Neighborhood Crime Exposure Among Housing Choice Voucher Households

Assisted Housing
Research Cadre Report

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Preface

Given a choice to move, do voucher holders successfully locate in neighborhoods with greater public safety? Housing Choice Vouchers provide tenants with opportunities to obtain affordable housing in higher quality neighborhoods, yet evidence suggests that they rarely take advantage of such opportunities by moving to lower-poverty neighborhoods.

Using census tract-level crime and subsidized housing data for 91 large cities in 2000, the researchers compare the neighborhood crime rates of voucher holders to those of public housing, Low-Income Housing Tax Credit, and unassisted poor renter households. The researchers also examine longitudinal crime data from seven cities at the census tract level, allowing them to observe changes in crime exposure from 1998 to 2008.

The results suggest that from 1998 to 2008 exposure of voucher holders to neighborhood crime improved considerably in seven sample cities. However, gains in safety are not attributed to voucher households moving to lower crime neighborhoods. Rather, the more significant cause is that the safety levels of the neighborhoods where voucher holders live improved more than those of other neighborhoods.

The researchers find that voucher households occupied neighborhoods that were about as safe as the average poor renter household, and with much lower crime rates than those of assisted tenants of place-based programs (i.e., the Low Income Housing Tax Credit and public housing programs) in the same cities. Although voucher holders selected much safer neighborhoods than those of other subsidized households, they did not select lower poverty neighborhoods. This result suggests that voucher households simply may care more about safety levels than about poverty rates. At the very least, it suggests that neighborhood poverty rates do not perfectly capture underlying neighborhood conditions.

Public safety outcomes of voucher holders are found to differ on the basis of race and ethnicity. Consistent with other studies, black voucher households lived in neighborhoods with higher crime rates than other voucher holders. Yet their neighborhoods were considerably safer than those of poor black households and black renters. This was not the case for white and Hispanic voucher holders, suggesting that the voucher program may be more successful in helping black households reach safer neighborhoods than it is in helping white and Hispanic households reach lower crime communities.

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The federal government increasingly relies on housing vouchers to make housing more affordable to lower income households, often with the hope that assisted households will use these portable subsidies to move to (or remain in) higher quality neighborhoods. While other researchers have examined the poverty rate and broader socioeconomic conditions in neighborhoods reached by voucher holders, we contribute to this literature by examining an arguably more fundamental neighborhood attribute—safety, as measured by neighborhood crime rates.

Using census tract-level crime and subsidized housing data on 91 large cities in 2000, we compare the crime rates of the neighborhoods of voucher holders to those of the neighborhoods lived in by public housing, Low-Income Housing Tax Credit, and poor renter households. We augment these analyses with a longitudinal sample of crime from seven cities at the census tract level, allowing us to observe changes in crime exposure from 1998 to 2008.

We find that the voucher households in these cities occupied neighborhoods about as safe as the average poor renter household, and in neighborhoods with much lower crime rates than those lived in by households assisted through place-based programs (the Low Income Housing Tax Credit and public housing programs) in these same cities. Interestingly, however, although voucher holders reached neighborhoods that were much safer than those lived in by other subsidized households, they did not live in lower poverty communities. It may be that voucher households simply care more about safety levels than poverty rates, and thus use their choice to select safer communities. At the very least, it suggests that neighborhood poverty rates do not perfectly capture underlying neighborhood conditions.

We find interesting differences by race. Consistent with studies examining neighborhood poverty rates, we find that black voucher households lived in neighborhoods with higher crime rates than other voucher holders. However, we find that black voucher holders actually lived in neighborhoods that were considerably safer than the neighborhoods lived in by other comparable black households without vouchers—poor black households and black renters. This was not the case for white and Hispanic voucher holders, suggesting perhaps that the voucher program may be more successful in helping black households reach safer neighborhoods than it is in helping white and Hispanic households reach lower crime communities.

Longitudinal results suggest that voucher holder exposure to neighborhood crime improved considerably in our seven sample cities from 1998 to 2008. However, these gains in safety do not appear to have been due to voucher households moving to lower crime neighborhoods. Rather, the more significant cause is that the safety levels of the neighborhoods where voucher holders live improved more than those of other neighborhoods.

I. Introduction

One of the key justifications for the Housing Choice Voucher program is to provide assisted tenants with a greater range of neighborhood choices, and hopefully enable them to reach better neighborhoods. Indeed, the U.S. Department of Housing and Urban Development's (HUD's) recent strategic plan highlighted as a key goal improving the quality of available community opportunities reported by HUD residents.[i] This report analyzes the efficacy of the voucher program at achieving this goal, focusing specifically on neighborhood crime.

Prior work describing the neighborhoods occupied by subsidized households has commonly relied on poverty as a proxy measure of neighborhood distress, as other measures of the opportunities provided by neighborhoods are not typically available on a broad scale. Poverty is typically correlated (negatively) with quality of life and local services, but neighborhoods with similar poverty rates often differ from one another in a number of important characteristics, including the public safety risks shared by the residents.

These public safety risks are real. People living in high crime neighborhoods are more likely to be victims of crime, suffering physical, financial, and/or psychological harm. Votruba and Kling (2009) estimate that moving to safer neighborhoods saved up to 17 lives for 2,850 participants in the Moving to Opportunity (MTO) program, with 13 of those averted deaths due to homicide. Additional research on the MTO program suggests that neighborhood violent crime affects standardized test scores (Sharkey 2010) and indeed, some researchers have argued that the disparate results across MTO sites may be in part due to variation in crime among these different locations (Burdick-Will et al. 2010). Moreover, being a witness to violent crime or living in fear of victimization can lead to stress and even psychological difficulties (Garbarino et al. 1992; Stafford, Chandola, and Marmot 2007). Finally, there is evidence that youth who grow up in high crime neighborhoods are disproportionately likely to begin criminal careers and engage in risky behaviors such as drug and alcohol use (Case and Katz 1991; Ellen and Turner 1997).

Not surprisingly, crime is often cited as a concern for those who wish to move out of distressed neighborhoods. In surveys of both Gautreaux and MTO demonstration participants, crime was consistently offered as a primary motivation for wanting to enroll in those programs and move out of original high-crime neighborhoods (Goering et al. 2002; Hanratty, McLanahan, and Pettit 1998; Rubinowitz and Rosenbaum 2000).

Clearly, crime is a vital component of neighborhood quality and thus a key outcome of interest in evaluating the efficacy of subsidized housing policies that seek to move program participants to better neighborhoods. This report aims to shed light on this critical dimension of the Housing Choice Voucher program in cities. Specifically, we address the following questions:

1. How does the safety of the neighborhoods where voucher households live compare to safety of the neighborhoods where they might have otherwise lived?
2. Does exposure to neighborhood crime differ across different types of voucher households?
3. How has crime exposure changed over time for voucher households? To what extent can these changes be attributed to shifts in the geographic distribution of these households versus improvements in neighborhoods where these households are concentrated?

Using census tract-level crime data in 91 large cities averaged for the years 1999 to 2001, we address our first question by examining the exposure of voucher holders to crime in these cities at the beginning of the decade.[ii] We experiment with a variety of counterfactuals to assess

whether vouchers are enabling households to reach safer neighborhoods than those in which they would have likely lived absent their vouchers. We shed light on our second question by then exploring differences in exposure outcomes across subgroups of voucher holders. Finally, using tract- and neighborhood-level crime data from seven cities in 1998 and 2008, we describe changes over time in these crime exposure rates.

Before conducting this empirical analysis, we provide a summary of the relevant literature. Next, we describe the data and specify the measures employed to address the questions above. We then present the empirical results and conclude with a discussion of the key findings and the policy implications. As a preview, this report finds that in the large cities we study:

- Voucher households lived in lower crime neighborhoods than other subsidized households.
- Black voucher holders faced higher neighborhood crime rates than white and Hispanic voucher households, but black voucher holders lived in safer neighborhoods relative to poor households and renters of their same race without vouchers than white and Hispanic voucher holders.
- The neighborhoods in our seven sample cities where voucher holders typically reside became substantially safer between 1998 and 2008.
- The movement of voucher households contributed little to these improvements. Rather, the key change was that the crime rates in the neighborhoods where voucher holders live fell markedly.

II. Prior Literature

Three federal housing policies have become the predominant tools for subsidized housing: traditional public housing, the Low-Income Housing Tax Credit (LIHTC), and Housing Choice Vouchers. Despite being discussed in policy circles as far back as the 1930s, vouchers did not become a feature of federal housing policy until 1974 (Orlebeke 2000; Schwartz 2006). But the program grew quickly. By 1980 there were over 625,000 voucher holders, and in 2008 there were over 2.2 million. Voucher households comprised 44 percent of U.S. Department of Housing and Urban Development (HUD)-assisted households in 2008.

A key potential benefit of vouchers is that they provide households much better mobility and location choice options than does project-based assistance. Enhanced choice, proponents argue, is likely to reduce poverty concentration in cities and allow voucher households access to higher opportunity neighborhoods. Whereas public housing and LIHTC residents are typically quite limited in choice of developments and units, voucher households should be able to select into a much wider array of neighborhoods and therefore have the opportunity to choose lower crime areas. Additionally, voucher tenants are less visible to neighbors than public housing and LIHTC developments, and thus may have an easier time reaching neighborhoods with lower crime and poverty rates. However, landlords may resist accepting tenants with vouchers, perhaps especially in lower crime and poverty environments. There is clearly still more research to be done on how voucher households select their housing units and neighborhoods.

HUD has expanded voucher portability throughout the life of the voucher program. Beginning in 1987, vouchers could be used anywhere in the U.S. with a voucher program. More recently, the HOPE VI program and the Quality Housing and Work Responsibility Act of 1998 (QHWRA) have provided HUD with additional tools to help local public housing authorities deconcentrate assisted households, frequently with the use of housing vouchers. To be sure,

voucher location choice is still constrained, particularly by market conditions, but research shows that almost all communities have rental housing units that would be affordable to voucher holders (Devine et al. 2003).

Poverty Exposure for Subsidized Households

Most of the literature describing the neighborhoods lived in by assisted households focuses on poverty rates. For traditional public housing residents, the evidence is clear that they live in comparatively poor neighborhoods. Goering, Kamely, and Richardson (1997) find that just under half of all public housing tenants in 1990 lived in high poverty census tracts (poverty 40 percent or higher). Similarly, Newman and Schnare (1997) report that over 43 percent of tenants in family public housing lived in high poverty census tracts in 1990.

There is evidence that voucher households also live in neighborhoods with higher than average poverty. Pendall (2000), examining census tract-level data from HUD on 1998 voucher households, finds that neighborhoods with voucher holders had a 1990 poverty rate of 20 percent, compared to 15 percent for the U.S. as a whole. In addition, tenants receiving all forms of assistance were more likely than renters as a whole to live in neighborhoods scoring high on a neighborhood distress index, constructed from poverty rates, public assistance receipt, the proportion of female-headed households and high school dropouts, and labor force participation.

Still, studies typically find that voucher holders live in somewhat less distressed census neighborhoods than other assisted households. For example, in their comprehensive examination of the location patterns and neighborhood characteristics of the entire voucher population, Devine et al. (2003) find that almost 83 percent of census tracts in the 50 largest Metropolitan Statistical Areas included at least one voucher household. By contrast, only 8 percent of all census tracts in these Metropolitan Statistical Areas (MSAs) included public housing units. The relatively high dispersion of voucher households suggests that at least some voucher households must live in high quality neighborhoods. Indeed, in the same study, the authors find that almost 30 percent of voucher households in 1990 lived in census tracts with fewer than 10 percent of the residents living in poverty. Another 30 percent lived in tracts with 10 to 20 percent poverty rates. Approximately 22 percent of voucher families lived in neighborhoods with poverty rates of 30 percent or more.

Hartung and Henig (1997) provide evidence that the voucher program in the Washington, DC metropolitan area has been more effective in providing access to lower poverty neighborhoods than other forms of housing assistance. They find that while 76 percent of the public housing and 50 percent of the other HUD-assisted developments are in tracts with median incomes below $25,000, only 32 percent of voucher households live in such tracts. Thus although about 90 percent of Washington's voucher households were located in tracts with median incomes below $75,000, they were less concentrated in poor tracts than their counterparts living in public housing and other place-based, subsidized housing.

Most recently, McClure (2006) compares locational outcomes for the voucher and LIHTC programs. Using 2002 administrative data on voucher households and LIHTC units placed in service through that year, he finds that about 30 percent of LIHTC households and 26 percent of voucher households lived in low poverty census tracts in that year. And on average, voucher holders lived in very slightly lower poverty neighborhoods than LIHTC households.[iii] Significantly, the proportions of LIHTC and voucher households in high poverty tracts were slightly lower than the percentages of poor households who lived in high poverty tracts—though

higher than the share of all renters who lived in such tracts. The households assisted through both of these programs, in other words, were reaching neighborhoods with somewhat lower poverty rates than poor households but they were still living in neighborhoods that were significantly higher poverty than other renters (at least in 2002).

A number of authors have documented the failure of voucher holders to move to higher income neighborhoods and the tendency for this population to cluster geographically (Wang, Varady, and Wang 2008; Wang and Varady 2005). This clustering has been found to be the result of phenomena other than housing market dynamics, including landlord refusal to rent to voucher households and racial segregation (Turner, Popkin, and Cunningham 1999). However, even these clustered households live in significantly lower poverty neighborhoods as compared to public housing households.

Neighborhood Crime Rates

Few studies examine the neighborhood crime rates experienced by voucher holders, largely because of a lack of suitable data. However, studies of three major mobility programs—Gautreaux, Moving to Opportunity (MTO), and HOPE VI—provide some evidence on the neighborhood safety of both public housing residents (pre-move) and voucher households (post-move). As participants were chosen precisely because they lived in distressed neighborhoods, the reported numbers are not generalizable to all subsidized households, but they are still illuminating. In brief, these groups were located in very high crime areas when living in their original public housing developments and moved to lower crime (yet still relatively unsafe) areas after receiving their vouchers.

The Gautreaux program was created in Chicago in 1976 as a result of a series of lawsuits against the Chicago Housing Authority (CHA) and HUD. Gautreaux offered black families in CHA housing the opportunity to move to desegregated areas around the Chicago area, including the suburbs. The program moved more than 7,000 families between 1976 and 1998 (Keels et al. 2005). According to Rubinowitz and Rosenbaum (2000), nearly half of Gautreaux participants reported that violent incidents occurred regularly in their neighborhoods. Criminal victimization rates were twice as high among Chicago public housing tenants as in the city as a whole. Keels et al. (2005) estimate that violent crime rates in Gautreaux participants' original neighborhoods were three times as high as those in the average Chicago neighborhood.

In the short-term, those that moved to new neighborhoods through the program continued to face higher crime rates than others in their surrounding areas. Suburban movers landed in neighborhoods with a violent crime rate about five times as high as the crime rate in the Chicago suburbs at that time, and those that moved within the city faced violent crime rates about 1.5 times as high as the average neighborhood in the city. In the longer term, however, the Gautreaux households tracked by Keels et al. (2005) lived in neighborhoods with very comparable violent and property crime rates to the county as a whole.

MTO was launched by HUD in 1993 as a five-city experimental demonstration to move subsidized households living in high-poverty public housing developments into low poverty neighborhoods. Goering et al. (2002) report that more than half of MTO participants identified crime, gangs, and drugs as the principal motivation for wanting to move out of their neighborhoods. Hanratty, McLanahan, and Pettit (1998) report that almost 60 percent of the Los Angeles participants cited getting away from drugs or gangs as the primary reason for wanting to move. Shocking proportions of these respondents reported criminal victimization of one or more

of their household members in the past six months. Furthermore, these descriptions are supported by administrative data. Violent crime rates for the baseline MTO census tracts in Boston, Chicago, and Los Angeles were three times higher than in the metropolitan areas as a whole (Kingsley and Pettit, 2008).

As for the post-move neighborhoods, there is some evidence that MTO participants occupied lower crime neighborhoods after participating in the program. Kingsley and Pettit (2008) find that violent crime rates in Boston, Chicago, and Los Angeles were almost twice as high in the MTO origin neighborhood than in the Section 8 movers' initial post-move neighborhood. Feins and Shroder (2005) report results of pre- and post-move surveys for the MTO treatment, comparison, and control groups (the comparison group include households who received vouchers but were not restricted to use them in low poverty neighborhoods). Survey respondents in the two groups that received vouchers reported significantly greater improvements in neighborhood safety than the control group for every question asked.[iv] Thus MTO participants were successful in using vouchers to move to safer neighborhoods.

Although the revitalization projects and voucher mobility spawned by HOPE VI are still in progress, there is some evidence that the program is moving participants to safer and more affluent neighborhoods. Buronet al. (2002) provide a snapshot of post-revitalization neighborhood conditions in eight cities and find that post-revitalization households still occupy relatively unsafe neighborhoods. Overall, about 40 percent of the respondents reported "big problems" with drug trafficking and gang activity in their current neighborhood, and fewer than 20 percent reported big problems with violent crime. Households in the sample that were no longer receiving a housing subsidy were the least likely to report big problems with drug trafficking and gang activity, while returning HOPE VI residents were the most likely to report big problems.

Taken together, previous work on the neighborhood conditions faced by subsidized households suggests that voucher households on average live in neighborhoods with higher poverty rates than the average renter, but they live in lower poverty areas than public housing tenants and in areas with slightly lower poverty rates than other poor households. Thus tenants assisted through these programs have had some success in reaching low poverty neighborhoods, but the success has been relatively modest. We know little about the exposure of voucher households to crime. What we know comes from the experience of a very particular subset of voucher holders that moved out of distressed public housing developments through the Gautreaux, MTO, or HOPE VI programs. This body of research offers some suggestive evidence that these selected voucher recipients have been successful in moving to safer neighborhoods. It remains to be seen if the broader voucher population—those not necessarily eligible for and selected into specialized programs, and representing a wider array of cities—has been able to reach safer neighborhoods.

III. Data and Methods

Data

Our analysis relies on two sets of crime data, all restricted to large cities (rather than Metropolitan Statistical Areas (MSAs)). First, we use data from the National Neighborhood Crime Study, a nationally representative sample of crime data for 9,593 census tracts in 91 U.S. cities, collected by Ruth Peterson and Lauren Krivo of Ohio State University. Crime counts from

1999 to 2001 were provided to Peterson and Krivo by local police departments. The dataset includes an average of the Part I crime categories over the entire three years for each census tract. Such three-year averages allow for abnormal spikes to be smoothed out over the sample period, and are frequently used in crime research when possible (Sampson, Raudenbush, and Earls 1997). The sample of 91 cities was randomly chosen, stratified by region, from all cities with at least 100,000 persons as of the 2000 census. In the event that police departments were not able to provide crime data, the city was replaced with one of "similar size, racial/ethnic composition, and level of poverty" (Peterson and Krivo 2010). A list of the 91 cities, in addition to basic descriptive statistics on crimes and subsidized housing units for each city, is shown in Appendix A—1.

The second data set includes annual census tract-level crime data for seven U.S. cities—Austin, Chicago, Cleveland, Denver, Indianapolis, Philadelphia, and Seattle—from 1998 to 2008. Appendix A—2 displays the crime data availability for those years and describes the sources of the data.[v]

We merged census tract-level counts of four types of households to the crime data—voucher households, renter households below the poverty line, public housing tenants, and Low-Income Tax Credit (LIHTC) households. Voucher and public housing data were obtained from the U.S. Department of Housing and Urban Development (HUD's) Picture of Subsidized Households. At the present time, voucher data are available through this data set for 1998, 2000, 2004, and 2008. In addition, we obtained access to household-level voucher data from HUD for 2000, in order to estimate crime exposure rates for voucher households with different demographic characteristics. Public housing data are available for 1996 to 1998, 2000, 2004, and 2008. LIHTC data are available from HUD's LIHTC database from 1987 to 2007. U.S. Census data on poor renter counts are available for 2000. Finally, we merge these data to 2000 census counts of total housing units and tract-level demographic statistics from the Urban Institute's Neighborhood Change Database.

Like all administrative data sets, there are gaps in coverage and variation in quality. The voucher and public housing data are collected by HUD from local housing authorities, and in the early years of our sample, reporting rates were sometimes well below 100 percent. (The dataset provides complete information for 87 percent of voucher recipients in 1998, for example.) By 2008, reporting rates rose to 98 percent. HUD publishes the percentage of vouchers and public housing units that are reported by each city, so we can identify which cities were most affected by these data gaps. Appendix Table A—3 displays the percent reported by each city's housing authority for the longitudinal sample (Austin, Chicago, Cleveland, Denver, Indianapolis, Philadelphia, and Seattle) in 1998 and 2008 (though 2008 voucher numbers are unavailable). In 1998 (and presumably 2008), the reporting rate for vouchers was consistently very high. For all cities aside from Indianapolis (84 percent), the reporting rate was 99 percent. Public housing reporting rates were considerably lower, at least in 1998. In that year, reporting rates for public housing were just 54 percent in Chicago and 50 percent in Philadelphia. However, we have little reason to believe that reporting rates would vary with the crime rates of the development. If they did vary, we expect that they would be lower in higher crime developments, suggesting that our results could potentially understate the crime rates experienced by public housing residents.

Table 1 displays descriptive statistics as of 2000 for the 91-city cross-sectional sample and the longitudinal seven-city sample. Since our sample is restricted to large cities (i.e. not MSAs) we also provide descriptive statistics for all tracts in U.S. cities with populations greater than 100,000 as a comparison.

Table 1: Average census tract characteristics in 2000

	91-City Cross-Section Sample (N=9,583)	Seven-City Longitudinal Sample (N=1,806)	All Tracts in U.S. cities > 50,000 (N=25,893)
Average Tract Characteristics			
Crimes per 1,000 people	62.0	71.4	75.8[vi]
Voucher holders per tract	31.8	28.7	30.4
LIHTC units per tract	22.7	23.0	19.6
Public housing per tract	26.3	43.3	27.7
Poor renters per tract	184.4	196.3	170.3
Population per tract	4,114	3,765	4,111
Poverty rate (weighted avg)	16.9%	19.5%	15.5%
Percent non-Hispanic white (weighted avg)	48.4%	42.1%	53.2%
Percent non-Hispanic black (weighted avg)	22.5%	33.3%	18.8%
Percent Hispanic (weighted avg)	22.9%	19.2%	20.4%
Total population in tracts	39,426,839	6,799,280	106,466,565

Comparing the three samples in Table 1, we see that the tracts included in the 91-city sample are quite similar to all census tracts in large cities. The tracts in the 91-city sample contain similar proportions of people in poverty and in different racial groups—though the 91-city sample is slightly more nonwhite. The largest difference between the two samples is crime rates; the average neighborhood crime rate is considerably lower for the 91 cities than the average crime rate for the full set of core-city tracts.

As for subsidized housing, average voucher concentrations within census tracts are fairly uniform throughout the two samples and all U.S. cities, ranging from 29 voucher holders per tract to 32 per tract, or approximately two percent of all housing units. LIHTC concentrations also vary little across the samples—ranging from 20 to 23 per tract (less than 2 percent of a tract's housing units on average). Public housing concentration is much more varied across the samples. In the longitudinal sample, the presence of Chicago among the seven cities leads to a larger average number of public housing units per census tract than the other samples. The tracts in the longitudinal sample are also slightly different demographically than the full set of urban tracts.

Appendix B—1 displays how crime and housing variables change over time in the longitudinal sample. As shown, crime rates decreased over time, as they did across the United States, while the number of voucher households and LIHTC units increased, and the number of public housing units declined. Aggregate crime rates (expressed as crimes per 1000 residents[vii]) decline 23 percent from 1998 to 2008. From 1998 to 2008, the number of voucher and LIHTC households doubled. Public housing units did the opposite—declining over the decade from 73,181 to 57,207.

Finally, we have access to data for over 212,000 voucher households who, in the year 2000, lived in the cities for which we have crime data. This represents 17 percent of all voucher holders nationwide in 2000. (These cities also contain 23 percent of LIHTC tenants, and 19 percent of all public housing tenants.) From these data we can determine whether the household used a voucher to move into that census tract in that year, the race of the household head,

whether the household contains children under 18, and the total household income. Appendix B—2 displays descriptive statistics for the key variables in this sample.

Estimating Group-Specific Crime Exposure

To estimate the crime rates faced by the typical household in each group, we estimate crime exposure rates, which weight a neighborhood's crime rate by the proportion of the sample's relevant household type (voucher, LIHTC, etc.) within that neighborhood. These exposure rates, in other words, essentially show the neighborhood crime rate experienced by the average member of the given group. Specifically, the crime exposure measure is expressed for voucher households as:

$$(1)\ \sum_{i=1}^{n}[Crime_i * (\frac{v_i}{V})]$$

Where $Crime_i$ is the crime rate (either total or violent) in census tract i, $v_i$is the number of voucher households (or public housing, LIHTC, or poor renter households) in census tract i, and V is the number of voucher households (or public housing or LIHTC units, or poor renter households) in the sample. The resulting value is essentially a weighted average neighborhood crime rate, or the crime rate faced by the typical household in that group. As a weighted average, we can conduct differences in sample means tests.[viii] In addition, we estimate the percentage of each housing subgroup population that resides in a high crime neighborhood, defined as one with a crime rate at least one standard deviation above the mean. In robustness checks, we also use the number of crimes per square mile of land area and the number of crimes per 1,000 housing units.

The primary motivation for this report is to determine whether the voucher program is effective in helping program participants reach relatively safe neighborhoods. Comparing voucher household crime exposure to that of the general population is informative, but does not provide a very good counterfactual for where voucher households would have lived if they had not had the benefit of a housing voucher. To provide a sense of the other options that voucher households might have in the absence of a voucher program, we consider the average crime rates in the neighborhoods where LIHTC units, public housing units, and all units occupied by poor renters are located. These housing units represent locations where voucher households might live in the absence of the program. Comparing the neighborhoods of voucher holders to those of tenants in place-based programs allows us to identify whether the increased choice provided by vouchers help households reach better neighborhoods. Given that much of the growth in the voucher program is a result of the demolition of public housing, public housing locations serve as a viable counterfactual for where voucher holders could be living if such demolitions had not occurred. The LIHTC, as the largest place-based housing subsidy in the country, is another relevant place-based counterfactual.

We are able to conduct differences in proportions tests to identify which housing subgroups statistically differ from one another in their exposure to crime.[ix]

Identifying Changes in Voucher Crime Exposure Over Time

To estimate the relative changes in crime exposure among the voucher households from 1998 to 2008, we first limit the sample to a balanced panel, including only neighborhoods for which we have crime and housing data in 1998 and 2008. Note that there are two mechanisms through which crime exposure could change over time for voucher holders. First, the distribution

of voucher households across neighborhoods could shift to neighborhoods with higher or lower crime rates. Second, the distribution of voucher holders could remain constant, but crime rates could increase or decrease in the neighborhoods in which voucher holders are located. This is an important distinction for policy. If the gains in public safety for voucher holders were largely a result of improvements within their existing neighborhoods, housing mobility efforts may not deserve a lot of the credit for these gains. However, the vouchers may have enabled tenants to stay in these neighborhoods as they improved.

To test whether changes in crime exposure for voucher households were due to spatial shifts in crime patterns, we decompose the crime changes and compute a hypothetical crime exposure rate, showing what the crime exposure rate would have been for voucher holders in 2008 had the distribution of voucher holders remain unchanged between 1998 and 2008. This rate uses the 1998 voucher neighborhood distribution with 2008 crime rates, defined notationally (for vouchers) as:

$$(2)\ \sum_{i=1}^{n}[Crime_{i,2008} * \frac{v_{i,1998}}{V_{1998}}]$$

If the actual crime exposure rate in 2008 (using 2008 crime and voucher distributions) is roughly the same as this hypothetical rate, then we can infer that any changes were driven largely by changing conditions in the neighborhoods where voucher holders tend to live. By contrast, if we find that the actual crime exposure rate is significantly lower than the hypothetical crime exposure rate, then we infer that changes in the distribution of voucher holders likely explained a large part of any reduction in exposure.

Cross-Section Results

Table 2 displays crime exposure rates for the 91 cities in the cross-sectional sample covering the year 2000. We include in the table crime exposure rates for all households, voucher households, LIHTC tenants, public housing tenants, and poor renters living in these cities.

Table 2: Crime exposure rates in 2000
Sample: 91 cities

Unit type	Crimes per 1000 Persons	Statistically Different from Voucher Crime Exposure Rate?	Violent Crimes per 1000 Persons	Statistically Different from Voucher Violent Crime Exposure Rate?
All households	62.0	No	9.2	No
Vouchers	76.9	N/A	14.3	N/A
LIHTC	100.6	Significantly Higher (1%)	16.9	Significantly Higher (5%)
Public housing	108.4	Significantly Higher (1%)	22.3	Significantly Higher (1%)
Poor renters	82.2	No	14.4	No

The table shows that voucher holders on average lived in neighborhoods that had slightly higher crime than those lived in by all households and slightly lower crime than those lived in by poor renters. However, neither of these differences is statistically significant. We cannot say, in other words, that voucher holders lived in neighborhoods that were any more/less safe than poor renters or all households.

We can say that voucher holders lived in neighborhoods that were significantly more safe than those lived in by tenants in place-based subsidized housing programs in the cities under study. Public housing tenants lived in significantly higher crime neighborhoods in 2000 than voucher holders, and perhaps more surprisingly, tenants in low-income housing tax credit programs also lived in significantly higher crime neighborhoods. All of these results are robust to modifications in the crime rate denominator.[x]

What about exposure to violent crimes in particular? Total crime rates are largely driven by property crimes, particularly larceny and other thefts. (In this sample, only 15 percent of the crimes are violent crimes.) Yet exposure to violence may be a particular concern. Aizer (2008) finds that lower youth cognitive test scores can be explained in part by association with violent peers and exposure to neighborhood violent crime. Sharkey (2010) finds that children living in block groups where a homicide occurs one week before a standardized test perform worse than other comparable children.

The patterns for violent crime exposure are fairly similar to those for total crime exposure. Among assisted households, public housing residents lived in the most violent neighborhoods on average, while voucher holders lived in the least violent. On average, voucher holders lived in neighborhoods with safety levels very close to those of the neighborhoods lived in by the average poor renter.

Another way to measure differences in crime exposure is to compare the proportion of each population that lived in a high crime neighborhood, defined as neighborhoods with crime rates more than one standard deviation above the mean. Table 3 displays these proportions, together with results from statistical tests of differences in proportions between tenants in each housing program.

Table 3: Percent of each housing type in high crime neighborhoods in 2000
Sample: 91 cities

Unit Type	Percent in High Crime Neighborhoods	Statistically Different from Voucher Proportion?	Percent in High Violent Crime Neighborhoods	Statistically Different from Voucher Proportion?
Total	3.1%	Significantly Lower (1%)	5.1%	Significantly Lower (1%)
Vouchers	4.4%	N/A	11.0%	N/A
LIHTC	11.3%	Significantly Higher (1%)	16.4%	Significantly Higher (1%)
Public housing	10.8%	Significantly Higher (1%)	23.9%	Significantly Higher (1%)
Poor renters	6.0%	Significantly Higher (1%)	11.4%	Significantly Higher (1%)

The share of voucher holders who lived in high crime neighborhoods was significantly lower than the proportion for either LIHTC or public housing tenants. The only difference between these results and those in Table 2 is that the proportion of LIHTC households living in high-crime neighborhoods was slightly higher than the share of public housing residents though the differences is not statistically significant. The violent crime results are again very similar.

These promising findings on voucher crime exposure appear to contradict prior work that finds that voucher households have had limited success in gaining access to higher quality neighborhoods (McClure 2008; Pendall 2003; Wang, Varady, and Wang 2008; Wang and Varady 2005). These differences could be due to idiosyncrasies of our sample or they could reflect differences in patterns of exposure to crime as compared to exposure to poverty and racial

minorities. To test this, Table 4 expands on the analysis presented in Table 2 and displays poverty and minority exposure rates as well as average crime rates for the housing subgroups in 2000, using the 91-city sample.

Table 4: Neighborhood crime, poverty, and minority exposure rates in 2000
Sample: 91 cities

	Average Crime Rate	Average Poverty Rate	Average Percent Minority
Vouchers	76.9	24.4%	59.3%
LIHTC	100.6	26.8%	58.1%
Public housing	108.4	36.7%	65.7%
Poor renters	82.2	26.9%	51.8%

The Table shows plainly that crime exposure patterns are indeed different. LIHTC and voucher households on average live in communities with virtually identical poverty rates and minority population shares, whereas they live in communities that are quite different in terms of crime. Household preferences might help to explain the differences and similarities between crime, poverty, and minority exposure among these different types of households. The households with greater residential choice—vouchers and poor renters—live in neighborhoods with dramatically lower crime rates but with fairly similar poverty rates and racial compositions. This at least suggests that voucher holders and other poor households may be prioritizing the avoidance of high-crime neighborhoods in their choices, not neighborhoods with high minority and/or poor populations. This also suggests that if our key interest is facilitating access to safe neighborhoods that offer a rich set of opportunities, then poverty rates and minority concentration may not serve as ideal proxies.

Differences Across Subgroups of Voucher Holders

While the tables above provide useful information about the location and neighborhood choices of the average voucher holders, this section explores whether there are notable differences across sub-groups. We know that housing market opportunities and outcomes differ noticeably by income, race, and family structure; so too might the opportunities and outcomes of housing voucher holders. Table 5 displays crime exposure rates for voucher households, disaggregated by the race of the household-head, household income strata, the presence of children, and whether the household moved in 2000.

Table 5: Voucher crime exposure in 2000 by demographic and mobility characteristics
Sample: 91 cities

Population	Exposure Rate (per 1000 Population)
All voucher holders	78.4[xi]
White voucher holders	76.7*
Black voucher holders	81.4
Hispanic voucher holders	69.3*
Household income < $10,000	81.8
Household income $10,000 to $20,000	75.1**
Household income $20,000 to $30,000	69.3**
Household income > $30,000	63.7**
Voucher holders with children (NS)	77.0
Voucher holders without children	80.7

*Significantly different from black voucher holders at the 1% level.
**Significantly different from voucher holders with income below $10,000 at the 1% level.
NS—Not statistically different from relevant reference category.

The largest differences are across income groups, where there is a monotonic decline in voucher exposure to neighborhood crime as household income increases. This seems surprising given that vouchers should technically neutralize income differences by allowing households to pay only 30 percent of their income for rent. As for racial differences, Hispanic voucher holders lived in neighborhoods with the lowest crime, and black voucher holders lived in the highest crime neighborhoods. Crime exposure rates for voucher households with children were only very slightly lower than those for households without children, and the difference was not statistically significant.

Although Table 5 suggests that Hispanic voucher holders are the least exposed to crime, and black voucher holders are the most exposed, it fails to take into account the safety level of the neighborhoods that households of different races tend to live in absent housing assistance. While it is impossible to know exactly where households would have lived absent their voucher, Table 6 approximates such a counterfactual by comparing exposure to neighborhood crime for voucher households of different races to exposure of poor households and renter households of the same race. The implicit assumption, in other words, is that absent a voucher, households would have lived in the neighborhoods lived in by unassisted, poor and renter households of their same race. Importantly, this comparison does not suggest that voucher holders should be constrained or guided in their residential choices by their race; it simply assumes that they are as likely to operate under such constraints as are unassisted poor and renter households of the same race.

Table 6: Voucher, renter, and poor household crime exposure rates by race
Sample: 91 cities

Population	Exposure Rate (per 1000 Population)
White voucher households	76.7
White poor households	65.1
White renter households	70.3
Black voucher households	81.4
Black poor households	87.5
Black renter households	88.3
Hispanic voucher households	69.3
Hispanic poor households	64.0
Hispanic renter households	66.5

The results are surprising. White and Hispanic voucher holders tend to live in *higher* crime neighborhoods than their counterparts who do not receive vouchers (poor households and renter households). By contrast, black voucher households live in census tracts with slightly *lower* crime rates than black poor households and black renter households. The voucher program, in other words, is helping to close the black-white and black-Hispanic racial gap in exposure to crime. (Of course our comparison groups may differ from voucher holders in unobserved ways, and these differences may be more pronounced for particular racial groups. White and Hispanic voucher holders, in other words, may have quite different location preferences or face very different constraints compared to the full set of white and Hispanic poor households, while black voucher holders may be more similar to other black poor households. Thus we should be cautious in drawing conclusions from these findings.)

Longitudinal Results

The cross-section analyses suggest that, at least in cities, voucher households lived in neighborhoods that were about as safe as those lived in by poor renters and in lower crime neighborhoods than other subsidized households. A key question is how voucher crime exposure changes over time. Table 7 displays 1998 and 2008 crime exposure rates for all households and for voucher households in Austin, Chicago, Cleveland, Denver, Indianapolis, Philadelphia, and Seattle.

Table 7: Changes in crime exposure, 1998 to 2008
Sample: Seven-city longitudinal

	1998		2008	
	All households	Voucher	All households	Voucher
All	78.9	101.9	64.3	79.0
Austin	63.2	69.3	68.0	72.6
Chicago	81.5	103.1	55.8	77.5
Cleveland	68.5	69.8	63.0	63.6
Denver	67.4	104.1	71.7	76.1
Indianapolis	117.3	135.5	120.7	124.9
Philadelphia	74.0	80.1	64.7	63.9
Seattle	94.2	181.5	66.8	122.0

We see here that total crime dropped considerably in the entire sample (from 79 crimes per 1000 persons to 64 crimes per 1000 persons), but the reduction was not statistically significant, and not every city enjoyed these average reductions.[xii] Austin, Denver, and Indianapolis actually experienced slight increases in overall crime rates. Notably, the difference in the crime rates in the neighborhoods where voucher holders lived in 1998 and in 2008 was even larger than that for all tracts, and was statistically significant, unlike the difference for all tracts. The typical voucher household experienced a reduction in crime in every city except for a small increase in Austin (69 to 72 crimes per 1000 persons), and even in that city the crime increase for voucher holders was smaller than that experienced by the average household in the city. The only city where the overall crime decrease was greater than the crime decrease for voucher holders was Chicago. In Cleveland, Denver, Indianapolis, and Seattle, voucher holders experienced greater decreases in neighborhood crime than the overall population.

While it is impossible to know exactly what drove these reductions in exposure to neighborhood crime, a simple decomposition can shed some light on the causes.[xiii] Given that the decrease in voucher crime exposure was higher than in overall crime, two possibilities emerge. Either the spatial distribution of voucher households changed, and they moved disproportionately to lower crime neighborhoods, or it remained the same but the neighborhoods voucher holders lived in experienced disproportionate declines in crime. To tease this out, we estimate how average neighborhood crime rates for these subgroups would have changed over time if the geographic distribution of each subgroup had remained constant. Specifically, Table 8 presents what crime exposure rates would have been in 2008 had the distribution of voucher holders across neighborhoods remained identical between 1998 and 2008. (In other words, we calculate the exposure of 1998 voucher holders to 2008 neighborhood crime rates.) We compare these hypothetical neighborhood crime rates to the actual 2008 crime exposure rates.

Table 8: Decomposition of crime rate changes
Sample: Seven-city longitudinal

	1998 Voucher Location, 2008 Crime	2008 Voucher Location, 2008 Crime
All	82.4	79.0
Austin	76.0	72.6
Chicago	77.7	77.5
Cleveland	64.3	63.6
Denver	109.7	76.1
Indianapolis	122.1	124.9
Philadelphia	68.9	63.9
Seattle	117.9	122.0

As shown, the hypothetical crime exposure rates on the left side of the table are generally only slightly larger than the actual 2008 crime exposure rates on the right, suggesting that improvements in crime exposure were mostly driven by improvements in the neighborhoods where the various housing groups lived at baseline, rather than due to the movement of voucher recipients to lower crime neighborhoods. Still, the hypothetical crime exposure rates are typically somewhat higher than actual crime exposure rates (and significantly higher in Denver), suggesting that some portion of the reduction in exposure of voucher holders to crime likely resulted from shifts in the distribution of voucher holders towards lower crime neighborhoods. This suggests that ongoing mobility (rather than initial access to particular neighborhoods) contributed a small amount to improvements in voucher neighborhood safety.

Discussion

Using a number of different data sources, this report has described the extent to which voucher households are exposed to neighborhood crime, offering comparisons to public housing residents, LIHTC tenants, and other poor renter households, in a representative sample of U.S. cities. Our key finding is that, overall, voucher households occupied lower crime neighborhoods in 2000 than LIHTC and public housing tenants and neighborhoods that had about the same crime levels as those lived in by poor renters as a whole. This is true even though poverty rates were not as noticeably different.

Additionally, results from a smaller, longitudinal sample shows that voucher households experienced substantial drops in crime exposure from 1998 to 2008. Our preliminary analysis suggests that the reductions in crime exposure came largely (though not exclusively) from overall reductions in crime in the types of neighborhoods where voucher holders tend to live.

In sum then, these findings provide suggestive evidence of a tangible benefit to a switch from reliance on traditional public housing to increased use of vouchers—reduced crime exposure for subsidized households.

Our results provide new insight into the degree to which vouchers are enabling particular subgroups of voucher holders to reach safer neighborhoods. In particular, we find that in a sample of over 90 large cities, black voucher holders lived in safer neighborhoods than other black renters and black poor households in 2000, while white and Hispanic voucher holders lived in less safe neighborhoods compared to other renter and poor households of their same race.

It is worth underscoring that by limiting our analyses to large cities, we are likely overstating the neighborhood crime rates faced by voucher holders and LIHTC tenants, as we are

omitting the large number of them who live in smaller suburban communities. By 2000, voucher holders and LIHTC tenants were much more likely than public housing tenants to live in the suburbs (Devine et al. 2003). While suburban voucher holders and LIHTC tenants live in the higher poverty sections of suburbs, their neighborhoods still have considerably lower poverty rates on average than the neighborhoods lived in by their city counterparts (McClure 2006). It seems likely that the same pattern would hold for crime rates. We also may be understating the *reduction* in crime exposure for voucher holders, as an increasing number of voucher holders may have moved to the suburbs since 2000. Finally, since there may be differential selection of the suburbs by race of voucher holders, our patterns for subgroups might differ in the suburbs.

Ultimately, the goal of this research is to better understand the effectiveness of the Housing Choice Voucher program at affording participants access to higher opportunity, and in particular, safer neighborhoods. The evidence suggests it does. There are several ways in which additional research could enhance these findings. First, by exploring whether our results could be due to differences between the characteristics and preferences of voucher and other subsidized tenants (though given that voucher holders have lower incomes on average than other subsidized tenants, we would expect them, if anything, to locate in more disadvantaged neighborhoods than other assisted households). To better understand how voucher holders appear more able to reach lower crime neighborhoods than other subsidized households, future research should also explore how voucher holders choose their neighborhoods. Finally, future research should explore how and why these differences may vary across metropolitan areas, and whether differences in landlord resistance to voucher tenants or voucher policies contribute to them. Understanding the conditions under which voucher holders are able to reach safer neighborhoods could shed light on potential interventions that might in the long run allow voucher holders to access even safer communities.

IV. Appendixes

APPENDIX A

Appendix A—1: City list and descriptives for 91-city cross-section

CITY	Population	Housing Units	Crimes per 1000 Persons	Crimes per 1000 Housing Units	Vouchers	LIHTC Units	Public Housing Units	Rental Units Occupied by Poor Households
Akron, OH	240,756	107,544	58	129	2,852	1,818	3,647	11,753
Albuquerque, NM	481,532	211,547	80	182	4,058	1,945	846	17,601
Alexandria, VA	128,283	64,251	44	88	991	987	889	3,647
Anchorage, AK	258,847	99,932	39	102	1,657	401	588	4,372
Arlington, TX	347,483	136,874	64	162	2,203	2,509	0	9,058
Aurora, IL	232,741	80,070	24	70	703	736	656	2,692
Austin, TX	739,944	310,334	53	127	2,415	3,397	2,036	29,051
Bellevue, WA	132,235	57,274	29	67	454	675	109	2,129
Boston, MA	571,815	248,834	62	142	9,590	10,426	9,879	39,801
Buffalo, NY	287,217	144,961	64	127	5,674	1,627	4,740	26,526
Carrollton, TX	125,315	48,150	29	75	199	1,015	94	1,647
Chandler, AZ	180,269	68,123	55	145	334	240	312	2,158
Charlotte, NC	600,199	256,489	78	182	2,462	2,223	3,345	15,437
Chicago, IL	2,871,155	1,149,324	68	169	22,711	17,893	36,840	153,744
Chula Vista, CA	176,724	60,352	37	107	1,642	428	121	4,045
Cincinnati, OH	342,844	171,839	69	137	5,292	4,260	6,793	26,849
Cleveland, OH	471,265	213,876	65	144	6,788	4,762	10,267	36,490
Columbus, OH	810,375	370,569	76	166	5,354	9,386	3,588	36,409
Coral Springs, FL	123,002	43,478	32	89	265	0	0	2,077
Dallas, TX	1,218,325	498,651	81	198	10,244	14,591	4,384	50,257
Dayton, OH	188,930	90,573	84	175	1,407	2,279	3,736	11,877
Denver, CO	545,324	248,236	48	106	4,291	2,248	3,849	22,761
Des Moines, IA	204,995	87,469	59	139	1,775	1,352	907	5,885
Detroit, MI	830,044	325,923	106	270	6,113	4,192	3,296	46,056
Eugene, OR	163,496	72,470	55	125	1,113	539	322	9,016
Evansville, IN	130,246	61,034	47	100	1,483	781	871	5,263
Fort Collins, CO	145,762	59,718	31	76	839	1,089	154	5,009
Fort Wayne, IN	222,320	98,145	51	115	1,205	850	703	6,861
Fort Worth, TX	560,623	223,464	65	164	2,582	4,123	1,134	18,606
Fullerton, CA	150,346	53,084	28	80	945	822	0	4,030
Garden Grove, CA	207,774	58,627	24	84	1,878	612	0	4,705

Glendale, AZ	229,093	83,080	58	160	1,080	320	155	5,688
Hampton, VA	133,657	56,431	44	104	1,822	817	585	4,343
Hartford, CT	120,563	50,622	86	206	4,322	991	2,262	11,960
Hialeah, FL	243,532	77,176	50	159	2,796	106	1,116	11,610
Houston, TX	1,786,008	710,802	73	183	7,812	9,578	2,863	77,360
Inglewood, CA	124,959	42,644	37	107	1,398	21	0	6,536
Irving, TX	191,611	80,315	49	116	629	1,808	0	5,551
Jacksonville, FL	736,273	311,388	66	156	5,376	4,051	2,679	21,224
Kansas City, MO	460,059	209,785	87	192	4,488	7,140	1,032	17,733
Knoxville, TN	203,648	101,764	48	96	1,930	529	3,848	13,702
Lexington, KY	255,676	115,769	47	105	1,730	365	1,535	11,415
Lincoln, NE	224,388	96,598	61	143	890	1,068	320	8,342
Livonia, MI	100,545	38,658	30	79	17	0	177	525
Long Beach, CA	460,927	172,305	37	99	5,271	645	713	25,881
Los Angeles, CA	3,658,681	1,333,008	45	123	30,902	15,462	6,479	202,406
Louisville, KY	306,550	144,563	46	99	5,009	1,604	4,784	18,585
Madison, WI	236,303	106,456	33	72	1,138	1,832	758	11,493
McAllen, TX	113,041	40,486	74	207	726	6	199	4,347
Memphis, TN	687,414	287,986	81	192	4,057	4,028	5,928	32,143
Miami, FL	369,590	151,261	62	152	2,231	2,484	7,346	34,253
Milwaukee, WI	557,852	235,699	77	183	4,775	1,532	4,807	34,064
Minneapolis, MN	370,201	165,817	68	152	2,601	579	5,863	18,041
Naperville, IL	166,283	58,960	12	34	145	180	0	588
Nashville, TN	547,083	245,891	82	182	3,917	3,486	5,805	21,076
New Haven, CT	117,584	52,498	86	191	2,314	1,055	3,028	9,953
Newport News, VA	174,412	73,129	54	129	1,450	2,215	2,189	7,527
Norfolk, VA	208,040	91,472	65	147	1,826	1,915	3,020	13,018
Oakland, CA	399,383	157,452	64	162	9,272	2,385	3,306	19,824
Oklahoma City, OK	527,044	238,989	75	166	5,242	3,643	2,942	22,088
Ontario, CA	206,229	60,488	35	119	588	168	20	4,995
Overland Park, KS	169,949	70,722	35	84	425	414	0	1,400
Pasadena, CA	135,341	54,663	38	93	1,080	896	0	5,470
Pasadena, TX	157,986	55,860	39	111	919	1,573	0	4,818
Pembroke Pines, FL	151,958	60,158	32	81	56	0	0	1,054
Philadelphia, PA	1,495,623	658,462	56	126	9,442	6,546	17,709	79,252
Phoenix, AZ	1,331,761	504,038	71	189	4,142	843	2,939	40,001
Pittsburgh, PA	256,847	126,485	71	145	3,094	885	6,292	17,620
Plano, TX	244,977	95,553	34	86	223	240	50	2,001
Portland, OR	548,383	246,513	71	159	4,583	6,144	2,690	21,432

Rockford, IL	173,119	73,597	72	168	1,397	648	2,215	6,080
San Antonio, TX	1,207,251	455,046	60	158	10,831	1,827	5,405	42,418
San Bernardino, CA	246,966	88,086	45	125	2,545	694	664	13,704
San Diego, CA	1,206,318	470,285	39	99	8,507	3,169	1,401	43,938
Santa Rosa, CA	180,030	69,451	30	78	1,683	1,485	0	3,605
Seattle, WA	509,031	246,431	84	173	3,740	4,123	5,580	19,867
Simi Valley, CA	115,787	38,858	14	42	614	793	0	764
St. Louis, MO	346,326	175,820	134	264	3,426	3,466	4,710	25,443
St. Petersburg, FL	258,395	130,993	80	158	2,048	34	687	7,978
Stamford, CT	117,083	47,317	26	64	566	1,038	841	2,638
Sterling Heights, MI	124,263	47,398	24	63	149	200	153	1,129
Tampa, FL	330,721	149,124	92	203	2,502	470	3,429	15,213
Tempe, AZ	155,877	66,711	93	216	696	0	0	7,036
Toledo, OH	321,871	144,193	76	170	2,320	2,109	2,843	16,373
Topeka, KS	132,199	59,949	94	208	713	1,207	634	4,774
Tucson, AZ	518,337	228,413	84	189	3,474	2,413	1,440	24,822
VA Beach, VA	423,697	162,194	38	98	880	1,784	0	6,657
Waco, TX	125,127	51,640	76	184	1,530	488	889	8,970
Washington, DC	558,502	272,899	63	129	5,264	4,817	10,277	35,569
Waterbury, CT	107,271	46,827	57	130	754	454	716	5,531
Worcester, MA	169,028	70,604	48	116	2,015	1,011	2,181	9,881

Appendix A—2: Longitudinal crime data by city and year, 1998 to 2008

	98	99	00	01	02	03	04	05	06	07	08
Austin	X	X	X	X	X	X	X	X	X	X	X
Chicago	X	X	X	X	X	X	X	X	X	X	X
Cleveland		X	X	X	X	X	X	X	X	X	X
Denver*	X	X	X	X	X	X	X	X	X	X	
Indianapolis**	X	X	X	X	X	X	X	X	X	X	X
Philadelphia***	X	X	X	X	X	X	X	X	X		
Seattle	X	X	X	X	X	X	X	X	X	X	

*Neighborhood-level
**Crime data missing for half of the tracts. The tracts included represent just under half of Indianapolis' population.
***No homicide or rape

We collected crime data from one of three sources: directly from police department web sites or data requests to the department (Austin and Seattle), from researchers who obtained these data from police departments (Chicago), and from the National Neighborhood Indicators Partnership (NNIP)—a consortium of local partners coordinated by the Urban Institute to produce, collect, and disseminate neighborhood-level data—Cleveland (Case Western Reserve University), Denver (The Piton Foundation), Indianapolis (The Polis Center), and Philadelphia (The Reinvestment Fund). For all cities, total, property, and violent crimes are included, and for all cities but Denver and Indianapolis, crimes are further disaggregated into all Part I crimes (violent crimes: assault, sexual assault, homicide, and robbery; property crimes: larceny, burglary, motor vehicle theft, and arson).[xiv] In all cities except for Denver, neighborhoods are proxied by census tracts.[xv] Denver crime data is aggregated to locally defined neighborhoods, which are typically two to three census tracts. In Denver, we aggregated the tract-level housing data to the neighborhood level and linked these variables to the neighborhood crime data.

Appendix A—3: Percent of public housing units and vouchers reported by housing authority, 1998 and 2008

	1998		**2008**	
	Public Housing	Vouchers	Public Housing	Vouchers
Austin	96	99	99	NA
Chicago	63	99	54	NA
Cleveland	85	99	100	NA
Denver	98	99	99	NA
Indianapolis	74	84	97	NA
Philadelphia	50	99	87	NA
Seattle	95	99	89	NA

APPENDIX B

Appendix B—1: Seven-city longitudinal sample, crime and housing variables, 1998 to 2008

Year	1998	2000	2004*	2008**
Crimes Per 1000 persons	78.9	71.4	65.9	64.3
Crimes Per 1000 housing units	186.2	168.4	155.4	151.6
#Vouchers	35,351	51,819	45,528	72,894
# LIHTC Units	34,594	41,491	57,373	72,281
# Public Housing Units	73,181	78,206	58,179	57,207

*2004 voucher counts are low due to missing data in Philadelphia and Seattle.
**LIHTC units reported use 2007 totals.

Appendix B—2: Descriptives for Household-Level Voucher Data in 2000

	Number	Percent
Total	212,167	100.0%
White householder	56,775	18.7%
Black householder	136,838	64.4%
Hispanic householder	29,465	13.9%
Household income < $10,000	123,543	58.2%
Household income $10,000 to $20,000	67,808	32.0%
Household income $20,000 to $30,000	17,682	8.3%
Household income > $30,000	3,134	1.5%
Child in household	132,077	62.3%
No child in household	80,090	37.7%
Moved to tract using voucher in 2000	45,169	21.3%
Non-mover in 2000	166,998	78.7%

APPENDIX C

Appendix C—1: Crimes per 1000 housing units and crimes per square mile, 2000, cross-sectional sample

	Crimes per 1000 Housing Units	Crimes per Square Mile
Vouchers	187.1	742.8
LIHTC	211.9	895.5
Public housing	232.0	871.7
Poor renters	188.3	848.0

Appendix C—3: Ratios between 2008 and 1998 crime exposure rates, crimes per 1000 persons and crimes per 1000 housing units. Seven-city sample

	Crimes per 1000 Persons				Crimes per 1000 Housing Units			
	Total	Voucher	LIHTC	Public Housing	Total	Voucher	LIHTC	Public Housing
All	0.81	0.78	0.80	0.65	0.81	0.80	0.79	0.60
Austin	1.08	1.05	0.93	1.22	1.07	1.06	1.04	1.21
Chicago	0.68	0.75	0.65	0.45	0.69	0.78	0.65	0.39
Cleveland	0.92	0.91	0.92	1.14	0.92	0.90	0.79	1.05
Denver	1.06	0.73	1.16	0.86	1.05	0.83	1.42	0.87
Indianapolis	1.03	0.92	0.85	1.02	1.03	0.94	0.89	1.08
Philadelphia	0.87	0.80	0.88	0.73	0.87	0.79	0.83	0.78
Seattle	0.71	0.67	0.55	0.69	0.71	0.69	0.57	0.68

Appendix C—4: Violent crime exposure, 1998 to 2008, seven-city longitudinal sample*

	1998				2008			
	Total	Voucher	LIHTC	Public Housing	Total	Voucher	LIHTC	Public Housing
All	13.7	23.2	28.4	44.6	12.4	19.9	21.3	20.3
Austin	4.4	6.3	7.6	9.4	5.1	7.2	7.4	10.2
Chicago	19.1	33.1	37.5	69.0	13.2	24.0	21.0	18.4
Cleveland	12.8	15.0	21.8	22.3	13.2	13.9	17.2	25.4
Denver	4.5	7.6	11.2	11.2	6.0	6.9	16.8	11.8
Philadelphia	12.4	16.2	21.0	20.6	16.5	21.7	24.0	25.1
Seattle	7.7	20.4	34.2	12.7	9.7	22.3	34.7	15.0

* This table includes six cities only, as we do not have violent crime data for Indianapolis.

Endnotes

[i] U.S. Department of Housing and Urban Development. Draft 2010-2015 Strategic Plan.
http://portal.hud.gov/hudportal/HUD?src=/program_offices/cfo/stratplan

[ii] Note that we do not have census tract-level crime in the suburbs of these large cities (though some of the cities themselves are considered suburban), so our analysis is limited to central cities.

[iii] It is worth noting that LIHTC units were relatively more concentrated in low poverty neighborhoods than vouchers in the suburbs, while slightly less so in central cities. Our analysis focuses on large cities.

[iv] Questions address perceived safety during the day, safety during the night, drug activity in view in the neighborhood, and whether a household member was a crime victim in the past 6 months.

[v] We do not have 2008 data for three of the cities. For these cities, we use 2007 crime data to estimate 2008 voucher crime exposure rates. Though this is not ideal, there is not much reason to expect substantial changes in the neighborhood distribution in crime from 2007 to 2008 in these cities, and this is preferable to limiting the 2008 analysis to four cities. In Cleveland, which has missing crime data for 1998, we use 1997 and 1999 crime data to estimate 1998 crime rates using a linear interpolation.

[vi] All core cities of Metropolitan Areas, FBI Uniform Crime Reports, 2000.

[vii] Crime rates are expressed both as crimes per 1000 residents and as crimes per 1000 housing units. However, in the results section, we present crime exposure rates as crimes per 1000 residents, with crimes per 1000 housing units and crimes per square mile as robustness checks included in the appendix.

[viii] The differences in means test statistic approximates the normal distribution (Z) where the observed value is given by:

Where $\boldsymbol{\mu}_1$ and $\boldsymbol{\mu}_2$are the sample means for two housing subgroups and is the standard deviation of the sampling distribution for sample means, and given by:

[ix] The differences in proportions test statistic approximates the normal distribution (Z) where the observed value is given by:

where P_{s1} and P_{s2} are the sample proportions for two housing subgroups andis the standard deviation of the sampling distribution for sample proportions and equal to:

where is the pooled estimate of the population proportion and given by:

[x] One exception is that we find that LIHTC households lived in census tracts with higher crimes per square mile than public housing households (see Appendix C1). This suggests either that LIHTC units are located in more dense, geographically smaller census tracts than public housing units, or that when they are located in such tracts, these tracts have higher crime rates.

[xi] This is slightly higher than the voucher crime exposure rates reported in Table 3, due to differences between the household data and those reported in HUD's Picture of Subsidized Households.

[xii] It should be noted that the value of the crime rate denominator does not change from 1998 to 2008. Thus we are underestimating crime rate decreases in neighborhoods and cities with population growth (and requisite growth in crime numbers)

[xiii] The analysis does not take into account the possibility that the spatial location of these households could have impacts on neighborhood crime rates, but still allows us insight into whether crime decreases were more related to household movements or within-tract improvements.

[xiv] Philadelphia was not able to share sexual assaults or homicides, and those crimes are thus not included in overall totals or the individual categories. Given Philadelphia crime data were available from 1998-2006, we used 1998 and 1999 crime data to estimate 1997 numbers, and 2005 and 2006 crime data to estimate 2007 numbers.

[xv] Although Denver data is at the neighborhood level, 4,447 of our 4,523 neighborhoods are equivalent to census tracts. Thus in describing data and results, we often use the term "census tract."