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I. INTRODUCTION

In recent years, violence and public housing have been closely linked in political and popular cultures. To many, public housing symbolizes the dangers of inner city urban life. Built mainly in the 1950s and 1960s to assist the poor and working poor to escape "slum" conditions, most housing projects are clusters of high rise towers that were placed in neighborhoods already in the midst of significant social structural change. More recently, public housing design began to include low slung garden apartments, but these also were built in neighborhoods that traditionally were "slums" with high concentrations of many of the correlates of violence.

In the years following the Second World War, crime rates in neighborhoods with public housing sites had begun climbing, and rapid population change and economic decline had changed the fortunes of

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neighborhood residents for theworse.[1] In the last 20 years, the notion that public housing is, by its physical and social design, a dangerous milieu, has been reinforced by rare but widely publicized episodes of youth violence, sequential drug epidemics, and elevated rates of drug-related violence. Starting with the crack epidemic in the mid-1980s, the high rise towers of large, isolated, and ominous public housing projects came to symbolize societal drug and crime problems. Recent studies suggest that base rates of victimization and violent offending are higher in public housing compared to other contexts, and that these problems can be attributed in part to drug use and selling.[2]

The intense activity in Chicago public housing by drug gangs,[3] and its takeover in 1995 by the federal Department of Housing and Urban Development, [4] reinforced these images of public housing. Recent law and policy focusing drug control policies on public housing has reinforced the connections between public housing, crime and drugs.[5] These connections are routinely revisited in the press as a reminder of the persistence of drug problems in public housing.[6]

In response to these problems in large cities nationwide, the U.S. Department of Housing and Urban Development (HUD) launched the Drug Elimination Program (DEP). DEP funds were available only to public housing authorities to address drug problems. Drug problems included drug selling, drug use, and drug-related violence. The program was flexible and diverse, a reflection

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1 See, for example, Alex Kotlowitz, THERE ARE NO CHILDREN HERE (1990); Nicholas Lemann, THE PROMISED LAND (1991). Also, see earlier sociological works by Lee Rainwater, BEHIND GHETTO WALLS (1966), Ulf Hannerz, SOULSIDE (1969), and James Garbarino, CHILDREN AND FAMILIES IN THE SOCIAL ENVIRONMENT (1992).

2 Timothy Ireland et al., Violence Among Adolescents Living In Public Housing: A Two-Site Analysis**,** 3 *Criminology and Public Policy* 3 (2003**);** Susan Popkin, et al., THE HIDDEN WAR: THE BATTLE TO CONTROL CRIME IN PUBLIC HOUSING IN CHICAGO (2000); Tamara Dumanovsky et al., *Neighborhood Contexts of Crime in New York City's Public Housing*, presented at the September Research Institute on Neighborhood Effects on Low-Income Families, Joint Center for Poverty Research, The University of Chicago and Northwestern University (1999). Recent efforts by HUD to conduct victimization surveys in public housing projects suggest elevated rates, but with a host of methodological artifacts and complexities. See, for example, Harold R Holzman and Lanny Piper, Measuring Crime in Public Housing: Methodological Issues and Research Strategies, 14 *Journal of Quantitative Criminology* 331 (1998); Harold R Holzman, Criminological Research on Public Housing: Toward a Better Understanding of People, Places and Spaces, 42 *Crime and Delinquency* 361 (1996).

3 See, for example, Sudhir Alli Venkatesh, AMERICAN PROJECT: THE RISE AND FALL OF AN AMERICAN GHETTO (2000).

4 Judy A. England-Joseph, HUD's takeover of the Chicago Housing Authority, statement to the Subcommittee on Housing and Community Opportunity, Committee on Banking and Financial Services, House of Representatives, 1995.

5 See, for example, *HUD v Rucker*, *infra* note 23; The Anti-Drug Abuse Act of 1988 (Section 5101), *infra* note 21.

6 See, for example, N.R. Kleinfeld, With Drugs in Open, Elderly Live Behind Locks, *New York Times*, May 2, 2004, at 41 (describing drugs and violence in Harborview Terrace Houses on the west side of Manhattan, primarily by illegal tenants in a housing complex with a high proportion of elderly residents).

of the different needs and strengths of the local housing authorities. At its core, DEP combined several strategies in a comprehensive design to prevent and control drug use: police enforcement, drug treatment, drug prevention, coordination of services with health and social service agencies, and development of the social infrastructure of formal and informal supervision groups in the housing authorities.

The New York City Housing Authority (NYCHA) launched its local DEP program in 1990 to reduce drug use, drug selling, and drug-related crimes in public housing sites. The local programs are collaborations between NYCHA management and local tenant organizations and residents to design and implement DEP activities. Supported activities include enhanced police protection, drug treatment, drug prevention programs, youth and gang outreach, and community organizing. Capital projects also are supported by DEP, such as lighting improvements and installation of CCTV surveillance. Programs have been present in more than 85% of the sites for one or more years since the program's inception in 1991, and funding reached $40 million in 1996. NYCHA has spent over $165 million on DEP over its seven years.

Despite this large investment, there has been surprisingly little research on DEP efforts in New York City, or in DEP sites nationally.[9] More generally, research on drug and crime control efforts in public housing is very limited,[10] and only rarely tied to specific policy frameworks.[11] The contradiction between the severity of drug and crime problems in public housing and the relatively sparse literature has left an important gap on the effects of drug control strategies in public housing, neighborhoods and other small social areas.

NYCHA's 344 projects provide a rich context for testing drug control policies such as DEP. In this study, we examine the effects of the DEP intervention at three levels of complementary theoretical relevance: the public housing development itself, the neighborhood in which public housing is situated, and the police precinct where the tract is located. We begin with a description of the DEP Program as implemented in New York City, and then examine the impacts of DEP interventions at each spatial aggregation.

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9 Terence Dunworth and Aaron Saiger. Public Housing Drug Elimination Program Resource Document, Executive Summary. Washington DC: U.S. Department of Housing and Urban Development (1994).

10 Susan Popkin, et al., *The Hidden War*, supra note 2.

11 In contrast, see: Anthony Braga, et al., Problem-Oriented Policing in Violent Crime Places: A Randomized Controlled Experiment, 37 *Criminology* 541-580 (1999).

II. THE NEW YORK CITY HOUSING AUTHORITY

NYCHA is by far the nation's largest housing authority,[7] with an official population of over 600,000 residents in 344 public housing developments.[8] With over 179,000 units, public housing constitutes approximately 8.5% of all rental housing in New York City. Most (65%) of the city's public housing developments were built before 1970. Most developments are large: only 9% have fewer than 100 units. Most of these smaller developments were built after 1970. In contrast, thirty-three percent of all public housing developments in New York City have more than 1,000 units.

Public housing is not randomly distributed across the five boroughs of New York City, nor is it randomly sited in the city's neighborhoods. Over eighty-five percent of all public housing in the city is in three boroughs: Brooklyn, Manhattan and the Bronx. Although dispersed outside the commercial center in Manhattan, public housing is spread across most (53) of the city's 75 police precincts. This distribution reflects, in part, the decisions on where to locate public housing and the success of locally organized opposition in the wealthier neighborhoods. For example, only a few public housing developments were constructed in Queens, a largely middle class, residential area, and the largest cluster of public housing in Queens is in the Rockaways ― on the ocean side of Kennedy Airport ― an area that is geographically much closer to Brooklyn than to the center of Queens. Staten Island has only ten public housing developments, and these are concentrated in the borough's densely populated North Shore, near the ferry terminal.

In Manhattan, most developments are located above 110th St. or below midtown on the Lower East Side, well removed from the city's wealthiest neighborhoods and its commercial centers. Brooklyn has the most public housing in the city, with the largest concentrations in the heavily minority neighborhoods of Brownsville, Bushwick and East New York. Particularly for the larger developments in the "outer boroughs," such as Queensbridge, Morrisania or

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7 In comparison, the Chicago Housing Authority (CHA) administers 40,462 units. After these, the largest PHAs include Philadelphia with 22,229 units; Baltimore with 17,119; and Boston with 14,400 units (U.S. Department of Housing and Urban Development, Housing Authority Profiles).

8 Official population counts of public housing residents tend to undercount the total number of people living in public housing at any given time. Tenants are required to register family and income information with the Housing Authority annually. These figures are used to confirm eligibility for public housing, and in some cases are used to determine rents. Because of these administrative guidelines, tenants do not always report all household members to the Housing Authority. These "unofficial" residents may be family members or friends moving in for an extended period, or men living in otherwise female-headed single-parent families. This complicates analyses that rely on these official statistics. Comparing 1980 and 1990 census population numbers with NYCHA tenant counts for public housing developments whose boundaries correspond to census block groups shows that official population numbers are consistently lower than census numbers – on average, NYCHA population numbers were up to 30% lower than census counts.

Brownsville, public housing tends to ecologically dominate the surrounding areas, suggesting that some areas are "public housing neighborhoods."

Table 1 shows that public housing developments are sited in census tracts with higher crime rates than other areas. The average annual homicide count from 1985-96 in census tracts with public housing projects is more than three times higher (1.87 per year) compared to tracts without public housing.[9] Figure 1 shows that homicide rates were persistently higher over time in tracts with public housing, and remained higher in 1996, after the city's overall rates had sharply declined.

Table 1 also shows the extent of social disadvantage in tracts with public housing sites. Compared to non-public housing tracts, these census tracts have higher rates of households receiving public assistance, households below the poverty level, female headed households with children, renters, and minority population. They tend to have fewer high school graduates, persons in managerial or professional jobs, and persons working or in the labor force. They are more racially heterogeneous, and their population density is greater.

Table 2 shows the size and characteristics of public housing developments for the period from 1985-96, the years when we had detailed information on tenant characteristics. The total population has declined in recent years, but has remained poor and non-white. Household density has declined slightly, but the percentage of seniors and children below 10 years of age has increased. The percentage of families on welfare has grown, as has the average duration of residency. This suggests stability in the population, although at a rate where households have fewer resources that would help them eventually move to other housing contexts. With more children per household and long durations of public housing tenancy, it seems unlikely that the social or human ecology of public housing will change in the near future.

III. THE DRUG ELIMINATION PROGRAM

NYCHA first sought DEP funds from HUD in 1989, and a small pilot program was funded in 1990. A far larger program was supported starting in 1991; by 1995, DEP was present in most of the public housing developments in New York City. Funding levels for the various components of DEP are shown in detail in Table 3, and are summarized in broader categories in Table 4.

The primary goal of DEP was to reduce drug use, drug selling, drug-related crime and collateral crime problems by strengthening both formal and informal social control in public housing developments. Increased police presence and targeted prosecutions were the mechanisms to increase formal social control. The primary public security program was Operation Safe Home (OSH).

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9 The rates per 1,000 persons are .41 in tracts with public housing and .19 in tracts without public housing.

OSH created intensive patrols in and around public housing sites, while the Anti-Narcotics Strike Force (ANSF) received grant funds to support special prosecution activities primarily to evict tenants with drug arrests. For the first two years, slightly less than one dollar in three went to police patrols, through OSH. By the third year, almost half the budget was allocated to OSH; by 1995, more than half the funds went to OSH. ANSF funding was modest but stable throughout the study period, but remained a fraction of the law enforcement budget.

Stronger tenant organizations and increased resident patrols were the primary strategies to strengthen informal social control. NYCHA tenant organizations were encouraged to become active in producing security through the creation of Drug Elimination Committees, Tenant Patrols, and Community Center Programs. Over the years, DEP also offered services and programs to address issues more indirectly related to the reduction of drug-related crime, such as a Domestic Violence Program, a Career Training Program, and arts and sports activities.

The percentage of the program allocated to demand reduction programs dropped sharply beginning in 1994, as program funding more than doubled. Drug abuse treatment and prevention services received a declining share of the budget over the course of DEP, from more than one third of the 1991 budget to less than three percent in 1996. The decline is striking, from $5 million in 1991 to about $1 million in 1996. Tenant patrols, designed to engage residents of public housing in the co-production of security, were modestly but stably funded throughout the program. But the share of total DEP funds allocated to tenant patrols also dropped sharply as the program grew in 1994. Social and community services rose in 1994 as the program expanded, although these funds were diffused across 14 separate categories. When spread across the NYCHA system, the funded amounts per development were inconsequential.

The expansion of DEP in 1994, and the sharp shift in funding priorities to strengthen OSH, reflects broader shifts in law enforcement strategy and social policy in New York City in 1994, following a change in mayoral administration. The emphasis on street-level enforcement in New York City has been widely described[10] and analyzed.[11] The budget trends reflect not just the shift in policy choices; there were substantive changes in strategy, tactics, and policing style beginning in this time that provoked strong public reactions, and raised contentious claims about the role of policing to bring about citywide crime

10 See, for example, William Bratton and Peter Knobler, TURNAROUND (1998); Judith A Greene, Zero Tolerance: A Case Study of Police Policies and Practices in New York City, 45 *Crime and Delinquency* 171 (1999).

11 George Kelling and Catherine Cole, FIXING BROKEN WINDOWS (1996); New York State Attorney General, Stop and Frisk Report, 1999; Jeffrey Fagan and Garth Davies, Street Stops and Broken Windows: *Terry* Race, and Disorder in New York City, 28 *Fordham Urban Law Journal* 457 (2000).

reductions.[12] Declining investments in drug abuse treatment and prevention was part of this administration's generalized social policy shift and theoretical re-orientation that de-emphasized demand reduction strategies.[13]

Below, we describe details of the major components of DEP: Operation Safe Homes, the ANSF, Tenant Patrols, and Drug Treatment.[14]

A. Operation Safe Home

Operation Safe Home (OSH) was considered the "linchpin" of NYCHA's Drug Elimination Program.[15] OSH focused on increasing the presence of uniformed officers and law enforcement activities in public housing developments with the goal of providing a more secure living environment for its residents by combating serious crime. The program emphasized "vertical patrols" in public housing to clear problem areas, and subsequent maintenance to keep areas safe. OSH teams patrolled indoor and outdoor areas, conducted systematic building patrols – lasting from several weeks to several months – and worked with management teams to improve physical security at targeted sites (e.g., repairing broken lighting and door locks).

For the early part of DEP, OSH involved two separate groups, *Target Teams* and *Maintenance Teams*. "Target Teams," consisting of five officers and one sergeant, were deployed to selected developments in an attempt to "take back" a development building by building, often conducting vertical patrols in the larger buildings. OSH officers encouraged residents to form tenant patrols, and provided training and assistance to these patrols. Officers also reported any instances of physical damage or vandalism to management staff who were expected to attend to the maintenance needs of the target developments. The Target Phase lasted for up to a month and a half, after which a "Maintenance Team," usually two officers, were given periodic patrols at the recently "completed" developments.[16] Maintenance Teams were responsible for insuring that the work of the Target Teams remained effective after they moved on to a new development.

The number of police officers participating in OSH increased from 48 in

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12 Bernard Harcourt, ILLUSION OF ORDER (2001); Andrew Karmen, NEW YORK MURDER MYSTERY (2000); Malcolm Gladwell, THE TIPPING POINT (2nd edition) (2000).

13 At the same time, though, the Courts created and expanded a network of specialized treatment courts designed to divert drug offenders from criminal prosecution to substance abuse treatment. See, Greg Berman and John Feinblatt, Greg Berman & Aubrey Fox, Institutionalizing Innovation: The New York Drug Court Story, 27 *Fordham Urban Law Journal* 277 (2000). But these programs was open to all eligible criminal defendants, and public housing residents effectively lost their dedicated pathway into drug treatment.

14 For more detailed descriptions and analyses of the program components, see: Jeffrey Fagan et al., Drug Control in Public Housing: The Impact of the Drug Elimination Program of The New York City Housing Authority. Final Report, Robert Wood Johnson Foundation, July 2003.

15 NYCHA DEP Grant Application, 1991.

16 NYPD Operation Safe Home, 1994 Year End Report.

1991, to 81 in 1994. Each Police Service Area (PSA)[17] was assigned one or two Target Teams and one Maintenance Team, giving the area between five and ten OSH officers by 1994. In 1995, when the Transit Police and Housing Police were merged with the NYPD, OSH grew from 81 officers and nine sergeants, to 400 officers, with 57 sergeants.[18] Following a change in mayoral administration in 1994, the OSH budget doubled the next year, and increased again by 50% the following year. It remained at that level through the end of the decade.

B. Tenant Patrols

Through the Tenant Patrol Program, NYCHA involved residents in resisting drug-related crime in their developments. Volunteer residents, under the direction of a tenant patrol supervisor, walked the grounds of their public housing development in an effort to deter criminal activity. The tenant patrol supervisors, part-time employees of NYCHA, were funded through DEP – and were usually former tenant patrol volunteers. In case of emergency, supervisors had the ability to contact local police through the Citywide Telephone Monitoring System. In addition to crime deterrence, the patrol had an "early intervention" component, which identified and addressed common maintenance problems like broken lights, thermostats, and unclean lobbies.

NYCHA envisioned the patrols as the "eyes and ears" of the housing police and considered the tenant patrols one of the more important aspects of the Drug Elimination Program, in that it helped to create a bridge between the police and the community.[19] The tenant patrols worked with local police precincts and public housing management to identify problem areas on public housing grounds, providing a basis for cooperation between residents, NYCHA staff and the local police. As developed under NYCHA DEP, the level of activity of the tenant patrols corresponds with that of OSH. During OSH vertical patrols, recruitment efforts for the tenant patrols are increased.

NYCHA's Tenant Patrol Division had 15 staff members. The staff members' duties included coordinating and conducting training sessions for volunteer tenant patrol supervisors, and providing support for the supervisors once the patrol was under way. After the start of DEP, these efforts were organized around the OSH interventions. As OSH expanded, NYCHA found that the Tenant Patrol Division staff was not able to keep up with the tenant patrol volunteers' demand for support. By 1993, tenant patrol volunteers requested that each target site have it's own tenant patrol staff. In response, subsequent DEP budgets included salaries for 20 community coordinators (field associates) and supervisory staff. As a result, the Tenant Patrol Program's budget expanded seven-fold, from $165,000 in 1994 to $1.1 million in 1995. By 1999, the Tenant

17 Under the Housing Authority Police Department, PSAs were administrative units comparable to NYPD police precincts. For example, the South Bronx is PSA 7.

18 NYPD, Operation Safe Home Report, July 1995.

19 NYCHA DEP Grant Application, 1995.

Patrol Program had 213 part-time (20 hours per week) tenant patrol supervisors, working with 6,650 volunteers at 795 buildings; active tenant patrols were in place at 144 separate developments.

Despite this growth, the budget *share* for this component of DEP remained a small fraction of the total DEP budget, and was dwarfed starting in 1995 by the budget for police interventions. Over the study period, OSH consumed 45.5% of the total DEP outlay, compared to 1.8% for tenant patrols.

C. The Anti-Narcotics Strike Force

The Anti-Narcotics Strike Force (ANSF) was a team of attorneys, investigators and support staff that was created in 1988 within NYCHA's Law Department. Its focus was the eviction from public housing of persons involved in the illegal distribution and sale of narcotics.

Prior to 1971, NYCHA could evict tenants with only one month's notice, and without a hearing. In response to a 1967 challenge to these evictions, NYCHA entered into a consent decree which required a multiple-stage review process, including legal notice, representation, a NYCHA hearing and appeals, for all eviction cases (*Escalera vs the New York City Housing Authority*, 1971).[20] Recent changes in federal law provided an enabling framework for ANSF prosecutions,[21] and the law has been strengthened over the decade since DEP was created. In 1996, President Clinton announced the "One Strike" policy – essentially restating the provisions of the 1988 Anti-Drug Abuse Act – to encourage public housing authorities to apply the 1988 provisions to speed the eviction of residents involved in criminal activity. Also in 1996, a Federal judge granted NYCHA the right to use the Bawdy House Law – originally intended to allow evictions for vice, particularly prostitution – in cases involving drug traffickers.[22] Most recently, the U.S. Supreme Court upheld this provision in the case of *HUD v. Rucker*: a 9th Circuit case involving the eviction of a 63-year old

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20 Pedro and Rose Escalera were tenants in New York City public housing. They filed a class action in 1967 under *28 U.S.C. §§ 2201, 2202* and *42 U.S.C. § 1983* against NYCHA, alleging violations of the Fourteenth Amendment Due Process Clause and the United States Housing Act of 1937, as amended, *42 U.S.C. §§ 1401*. Before trial, the parties entered into settlement which later was incorporated into a decree, known as the "*Escalera* Decree," *Escalera v. New York City Housing. Authority*, 425 F.2d 853 (2d Cir. 1970).

21 The federal Anti-Drug Abuse Act of 1988 (Section 5101) strengthened existing public housing lease provisions by including language in the leases to the effect that: "A public housing resident, any member of the resident's household, or a guest or other person under the resident's control shall not engage in criminal activity, including drug-related criminal activity, on or near public housing premises . . . and such criminal activity shall be cause for termination of tenancy" (HUD, April 1991). A resident does not need to be convicted of criminal activity to be considered in violation of Section 5101.

22 N.Y.McKinney's RPAPL §§ 711 and 715. See, Valerie D. White, Note, Modifying the *Escalera* Consent Decree: A Case Study on the Application of the *Rufo* Test, 23 *Fordham Urban Law Journal* 377 (1996); Bill Alden, Procedure to Evict Drug Dealers Eased, Modification of 1071 Consent Decree Granted. *New York Law Journal*, April 22, pg 1.

grandmother and her family – based on the drug arrest of her mentally disabled granddaughter several blocks away from public housing grounds.[23]

Between 1991 and 1993, ANSF dedicated a total of two investigators, out of a team of 13, to cases arising solely from DEP targeted sites. In 1994, ANSF staff expanded capabilities, adding a total of five investigators through DEP funds.

D. Drug Abuse Treatment and Prevention Program

DEP's drug abuse intervention and prevention programs focused on two target populations: adolescents and pregnant or post-partum women. The main goal was to provide treatment services for drug-addicted pregnant and post-partum women and treatment and prevention services for drug-addicted or at-risk adolescents, through three strategies: (1) NYCHA hired community outreach workers to identify drug-addicted residents, (2) the Department of Health provided counselors to prepare drug-addicted residents for treatment, and (3) the program contracted out to local treatment service providers for the treatment component of the program. These programs included health education, individual counseling and group activities. In addition to this primary focus, the program provided referrals to treatment services for drug-addicted residents not included in the program's target populations.

Funding declined over the years for these services. NYCHA allocated $4.2 million in 1991 to fund pilot programs in three large public housing developments: Brownsville, East Harlem, and the South Bronx (Mott-Haven and Morrisania). These funds were not spent during the first DEP year, but instead were re-allocated over subsequent years. By the end of 1993, NYCHA had established contracts for treatment services for the three target sites and wanted to expand the search for treatment providers citywide. No further funds were allocated for these contracts; NYCHA continued to use the 1991 fiscal funds for most treatment contracts.[24] By 1997, NYCHA stopped contracting directly with drug treatment service providers and the emphasis of the program shifted to outreach and referrals in November 1992.

Slow referral rates illustrated the problems with this component of DEP.

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23 *Dep't of Housing. & Urban Development v Rucker,* 535 U.S. 125,(2002) (holding that the federal Anti-Drug Abuse Act, *42 U.S.C. § 1437d(l)(6) (1994*), requires lease terms that give local public housing authorities the discretion to terminate the lease of a tenant when a member of the household or a guest engaged in drug-related activity, regardless of whether tenant knew, or should have known, of the drug-related activity). In New York, public housing officials have similar discretion to evict tenants following conviction of co-residents on drug charges. See, also, *Escalera v. N.Y. Hous. Auth.,* 924 F. Supp. 1323, 1343-45 (S.D.N.Y. 1996).

24 Difficulties in the administration of the program contracts were the stated reason for the decision to decelerate treatment funding. In particular, NYCHA had trouble ensuring that providers were fulfilling their contracts. For example, one treatment provider, which NYCHA had contracted with in August 1995, had provided no services through December of 1995. NYCHA considered initiating default proceedings against the contractor.

By January of 1993, a total of 139 residents had been referred to drug treatment providers. However, not until 1994 were residents referred to programs under contract with NYCHA. NYCHA reported that between July and December 1994, 215 pregnant and post-partum women and 140 adolescents from the three pilots sites were referred to contracted programs. An additional 305 residents – not part of the program's target population – were referred to other treatment providers. Between July and December 1996, 14 pregnant and post-partum women from seven different neighborhoods, 296 adolescents, and 105 other residents were referred to treatment services. In 1998, 801 cases that were identified as having substance abuse problems during Termination of Tenancy action proceedings were referred to the Drug Abuse Outreach, Referral, and Placement Program by NYCHA management.

IV. RESEARCH METHODS

To assess DEP impacts, we use mixed effects panel models to estimate the effects of DEP on crime and violence in and around public housing from 1985-96, controlling for drug enforcement and the social and structural contexts of public housing and the surrounding neighborhoods. We estimate the effects of DEP three ways: first, as a dummy variable representing the period before or after DEP implementation in 1991; second, as a continuous (random) effect measured by DEP dollar investments (with zeros for the years before DEP); and third, as discrete dosages of its primary components of policy and theoretical interest – OSH and the tenant patrols. Since a significant portion of DEP funds supplemented law enforcement efforts (through OSH), we include drug arrests as a measure of law enforcement that was underwritten by DEP funds.

A. Study Sample

The study sample is 184 public housing sites, 53.5% of the 344 NYCHA housing developments. We excluded 64 public housing developments (PHDs) that do not fit the traditional definition of public housing.[25] After accounting for

25 Three categories of public housing were excluded from the sample: buildings that are part of the Multi-Family Home Ownership Program (MHOP), senior-only projects, and scattered-site housing. Under MHOP, NYCHA rehabilitated apartments in city-owned buildings and offered them for sale to working families in public housing. See, Glenn Thrush, "Promises, Promises," City *Limits* June/July (1997). Although these sites are administered through NYCHA, because they are part of a home-ownership program they are not comparable to other public housing sites, and are excluded from this study. Senior-only projects were excluded from the sample because these projects introduce different questions and considerations for understanding crime in public housing. Most family projects have a senior population ranging between 10% and 15%. Excluding senior-only sites does not have much impact on the age distribution of public housing residents. In 1990, for example, the senior population when all 233 projects are included totals 14.6%, while in the sample of 182 projects seniors account for 13.6% of the 1990 population. The

administrative consolidations[26] among the 280 PHDs, the final sample totals 184 PHDs. The final study sample includes all family PHDs in New York City built before 1985.

B. Variables, Measures and Data Sources

1. Drug and Crime Indicators

NYCHA Incident Reports. Until the NYC housing and transit police departments merged with the NYPD in 1995, NYCHA's housing police maintained independent records for public housing developments. Complete and consistent data is available for 1985 through 1994 for all NYCHA housing projects. These data are available in two forms. For the entire 10 year period, aggregated incident reports are available for each site. These reports include total number of incidents reported to housing authority police broken down by UCR Index Crime codes for Part I and Part II offenses. For the years 1985-1994 detailed incident reports are available. These files include details for each incident including location (inside a building, or outside, in public area, a sidewalk adjacent to the development, etc.), along with information on weapons, and characteristics of the victim and perpetrator (where applicable), and whether or not the victim is a resident.

NYPD Precinct Arrest and Complaint Reports. We contrast trends in drug and crime indicators for the NYCHA developments with the surrounding contexts of the local police precincts. There are several reasons to do this. First, arrest and crime reporting trends are significantly influenced by policy and strategy undertaken at the local police level. Prior to the consolidation of the NYPD and the Housing Police Department, enforcement and crime indicators were commingled between local NYPD precincts as well as the Housing Police.

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final exclusion is scattered site projects. These are generally single, walk-up, buildings that have been rehabilitated, and are indistinguishable from other buildings in the area. Buildings that are part of the West Side Urban Renewal (WSUR) – buildings throughout the Upper West Side of Manhattan managed by the Housing Authority – are examples of these scattered-site projects. For purposes of comparability, this study also excludes developments built after 1985. The few developments built after 1985 are distinct from other public housing sites. They are much smaller, and tend to be rehabilitations of existing buildings or scattered sites.

26 Administrative consolidations of public housing developments generally take one of two forms. The first kind of consolidation occurs with larger public housing developments. Although built contemporaneously, certain PHD sites combine two separate developments. A second type of consolidation is an amalgamation. This occurs when a new building is added to an already existing development. Amalgamations include developments such as Red Hook I & II, Queensbridge North & South, Throggs Neck & Addition, and Millbrook & Extension. In some cases, crime complaint and arrest reports are combined for two or more projects due to geographic proximity. Because data are combined for two or more developments, there is no way to determine in which PHD a specific incident occurred. Because there is no way to determine the exact site corresponding to the incident reports, tenant characteristics are consolidated across these projects, and they are considered one site for the purpose of this study.

Second, precinct indicators provide an estimate of larger ecological trends in crime in the neighborhoods surrounding the NYCHA developments. In previous research on crime in NYCHA developments (Dumanovsky et al., 1999), we estimated hierarchical models of crime that included precinct as well as development indicators: the precinct variables were (instead of are) significant in each of the models.

Complete NYPD Precinct Arrest and Complaint Reports were available from 1984 through 1996. These data are aggregated numbers of UCR crime categories (Part I and Part II) by precinct. The precinct totals for Part I offenses do not include Housing Authority Police Department incidents. NYPD numbers for Part II offenses may include housing and transit figures after 1979. Since the consolidation of the Housing Authority Police with the NYPD in 1995, public housing complaint and arrest data are no longer maintained by NYCHA.

Homicide. We use homicide victimization data from the Office of Vital Statistics and Epidemiology, New York City Department of Health and Mental Hygiene, to construct homicide counts for each census tract and police precinct from 1986-96. Homicides are geocoded based on the last known address of the victim.[27] The Vital Statistics records are compiled from death certificates completed by the Office of the Medical Examiner. Homicides are classified by the Medical Examiner using ICD-10 codes, and integrate investigation information from the New York City Police Department.

2. Social Structural Variables

a. NYCHA Tenant and Site Characteristics.

NYCHA interviews public housing tenants annually, and maintains yearly records of tenant characteristics for each project. This data is available from 1968 through 1996, aggregated by project and race: white, black, Hispanic and other. The data items are relatively consistent across time. They include total number of families, total population, average income, number of minors, number of elderly, number of welfare families, one-parent families, employment (number of families with 2 or more persons employed), average tenancy, and number of minors broken down by age groups.

Public housing site characteristics were obtained from NYCHA's archived records. Measures include total number of buildings, housing units, whether a development is reserved exclusively for the elderly, and the borough, community

27 In some cases, the location of the homicide may be some distance from the victim's residence. In a separate study, we examined Medical Examiner records to determine the distances from home to location where the body was recovered. For 80% of young males 15-24 killed during 1987-92, their bodies were recovered within one mile of their homes. We did not examine this for all homicides in the sample, although we have no empirical or theoretical reason to assume that the findings would differ for other demographic groups. Accordingly, we equate the victim's residence with the location where the body was recovered.

district, and police precinct for each project.

b. Tract and Precinct Social Structural Characteristics.

We included measures of social and economic factors that reflect contemporary theory regarding neighborhood, "place" and violence, theories that incorporate not just the structural deficits of social areas but also their dynamic processes of social control.[28] We selected 18 tract-level variables from the 1980, 1990, and 2000 Census files, and sorted them into seven constructs that reflect theoretically relevant dimensions of ecological or neighborhood risk. Dimensions include: poverty, racial residential segregation, social control, population mobility (anonymity), labor force participation, housing structure, and immigration. All data were aggregated at the housing development, census tract, and precinct levels. The various constructs were created for each of the three census years, and were then interpolated for the interceding years.

Social Control. We computed two dimensions of social control. The first captured the extent of supervision of young people within neighborhoods, including (1) the concentration of youth population, (2) the percent of female-headed households with young children, and (3) the ratio of youths to adults. The second dimension examined population size and change, including (1) the overall size of the population and (2) residential stability and turnover, based on length of residence.

Poverty. We computed three indicators of poverty: (1) percentage of households with incomes below the poverty level (2) percent of households receiving public assistance, and a Gini coefficient to measure inequality of household income of that tract relative to other tracts in the City.

Labor Market Participation. Labor market participation and human capital within the tract were measured with several variables: (1) employment rates, (2) percent employed in professional or managerial jobs, (3) the percent of the adult population over 25 with a high school education, and (4) the overall labor force participation rate (i.e., those working and those seeking work).

Racial Residential Segregation. We used a measure of racial fragmentation to characterize segregation and population heterogeneity within census tracts.[29] Residential racial fragmentation is computed as 1 - ((%black)^2 +

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28 See, for example, Robert J. Bursik, Jr., and Harold Grasmik, NEIGHBORHOODS AND CRIME (1993); Jeffrey D. Morenoff et al., Neighborhood Equality, Collective Efficacy, and the Spatial Dynamics of Urban Violence, 39 *Criminology* 517 (2001); Robert J. Sampson et al., Assessing "Neighborhood Effects:" Social Processes and New Directions in Research, 28 *Annual Review of Sociology* 443 (2002); Jeffrey Fagan and Garth Davies, The Natural History of Neighborhood Violence, 20 *Journal of Contemporary Criminal Justice* 121 (2004).

29 According to 1990 Census data for New York, African Americans are far more likely than Hispanics to live in racially segregated areas. We computed an index of racial fragmentation for New York, based on methods developed by Charles Lewis Taylor & Michael C. Hudson, WORLD HANDBOOK OF POLITICAL AND SOCIAL INDICATORS (2nd ed.) 216 (1972). Racial fragmentation is a measure of the racial heterogeneity within an area, and is computed as:

$(\%white)^2 + (\%Hispanic)^2 + (\%other)^2$).

Housing Structure and Market Conditions. Three dimensions of housing were computed: (1) vacancy rates: the percentage of vacant housing units, (2) overcrowding: the mean number of persons per room in residential units, and (3) the percent of housing units that are owner-occupied or rented.

Immigration. Two dimensions of immigration include linguistic isolation and whether the head of the household was foreign-born.

B. Data Analysis

The general analytic model estimates DEP effects on drug-related and other crime indicators. Control variables include drug enforcement, and the social structural characteristics of the housing project, tract or precinct, depending on the model. DEP and drug enforcement measures are lagged by one year. We estimate separate models for violent and property crimes in housing projects and police precincts. We estimate models for homicides to assess DEP effects in public housing developments. We included interactions of DEP with the social structural characteristics in each unit of analysis to better isolate the effects of DEP on specific dimensions of crime risk.

In the tract and project models, we control for crime rates in the surrounding areas to account for spatial diffusion.[30] For tracts, we use the data for

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$$1 - ((P)^2)$$

Where P = proportion of each race within the spatial unit.

We divided census tracts into quintiles of this index. African Americans are more likely to reside in the most homogeneous tracts, while Hispanics are far more likely to live in racially heterogeneous areas:

Quintile*	*% African Americans*	*% Hispanic*
1 (Most segregated)	33.74	5.63
2	23.25	13.01
3	25.32	27.68
4	27.34	36.32
5 (Least segregated)	20.26	32.09

[30] For example, Fagan and Davies found evidence of spatial diffusion of homicide from housing developments to their surrounding neighborhoods in the Bronx, one of New York's five boroughs (counties), for example, Jeffrey Fagan, & Garth Davies, Crime in Public Housing: Two Way Diffusion Effects, in ANALYZING CRIME PATTERNS : FRONTIERS OF PRACTICE (V. Goldsmith et al., eds.) 121 (1999). Dumanovsky et al. also found that crime rates in public housing were dependent on the crime rates in the surrounding neighborhoods. See, Tamara Dumanovsky, Jeffrey Fagan and J. Philip Thompson, *The Neighborhood Context of Crime In NYC's Public Housing Projects***,** Presented at the September Research Institute on Neighborhood Effects on

the surrounding police precinct. For the housing project estimates, we also use the crime rate in the surrounding police precinct. For this analysis, we would rather have used tracts, but some larger public housing sites occupy one or more census tracts. To avoid this isomorphism and confounding, we relied instead on precinct crime rates. Although heterogeneous units with ambiguous social meaning, precincts have the advantage of being the administrative unit where policing policies are implemented and managed. Because of the large size of precincts, we did not include a spatial control in the analyses of precinct-level effects.

We used mixed effects overdispersed Poisson regression models with an autoregressive covariance structure to estimate the impacts of DEP on crime and violence rates in and around public housing.[31] There are inherent difficulties associated with linear (OLS) regression to analyze *per capita* crime rates for aggregated units such as census tracts or precincts.[32] Accordingly, we use a modified Poisson regression approach to resolve this problem, where the Poisson models of counts are transformed into models of *per capita* offense rates through the inclusion of logged population as an independent variables in each of the models.[33]

All models were run in using the GLIMMIX macro in the SAS Generalized Linear Model procedure.[34] We specify both fixed and random effects to simulate a hierarchical panel design or growth curve model.[35] We include fixed effects for project and neighborhood characteristics, fixed effects for prior year indicia of violence and crime, drug enforcement in the prior year (lagged), and the social and economic indicia of the various ecological contexts. We include random effects for time (to account for within-neighborhood change over time) and a quadratic term for time, and random effects to account for the time-varying contributions of DEP funding over the panel.

We include a Moran's I statistic36 to assess spatial autocorrelation in the

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Low-Income Families, Joint Center for Poverty Research, The University of Chicago and Northwestern University (1999).

31 A potential difficulty with the Poisson specification lies with the assumption that the variance is equal to the mean, a condition often encountered in event (count) data that are customarily overdispersed (where the variance exceeds the mean, as often is the case when there are large numbers of zeros in the observations).

32 See, for example, D. Wayne Osgood, Poisson-Based Regression Analysis Of Aggregate Crime Rates, 16 *Journal of Quantitative Criminology* 21 (2000).

33 Wayne Osgood, *id*.

34 The procedure is PROC MIXED, applying the *GLIMMIX* macro for generalized linear models with mixed effects. SAS, Inc., Cary, NC. See, for example, Judith Singer, Using SAS PROC MIXED to Fit Multilevel Models, Hierarchical Models, and Individual Growth Models, 24 *Journal of Educational and Behavioral Statistics* 322 (1998)

35 See, for example, Judith Singer, *id*; William Greene, ECONOMETRIC ANALYSIS (5th edition) (2000).

36 Moran's I is a comparison of the value at any one location with the value at all other locations in adjacent (first order) or nearby (second order or higher) spatial units. Moran's I requires an intensity value for a crime point (represented here as the centroid of the census tract). This point is

crime measures and as a control for crime rates in adjoining areas.[37] Spatial autocorrelation also permits analyses of the displacement and diffusion of drug-related violence into the surrounding neighborhoods.

Finally, we included a measure to account for the endogeneity of crime and social disadvantage within each spatial unit (public housing site, tract, and precinct). The measure is the predicted value from a Poisson regression of the crime (or homicide) count in the initial year in each series (1986), predicted from the social structural variables.

V. RESULTS

A. Descriptive Statistics

Social and economic characteristics of tracts, precincts, and housing projects are shown in Tables 5 and 6. These measures are the average of 1980 – 2000 census measures. Tracts populations range from 10 to 25105, with a mean population of 3,446 persons. Precincts obviously are larger, with populations ranging from 23,021 to 225,027, and an average population of 95,624 persons.[38] Public housing developments have populations that range from 10 to 7,411, with a mean population of 2267.4 (σ = 1,577.5).

There are some revealing measures in Table 6 about NYCHA's public housing developments. The developments in the sample for this study are quite large, averaging more than 10 buildings per site, and number that no doubt is pushed higher by the small number of very large projects with multiple buildings. Since we excluded consolidations and amalgamations, the large size of these projects is noteworthy. More than 40 percent of the population are minors below 18 years of age, and 13.75% are seniors. Tenure averages more than 15 years, a remarkably long and stable period of residence for most families. But officially reported incomes are extremely low, averaging $12,525 per family per year. Nearly one in three families receive either "welfare" (TANF) or other forms of public assistance. Fewer than five percent of the households in public housing

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then assigned an intensity value, in this case the count of crimes within that tract. The Moran's I result varies between -1 and +1. Values closer to +1 indicate high degrees of clustering of similar values, either high (positive) or low (negative). Conversely, values closer to -1 demonstrate dispersion, where areas with high values are surrounding by neighbors with low values, and vice versa. A Moran's I of 0 suggests that spatial autocorrelation is absent, that event occurrence is random.

[37] These are first order estimates. We acknowledge the importance of second order spatial influences in recent empirical work, although we do not include second order measures since they may confounded with policing or DEP activities in those spatial units. See, Jeffrey D. Morenoff et al., Neighborhood Equality, Collective Efficacy, and the Spatial Dynamics of Urban Violence, *supra* note 28.

[38] The Central Park precinct has a tiny population but some crime. The models in the sections following were unaffected by excluding this precinct.

have two adults in the home who are employed. One family in five is a single-parent family with minor children. Just as populations in public housing are under-reported to avoid violations of NYCHA contracts and rules, there are strong incentives to engage in informal economic activity and avoid other sources of income that might jeopardize eligibility if known.

B. Data Reduction

For each of the three spatial aggregations, we used principle components factor analysis to create a smaller number of theoretically meaningful covariates from the 18 separate measures. As discussed earlier, these dimensions are *a priori* constructs that capture structural features of neighborhoods that are correlated with variations in crime rates. Factor analyses were completed for each year in the panel, and the factor scores serve as time-varying covariates in the models of DEP effects. To simplify and illustrate display, Table 7 shows the factor derivations for tracts and precincts for 1990, and Table 8 shows factor derivations for the public housing developments, also for 1990.

For tracts and precincts, factors vary in their explained variance. Poverty and inequality factors are strong, explaining 88.5% of the variance for tracts, and 92.9% for precincts. Anonymity and housing factors are the weakest, with explained variance ranging from 51.9% to 66.4%. For public housing developments, we constructed two factors, and use single measures for other covariates in the model. Explained variance for a poverty factor and a social control factor are shown in Table 8.

C. Estimates of DEP Effects

For each unit of analysis, we estimated models of DEP effects using overdispersed mixed effects Poisson regressions. We introduce a quadratic time component to better fit a model to the curvilinear distribution of crime over the study period. We control for the endogeneity of social structure and crime at the start of the time series by estimating a regression of social structure on crime rates for the baseline year (1986) at each unit of analysis, and including the predicted value from that model as a predictor in the panel analyses. And, as mentioned earlier, we use an offset of the logged population for each unit to approximate an analysis of per capita crime rates.

We use three different measures to estimate DEP effects: (a) a binary measure set at 0 for the years preceding DEP and 1 for the years in the panel when DEP was in effects, (b) a measure of total DEP funding for each year in the series, set at 0 for the years preceding DEP, and (c) specific estimates of the effects of OSH and Tenant Patrols, based on DEP investments in these specific components. We limited the components analysis to these two programs due to multicollinearity between these two components and the ANSF and Drug Services

components. We could not model project-specific interventions, since many of the DEP components were implemented in wide areas encompassing several public housing developments. For example, in the later years of DEP, some programs were borough-wide programs.[39] For the tract and public housing developments, we also include measures of crime in the areas surrounding areas for the tract and public housing components. For the latter, we use the crime rate in the precinct where the development is located. We would have preferred a smaller unit, such as the surrounding census tracts or some other definition of "neighborhood." But some developments were larger than one tract or straddled the borders of two tracts, complicating the boundary decision. DEP effects were lagged by one year, as were the effects of drug arrests.

1. Precinct Effects.

Separate analyses examined DEP effects on property and violent crimes. We used UCR crime categories to classify crimes into each category.[40]

Table 9a shows the models for DEP effects on violent crimes. For all three measures, DEP interventions significantly reduced crime rates over time. The effects of the control variables vary by DEP measure, so there is no clear picture of the effects of factors such as drug arrests or the concentration of public housing in a precinct. In all three models, the social structural covariates suggest that concentrations of structural risk are correlated with higher violence rates.

The analysis of DEP components suggests that these effects are specific to OSH interventions. More aggressive police patrol, coupled with police efforts to sustain the initial crime reduction contacts through the "maintenance teams," significantly contributes to lower violence rates. The effects of tenant patrols, designed to strengthen informal social control, does not appear to affect violence rates at the precinct level.

Of course, precincts are complex places, and there are many confounding and unobserved factors that might drive these models. There are two contradictory findings in the investment and components analyses that complicate the interpretation of DEP effects on precinct-wide crime rates. First, the fewer the number of public housing sites, the higher the violent crime rates. DEP was present in the public housing sites only, and its effects on the surrounding areas are uncertain. Accordingly, we cautiously view the effects on crime rates as concentrated in the public housing sites, since DEP was specific to those areas. But violent crime rates were higher in precincts with higher concentrations of population in public housing. This may be a project size proxy, since the population concentration reflects the presence of very large developments that

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[39] See, Jeffrey Fagan et al., Drug Control in Public Housing, *supra* note 14.

[40] Violent crimes included reported and verified felony crimes of robbery, rape, other sex crimes, murder, manslaughter, kidnap, and assault. Property crimes included reported and verified felony crimes of larceny, motor vehicle theft, and burglary.

often dwarf the surrounding areas. Crime problems are more severe in larger projects,[41] and this variable may be capturing the influence of the overall higher crime rates in precincts where developments are spatially concentrated.

The effect of DEP on property crime rates is clearer. Table 9b shows that DEP interventions are significant in all three models, including the components model. Controls for public housing sites in the precinct are not significant for the property crime models, and drug arrest are significant in only one instance. In the components model, both OSH and tenant patrols are significant, but in opposite directions. It is not hard to understand why these two components should work against one another, since these investments moved in opposite directions over time. But why these effects – limited to public housing sites – should influence precinct-level property crime rates is a more difficult question. There is little modifying evidence to suggest that these effects are specific to public housing sites, such as the concentration of public housing in the precincts.

2. Tract Effects

Here, we are limited to analysis of homicide victimization rates, since geo-coded crime data are not publicly available for analysis of other crime measures. The results of the tract analysis in Table 10 are consistent with the precinct analysis. DEP effects are large, significant, and in the expected direction. In the components analysis, OSH significantly predicts lower homicide rates, but tenant patrols are not a significant predictor of homicide rates. These models control for the effects of homicide in the surrounding census tracts.

The dummy variable for whether the tract contains a public housing site is significant in the binary and components models, but the coefficient is negative. Accordingly, tracts with public housing sites have overall higher homicide rates compared to other tracts, as shown graphically in Figure 1. In this table, the beneficial effects of DEP are evident, even after we control for base rate differences in homicide risk in public housing sites over time, and for homicide rates in surrounding census tracts.

This analysis also shows that drug sale and drug possession arrests are associated with higher homicide rates in census tracts. This counter-intuitive effect is not surprising in the context of street-level drug markets. Higher drug arrests are a marker for higher violence rates in both neighborhood studies[42] and city-level analyses.[43] Drug markets often stable and institutionalized, despite their

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41 See, for example, Dumanovsky et al., Neighborhood Contexts of Crime in New York City Public Housing, *supra* note 30.

42 Fagan and Davies, The Effects of Drug Enforcement on the Rise and Fall of Homicide in New York City, 1985-96, Final Report, Grant 031675, Substance Abuse Policy Research Program, Robert Wood Johnson Foundation (2002).

43 Graham Ousey and Matthew R. Lee, Examining the Conditional Nature of the Illicit Drug Markets-Homicide Relationship: A Partial Test of the Theory of Contingent Causation. 40 *Criminology* 101 (2002); Eric Baumer et al., The Influence of Crack Cocaine on Robbery,

illicit activity and the potential harms from drug abuse.[44] Disrupting markets introduces instability, and such instability often is the spark for lethal violence.[45] High rates of arrests may have the short-term effect of destabilizing drug markets by removing social controls exerted by drug organizations intent on keeping neighborhoods stable to avoid problems with the police.[46] Accordingly, drug enforcement may have a churning effect on drug markets that invites instability and conflict. When drug offenders are removed via arrest, they were quickly replaced by a supply of young men whose income potential seemed far better in illegal work than in legal work. The competition among new sellers and newly emerging organizations often is a fertile context for renewed and recurring violence.[47]

3. DEP Effects in NYCHA Developments

There were no significant effects of DEP interventions in the housing projects themselves, either on violence or property crime rates. Table 11a shows the results for the analysis of DEP effects on violence. The positive coefficients for the violence rate in the surrounding precinct suggests that project crime rates are significantly influenced by what happens in the surrounding social context. Drug possession arrests in the projects also appear to influence violent crime in two of the models, perhaps suggesting a demand-side suppression effect on drug

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Burglary, and Homicide Rates: A Cross-City, Longitudinal Analysis, 35 *Journal of Research in Crime and Delinquency* 316 (1998); Richard Rosenfeld and Scott H. Decker, Are Arrest Statistics a Valid Measure of Illicit Drug
Use? 16 *Justice Quarterly* 685 (1999).

44 See, Judith Matloff, Whose Neighborhood? *New York Times*, July 14, 2002, for a detailed account of a northern Manhattan neighborhood where several drug sellers took strong measures to keep their neighborhood safe and avoid attention from the police. Several studies suggest that drug enforcement removes established drug sellers from established territories, from organizational positions in drug organizations, and from stable business relationships with customers. The vacuum created by aggressive drug enforcement is quickly filled by competing drug selling groups, and new sellers arrive to establish business relationships with active buyers seeking new sources of drug supplies. But, when several groups or individuals compete to fill these vacuums, the possibility arises for disputes and conflicts that are settled by violence. Also, when organizations are destabilized by arrests, internal organizational conflicts may arise as group members compete to assume higher positions in their organizations that were vacated following arrests and convictions. Again, such internal instability may be resolved by violence.

45 See, for example, Paul Goldstein, et al.,Crack and Homicide in New York City, 1988: A Conceptually-Based Event Analysis, 16 *Contemporary Drug Problems* 161 (1990); Phillippe Bourgois, IN SEARCH OF RESPECT (1995); Richard Curtis, The Improbable Transformation Of Inner-City Neighborhoods: Crime, Violence, Drugs, And Youth In The 1990s, 88 *Journal of Criminal Law and Criminology* 1233 (1998);

46 See, for example, Robert Jackall, WILD COWBOYS (1997)

47 Bourgois, *supra* note 45; Robert Jackall, WILD COWBOYS, id; Sudhir Alli Venkatesh, AMERICAN PROJECT (2000); Jeffrey Fagan and Deanna L. Wilkinson, Guns, Youth Violence and Social Identity, in *Youth Violence* (M. Tonry and M.H. Moore, eds.), 24 *Crime and Justice* 373 (1998).

markets due perhaps to increased police activity focused less on sales than on drug possession. Table 11b shows no effects of either DEP or drug arrests or precinct crime rates on property crimes in public housing.

We suggest caution in comparing these models to the previous ones, given differences in measurement and data sources. Recall that the measure of crime in this analysis is taken from NYCHA incident reports, and its validity may differ from police or public health data used in the previous analyses. At the same time, any measurement error in this series is stable over time within sites, so estimates of within-site changes in crime rates are likely to be stable. Accordingly, we regard these results are reliable, and measurement error may have only a minor influence on the size of the coefficients.

D. Summary

Table 12 provides a summary of the estimates of DEP effects on violence and property crimes in and around public housing. The absence of effects within public housing is less surprising in the context of how DEP funds were allocated and applied by the NYPD. DEP was focused on housing sites, but also was sufficiently diffused in the NYPD's broader administrative units – police service areas, or PSA's – to provide resources that benefited law enforcement generally. Seen this way, DEP was an important and strategically valuable supplement to the NYPD's strategic response to a particularly acute violence and crime epidemic.[48] It allowed the police to focus not just on crimes in public housing, but in the surrounding areas, as well. This strategy is consistent with the reality that crime problems in public housing are reciprocally tied to crime problems in the surrounding areas.[49]

But the absence of measurable and positive effects within public housing speaks to the one-sided nature of the enforcement strategy. The policing strategy was well-supported and active both within public housing and the surrounding areas. The non-enforcement components of DEP were targeted specifically within public housing sites: tenant patrols and drug treatment for its residents. These were poorly funded and the efforts diluted, considering NYCHA's vast landscape. These low funding levels *per site* may have limited the development and effectiveness of the non-enforcement approaches. Moreover, the reaction of minority communities to the NYPD's aggressive police tactics may have led to adverse responses by residents to the intensive drug patrols, animating their

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48 See, for example, George Kelling and William Souza, Do Police Matter? An Analysis of the Impact of New York City's Police Reforms (2001), http://www.manhattan-institute.org/cr_22.pdf, visited March 14, 2003. Kelling and Souza see New York's crime decline as the result of the adoption of a strategy of aggressive policing of social and physical disorder via "zero tolerance" policies and high rates of misdemeanor arrests, which in turn had prophylactic effects on crime rates.

49 Dumanovsky et al., Neighborhood Contexts of Crime in Public Housing, *supra* note 30; Jeffrey Fagan and Garth Davies, Crime in Public Housing, *supra* note 14.

withdrawal from their own participation in social control and security.[50] The failure to mount viable interventions that directly touched on the drug problems, social and economic lives, or normative orientations of NYCHA residents may explain their withdrawal from social regulation, and in turn, the absence of DEP effects within projects. In the next section, we discuss the reasons why.

VI. CONCLUSION

DEP was launched in 1990 at the peak of New York City's epidemic of lethal violence, much of which was animated by the explosive growth of street-level drug markets.[51] DEP was launched concurrently with other strong crime control measures, most prominently "Operation Safe Streets."[52] Within two years of the launch of DEP, and Operation Safe Streets, crime rates began to decline in the City.[53] Homicide and non-lethal injuries, a reliable measure of criminal violence that is independent of police reporting influences, declined slowly in 1992 and 1993, and then began a precipitous decline that lasted through the end of the decade. Apportioning the reduction to DEP, other crime control measures, a general decline in drug epidemics, or to a secular decline in violence and crime due to economic or other social forces, is a conceptual and empirical challenge and a contentious public policy debate.

In this study, we attempted to isolate the effects of DEP as one such policy change. Using official records, we also show how formal social control – drug arrests, primarily, conducted by special teams – contributed to the reduction of crime and violence in the areas surrounding public housing, but appeared to have little influence on the public housing sites they targeted. Based on this trend, we draw lessons about DEP and about social control in public housing.

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50 Jason Sunshine and Tom R. Tyler, Moral Solidarity, Identification with the Community, and the Importance of Procedural Justice: The Police as Prototypical Representatives of a Group's Moral Values, 66 *Social Psychology Quarterly* 153 (2003).

51 Richard Curtis, The Improbable Transformation of Inner-City Neighborhoods: Crime, Violence, Drugs, And Youth In The 1990s, 88 *Journal of Criminal Law and Criminology* 1233 (1998); Phillippe Bourgois, IN SEARCH OF RESPECT, supra note 45; Ansley Hamid, The Political Economy of Crack-Related Violence," 17 *Contemporary Drug Problems* 31 (1990); Bruce D. Johnson, et al., Drug Abuse in the Inner City: Impact on Hard-Core Drug Users and the Community, 13 *Crime and Justice* 9 (1990).

52 See, for example, Andrew Karmen, NEW YORK MURDER MYSTERY, supra note 2; Michele Sviridoff, et al., The Neighborhood Effects of New York City's Tactical Narcotics Team on Three Brooklyn Precincts: Evaluation of the Tactical Narcotics Teams (1992).

53 Jeffrey Fagan et al., *Declining Homicide in New York: A Tale of Two Epidemics*, 88 J. Crim. L. & Crim'l'gy 1277 (1998),; Karmen, *supra note 2.*

A. Drug Control as Leveraged Social Control

Public housing in New York City accounts for a sizable portion of housing in many poor neighborhoods, and in some communities it is the primary type of housing.[54] Although crime rates sometimes differ in public housing compared to the surrounding area, public housing developments exert a strong influence on the neighborhoods surrounding them, but so too do those neighborhoods influence crime within the housing developments they surround. Also, the correlates of crime in public housing are not necessarily those found in the city as a whole, or in other poor urban areas.[55] Accordingly, the embeddedness of public housing in broader ecological dynamics of their surrounding neighborhoods is an empirical fact that bears on the impacts of the DEP program.

The diffusion of social order and patterns of social exchanges in public housing "neighborhoods" suggests that the fates of persons living in public housing and persons living in their surrounding areas are tightly linked. Policy decisions that located public housing in specific neighborhoods, which themselves already were burdened by concentrated poverty, racial segregation, and weakened mechanisms of informal social control, placed those burdens *de facto* on the residents of public housing. This history of urban development reciprocally shaped neighborhood ecologies and the fates of public housing developments.[56] The effects of more recent policy decisions concerning changes in welfare policy, housing policies, and public housing eligibility are still unknown. But, together with well-publicized changes in police intervention strategies in New York City,[57] housing policy decisions that target drugs and crime held out the promise to significantly improve the ecology of poor neighborhoods.

DEP must be viewed, then, not just in its ability to root out and suppress drug and crime problems in public housing, but in its ability to foster sustainable changes in the capacity for social control among public housing residents. The first goal – to root out crime and drug problems – was pursued through strong investments of DEP funds in Operation Safe Homes, increasing patrol strength and focusing its resources in pubic housing. OSH was coupled with special prosecutions of public housing residents to intensify its deterrence efforts.

The second goal – strengthening informal social control by increasing resident participation in patrol and other collective action projects – was informed

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54 Peter Marcuse, Interpreting Public Housing History, 12 *Journal of Architectural and Planning Research* 240 (1995); Dumanovsky, et al., Neighborhood Variation in Crime in Public Housing, *supra* note 30; Susan Saegert, Gary Winkel, and H. Swartz, Social Capital and the Revitalization of New York City's Distressed Inner-City Neighborhoods, 9 *Housing Policy Debate* 17 (1998).

55 Tamara Dumanovsky, Neighborhood Context of Crime in Public Housing, *supra* note 30; Garth Davies, Social Ecology and the Diffusion of Crime and Violence In and Around Public Housing in New York City (doctoral dissertation) (2003).

56 Peter Marcuse, *Public Housing History*, *supra* note 54.

57 Willam Bratton and Peter Knobler, TURNAROUND (1998); George Kelling and Catherine Coles, FIXING BROKEN WINDOWS (1996); Fagan and Davies, *Street Stops and Broken Windows*, *supra* note 11.

by theories that emphasize the importance of social regulation and collective efficacy in reducing crime.[58] DEP pursued this goal, for a time, by investing in tenant organizations and social services that would enhance the capacity of citizens to exert social control by (a) building social ties between citizens and (b) strengthening ties between citizens and law enforcement.[59] The results of these processes were designed to strengthen forms of informal social control to reduce crime and drug problems. In other words, DEP was designed to promote the expansion of social capital by increasing the capacity for supervision.

B. Diffusion of Efforts in a Political Context

When interviewed, residents reported that drug and alcohol problems improved in public housing, and that crime and unwarranted police harassment also declined during this time.[60] Physical and social disorder also waned as a perceived problem in and around many of the public housing sites included in these surveys. But residents said that these improvements were unrelated to DEP programs, and that policing under DEP was largely unchanged from previous eras. Residents reported that their involvement with the police, as well as social ties among residents, remained unchanged, and few respondents reported general improvements in their perceived safety. Social capital – as measured in these interviews by the extent of local social ties and citizen interactions – either declined or remained unchanged in most public housing sites. Thus, residents generally were unwilling to attribute improvements in the problems of drugs, crime and disorder as linked to better policing, stronger tenant activity, or closer ties among public housing residents.

Thus, the good news of perceived improvements in tenants' lives is tempered by the fact that the sources of these improvements were un related to DEP, nor to other measurable or sustainable changes in social interactions or social organization among public housing tenants. The goal to strengthen social capital and informal social control involved transfer of some burden of social control over time from police to citizens. Social control is strongest when citizens partner with legal actors to enforce laws.[61] In DEP, the balance of social control functions remained primarily the province of the police, and these efforts were

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58 Robert J. Sampson, et al., Neighborhoods and Violent Crime: A Multilevel Model of Collective Efficacy, 277 *Science* 918 (1997).

59 Robert J. Bursik, Jr., and Harold Grasmick, NEIGHBORHOODS AND CRIME (1993); Sampson et al., *id;* Wesley Skogan, DISORDER AND DECLINE (1990); Ralph B. Taylor, BREAKING AWAY FROM BROKEN WINDOWS (2001).

60 See, Jeffrey Fagan et al., Drug Control in Public Housing, *supra* note 14. In this study, interviews were completed with 752 respondents including residents and NYCHA staff in 62 NYCHA developments located in 19 neighborhoods, in 1998-2000. Of these 752, 87.3% were NYCHA residents.

61 See, for example, Charles Tittle, CONTROL BALANCE (1996).

diffused throughout the department, often with harsh effects.[62] Despite the intention to address crime and drug problems in public housing, police internalized DEP funds as part of an overall strategic facelift for the department.

The disproportionate allocation of DEP funds to enforcement and the relatively smaller and more diluted investments in tenant programs (informal social control), were noted by residents. In contrast, DEP resources for tenant social and preventive programs were diffused throughout NYCHA's public housing sites. The programs were generally underfunded, thematically inconsistent, and not created with an eye toward permanence or even sustainability. In key informant interviews,[63] law enforcement officials, NYCHA administration, and tenant leaders all described DEP a program that was primarily a supplement to ongoing policing programs, that was indistinguishable from the routine policing tactics in public housing, and that only casually and haphazardly supported social developmental or preventive programs.[64] They characterized Operation Safe Homes DEP funds as a means to expand policing, not to develop new forms of patrol that reflected the reality of public housing or its unique crime problems. Under DEP, no special programs were created, no new initiatives were developed or tested, and nothing sustainable apart from everyday command-and-control policing was developed or sustained under this program.[65]

Police tactics in this era were controversial and racialized, and the racial imbalances in policing often were flashpoints for social tension conflict between minority citizens and police since 1994.[66] The concentration of African Americans and Hispanics in public housing increased their exposure to the aggressive police tactics of this era. In many African American communities, the racial breach was an impediment to police-citizen cooperation. In public housing, OSH extended these policing tactics to largely poor and nonwhite citizens,

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62 "Operation Condor" was created during this era, an initiative of the New York City Police Department that used overtime pay to motivate police officers to make "buy-and-bust" arrests for drug offenses. The program produced thousands of arrests across the City, but its tactics raised complaints from minority citizens about its racial disproportionality, and the excessive use of a full criminal justice process (including the use of pretrial detention rather than summons) for low-level drug offenders whose crimes were mostly non-violent and who posed a minimal public safety threat. The death of Patrick Dorismond, an unarmed citizen who was approached by Condor officers who tried to sell him marijuana during an Operation Condor arrest, heightened racial tensions between minority citizens and the police. Jeffrey Rosen, Excessive Force: Why Patrick Dorismond Didn't Have to Die, *The New Republic,* Apr. 10, 2000, at 26; see also William Rashbaum, Police Suspend Extra Patrols for 10 Days, *N.Y. Times*, Oct. 10, 2000, at B1.

63 Jeffrey Fagan, Drug Control in Public Housing, *supra* note 14. Key informants included 12 NYPD police officers from all PSA's in the city, 13 tenant association leaders and providers of DEP-funded social service programs within NYCHA.

64 Jeffrey Fagan, Drug Control in Public Housing, *id*.

65 *Id*, at __.

66 New York State Attorney General, 1999; David Kocieniewski, Success of Elite Police Unit Exacts a Toll on the Streets, *New York Times*, February 15, 1999, at A1; Kit R. Roane, Minority Private-School Students Claim Police Harassment, *New York Times*, March 26, 1999, at B5; Fagan and Davies, *id*.

weakening police-citizen cooperation to create the reciprocal social controls essential to effective crime control. Many respondents complained that these tactics tended to isolate citizens from the police, and offered no incentive for citizens to engage with one another or with OSH or the police generally in the co-production of security. Instead, citizens continued their reliance on formal social control, and the difficult and delicate process of social capital development was stillborn.

Many of these complaints applied equally to the Anti-Narcotic Strike Force. At a time when the courts in New York City were returning to a philosophy of individualized justice, and in a historical context when the courts were reorganizing in most boroughs to provide drug treatment services and a theory of therapeutic jurisprudence,[67] the ANSF pursued an aggressive program of prosecution of both petty and serious drug offenders in public housing. Treatment was not a part of ANSF actions, which were focused on either the removal of offending families from public housing or the incarceration of drug offenders. Cases were brought against public housing tenants without discretion, and with little attention to the individual context of the case or the potential impact of prosecution on collateral parties. Nearly all incidents were processed formally through one or more available legal routes. While some prosecutions were seen by key informants as important weapons against well organized drug dealers, the formality of ANSF also led to prosecutions of low-level users and drug possessors whose incarceration or eviction was not seen as contributing substantially to drug control or crime reduction.

DEP perhaps was a lost opportunity, both for innovation and for testing of new ways to control and eliminate drug problems. Identifying the unique contributions of DEP in an era of declining crime rates is difficult, and was further complicated by its diffused implementation. Second, the blurring of lines between everyday police patrol and OSH (especially post-merger) defeated efforts to rigorously estimate the crime control effects of special policing in the PSA's and in the public housing sites. The narrow scope of interventions, inability to distinguish DEP component from ongoing policies and tactics, and the generally weak "dosage" of efforts or investment in social programs and tenant patrol across the 184 public housing sites, formed a weak program that was barren of vision, theory or execution. Public housing residents and key informants both seemed to agree.

C. Social Norms and Drug Control in Public Housing

67 Drug treatment courts opened during this time in every borough except Manhattan. See, Berman et al, Institutionalizing Innovation, *supra* note 13.

There are realizable pathways to the original vision of DEP that offer the promise of sustainable impacts that can accomplish both the suppression and social developmental components of DEP. The pivotal kernel is a strategy that brings citizens and police into closer collaboration to address problems of crime, drugs and disorder. DEP offered no new vision of policing, and in fact, simply intensified a policing and prosecution regime that was antagonistic to many citizens.

The incentives for people to engage with legal actors in social regulation and the co-production of security may lie in their evaluations of their treatment by the police. Fairness and crackdowns may be inconsistent, but at least citizens know they are tradeoffs. Recent work by Tom Tyler, based on a survey of residents in three Oakland, California neighborhoods suggests that citizens' evaluations of legal actors are not linked to the outcomes of their court cases or interactions with police, or on the crime rate in their neighborhood.[68] Tyler focuses instead on the fairness of their treatment from those authorities. Ron Weitzer reaches the same conclusion in a survey of residents of three neighborhoods in Washington DC.[69] He reports contrasting evaluations of police services in two predominantly black neighborhoods. Proactive policing of residents of a poor, high crime neighborhood elicited less favorable reactions to police than did the more reactive and respectful treatment of citizens in an "orderly" middle class neighborhood.70

Although the law is based on the implicit or explicit threat of sanctioning for wrongdoing, the legal system depends heavily on voluntary compliance from most citizens to set and enforce norms, and to engage with the police in social control. Hence, lower levels of legitimacy make social regulation more costly and difficult, both materially and politically. The police depend heavily on the voluntary cooperation of citizens to fight crime. Citizens report crime and criminals, informally help to police their neighborhoods, and aid the courts as jurors and witnesses. Without these cooperative acts from the public, the police risk being seen as an intrusive force imposing order. And without these acts, the meaning of order becomes detached from its social basis and loses its moral weight to influence others in the community.

A social norms approach would invite policing of drug problems in the context of corresponding and contemporaneous extra-legal social initiatives aimed

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68 Tom Tyler and Y. Huo, TRUST IN THE LAW: ENCOURAGING PUBLIC COOPERATION WITH THE POLICE AND COURTS (2002) ; See, also,Tom R. Tyler, Public Trust And Confidence In Legal Authorities: What Do People Want From The Law And Legal Institutions?, 19 *Behavioral Science and the Law* 215 (2001).

69 Ronald Weitzer,. Racialized Policing: Residents' Perceptions in Three Neighborhoods, 34 *Law & Soc'y Review* 129 (2000)

70 Weitzer, Id.. Weitzer's findings stand Broken Windows theory on its head by suggesting that the police may be reacting to the visible cues of crime and disorder, not just would-be criminals who might journey to a disorderly neighborhood to take advantage of crime opportunities. Weitzer's findings suggest that in neighborhoods with visible signs of disorder, police react with indiscriminate and widespread patterns of aggressive stops and interdiction of citizens.

at the same or parallel problems. These realistically balanced efforts reflect a more complex view of the interaction of crime and drugs, one that recognizes their spurious relationship to broader underlying social and physical conditions within neighborhoods. While OSH and ANSF approaches might promote a temporary reduction of crime through suppression, a legitimacy-focused approach promotes construction of social networks that integrate community-level social processes with the regulation of crime and disorder.

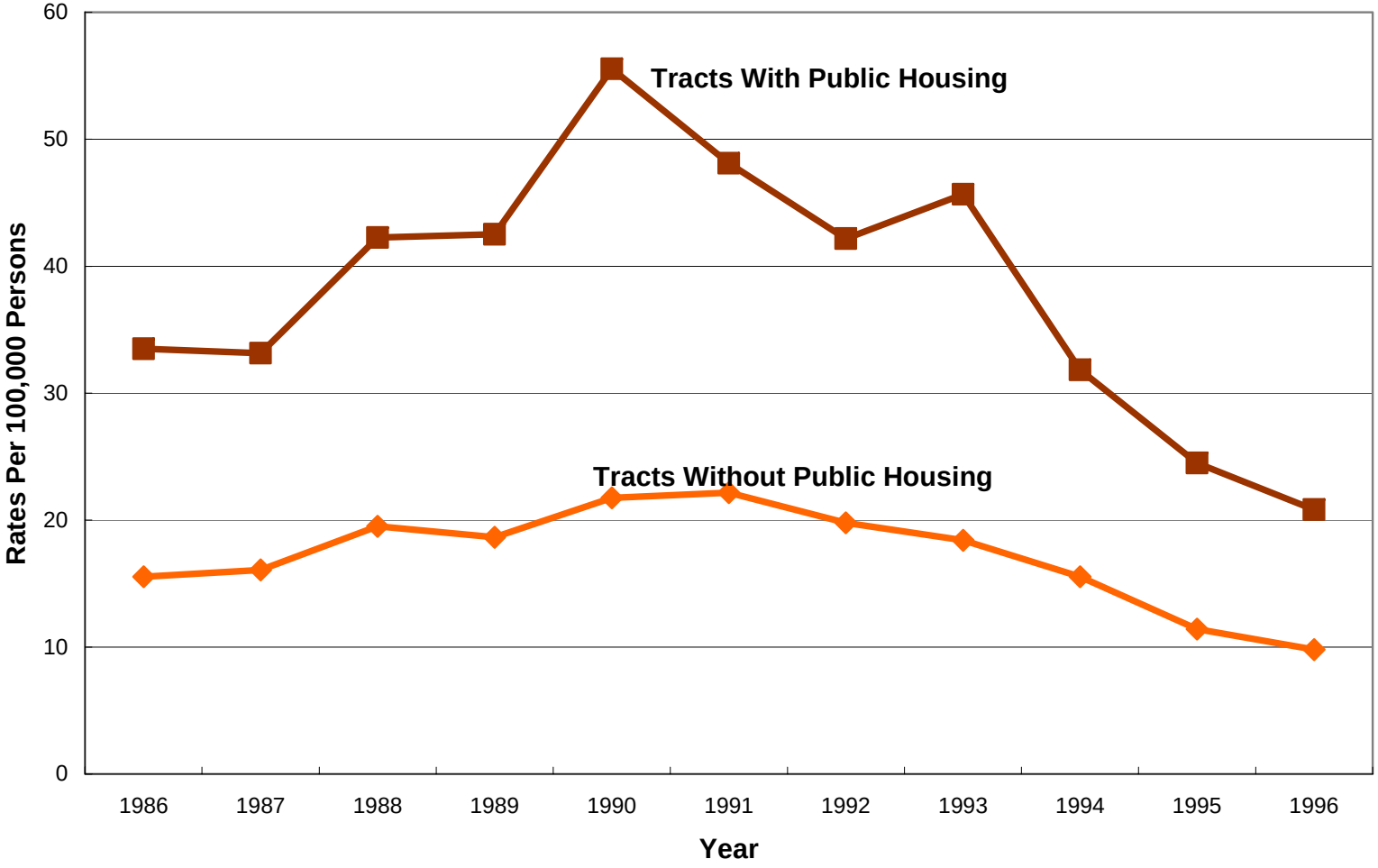
Table 1. Comparison of Social Indicators and Homicide Rates in New York City Census Tracts with and without Public Housing Developments

	Tracts With Public Housing		Tracts without Public Housing	
Variable	*Mean*	*SD*	*Mean*	*SD*
Homicide (counts)*	1.87	1.29	0.53	0.75
% Households with Public Assistance Income±	31.54	13.36	11.65	11.54
Gini for Total Household Income	0.47	0.04	0.36	0.09
% Households Under Poverty Level	38.39	13.76	15.63	13.23
% High School Graduates - Total - 25+	51.20	12.95	68.16	15.75
% in Managerial, Professional, or Technical Jobs	20.91	10.83	30.75	15.28
Employment Rate	83.32	6.72	91.11	6.64
Labor Force Participation Rate	50.97	9.31	61.81	11.24
% Nonwhite	85.74	22.67	51.14	35.71
Racial Fragmentation Index	0.45	0.15	0.37	0.20
% Female Headed Households with Children < 18	21.56	10.28	8.70	9.55
Supervision Ratio (25-64 by 5-24)	1.60	0.90	2.52	2.16
% Youth Population (5-15)	20.28	6.05	14.02	6.50
Population	4885	2603	3118	2381
Residential Mobility - Same House as 5 Years Ago	66.42	8.92	62.51	12.08
% Foreign Born	17.05	12.19	28.56	14.98
% Linguistic Isolation	12.25	9.69	10.80	10.17
Vacancy Rate	4.38	4.34	5.67	6.08
% Occupied Units that are Rentals	90.69	10.41	61.99	25.48
% Tracts Containing Public Housing	10.56			
Public Housing Population	1801	1661		
% Tract Population comprised of Public Housing	37.37	25.63		

* Homicide measures are average for 1985-96 period. Per capita rates show similar differences: .41 per 1,000 persons in public housing tracts, .19 per 1,000 persons in tracts without public housing.

± Indicators are calculated from 1990 Census Data, which is midpoint of 1985-96 study interval.

Figure 1. Homicide Rates in NYC Census Tracts With and Without Public Housing, 1986-96



Source: Injury Prevention Program, New York City Department of Health and Mental Hygiene, various years

Table 2. NYCHA Population, Household Size and Population Characteristics, 1985-96 (N=184)

Year	Total Population	Total Families	Persons per Household	% Seniors	% Families on Welfare	Average Residency (years)	% White	% Population below 10	% Population 10-17
1985	447,944	160,545	2.79	11.9	27.5	13.3	9.3	17.5	19.7
1986	441,483	160,481	2.75	12.3	27.6	13.8	9.1	17.7	19.2
1987	434,763	159,915	2.72	12.4	27.5	14.4	8.8	17.8	19.0
1988	432,160	159,152	2.72	12.5	28.6	14.9	8.4	18.3	18.8
1989	422,445	159,974	2.64	13.4	28.6	14.9	7.6	18.3	17.5
1990	422,347	160,578	2.63	13.6	29.3	15.4	7.4	19.1	17.6
1991	424,308	160,162	2.65	13.5	30.3	15.7	7.0	19.1	17.6
1992	410,586	159,207	2.58	13.2	30.9	15.0	6.4	20.6	17.6
1993	413,923	160,029	2.59	13.2	31.1	16.2	6.4	20.6	17.5
1994	399,822	156,042	2.56	13.3	31.1	16.7	6.2	20.6	17.9
1995	391,420	153,936	2.54	13.4	31.0	17.1	6.0	20.5	18.2
1996	392,430	155,325	2.53	13.4	30.1	17.1	5.9	20.4	17.8

Source: New York City Housing Authority, Annual Tenant Recertification Surveys, various years

Table 3. DEP Annual Budget by Program Components, 1991-96

Programs	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**
Operation Safe Home	$4,222,697	$4,417,763	$7,395,957	$14,040,143	$22,030,824	$19,441,604
Tenant Patrol	59,371	76,547	178,055	165,000	1,136,995	1,265,038
Anti-Narcotics Strike Force	76,186	122,677	82,482	978,781	648,603	1,060,803
Drug Abuse Contracts	4,171,410					
Treatment Services	838,544	2,680,339	2,033,244	1,329,826		
Drug Prevention		1,325,224			1,034,117	
Drug Abuse Treatment						819,216
Domestic Violence Program	750,000	395,000	1,040,548	94,305	605,000	1,198,470
Resident Programs	1,276,448	2,810,786	2,436,709	5,211,291		
Community Center Programs				3,025,849	10,622,000	8,445,052
Youth Sports Programming						
Anti-Graffiti				1,406,013	969,381	1,211,636
Seasonal Jobs Program				6,123,174	1,518,993	1,110,179
Summer Youth Employment						
Parenting Skills		109,298	24,948	78,997		
Career Training		2,773,627	1,388,870	5,769,208	1,862,234	
Streetworker	188,898	80,926	248,148			
City Scouts				127,790		
Drug Elimination Staff	334,005	243,176	671,876			
Grants Administration				65,000	150,000	167,921
Partners in Reading						182,105
D.A.R.E./G.R.E.A.T.						97,976
Security Repair Team	249,700					
Security Repair Materials	531,522					
Physical Improvements				294,000		
Police Equipment				118,000		
Total	**$12,698,781**	**$15,035,363**	**$15,500,837**	**$38,827,377**	**$40,578,147**	**$35,000,000**

Table 4. Annual Budget Allocation by DEP Program Components, 1991-99 ($M)

	Program Type						
Year	**Operation Safe Home**	**Tenant Patrol**	**Anti-Narcotics Strike Force**	**Drug Abuse Treatment and Prevention**	**Social and Community Services**	**Security Equipment**	**Total**
1991	4.223	0.059	0.076	5.010	2.549	0.781	12.699
1992	4.418	0.077	0.123	4.006	6.413	0.000	15.035
1993	7.396	0.178	0.082	2.033	5.811	0.000	15.501
1994	14.040	0.165	0.979	1.330	21.902	0.412	38.827
1995	22.031	1.137	0.649	1.034	15.728	0.000	40.578
1996	19.442	1.265	1.061	0.917	12.315	0.000	35.000
Total	**71.55**	**2.88**	**2.97**	**14.33**	**64.718**	**1.193**	**157.64**
Percent	**45.3**	**1.83**	**1.88**	**9.1**	**41.05**	**0.08**	**100**

Source: NYCHA PHDEP Income and Expense Reports, Phase II - Phase IX, reported between 12/31/95 to 12/31/99.

Table 5. Social Structural Characteristics of New York City Census Tracts and Police Precincts, 1990

	Tracts		Precincts	
Variable	*Mean*	*SD*	*Mean*	*SD*
% Households with Public Assistance Income	13.03	11.95	14.26	10.87
Gini for Total Household Income	0.38	0.08	0.40	0.07
% Households Under Poverty Level	18.91	14.22	20.99	12.50
% High School Graduates - Total - 25+	66.16	15.48	66.57	14.36
% in Managerial, Professional, or Technical Jobs	29.73	14.78	32.45	14.90
Employment Rate	90.32	6.01	89.93	4.53
Labor Force Participation Rate	59.65	9.52	60.01	8.01
% Nonwhite	56.49	35.28	59.05	29.99
Racial Fragmentation Index	0.39	0.18	0.48	0.15
% Female Headed Households with Children < 18	10.44	9.53	11.02	8.27
Supervision Ratio (25-64 by 5-24)	2.29	1.35	2.27	1.13
% Youth Population (5-15)	15.33	6.13	14.93	5.58
Population	3446	2312	95524	43237
Residential Mobility - Same House 5 Years Ago	62.91	9.42	61.94	5.41
% Foreign Born	28.67	14.65	27.10	12.51
% Linguistic Isolation	11.10	9.47	11.43	8.18
Vacancy Rate	5.51	4.43	6.01	3.08
% Occupied Units that are Rentals	65.82	25.02	73.97	18.18

Source: STF3A, STF3C Census Files for 1980-2000. Results are shown for 1990 only

Table 6. Social and Economic Characteristics of NYCHA Residents and Developments, 1986-95

Variable	*Mean*	*SD*
Income	12525	3537
% Minors (Under Age 21)	43.49	7.92
% Seniors (Age 62 and Older)	13.75	7.63
% Families Receiving Welfare	29.35	12.11
% Families with One Parent and Children < 18	21.28	9.76
% Families with 2 or more Persons Employed	4.56	3.49
Racial Fragmentation Index	0.46	0.15
Tenure	15.53	3.56
Number of Buildings	10.47	9.28

Source: New York City Housing Authority, Annual Resident Certification Surveys, various years

Table 7. Principle Components Factor Analysis, New York City Census Tracts & Police Precincts, 1990

	Tracts			Precincts		
Factor	***Component***	***Eigenvalue***	***% Explained Variance***	***Component***	***Eigenvalue***	***% Explained Variance***
Poverty/Inequality		2.65	88.5		2.79	92.9
% Households Under Poverty Level	0.971			0.980		
% Households with Public Assistance Income	0.940			0.941		
Gini for Total Household Income	0.909			0.971		
Labor Market/Human Capital		2.69	67.2		3.33	83.4
% High School Graduates - Total - 25+	0.929			0.942		
% in Managerial, Professional, Technical Jobs	0.836			0.895		
Employment Rate	0.774			0.899		
Labor Force Participation Rate	0.726			0.915		
Segregation		1.30	64.8		1.09	54.7
Racial Fragmentation Index	0.805			0.739		
% Nonwhite	0.805			0.739		
Supervision		2.27	75.6		2.38	79.3
%Youth Population (5-15)	0.937			0.917		
% Female Headed Households with Children Under 18	0.847			0.844		
Supervision Ratio (25-64 by 5-24)	-0.819			-0.909		
Anonymity		1.04	51.9		1.33	66.4
Population - 1990	0.720			0.815		
Residential Mobility - Same House as 1985	0.720			0.815		
Immigration		1.53	76.7		1.61	80.3
Linguistic Isolation	0.876			0.896		
Foreign Born	0.876			0.896		
Housing Structure		1.15	57.3		1.18	58.8
%Occupied Units that are Rentals	0.757			0.767		
Vacancy Rate	0.757			0.767		

Table 8. Factor Composition – NYCHA Public Housing (1990)*

Factor	*Component*	*Eigenvalue*	*% Explained Variance*
Public Housing Poverty		1.71	85.5
% Families Receiving Welfare	0.925		
Income	-0.925		
Public Housing Social Control		1.84	91.8
% Minors (Under Age 21)	0.958		
% Families with One Parent and Children Under 18	0.958		

* Factor scores computed for each year from 1985-96, 1990 shown as illustration.

Table 9a. Mixed Effects Poisson Regression of DEP Effects on Violent Crime Rates, New York City Police Precincts, 1986-96

	DEP Binary		DEP Investment		DEP Components	
Effect	***t***	***p(t)***	***t***	***p(t)***	***t***	***p(t)***
Intercept	2.38	0.020	1.27	0.209	0.60	0.550
Time	13.25	0.000	12.61	0.000	5.63	0.000
$Time^2$	-13.18	0.000	-12.29	0.000	-5.35	0.000
DEP	-5.55	0.000	-9.10	0.000		
Operation Safe Homes					-13.36	0.000
Tenant Patrols					1.94	0.057
Number of Public Housing Sites	-1.39	0.164	-2.39	0.018	-3.14	0.002
% Population in Public Housing	1.55	0.122	2.47	0.014	3.27	0.001
Drug Possession Arrests (logged)	-3.81	0.000	-0.96	0.339	1.66	0.099
Drug Sale Arrests (logged)	1.16	0.248	2.56	0.011	0.36	0.723
Endogeneity	11.13	0.000	15.22	0.000	15.34	0.000
Precinct Social Characteristics						
Population (Logged)	3.06	0.002	5.83	0.000	6.58	0.000
Poverty	3.60	0.000	2.01	0.046	2.15	0.034
Human Capital	3.16	0.002	2.35	0.020	2.50	0.014
Segregation	2.68	0.008	5.92	0.000	5.65	0.000
Social Control - Supervision	1.92	0.055	0.41	0.685	1.09	0.276
Social Control - Anonymity	0.27	0.787	0.29	0.770	-0.62	0.536
Immigration	1.03	0.305	0.21	0.832	0.60	0.548
Housing	4.15	0.000	5.75	0.000	6.47	0.000
DEP Interactions						
DEP*Poverty	-0.07	0.944	-0.33	0.739	-1.06	0.290
DEP*Human Capital	0.25	0.805	-0.49	0.626	-0.58	0.563
DEP*Segregation	1.50	0.135	-0.80	0.422	-0.29	0.769
DEP*Supervision	-0.38	0.708	0.75	0.454	1.62	0.107
DEP*Anonymity	0.52	0.605	-1.23	0.220	-1.43	0.156
DEP*Immigration	-0.26	0.796	-0.90	0.367	-1.78	0.077
DEP*Housing	-0.91	0.365	-1.24	0.215	-0.77	0.441
Model Statistics: -2LL	-827.00		-301.7		-473.2	

Table 9b. Mixed Effects Poisson Regression of DEP Effects on Property Crime Rates, New York City Police Precincts, 1986-96

	DEP Dummy		DEP Investments		DEP Components	
Effect	***t***	***p(t)***	***t***	***p(t)***	***t***	***p(t)***
Intercept	1.71	0.091	-2.59	0.012	5.56	0.000
Time	9.71	0.000	13.30	0.000	-5.13	0.000
$Time^2$	-9.76	0.000	-12.85	0.000		
DEP	-6.91	0.000	-11.19	0.000		
Operation Safe Homes					-13.91	0.000
Tenant Patrols					4.12	0.000
Number of Public Housing Sites	-1.61	0.108	-0.15	0.878	-0.31	0.754
% Population in Public Housing	1.32	0.187	-0.69	0.488	-0.63	0.531
Drug Possession Arrests (logged)	-3.08	0.002	-1.56	0.120	0.54	0.589
Drug Sale Arrests (logged)	-1.16	0.248	1.67	0.097	-0.35	0.727
Endogeneity	10.28	0.000	19.19	0.000	19.42	0.000
Precinct Social Characteristics						
Population (Logged)	3.43	0.001	9.77	0.000	10.49	0.000
Poverty	3.76	0.000	-1.32	0.188	-1.36	0.176
Human Capital	4.62	0.000	-0.70	0.485	-0.90	0.372
Segregation	0.66	0.507	1.18	0.239	1.36	0.178
Social Control - Supervision	-0.89	0.374	-3.24	0.001	-3.59	0.001
Social Control - Anonymity	0.33	0.742	-1.93	0.054	-2.54	0.012
Immigration	1.50	0.133	0.27	0.788	0.18	0.855
Housing	-1.05	0.292	3.29	0.001	3.60	0.001
DEP Interactions						
DEP*Poverty	-0.75	0.454	-0.39	0.700	-0.34	0.738
DEP*Human Capital	-0.32	0.746	-0.78	0.435	-0.79	0.432
DEP*Segregation	1.19	0.235	1.45	0.150	1.19	0.238
SEP*Supervision	-0.12	0.908	-0.52	0.603	-0.45	0.654
DEP*Anonymity	1.05	0.292	-1.15	0.253	-1.81	0.072
DEP*Immigration	-0.67	0.506	-1.18	0.238	-1.17	0.245
DEP*Housing	0.73	0.467	-0.53	0.596	-0.81	0.421
Model Statistics: -2LL	-637.8		-314.20		-433.40	

Table 10. Mixed Effects Poisson Regression of DEP Effects on Homicide Counts, New York City Census Tracts, 1985-96

	DEP Binary		DEP Investment		DEP Components	
Effect	***t***	***p(t)***	***t***	***p(t)***	***t***	***p(t)***
Intercept	-38.46	0.000	-27.40	0.000	-26.34	0.000
Time	15.33	0.000	4.33	0.000	1.29	0.197
$Time^2$	-14.59	0.000	-4.25	0.000	-1.25	0.213
DEP	-11.91	0.000	-6.16	0.000		
Operation Safe Homes					-4.50	0.000
Tenant Patrols					1.23	0.219
Public Housing Dummy	-2.58	0.010	-1.75	0.080	-1.70	0.089
Drug Arrests - Sale	3.59	0.000	2.73	0.006	2.62	0.009
Drug Arrests - Possession	0.18	0.855	2.76	0.006	2.91	0.004
Spatial Lag	12.17	0.000	12.85	0.000	12.68	0.000
Endogeneity	14.45	0.000	22.97	0.000	22.53	0.000
Population (Logged)	33.48	0.000	24.97	0.000	25.03	0.000
Poverty	4.85	0.000	0.36	0.720	0.45	0.652
Human Capital	-1.52	0.128	-0.89	0.372	-0.82	0.412
Segregation	15.76	0.000	8.44	0.000	8.55	0.000
Social Control - Supervision	8.78	0.000	5.81	0.000	5.63	0.000
Social Control - Anonymity	-2.41	0.016	-0.93	0.350	-0.61	0.544
Immigration	-8.69	0.000	-4.30	0.000	-4.23	0.000
Housing	3.60	0.000	2.71	0.007	2.57	0.010
DEP Interactions						
DEP*Poverty	-1.45	0.148	0.09	0.926	-0.11	0.916
DEP*Human Capital	-0.31	0.755	-0.02	0.988	-0.12	0.903
DEP*Segregation	0.86	0.389	-0.94	0.349	-1.15	0.252
DEP*Supervision	1.96	0.050	0.13	0.897	0.29	0.772
DEP*Anonymity	3.04	0.002	0.52	0.601	0.02	0.980
DEP*Immigration	-0.70	0.482	-0.32	0.752	-0.19	0.846
DEP*Housing	-0.02	0.987	-0.17	0.868	-0.03	0.978
Model Statistics: -2LL	84199.0		38844.8		38813.2	

Table 11a. Mixed Effects Poisson Regression of DEP Effects on Reported Violent Crime Rates, NYCHA Developments, 1986-94

	DEP Binary		DEP Investment		DEP Components	
Effects	***t***	***p(t)***	***t***	***p(t)***	***t***	***p(t)***
Intercept	-19.79	0.000	-12.85	0.000	-1.97	0.050
Time	0.80	0.427	2.14	0.033	-0.46	0.649
$Time^2$	-2.30	0.021	-0.94	0.350	0.54	0.586
DEP	1.22	0.225	-0.08	0.933		
Operation Safe Homes					-0.52	0.606
Tenant Patrols					-0.79	0.433
Drug Possession Arrests (log)	-1.68	0.092	-2.85	0.005	-2.95	0.003
Drug Sale Arrests (log)	3.40	0.001	0.34	0.735	0.28	0.783
Precinct Property Crime Rate	5.73	0.000	3.52	0.001	3.59	0.000
Endogeneity	9.24	0.000	8.70	0.000	8.70	0.000
PH Development Characteristics						
Population (log)	33.55	0.000	28.97	0.000	28.86	0.000
Poverty	1.69	0.091	1.85	0.064	1.70	0.090
Supervision Ratio (Seniors/Minors)	11.38	0.000	2.73	0.007	2.86	0.005
Employed (2 or more persons in HH)	-1.87	0.061	-0.41	0.685	-0.43	0.670
Tenure	2.71	0.007	-0.10	0.920	-0.01	0.990
Racial Heterogeneity	-1.32	0.187	0.17	0.862	0.26	0.795
DEP Interactions						
DEP * Poverty	2.30	0.022	0.86	0.391	0.92	0.359
DEP * Supervision	-4.22	0.000	-0.76	0.446	-0.85	0.397
DEP * Employment	-1.09	0.277	-0.32	0.748	-0.32	0.751
DEP * Tenure	-0.69	0.493	0.51	0.611	0.45	0.650
DEP * Racial Fragmentation	-1.40	0.163	-1.97	0.049	-1.98	0.049
Model Statistics: -2LL	2096.40		1393.7		1393.7	

Table 11b. Mixed Effects Poisson Regression of DEP Effects on Reported Property Crime Rate, NYCHA Developments, 1986-94

	DEP Binary		DEP Investment		DEP Components	
Effects	***t***	***p(t)***	***t***	***p(t)***	***t***	***p(t)***
Intercept	-11.90	0.000	-9.38	0.000	-1.30	0.196
Time	1.66	0.097	2.59	0.010	-0.09	0.927
$Time^2$	-9.41	0.000	-0.86	0.388	0.26	0.798
DEP	-1.38	0.168	-0.84	0.403		
Operation Safe Homes					-0.33	0.739
Tenant Patrols					0.14	0.892
Drug Possession Arrests (log)	0.29	0.774	-1.25	0.213	-1.10	0.272
Drug Sale Arrests (log)	-0.28	0.781	-0.53	0.596	-0.49	0.625
Precinct Property Crime Rate	0.00	0.999	-1.35	0.178	-1.38	0.168
Endogeneity	8.47	0.000	6.84	0.000	6.87	0.000
PH Development Characteristics						
Population (log)	29.61	0.000	25.45	0.000	25.55	0.000
Poverty	2.75	0.006	2.90	0.004	3.02	0.003
Supervision Ratio (Seniors/Minors)	3.08	0.002	-1.94	0.053	-2.10	0.037
Employed (2 or more persons in HH)	-3.39	0.001	0.68	0.499	0.70	0.485
Tenure	0.55	0.581	-1.01	0.315	-1.10	0.273
Racial Heterogeneity	-4.73	0.000	0.66	0.508	0.65	0.517
DEP Interactions						
DEP * Poverty	1.52	0.129	-1.02	0.310	-1.08	0.279
DEP * Supervision	-1.54	0.125	1.29	0.197	1.38	0.168
DEP * Employment	0.98	0.328	-0.66	0.507	-0.68	0.496
DEP * Tenure	1.05	0.292	-0.46	0.648	-0.41	0.683
DEP * Racial Fragmebtation	1.83	0.068	-1.44	0.151	-1.48	0.140
Model Statistics: -2LL	2523.2		1697.7		1676.3	

Table 12. Summary of DEP Effects at Three Spatial Aggregations

	DEP Binary		DEP Investment		DEP Components	
	t	***p(t)***	***t***	***p(t)***	***t***	***p(t)***
Police Precincts						
Violent Crimes	-5.55	0.000	-9.10	0.000		
Operation Safe Home					-13.36	0.000
Tenant Patrols					1.94	0.057
Property Crimes	-6.91	0.000	-11.19	0.000		
Operation Safe Home					-13.91	0.000
Tenant Patrols					4.12	0.000
Census Tracts						
Homicide Victimizations	-11.91	0.000	-6.16	0.000		
Operation Safe Home					-4.50	0.000
Tenant Patrols					1.23	0.219
Public Housing Developments						
Violent Crimes	1.22	0.225	-0.08	0.933		
Operation Safe Home					-0.52	0.606
Tenant Patrols					-0.79	0.433
Property Crimes	-1.38	0.168	-0.84	0.403		
Operation Safe Home					-0.33	0.739
Tenant Patrols					0.14	0.892

All models controlled for social and economic contexts, crime rates in surrounding areas, time (quadratic), and interactions of DEP indicator with contextual factors