-40.

Pease, K. (1991). "The Kirkholt Project: Preventing Burglary on a British Public Housing Estate." *Security Journal* 2:73-77.

Poyner, B. (1992a). "Situational Crime Prevention in Two Parking Facilities." In R.V. Clarke (ed.), *Situational Crime Prevention: Successful Case Studies*, pp. 174-184, New York: Harrow and Heston.

——— (1992b). "Video Cameras and Bus Vandalism." In R. V. Clarke (ed.), *Situational Crime Prevention: Successful Case Studies*, pp. 185-193, New York: Harrow and Heston.

Poyner, B. and B. Webb (1987). *Successful Crime Prevention: Case Studies*. London: Tavistock Institute of Human Relations.

Press, S.J. (1971). *Some Effects of an Increase in Police Manpower in the 20th Precinct of New York City*. New York: Rand Institute.

Reppetto, T.A. (1976). "Crime Prevention and the Displacement Phenomenon." *Crime and Delinquency* (April):166-77.

Rossmo, D.K. (1993). "Multivariate Spatial Profiles as a Tool in Crime Investigation." In R. Block and P. Dabdoub (eds.), *Proceedings of the Workshop on Crime Analysis through Computer Mapping*, pp. 89-126. Chicago: Illinois Criminal Justice Information Authority.

Scherdin, M.J. (1986). "The Halo Effect: Psychological Deterrence of Electronic Security Systems." *Information Technology and Libraries* (September):232-35.

Sherman, L.W. (1990). "Police Crackdowns: Initial and Residential Deterrence." In M. Tonry and N. Morris (eds.), *Crime and Justice: A Review of Research*, Vol. 12, pp. 1-48, Chicago: University of Chicago Press.

Snyder, R. (1990). "Oakland Church Community Organizations—Community Response to Drug Abuse." *In Eight Successful City Drug Control Programs*, pp. 13-17, City: United States Conference of Mayors. Washington, DC.

Tyrpak, S. (1975). *Newark High-Impact Anti-Crime Program: Street Lighting Project Interim Evaluation Report*. Newark, NJ: Office of Criminal Justice Planning.

U.S. Department of Justice (1992). *Drugs, Crime, and the Justice System: A National Report from the Bureau of Justice Statistics*. Washington, DC: U.S. Government Printing Office.

Ward, B. (1987). "Drug Abuse and Trafficking: NYPCD Meets the Challenge." *The Police Chief* 54(10):81-85.

Weisburd, D. and L. Green (1995a). "The Complexities of Measuring Spatial Displacement: Insights from the Minneapolis Hot Spots Experiment." In J. Eck and D. Weisburd (eds.), *Crime and Place*, pp. (forthcoming), Monsey, NY: Criminal Justice Press.

Weisburd, D. and L. Green (1995b). "Policing Drug Hotspots: The Jersey City DMA Experiment. *Justice Quarterly*, This issue.

Wilson, A.G. and R.J. Bennett (1985). *Mathematical Methods in Human Geography and Planning*. Chichester, UK: Wiley.