

---

# Providing Affordable Family Housing and Reducing Residential Segregation by Income

## A Systematic Review

Laurie M. Anderson, PhD, Joseph St. Charles, MPA, Mindy T. Fullilove, MD, Susan C. Scrimshaw, PhD, Jonathan E. Fielding, MD, MPH, MBA, Jacques Normand, PhD, and the Task Force on Community Preventive Services

---

**Overview:** The inadequate supply of affordable housing for low-income families and the increasing spatial segregation of some households by income, race, ethnicity, or social class into unsafe neighborhoods are among the most prevalent community health concerns related to family housing. When affordable housing is not available to low-income households, family resources needed for food, medical or dental care, and other necessities are diverted to housing costs. Two housing programs intended to provide affordable housing and, concurrently, reduce the residential segregation of low-income families into unsafe neighborhoods of concentrated poverty, are reviewed: the creation of mixed-income housing developments and the Department of Housing and Urban Development (HUD) Section 8 Rental Voucher Program. The effectiveness of mixed-income housing developments could not be ascertained by this systematic review because of a lack of comparative research. Scientific evidence was sufficient to conclude that rental voucher programs improve household safety as measured by reduced exposure to crimes against person and property and decreased neighborhood social disorder. Effectiveness of rental voucher programs on youth health risk behaviors, mental health status, and physical health status could not be determined because too few studies of adequate design and execution reported these outcomes. (*Am J Prev Med* 2003;24(3S):47–67)

---

### Introduction

The social, physical, and economic characteristics of neighborhoods are increasingly recognized as having both short- and long-term consequences for residents' physical and psychological well-being.<sup>1,2</sup> Among the most pressing health-related, neighborhood-level issues currently facing the nation are the inadequate supply of housing affordable to lower-income households and the

increasing spatial (residential) segregation of households by income, race, ethnicity, or social class, as well as the related increase in poverty and impoverished areas within many of the country's urban centers.<sup>3</sup> Selected goals and objectives from the U.S. Department of Housing and Urban Development (HUD)<sup>4</sup> and from *Healthy People 2010*,<sup>5</sup> related to housing programs that reduce residential segregation by income, race, or ethnicity, are shown in Table 1.

---

From the Division of Prevention Research and Analytic Methods, Epidemiology Program Office, Centers for Disease Control and Prevention (Anderson, St. Charles), Atlanta, Georgia; the Task Force on Community Preventive Services and Columbia University (Fullilove), New York, New York; the Task Force on Community Preventive Services and University of Illinois, Chicago, School of Public Health (Scrimshaw), Chicago, Illinois; the Task Force on Community Preventive Services, Los Angeles Department of Health Services, and School of Public Health, University of California, Los Angeles (Fielding), Los Angeles, California; National Institute on Drug Abuse, National Institutes of Health (Normand), Bethesda, Maryland

The names and affiliations of the Task Force members are listed at the front of this supplement, and at [www.thecommunityguide.org](http://www.thecommunityguide.org).

Address correspondence to: Laurie M. Anderson, PhD, MPH, Community Guide Branch, Centers for Disease Control and Prevention, 4770 Buford Highway, MS-K73, Atlanta GA 30341. E-mail: LAA1@cdc.gov.

Address reprint requests to: Community Guide Branch, Centers for Disease Control and Prevention, 4770 Buford Highway, MS K-73, Atlanta GA 30341. Website: [communityguide@cdc.gov](mailto:communityguide@cdc.gov).

### The Inadequate Supply of Housing Affordable to Lower-Income Households

Housing and health are related in several ways. Housing is a basic necessity that provides shelter from the elements; facilitates the storage of food, water, and other essentials; and is the setting for the communal life of the household. Housing is an object of attachment and a source of identity and also has a significant relationship to psychological well-being.<sup>6</sup> The World Health Organization's *Health Principles of Housing*<sup>7</sup> points to the association between housing and health as including protection against communicable diseases; protection against injuries, poisonings, and chronic

**Table 1.** Selected U.S. Department of Housing and Urban Development (HUD) goals<sup>4</sup> and objectives, and *Healthy People 2010*<sup>5</sup> goals and objectives related to housing programs that reduce residential segregation by income

---

**HUD FY2000–FY2006 Strategic Plan**

---

**Goal 1:** Increase the availability of decent, safe, and affordable housing in American communities.

**Objective:** By 2005, the number of families with children, elderly households, and persons with disabilities with worst-case housing needs will decrease by 30% from 1997 levels. (“Worst-case housing needs” are defined as unassisted very-low-income renters who pay more than half of their income for housing or live in severely substandard housing.)

**Goal 2:** Ensure equal opportunity in housing for all Americans.

**Objective:** Segregation of racial and ethnic minorities and low-income households will decline.

**Goal 3:** Promote housing stability, self-sufficiency, and asset development of families and individuals.

**Objective:** The annual percentage growth in earnings of families in public and assisted housing increases.

**Goal 4:** Improve community quality of life and economic vitality.

**Objective:** The share of households located in neighborhoods with extreme poverty decreases.

Among low- and moderate-income residents, the share with a good opinion of their neighborhood increases.

Residents of public housing are more satisfied with their safety. (Note: For the purposes of this measure, a “good opinion” of the neighborhood is defined as a response of 7–10 on a 10-point scale assessing “overall opinion of neighborhood.”)

---

**Healthy People 2010 Goals and Objectives**

---

**Educational and Community-Based Programs Goal:** Increase the quality, availability, and effectiveness of educational and community-based programs designed to prevent disease and improve health and quality of life.

**Community Setting Objective:** (Developmental) Increase the proportion of Tribal and local health service areas or jurisdictions that have established a community health promotion program that addresses multiple *Healthy People 2010* focus areas. (Objective 7–10)

**Environmental Health Goal:** Promote health for all through a healthy environment.

**Healthy Homes and Healthy Communities Objective:** Reduce the proportion of occupied housing units that are substandard. (Objective 8–23)

**Injury and Violence Prevention Goal:** Reduce disabilities, injuries, and death due to unintentional injuries and violence.

**Violence and Abuse Prevention Objectives:**

Reduce homicides. (Objective 15–32)

Reduce the annual rate of rape or attempted rape. (Objective 15–35)

Reduce sexual assault other than rape. (Objective 15–36)

Reduce physical assaults. (Objective 15–37)

---

diseases; and reduction of psychological and social stresses.<sup>8</sup>

Affordability of housing is linked to the health and well-being of individuals and families. When a market lacks a sufficient supply of affordable housing, lower-income families are often forced to limit expenditures for food, medical care, and other necessities in order to pay rent.<sup>9</sup> The lack of affordable housing within a community can contribute to family residential instability, as families are forced to move frequently, live with other families in overcrowded conditions, or experience periods of homelessness. In the course of a year, at least 2.3 million people in the United States, including nearly 1 million children, are likely to experience at least one period of homelessness.<sup>10</sup> Although several factors contribute to homelessness, including mental illness, chemical dependency, and domestic violence, the importance of affordable housing cannot be overlooked.<sup>11</sup> Family residential instability is associated with children’s poor attendance and performance in school; not having a primary source of medical care; lacking preventive health services (e.g., child immunizations); and suffering from various acute and chronic medical conditions, sexual assault, and violence.<sup>12–14</sup>

In spite of the recent economic slowdown, home ownership rates steadily climbed through 2000 for all

income, racial, and ethnic groups, with white home ownership reaching 73.8% and minority ownership reaching 48.1%.<sup>15</sup> But housing affordability remains a critical concern. More than 14 million households—about one in eight—spent more than 50% of their incomes on housing in 1999, and three in ten households paid at least 30% or more of their incomes for housing. Housing affordability problems affect moderate-income as well as low-income families (Table 2). In this country, no state offers a minimum wage sufficient to allow a family with one full-time worker adequate earnings (at 30% of income) to afford the federal fair-market rent for a two-bedroom apartment.<sup>15</sup> In fact, in 24 states, even families with two full-time minimum wage earners have insufficient income to meet fair-market rents without exceeding the 30% of income threshold for affordability.<sup>15</sup>

On the supply side, between 1997 and 1999 more than 200,000 unsubsidized rental units affordable to extremely low-income households were lost from the housing stock. This brought the total number of unsubsidized units affordable to the poorest households to 1.2 million; with the number of extremely low-income households estimated at 4.5 million, the shortfall in affordable housing stands at 3.3 million units.<sup>15</sup> Federal rental housing programs only partially meet the country’s persistent need for affordable rental

**Table 2.** Terms used in this report to describe income and housing costs

	<b>Term</b>	<b>Definition</b>
<b>Household income</b>	Moderate income household	Income between 80% and 120% of the area median
	Low income	Income less than 80% of the area median
	Extremely low income	Income at or below 30% of the area median
<b>Rent as proportion of household income</b>	Affordable (housing) units	Those not requiring more than 30% of household income for rent
	Moderately cost burdened household	More than 30% of household income for rent
	Severely cost burdened household	More than 50% of household income for rent
<b>Neighborhood income</b>	Poverty neighborhood	20% or more of residents are at the poverty level
	Extreme poverty neighborhood	40% or more of residents are at the poverty level
<b>Interventions reviewed</b>	Mixed-income housing development	A publicly subsidized multifamily rental housing development in which the deliberate mixing of income groups is a fundamental part of the development's operating and financial plans
	Tenant-based rental assistance program	A publicly subsidized rental assistance program, for families with incomes below 50% of area median income, in which families contribute 30% of monthly income toward housing costs and the remainder is subsidized up to a locally defined standard

housing. Although the federal government provides rental assistance to about 4.6 million extremely low and low income renters, more than twice as many (9.7 million) such households receive no federal housing assistance.<sup>15</sup>

### **Socioeconomic Segregation and the Growth in Central-City Impoverishment**

Over recent decades, metropolitan areas have seen a general trend of increased spatial segregation of poor households, as well as the associated increase in central-city poverty. Between 1970 and 1990, the percentage of poor metropolitan area residents living in extreme poverty neighborhoods (i.e., those with poverty rates at or above 40%) increased from 12.4% to 17.9%, while indices of the residential segregation of the poor also rose.<sup>16</sup> At the same time, the population living in poverty within the nation's 100 largest central cities increased both in absolute terms and as a proportion of all central-city residents. While the poverty population of these cities rose, it also became increasingly concentrated in impoverished areas: the percentage of central-city poor living in poverty neighborhoods (those with poverty rates at or above 20%) grew from approximately 55% to 69%, and the percentage living in extreme poverty neighborhoods grew from 17% to 28%. Over the same period, impoverished neighborhoods significantly increased as a proportion of all central-city neighborhoods and the population in extreme poverty neighborhoods doubled.<sup>16</sup>

Considerable public debate has arisen about the sources of these post-1970 trends in poverty and its spatial distribution. Among social policy researchers, attention has been given to untoward consequences of

federal housing policy, the rising numbers of low-skilled immigrants residing in large central cities, and structural changes within the economy that have resulted in higher-paying blue-collar jobs moving from central cities to the suburbs, overseas, or simply being eliminated.<sup>17</sup> Blue-collar jobs that offered adequate wages have been replaced by low-paying, service-sector employment or white-collar jobs with educational and skill requirements that preclude most working-class city residents.<sup>17</sup> Exacerbating these changes to the urban economic landscape are the restrictive land-use practices of affluent suburbs, which hinder the relocation of lower-income families to suburban communities where low-skilled employment is often much more readily available.<sup>18-21</sup>

African Americans are particularly affected by these changes in the metropolitan opportunity structure. Social, political, and economic forces have historically concentrated large numbers of lower-income African Americans in central cities, and continued racial discrimination in housing markets impedes their movement out of these areas.<sup>19,22</sup> Despite a reduction in racial segregation over recent decades, African Americans remain highly overrepresented within the populations of impoverished neighborhoods. In 1990, 17.4% of all African-American residents of the country's metropolitan areas lived in extreme poverty neighborhoods, compared with only 1.4% of all white residents.<sup>23</sup> At the same time, within the 100 largest central cities, 24.2% of all African Americans, but only 3.2% of whites, lived in extreme poverty neighborhoods, with African Americans representing more than 50% of the population of these areas.<sup>16</sup>

Residential segregation of poor households may have significant ramifications for the public's health. A grow-

ing body of literature suggests that neighborhood qualities associated with residents' socioeconomic characteristics (e.g., poverty rate, level of welfare participation, percentage of workers with professional or managerial jobs) have an effect on individual social, economic, and health outcomes that is either independent of, or interacts with, individual-level factors.<sup>24–27</sup> These “neighborhood effects” arise from ecologic conditions that neighborhood-level socioeconomic status (SES) tends to reflect, such as social cohesion, the availability of employment opportunities, the availability and quality of neighborhood services, and the quality of the physical environment. For example, studies have found that, after controlling for individual SES and other individual-level health determinants, measures of neighborhood SES generally remain inversely associated with the risk of coronary heart disease, neural tube defect, and mortality.<sup>28–30</sup> Studies have also found neighborhood SES to influence adolescent sexual activity and childbearing, behavioral and emotional problems among youth, school readiness and educational achievement, and welfare participation.<sup>31,32</sup>

The spread of impoverished urban areas can lead to the physical and social deterioration of neighborhoods. High residential turnover and the increased concentration of poverty result in housing disinvestment and deteriorated physical conditions, a reduction in the capacity of formal and informal institutions to maintain public order, and a decline in the ability of informal networks to circulate information (e.g., about employment opportunities and health resources) and to promote healthy behaviors and positive life choices.<sup>33</sup>

Given the growing number of poor families with children in the United States who need affordable housing, we sought to identify whether family housing subsidies effectively improve household health outcomes.

## Interventions Reviewed

The Task Force on Community Preventive Services (the Task Force) uses evidence from systematic reviews to make recommendations about the use of interventions to improve health. In the social environment and health logic model (described elsewhere in this supplement<sup>34</sup>) “neighborhood living conditions” serve as an intermediate indicator along a pathway linking resources in the social environment to health outcomes. Based on a priority-ranking process,<sup>34</sup> the systematic review development team (the team) chose to address mixed-income housing programs. The two ways to create mixed-income housing are to move higher-income households into lower-SES neighborhoods, or move lower-income households to higher-SES neighborhoods. The two interventions selected for review aim to achieve those goals. They are

1. the creation of mixed-income housing developments in low SES neighborhoods, which provide

- both market rate and subsidized housing units within multifamily rental properties, so that households from different income groups are deliberately mixed; and

2. tenant-based rental assistance programs, which provide lower-income families with housing subsidies that are not tied to a specific housing unit but instead allow families choice of housing in the private rental market and give them access to higher income neighborhoods.

Mixed-income housing was selected because of the intervention's potential for bringing working families back into neighborhoods with high levels of poverty. This approach offers two distinct benefits: (1) the presence of working families prevents or reverses a neighborhood's physical and social deterioration and (2) mixed-income housing can be an effective method for expanding the supply of affordable housing.

Tenant-based rental assistance programs were chosen for review because they provide housing assistance to lower-income households while allowing assisted households to secure housing in relatively affluent neighborhoods. Unlike mixed-income housing developments, which bring non-poor families back into neighborhoods with high poverty levels, tenant-based rental assistance programs achieve residential deconcentration of poverty by sending families out of high poverty areas.

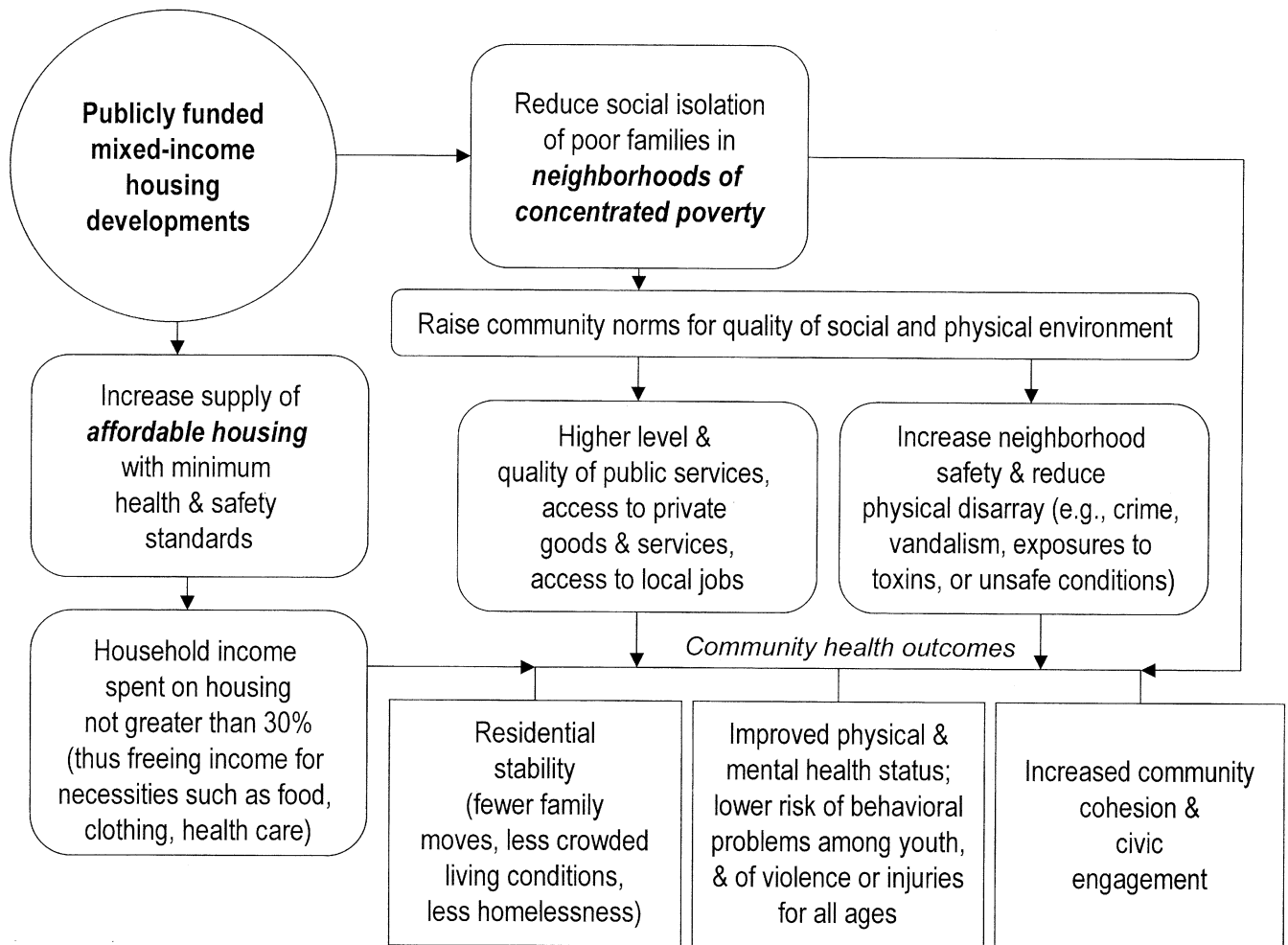
## Conceptual Approach

A detailed description of the general methods used to conduct the systematic reviews for the *Guide to Community Preventive Services* (the *Community Guide*) has been published.<sup>35</sup> The specific methods for conducting reviews of interventions to promote healthy social environments are described in detail in this supplement.<sup>34</sup> This section briefly describes the conceptual approach and search strategy for interventions that provide affordable family housing and limit the spatial concentration of poverty.

## Analytic Frameworks

The analytic frameworks—conceptual models used to evaluate the effectiveness of mixed-income housing developments and tenant-based rental assistance programs in improving community health outcomes—are shown in Figures 1 and 2, respectively. Among environmental factors that may influence health-related outcomes, the most pertinent are neighborhood physical and social conditions; the quality and availability of public services in a neighborhood; opportunities for employment, access to goods and services, and other benefits provided by economic activity within the neighborhood; and the adequacy of the local housing supply in providing affordable housing for lower-income households.

For each intervention, outcome measures evaluated to determine their success included



**Figure 1.** Analytic framework used to evaluate the effectiveness of mixed-income housing developments. (Circle denotes intervention, rectangles with rounded corners denote intermediate outcomes, and rectangles with square corners denote community health outcomes.)

- reduction in housing hazards: substandard housing conditions that pose health and safety risks;
- improvement in neighborhood safety: reduction of intentional injuries, victimization from crime, crime against person and property, and social disorder;
- reduction in youth risk behaviors: behavioral problems in school and at home, dropping out of school, delinquency, and arrests; and
- improvement in mental or physical health status: physical or psychological morbidity and unintentional injury.

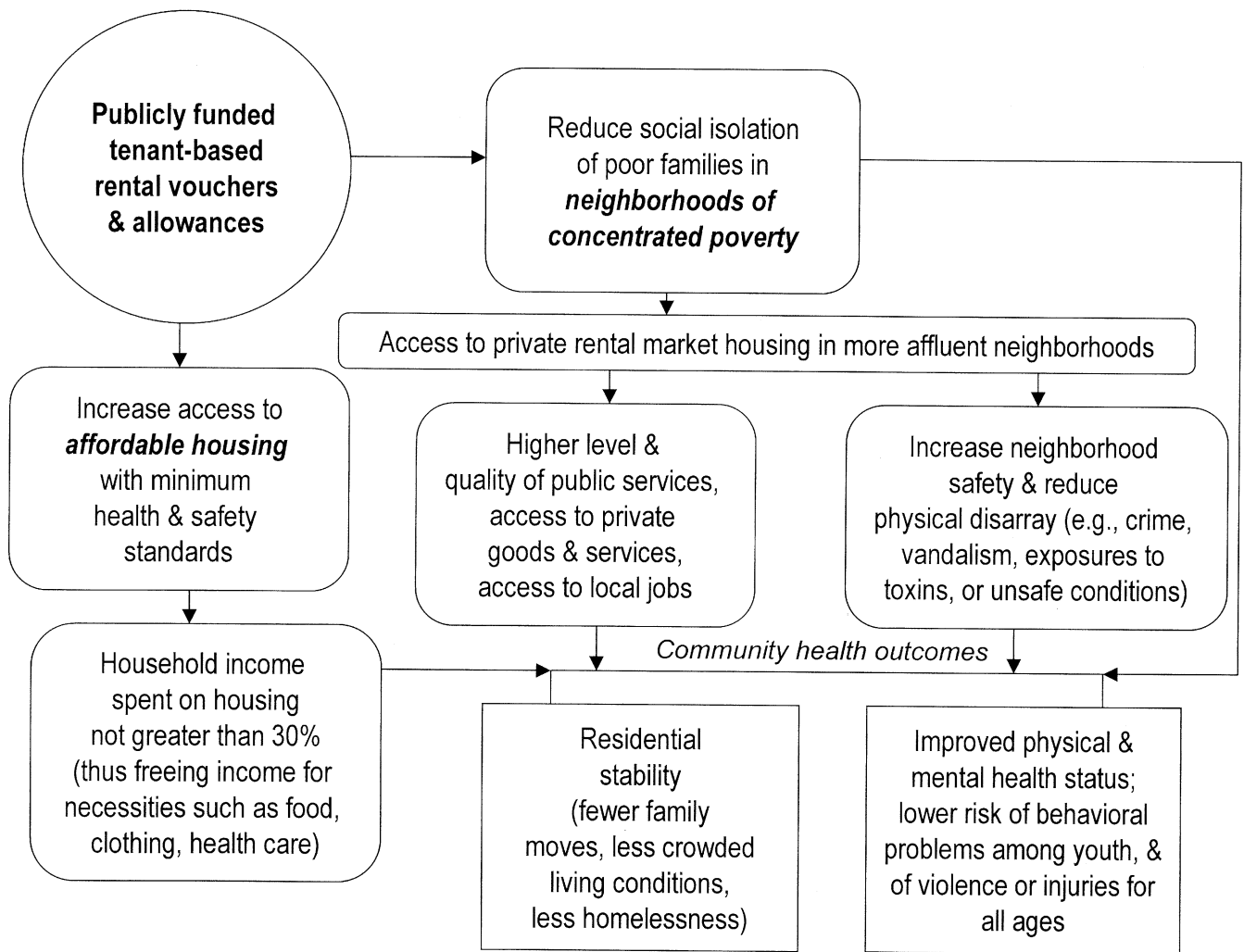
To ascertain implementation of the program, we collected data on the percentage of household income spent on housing (for both interventions) and on the socioeconomic heterogeneity of housing development residents (for mixed-income housing developments) or of neighborhoods (for tenant-based rental assistance programs).

### Search Strategy

Searches for mixed-income housing developments and tenant-based rental assistance programs were conducted in 10 computerized databases: Avery Index to Architectural Period-

icals, EBSCO Information Services' Academic Search Elite™, HUD User Bibliographic Database, MarciveWeb Catalogue of U.S. Government Publications, ProQuest Dissertations, ProQuest General Research Databases, PsychINFO, Public Affairs Information Services, Social Sciences Citation Index, and Sociological Abstracts. Internet resources were examined, as were reference lists of reviewed articles and referrals from specialists in the field. To be included in the reviews of effectiveness, studies had to

- document an evaluation of a mixed-income housing development or a tenant-based rental assistance program for families within the United States,
- be published in English between 1965 and 2000,
- compare outcomes among groups of people exposed to the intervention with outcomes among groups of people not exposed or less exposed to the intervention (whether the comparison was concurrent between groups or before-and-after within groups), and
- measure outcomes defined by the analytic framework for the intervention.



**Figure 2.** Analytic framework used to evaluate the effectiveness of tenant-based rental assistance programs. (Circle denotes intervention, rectangles with rounded corners denote intermediate outcomes, and rectangles with square corners denote community health outcomes.)

For the review of mixed-income housing developments, the team examined 312 citations (titles and abstracts) identified through the database search, review of pertinent reference lists, and consultation with housing specialists. These titles and abstracts were screened to determine if the report or article described a comparative intervention study (as opposed to program descriptions, general statistics on mixed-income developments, case studies, and so on). Based on this screening, 41 articles, reports, and dissertations were obtained and evaluated for inclusion, but none met the inclusion criteria listed above.

For the review of tenant-based rental assistance programs, the literature searches yielded 509 citations, of which 56 were obtained and evaluated for inclusion. Of these, 33 were excluded because they did not evaluate a relevant intervention or they lacked a comparative study design. Twenty-three articles and reports were considered qualifying studies (see Evaluating and Summarizing the Studies in the accompanying article<sup>34</sup>) and the findings in this review are based on those studies.

### Intervention Effectiveness and Economic Efficiency Mixed-Income Housing Developments

For this review, a *mixed-income housing development* is defined as a publicly subsidized multifamily rental housing development, in which the deliberate mixing of income groups is a fundamental part of the development's operating and financial plans. A portion of a development's units must be reserved for, and made affordable to, households whose incomes are at least below 60% of the area median, although there may be variation among developments in the income levels of all residents and the relative representation of each income group. These developments may be created either through new construction or conversion of existing developments, but they must exist within poverty neighborhoods (where more than 20% of households have income below the federal poverty level).

**Reviews of evidence.** The effectiveness of mixed-income housing developments in providing affordable housing in safe neighborhood environments could not be ascertained by this systematic review. We found no studies comparing outcomes among groups of people exposed to the intervention with outcomes among groups of people not exposed to the intervention.

Applicability and economic effectiveness were not assessed, because effectiveness of the intervention could not be established.

Case studies and qualitative research reviewed were, however, useful for several purposes, including generating hypotheses, describing programs, recognizing unanticipated outcomes or potential harms, assessing the fidelity with which programs were implemented, and many others. This literature was less reliable, however, for attributing effects to programmatic efforts.

### Tenant-Based Rental Assistance Programs

Tenant-based rental assistance programs subsidize the cost of housing secured by low-income households within the private rental market through the use of vouchers or direct cash subsidies. HUD's Section 8 program is administered by local and state housing agencies under contract to the federal government. The Section 8 program subsidizes rental costs for families with incomes below 50% of area median income. Families contribute 30% of their monthly income toward housing costs, and the Section 8 subsidy provides the remainder for rental costs up to a locally defined standard.

Unlike traditional, supply-side housing assistance programs for the poor, which subsidize the construction and operation of housing for low-income households, tenant-based rental assistance programs subsidize the cost of rentals for low-income households in the private rental market. Low-income families can use vouchers to rent privately owned housing in neighborhoods of their choice, without spending more than 30% of their income on housing. Historically, proponents of tenant-based rental assistance have argued that, when compared with supply-side programs such as public housing, tenant-based (or demand-side) programs offer several advantages. They are more cost-effective, offer assisted households increased choice in housing type and location, and provide for greater equity by allowing limited government funds to be spread more evenly among those in need. (Supply-side programs, bound by the high cost of housing construction, grant deep subsidies to only a lucky few.<sup>36</sup>) For their part, supporters of supply-side housing have countered that, given housing market dynamics, tenant-based assistance may result in higher rental costs and be detrimental to all lower-income tenants, and the infusion of subsidies may spur only minor improvements in the supply and quality of available rental housing.

Although federal housing policy has traditionally placed an almost exclusive dependence on supply-side programs in attempting to meet the housing needs of low-income renters, recent decades have seen a dramatic shift toward a reliance on tenant-based assistance. The increasingly apparent problems of physical and social deterioration in several highly publicized public housing developments motivated this change in focus. In addition, insufficient financial resources to meet high rent burdens are now the primary housing problem faced by poor households, rather than the physically substandard living conditions that supply-side programs sought to alleviate.<sup>36</sup>

Tenant-based assistance now accounts for 1.4 million of the 4.6 million rental units that are directly subsidized by the federal government in its effort to reduce the number of renter households forced to pay more than 30% of their incomes on housing.<sup>15</sup> HUD's Section 8 tenant-based rental assistance program has always sought to give subsidized households expanded choice in where they live, instead of limiting them to the racially and economically segregated neighborhoods in which public housing developments are too often located.

The success of Section 8 vouchers and certificates in moving assisted families to less impoverished or less racially segregated areas is dependent on several factors, including housing market discrimination, the inexperience of program participants as housing "consumers," the desire of many to remain near established social ties and the conveniences of the urban core, the time and transportation constraints that hinder such households in conducting housing searches in suburban locations, and administrative and programmatic shortcomings of local housing authorities.<sup>37,38</sup> In light of this, some rental voucher programs are augmented with housing search counseling, employment and transportation assistance, community networking, landlord outreach, or post-placement services.<sup>39</sup>

**Effectiveness.** Our search identified 12 studies<sup>40-62</sup> (in 23 papers) on the effectiveness of tenant-based rental assistance programs in improving community health outcomes. These 12 studies represent four broad groups of federal housing evaluation efforts: (1) the Housing Allowance Experiment<sup>41,45,62</sup>; (2) HUD's Section 8 Rental Certificate and Voucher program<sup>40,46,47</sup>; (3) the Gautreaux program in which rental vouchers were provided to African-American families in racially segregated public housing in Chicago<sup>44,51,52,54,57-61</sup>; and (4) Moving to Opportunity for Fair Housing research, implemented in five large cities, which combines rental vouchers with household counseling to help low-income families move from public housing to nonpoverty neighborhoods.<sup>42,43,48-50,53,55,56</sup> Summary effect measures for each prespecified outcome of inter-

**Table 3.** Effectiveness of tenant-based rental assistance programs on various outcomes: summary effects from the body of evidence

Outcome	No. of outcome measures	Median change	Range or measure
<b>Neighborhood safety</b>			
Experience of victimization: crimes against person or property, exposure to violence (mugged, threatened with gun or knife, beaten, assaulted, stabbed or shot)	12 <sup>41,42,48,51,53</sup>	-6%	-22% to +6%
Neighborhood murder rate	1 <sup>53</sup>	NA	-52%
Social disorder: public drinking, public drug use, seeing person carrying weapon, hearing gunfire	17 <sup>43,48,52,55</sup>	-15.5%	-89% to -3%
<b>Housing quality</b> (Substandard conditions that pose health and safety risks)			
Peeling paint	1 <sup>55</sup>	NA	-53%
Inadequate plumbing	1 <sup>55</sup>	NA	-28%
Rodent infestation	1 <sup>55</sup>	NA	-34%
Broken or missing lock on door to unit	1 <sup>55</sup>	NA	-42%
<b>Youth risks</b>			
Behavioral problems in school, behavioral problems at home, delinquent acts, arrests for violent crime, arrests for property crime	16 <sup>43,48,50</sup>	-7.8%	-8.5% to -7%
<b>Psychological and physical morbidity</b>			
Self-reported symptoms of depression and anxiety by household head	28 <sup>43,48</sup>	-8%	-9.5% to -6.5%
Self-rated health status as "good" or "excellent" compared with "fair" or "poor"	4 <sup>43,48</sup>	+11.5%	+9% to +11.5%
Child needing acute medical attention for injuries or asthma	4 <sup>43</sup>	-4.5%	-6% to 0%
Child use of preventive services	2 <sup>43</sup>	-5.5%	-7% to -4%

NA, not applicable

est are shown in Table 3. Details of the qualifying studies are provided in Appendix A.

Five studies<sup>41,42,48,51,53</sup> (two of greatest design suitability and fair quality of execution, one of greatest design suitability and good execution, and two of moderate design suitability and fair execution) reported measures of neighborhood safety. For household victimization, the median decrease was 6%, measured, on average, 6 months after the intervention took place. Four studies<sup>43,48,52,55</sup> (one of greatest design suitability and good quality of execution, one of greatest design suitability and fair execution, one of moderate design suitability and fair execution, and one of least suitable design and fair execution) examined changes in neighborhood social disorder; the median difference was a 15.5% decrease. One study<sup>53</sup> (of greatest design suitability and fair quality of execution) compared murder rates in the neighborhood to which households relocated with rates in their neighborhood of origin and reported a decrease.

One study<sup>55</sup> (of least suitable design and fair quality of execution) reported decreases in health and safety risks, including peeling paint, inadequate plumbing, rodent infestation, and a broken or missing lock on the door to the housing unit.

Three studies<sup>43,48,50</sup> (all of greatest suitability of design, one of good quality of execution and two of fair execution) reported on youth risk behaviors, measured

between 1 and 5 years (mean, 2.9 years) after the intervention took place. The median difference was a decrease in behavioral problems of 7.8%.

Two studies<sup>43,48</sup> (both of greatest suitability of design, one of good quality of execution and one of fair execution) reported on self-reported symptoms of depression and anxiety by head of household. The median difference was a decrease of 8%. The same two studies<sup>43,48</sup> reported self-rated health status. In these studies, the median difference in people rating their health as "good" or "excellent" compared with "fair" or "poor" increased by 11.5%.

One study<sup>43</sup> (of greatest suitability of design and good quality of execution) reported on diverse child health outcomes. A median decrease of 4.5% was observed in the need for acute medical care for injuries or asthma episodes. A median decrease of 5.5% was observed for use of preventive services for children (e.g., well-child check-ups and vaccinations). This decrease in use of child preventive services is an undesired outcome, which could reflect barriers to care in families' new, more affluent neighborhoods (e.g., fewer providers accepting Medicaid, fewer clinics oriented to low-income families). The decrease in emergency room treatment for acute asthma episodes and injuries could also be an undesired outcome—reflecting decreased access to care—or it could be a desired outcome, reflecting reduced need for acute care among the



relocated families, a plausible result in view of the fact that both childhood asthma and injuries are associated with substandard housing.<sup>43</sup>

**Applicability.** The rental assistance programs reviewed were implemented in urban areas. The populations studied included families with children. We did not examine housing programs that targeted the elderly or people with special health needs. Only low-income socioeconomic groups were represented, including white, Latino, and African-American populations; effects were similar for all of these groups.

**Other positive or negative effects.** Rental assistance programs encourage families to move to neighborhoods of greater prosperity; this may disrupt the social ties and supports in the old neighborhood, resulting in its increased social deterioration. Overrepresentation of Section 8 families in receiving neighborhoods, particularly weaker or declining neighborhoods where more moderately priced housing may exist, could possibly destabilize those neighborhoods and create new areas of poverty. The team conducted additional literature searches to determine if the intervention had negative consequences for the neighborhoods of poverty from which families moved (i.e., disruption of social ties and networks, depleting neighborhoods of human capital, and furthering neighborhood decline) and none were identified. The potential for destabilization of receiving neighborhoods was raised in the literature, but no data were found documenting this outcome.

**Economic efficiency.** No economic studies were found that met the requirements for inclusion in a *Community Guide* review.<sup>63</sup>

**Barriers to intervention implementation.** Barriers to implementing tenant-based rental assistance programs are described in the literature. Relocating households to better neighborhoods may be hindered if families cannot search for housing in these areas because they lack transportation or funds for apartment application fees, or they fear discrimination or encountering landlords who refuse to accept Section 8 tenants. Local housing market conditions may also inflate rents above the means of Section 8 rental voucher recipients.

**Conclusion.** Tenant-based rental assistance programs are recommended to improve household safety, on the basis of sufficient evidence of reductions in exposure to crimes against person and property and decreases in neighborhood social disorder. We were, however, unable to determine the effectiveness of such programs on housing hazards, youth risk behaviors, and psychological and physical morbidity, because too few studies of adequate design and execution (according to *Community Guide* rules of evidence<sup>35</sup>) reported these outcomes.

## Research Issues

Systematic reviews are useful both for developing recommendations and for identifying important unanswered questions. The research questions posed below can be used to guide future research, both by government agencies and foundations in their allocation of research funding and by academic and other research organizations in their selection of research priorities.

## Mixed-Income Housing Developments

**Effectiveness.** The degree to which creating mixed-income housing developments in neighborhoods with concentrated poverty increases neighborhood socioeconomic heterogeneity could not be determined in this systematic review. Therefore, basic research questions remain.

- Are such housing developments effective in beginning a process of neighborhood revitalization that makes an area more attractive to higher-income households as well, or are changes to a neighborhood's demographic makeup limited to the housing development itself?
- How does variability among housing developments affect important outcomes, such as differences in the income groups represented, the degree of representation by each income group, and whether or not the units occupied by the various income groups are intermixed? The types and quality of social services provided at a housing development may influence the degree of social integration among tenants of various income groups, which is considered an important intermediate outcome of income mixing. Similarly, the employability of disadvantaged household heads may be increased in developments where job training, child care, or other pertinent services are provided.
- To what degree does bringing higher-income households into neighborhoods of concentrated poverty affect these neighborhoods in terms of crime, the quality and availability of public services, residents' access to market goods and services, and neighborhood physical conditions?

**Other positive or negative effects.** If mixed-income housing developments are effective in beginning a process of revitalization that attracts higher-income households to a neighborhood, to what extent does this revitalization and the related increases in housing costs ultimately push poor families out of the area?

## Tenant-Based Rental Assistance Programs

**Effectiveness.** The causes of residential segregation and isolation of families by income, race, ethnicity, or social class into neighborhoods of concentrated poverty are complex. Tenant-based rental assistance programs

allow families to find affordable housing in safer neighborhoods, but the potential to fully realize housing and neighborhood choice could be advanced by a greater understanding of factors that affect choice.

- What resources are critical in allowing families to fully realize the potential for housing mobility (e.g., counseling on housing search strategies, transportation resources)?
- How can the Section 8 program be made more attractive to landlords, particularly when rental units are scarce in a tight rental market?

**Applicability.** Our review focused on urban areas and low SES families with children. Applicability of this intervention to the elderly and to those with special health needs should be assessed.

**Other positive or negative effects.** Encouraging residential mobility away from poor central-city areas may disrupt existing neighborhood social networks and supports, giving way to greater neighborhood social deterioration.

- To what extent should housing mobility strategies be coupled with revitalization efforts to make central-city neighborhoods more attractive to families at all income levels?
- What factors contribute to residential clustering of Section 8 families in particular neighborhoods, which could eventually lead to neighborhood decline and the reconcentration of poverty?

**Economic efficiency.** Tenant-based rental assistance programs do not add to the stock of housing but rely on available housing in the private rental market. In tight rental markets, when few units are available, is a voucher approach feasible? How does the program compare in cost with housing built and maintained by public funds? Are rental voucher programs cost effective?

**Ecologic perspective.** Finally, the complex interactions of biology, individual and family characteristics, and the social and physical environments<sup>65</sup> posited by the *Community Guide's* social environment and health logic model<sup>34</sup> underscore the need for additional research, consistent with an ecologic perspective.

## Discussion

The importance of housing policy that attempts to deconcentrate neighborhood poverty while providing affordable housing to low-income families can be seen in the strong emphasis placed on income mixing within the HOPE VI Urban Revitalization Demonstration Program,<sup>64</sup> the federal government's program for the physical and social revitalization of distressed public housing. Such an emphasis is in sharp contrast to the public housing program's record of concentrating pov-

erty by routinely constructing developments in impoverished areas and reserving units for the poorest of households, practices which are believed to be largely responsible for many of public housing's most recognized failures: environments of violence, substance abuse, welfare dependency, teen pregnancy, unemployment, and lowered educational achievement among youth.

In the public health arena, increased interest in multilevel determinants of health—biologic, individual, and environmental—has spawned research linking physical and social conditions of neighborhoods and family housing to specific changes in health status. A clearer understanding of the relationship between neighborhood, housing conditions, and community health outcomes will allow us to invest in interventions that produce the most beneficial results and reduce persistent health disparities associated with income, race, ethnicity, and social class.

## Use of the Recommendation

The Task Force recommendation for tenant-based rental assistance programs can be used by public health agencies in conjunction with local housing authorities to inform policy makers of the effectiveness of such programs for increasing family safety in the neighborhood environment.

## Summary: Findings of the Task Force

Evidence was insufficient to determine the effectiveness of mixed-income housing developments in improving family health and safety while providing affordable housing, because no studies compared groups of people exposed to the intervention with groups not exposed.

The use of tenant-based rental assistance programs is recommended for improving household safety, on the basis of sufficient evidence of reductions in exposure to crimes against person and property and decreases in neighborhood social disorder. The effectiveness of these programs in reducing housing hazards, youth risk behaviors, and psychological and physical morbidity could not be determined, because too few studies of adequate design and execution reported these outcomes, and results were inconsistent.

---

We thank the following individuals for their contributions to this review: Robert Filley, College of Architecture and Urban Planning, University of Washington; Todd Richardson, Department of Housing and Urban Development; Judie Feins, Abt Associates; Onnalee Henneberry, Research Librarian; Kate W. Harris, Editor; and Peter Briss for technical support.

Our Consultation Team: Regina M. Benjamin, MD, MBA, Bayou La Batre Rural Health Clinic, Bayou La Batre, Alabama; David Chavis, PhD, Association for the Study and

Development of Community, Gaithersburg, Maryland; Shelly Cooper-Ashford, Center for Multicultural Health, Seattle, Washington; Leonard J. Duhl, MD, School of Public Health, University of California, Berkeley, California; Ruth Enid-Zambrana, PhD, Department of Women's Studies, University of Maryland, College Park, Maryland; Stephen B. Fawcette, PhD, Work Group on Health Promotion and Community Development, University of Kansas, Lawrence, Kansas; Nicholas Freudenberg, DrPH, Urban Public Health, Hunter College, City University of New York, New York, New York; Douglas Greenwell, PhD, The Atlanta Project, Atlanta, Georgia; Robert A. Hahn, PhD, MPH, Epidemiology Program Office, CDC, Atlanta, Georgia; Camara P. Jones, MD, PhD, MPH, National Center for Chronic Disease Prevention and Health Promotion, CDC, Atlanta, Georgia; Joan Kraft, PhD, National Center for Chronic Disease Prevention and Health Promotion, CDC, Atlanta, Georgia; Nancy Krieger, PhD, School of Public Health, Harvard University, Cambridge, Massachusetts; Robert S. Lawrence, MD, Bloomberg School of Public Health, Johns Hopkins University, Baltimore, Maryland; David V. McQueen, National Center for Chronic Disease Prevention and Health Promotion, CDC, Atlanta, Georgia; Jesus Ramirez-Valles, PhD, MPH, School of Public Health, University of Illinois, Chicago, Illinois; Robert Sampson, PhD, Social Sciences Division, University of Chicago, Chicago, Illinois; Leonard S. Syme, PhD, School of Public Health, University of California, Berkeley, California; David R. Williams, PhD, Institute for Social Research, University of Michigan, Ann Arbor, Michigan.

Our Abstraction Team: Kim Danforth, MPH; Maya Tholandi, MPH; Carolynne Shinn, MS; Garth Kruger, MA; Michelle Weiner, PhD; Jessie Satia, PhD; Kathy O'Connor, MD, MPH.

We would like to acknowledge financial support for these reviews from the Robert Wood Johnson Foundation.

## References

- Diez Roux AV, Merkin SS, Arnett D, et al. Neighborhood of residence and incidence of coronary heart disease. *N Engl J Med* 2001;345:99–106.
- Ellen IF, Mijanovich T, Dillman KN. Neighborhood effects on health: exploring the links and assessing the evidence. *J Urban Affairs* 2001;23:391–408.
- Massey D, Denton N. *American apartheid: segregation and the making of the underclass*. Cambridge, MA: Harvard University Press, 1993.
- U.S. Department of Housing and Urban Development. *FY 2000–FY 2006 strategic plan*. 2000. Available at: [www.hud.gov/reform/strategicplan.pdf](http://www.hud.gov/reform/strategicplan.pdf). Accessed June 20, 2002.
- U.S. Department of Health and Human Services. *Healthy people 2010*, 2nd edition. Washington, DC: U.S. Government Printing Office, 2000.
- Fullilove MT, Fullilove RE. What's housing got to do with it? *Am J Public Health* 2000;90:183–04.
- World Health Organization. *Health principles of housing*. Geneva, Switzerland: World Health Organization, 1989.
- Thiele B. The human right to adequate housing: a tool for promoting and protecting individual and community health. *Am J Public Health* 2002;92:712–5.
- Freeman L. America's affordable housing crisis: a contract unfulfilled. *Am J Public Health* 2002;92:709–12.
- The Urban Institute. *A new look at homelessness in America*. 2000. Available at: [www.urban.org/Template.cfm?Section=Home&NavMenuID=141&template=/TaggedContent/ViewPublication.cfm&PublicationID=7476](http://www.urban.org/Template.cfm?Section=Home&NavMenuID=141&template=/TaggedContent/ViewPublication.cfm&PublicationID=7476). Accessed June 1, 2002.
- DeOllos IY. *On becoming homeless: the shelterization process for homeless families*. New York: University Press of America, 1997.
- Institute of Medicine. *Homelessness, health and human needs*. Washington, DC: National Academy Press, 1988.
- Wood DL, Valdez RB, Hayashi T, Shen A. Health of homeless children and housed, poor children. *Pediatrics* 1990;86:858–66.
- Fischer PJ. Victimization and homelessness: cause and effect. *N Engl J Public Policy* 1992;8:229–46.
- Joint Center for Housing Studies of Harvard University. *The state of the nation's housing: 2001*. 2001. Available at: [www.jchs.harvard.edu/publications/markets/SON2001.pdf](http://www.jchs.harvard.edu/publications/markets/SON2001.pdf). Accessed June 1, 2002.
- Kasarda JD. Inner-city concentrated poverty and neighborhood distress: 1970 to 1990. *Housing Policy Debate* 1993;4:253–302.
- Kasarda JD, Ting K. Joblessness and poverty in America's central cities: causes and policy prescriptions. *Housing Policy Debate* 1996;7:387–419.
- Downs AD. *New visions for metropolitan America*. Washington, DC: The Brookings Institution, 1994.
- Fosburg LB, Popkin SJ, Locke GP. An historical and baseline assessment of HOPE VI: volume I, cross-site report. Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research, 1996.
- Orfield M. *Metropolitics: a regional agenda for community stability*. Washington, DC: The Brookings Institution, 1997.
- Rusk D. *Inside game, outside game: winning strategies for saving urban America*. Washington, DC: The Brookings Institution, 1999.
- Hogan JB, Lengyel DL. Experiences with scattered-site housing. *Urban Resources* 1985;2:9–14.
- Jargowsky P. *Poverty and place: ghettos, barrios, and the American city*. New York: Russell Sage Foundation, 1997.
- Diez-Roux AV. Bringing context back into epidemiology: variables and fallacies in multilevel analysis. *Am J Public Health* 1998;88:216–22.
- Brooks-Gunn J, Duncan GJ, Klebanov PK, Sealander N. Do neighborhoods influence child and adolescent development. *Am J Sociol* 1993;99:353–95.
- Sampson RJ, Squires GD, Zhou M. *How neighborhoods matter: the value of investing at the local level*. Washington, DC: American Sociological Association, 2001.
- Morenoff JD, Sampson RJ, Raudenbush SW. Neighborhood inequality, collective efficacy, and the spatial dynamics of urban violence. *Criminology* 2001;39:515–60.
- Diez-Roux AV, Nieto FJ, Muntaner C, et al. Neighborhood environments and coronary heart disease: a multilevel analysis. *Am J Epidemiol* 1997;146:48–63.
- Wasserman CR, Shaw GM, Selvin S, Gould JB, Syme SL. Socioeconomic status: neighborhood social conditions and neural tube defects. *Am J Public Health* 1998;88:1674–80.
- Yen IH, Kaplan GA. Neighborhood social environment and risk of death: multilevel evidence from the Alameda County Study. *Am J Epidemiol* 1997;149:898–907.
- Leventhal T, Brooks-Gunn J. The neighborhoods they live in: the effects of neighborhood residence on child and adolescent outcomes. *Psychol Bull* 2000;126:309–37.
- Osterman P. Welfare participation in a full employment economy: the impact of neighborhood. *Soc Problems* 1991;38:475–90.
- Wilson WJ. *The truly disadvantaged*. Chicago: University of Chicago Press, 1987.
- Anderson LM, Fielding JE, Fullilove MT, Scrimshaw SC, Carande-Kulis VG, and the Task Force on Community Preventive Services. Methods for conducting systematic reviews of the evidence of effectiveness and economic efficiency of interventions to promote healthy social environments. *Am J Prev Med* 2003;24(suppl 3):25–31.
- Briss PA, Zaza S, Pappaioanou M, et al. Developing an evidence-based Guide to Community Preventive Services—methods. *Am J Prev Med* 2000;18(suppl 1):35–43.
- Winnick L. The triumph of housing allowance programs: how a fundamental policy conflict was resolved. *Citiescape J Policy Dev Res* 1995;1:95–121.
- Goering J, Stebbins H, Siewert M. *Promoting housing choice in HUD's rental assistance programs*. Washington, DC: U.S. Department of Housing and Urban Development, 1995.
- Maney B, Crowley S. *Scarcity and success: perspectives on assisted housing*. Washington, D.C.: National Low Income Housing Coalition, 1999.
- Peterson G, Williams K. *Housing mobility: what has it accomplished and what is its promise?* Washington, DC: The Urban Institute, 1994.
- Abt Associates. *Participation and benefits in the urban Section 8 program: new construction and existing housing (2 vols.)*. Cambridge, MA: Abt Associates Inc., 1981.

41. Atkinson R, Hamilton W, Myers D. Economic and racial/ethnic concentration in the housing allowance demand experiment. Cambridge, MA: Abt Associates Inc., 1980.
42. Katz LF, Kling JR, Liebman JB. Moving to Opportunity in Boston: early results of a randomized mobility experiment. Working Paper No. 441. 2000. Available at: [www.wws.princeton.edu/~kling/mto/](http://www.wws.princeton.edu/~kling/mto/). Accessed July 12, 2002.
43. Katz LF, Kling JR, Liebman JB. The early impacts of Moving to Opportunity in Boston: final report to the U.S. Department of Housing and Urban Development. 2000. Available at: [www.wws.princeton.edu/~kling/mto/](http://www.wws.princeton.edu/~kling/mto/). Accessed June 20, 2002.
44. Kaufman JE. Low-income black youth in white suburbs: education and employment outcomes. [Dissertation]. Evanston, IL: Northwestern University, 1991.
45. Kennedy SD. Housing Allowance Demand Experiment: final report. Cambridge, MA: Abt Associates Inc., 1980.
46. Kennedy SD, Finkel M. Section 8 rental voucher and rental certificate utilization study: final report. Washington, DC: U.S. Department of Housing and Urban Development, 1994.
47. Leger ML, Kennedy SD. Final comprehensive report of the freestanding housing voucher demonstration (2 vols). Cambridge, MA: Abt Associates Inc., 1990.
48. Leventhal T, Brooks-Gunn J. Moving to Opportunity: what about the kids? 2000. Available at: [www.wws.princeton.edu/~kling/mto/](http://www.wws.princeton.edu/~kling/mto/). Accessed June 20, 2002.
49. Ludwig J, Duncan GJ, Pinkston JC. Neighborhood effects on economic self-sufficiency: evidence from a randomized housing-mobility experiment. 2000. Available at: [www.wws.princeton.edu/~kling/mto/](http://www.wws.princeton.edu/~kling/mto/). Accessed July 12, 2002.
50. Ludwig J, Duncan GJ, Hirschfield P. Urban poverty and juvenile crime: evidence from a randomized housing-mobility experiment. JCPR Working paper 158. 2000. Available at: [www.jcpr.org/wp/wpprofile.cfm?id=162](http://www.jcpr.org/wp/wpprofile.cfm?id=162). Accessed July 12, 2002.
51. Meaden PM. Social integration and self-esteem outcomes among low-income black adolescents in middle-class white suburbs [Dissertation]. Evanston, IL: Northwestern University, 1993.
52. Peroff KA, Davis CL, Jones R, Curtin RT, Marans RW. Gautreaux housing demonstration: an evaluation of its impact on participating households. Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research, Division of Policy Studies, 1979.
53. Pettit B, McLanahan S, Hanratty M. Moving to Opportunity: benefits and hidden costs. Working Paper 98-11. 2000. [www.wws.princeton.edu/~kling/mto/](http://www.wws.princeton.edu/~kling/mto/). Accessed June 20, 2002.
54. Popkin S, Rosenbaum J, Meaden P. Labor market experiences of low-income black women in middle-class suburbs: evidence from a survey of Gautreaux program participants. *J Policy Anal Manage* 1993;12:556-73.
55. Rosenbaum E, Harris LE. Low-income families in their new neighborhoods: the short-term effects of moving from Chicago's public housing. 2000. Available at: [www.wws.princeton.edu/~kling/mto/chicago.htm#Chi3](http://www.wws.princeton.edu/~kling/mto/chicago.htm#Chi3). Accessed June 20, 2002.
56. Rosenbaum E, Harris LE. Residential mobility and opportunities: early impacts of the Moving to Opportunity demonstration program in Chicago. 2000. Available at: [www.wws.princeton.edu/~kling/mto/](http://www.wws.princeton.edu/~kling/mto/). Accessed June 20, 2002.
57. Rosenbaum J, Popkin SJ. Economic and social impacts of housing integration. Evanston, IL: Northwestern University, 1990.
58. Rosenbaum JE, Kulieke MJ, Rubinowitz LS. Low-income black children in white suburban schools: a study of school and student responses. *J Negro Educ* 1987;56:35-43.
59. Rosenbaum JE, Popkin SJ. Employment and earnings of low-income blacks who move to middle-class suburbs. In: Jencks C, Peterson PE, eds. *The urban underclass*. Washington, DC: The Brookings Institution, 1991;342-56.
60. Rosenbaum JE, Popkin SJ, Kaufman JE, Rusin J. Social integration of low-income black adults in middle-class white suburbs. *Social Problems* 1991;38:448-61.
61. Rusin-White J. Self-efficacy, residential integration and attainment in Gautreaux families: a longitudinal study [Dissertation]. Evanston, IL: Northwestern University, 1993.
62. Solomon AP, Fenton CG. The nation's first experience with housing allowances: the Kansas City demonstration. Working Paper No. 23. Joint Center for Urban Studies of MIT and Harvard University, 1973.
63. Carande-Kulis VG, Maciosek MV, Briss PA, et al. Methods for systematic reviews of economic evaluations for the Guide to Community Preventive Services. *Am J Prev Med* 2000;18(suppl 1):75-91.
64. Salama JJ. The redevelopment of distressed public housing: early results from HOPE VI projects in Atlanta, Chicago, and San Antonio. *Housing Policy Debate* 1999;10:95-142.
65. National Research Council. Equality of opportunity and the importance of place. Summary of a workshop. Iannotta JG, Ross JL, eds. Washington, DC: National Academy Press, 2002.

**Appendix A: Studies measuring the effects of tenant-based rental assistance programs on various outcomes**

Study & Year Design suitability Execution	Intervention	Measurement time from intervention	Measure used (sample size)	Absolute difference	Effect size <sup>a</sup> (p value)
<b>Household income spent on housing not greater than 30%</b>					
Abt Associates Inc., 1981 <sup>1</sup> Least Fair	Housing voucher/certificate	6 mo	Reduction in percent of households paying >25% of income for rent & utilities (n = 299)	36%	39% (NR)
Kennedy, 1980 <sup>2</sup> Greatest Fair	Direct cash housing subsidy	2 yr	Favorable difference in percent of study participants spending >25% of income on rent and utilities (n = 1660)	21%	34% (NR)
Kennedy & Finkel, 1994 <sup>3</sup> Least Fair	Housing voucher/certificate	0-10 mo (mean, NR)	Reduction in percent of income spent on rent: New York City (n = 384) 32 sites across the country (New York not included) (n = 1090)	17% 21%	26% (NR) 38% (NR)
Leger & Kennedy, 1990 <sup>4</sup> Least Good	Housing voucher/certificate	1 yr	Reduction in percent of income spent on rent: Voucher (n = 2239) Certificate (n = 2076)	33% 35%	49% (NR) 53% (NR)
<b>Social and health risks: housing hazard outcomes</b>					
Rosenbaum & Harris, 2000 <sup>5</sup> Least Fair	MTO Study: Chicago <sup>b</sup> Housing voucher/certificate (restricted for use in low- poverty areas) & relocation services	13 mo	Favorable difference in: Walls with peeling paint or broken plaster (n = 64) Plumbing that doesn't work (n = 64) Rat or mouse infestation (n = 64) Broken locks or no locks on door to unit (n = 64)	53% 28% 34% 42%	76% (.001) 59% (.001) 66% (.001) 98% (.001)
<b>Neighborhood safety and physical disorder (e.g., crime, violence, exposure to unsafe conditions)</b>					
Atkinson, Hamilton & Myers, 1980 <sup>6</sup> Greatest Fair	Direct cash housing subsidy	2 yr	Favorable percent change in rate of crimes against persons: Pittsburgh (n = 320)  Phoenix (n = 433) Favorable percent change in rate of crimes against property: Pittsburgh (n = 320) Phoenix (n = 433)	2% -11% 5% -11%	23% -153% (NS) 489% (NS) -136% (.05)

Appendix continued

Study & Year Design suitability Execution	Intervention	Measurement time from intervention	Measure used (sample size)	Absolute difference	Effect size <sup>a</sup> (p value)
Katz, Kling & Liebman, 2000 <sup>7</sup> Greatest Good	MTO Study: Boston <sup>b</sup> Experimental: Housing voucher/certificate (restricted for use in low-poverty areas) & relocation services Section 8: Housing voucher/certificate	1–3.5 yr (mean = 2.2)	Favorable difference in percent reporting streets near home are “unsafe” or “very unsafe” during day: Experimental vs. Control Section 8 vs. Control (all groups = 509) Favorable difference in household head or children having seen people using or selling drugs in neighborhood once a week or more: Experimental vs. Control Section 8 vs. Control (all groups=507) Favorable difference in household head or children having seen or heard gunfire in neighborhood once a month or more: Experimental vs. Control Section 8 vs. Control (all groups=513) Favorable difference in child having seen someone with a weapon in the past 3 mo: Experimental vs. Control Section 8 vs. Control (all groups=558)	14% 6%  20% 13%  12% 10%  7% 3%	37% (.05) 16% (NS)  55% (.05) 35% (.05)  60% (.05) 48% (.05)  70% (.05) 33% (NS)
Katz, Kling & Liebman, 2000 <sup>8</sup> Greatest Good	MTO Study: Boston <sup>b</sup> Experimental: Housing voucher/certificate (restricted for use in low-poverty areas) & relocation services Section 8: Housing voucher/certificate	1–3.5 yr (mean = 2.2)	Favorable difference in experience of any criminal victimization in previous 6 mo: Experimental vs. Control Section 8 vs. Control (all groups=519)	12% 12%	46% (.05) 45% (.05)
Leventhal & Brooks-Gunn, 2000 <sup>9</sup> Greatest Fair	MTO Study: New York <sup>b</sup> Experimental: Housing voucher/certificate (restricted for use in low-poverty areas) & relocation services Section 8: Housing voucher/certificate	3 yr	Favorable difference in scale measure (developed for this study) of physical and social disorder (trash, graffiti, public drinking, public drug use, and abandoned buildings) reported as a problem in neighborhood: Experimental vs. Control (n = 203) Section 8 vs. Control (n = 181) Favorable difference in scale measure of exposure to violence (mugged, threatened with gun or knife, beaten or assaulted, and stabbed/shot) in past 6 mo: Experimental vs. Control (n = 203) Section 8 vs. Control (n = 181)		.93 (.001) .61 (.01)  .18 (NS) .01 (NS)

Appendix continued

Study & Year Design suitability Execution	Intervention	Measurement time from intervention (mean, NR)	Measure used (sample size)	Absolute difference	Effect size <sup>a</sup> (p value)
Meaden, 1993 <sup>10</sup> Moderate Fair	Gautreaux Study Housing voucher/certificate & relocation services Treatment: those moved to predominately white, suburban neighborhoods Comparison: those moved to urban neighborhoods	7.5–13 yr (mean, NR)	Never been hurt at school (n = 98)	1%	(NS)
Peroff, Davis, Jones, Curtin, & Marans, 1979 <sup>11</sup> Moderate Fair	Gautreaux Study Housing voucher/certificate & relocation services Treatment: those moved to predominately white, suburban neighborhoods Comparison: those moved to urban neighborhoods	0–2.5 yr (mean, NR)	Neighborhood social and physical disorder reported as "not a problem": Vandalism (n = 294) Rundown houses (n = 294) Juvenile delinquency (n = 294) Trash and litter (n = 294) Drug addiction (n = 294) Neighborhood crime (n = 294)	12% 22% 17% 7% 18% 14%	28% (NR) 35% (NR) 30% (NR) 12% (NR) 29% (NR) 22% (NR)
Pettit, McLanahan & Hanratty, 2000 <sup>12</sup> Greatest Fair	MTO Study: Los Angeles <sup>b</sup> Experimental: Housing voucher/certificate (restricted for use in low- poverty areas) & relocation services Section 8: Housing voucher/certificate	1 yr	Favorable percent change in neighborhood murder rate: Experimental vs. Control (n = 225)  Section 8 vs. Control (n = 128)	60%  44%	Insufficient data to compute effect Insufficient data to compute effect
Rosenbaum & Harris, 2000 <sup>5</sup> Least Fair	MTO Study: Chicago <sup>b</sup> Housing voucher/certificate (restricted for use in low- poverty areas) & relocation services	13 mo	Favorable difference in degree to which 5 categories of physical and social disorder are reported as a problem in neighborhood: Trash or litter on streets or sidewalks (n = 60) Graffiti or writing on walls (n = 60) People drinking in public (n = 60) Drug dealers or users (n = 60) Abandoned buildings (n = 60)	67% 89% 85% 77% 15%	70% (.001) 90% (.001) 89% (.001) 78% (.001) 73% (.01)

Appendix continued

Study & Year Design suitability Execution	Intervention	Measurement time from intervention	Measure used (sample size)	Absolute difference	Effect size <sup>a</sup> (p value)
Rosenbaum & Harris, 2000 <sup>5</sup> Least Fair	MTO Study: Chicago <sup>b</sup> Housing voucher/certificate (restricted for use in low- poverty areas) & relocation services	13 mo	Parking lots or streets near neighborhood school rated as "safe" or "very safe" (n = 55) Being home alone at night rated as "safe" or "very safe" (n = 55) Streets near home at night rated as "safe" or "very safe" (n = 55) Favorable difference in report of anyone in household experiencing criminal victimization (reference period is previous 6 mo at baseline and previous 3 mo at post-test): Having purse, wallet, or jewelry snatched (n = 55) Being threatened with a knife or gun (n = 55) Being beaten or assaulted (n = 55) Being stabbed or shot (n = 55) Someone trying to break into home (n = 55)	78% 56% 79%	423% (.001) 144% (.001) 853% (.001)
Rusin-White, 1993 <sup>13</sup> Moderate Fair	Gautreaux Study Housing voucher/certificate & relocation services Treatment: those moved to predominately white, suburban neighborhoods Comparison: those moved to urban neighborhoods	0-6 yr (mean = 2)	Perception of neighborhood safety (n = 149)	26% 15% 22% 9% 27%	88% (.001) 73% (.01) 92% (.001) 100% (.1) 93% (.001) .17 (.01)
<b>Youth risk behaviors</b>					
Katz, Kling & Liebman, 2000 <sup>7</sup> Greatest Good	MTO Study: Boston <sup>b</sup> Experimental: Housing voucher/certificate (restricted for use in low- poverty areas) & relocation services Section 8: Housing voucher/certificate	1-3.5 yr (mean = 2.2)	Favorable difference in fraction of 7 problem behaviors in school and home (boys): Experimental vs. Control Section 8 vs. Control (all groups = 274) Favorable difference in fraction of 7 problem behaviors in school and home (girls): Experimental vs. Control Section 8 vs. Control (all groups=300)	9% 11% 2% 5%	28% (.05) 35% (.05) 12% (NS) 26% (NS)

Appendix continued



Study & Year Design suitability Execution	Intervention	Measurement time from intervention	Measure used (sample size)	Absolute difference	Effect size <sup>a</sup> (p value)
Leventhal & Brooks-Gunn, 2000 <sup>9</sup> Greatest Fair	MTO Study: New York <sup>b</sup> Experimental: Housing voucher/ certificate (restricted for use in low-poverty areas) & relocation services Section 8: Housing voucher/certificate	3 yr	Favorable difference in percent of youth reporting having smoked cigarettes in past month: Experimental vs. Control (n = 96) Section 8 vs. Control (n = 103) Favorable difference in percent of youth reporting having consumed alcohol in past month: Experimental vs. Control (n = 96) Section 8 vs. Control (n = 103) Favorable difference in number of delinquent acts (trespassed, graffiti, stolen, secretly carried a weapon, hit someone, and destroyed property) engaged in by youth during past month: Experimental vs. Control (n = 96) Section 8 vs. Control (n = 103) Favorable difference in self-report among youth of experiencing behavior problems sometimes or often in past 6 mo: Disobey parents: Experimental vs. Control (n = 236) Section 8 vs. Control (n = 267) Disobey in school: Experimental vs. Control (n = 236) Section 8 vs. Control (n = 267) Difficulty getting along with others: Experimental vs. Control (n = 236) Section 8 vs. Control (n = 267) Arguing a lot: Experimental vs. Control (n = 236) Section 8 vs. Control (n = 267)	9% -2%  -1% -3%  .09 .26  9% 13% 8% 2% 6% -8% 13% 11%	39% (NS) -10% (NS)  -23% (NS) -66% (NS)  .07 (NS) .20 (NS)  27% (NS) 41% (.1) 28% (NS) 6% (NS) 17% (NS) -26% (NS) 17% (.1) 14% (NS)
Ludwig, Duncan & Hirschi, 2000 <sup>14</sup> Greatest Fair	MTO Study: Baltimore <sup>b</sup> Experimental: Housing voucher/certificate (restricted for use in low- poverty areas) & relocation services Section 8: Housing voucher/certificate	3-5 yr (mean = 3.7)	Favorable difference in percent of teens arrested for violent crime per quarter: Experimental vs. Control (n = 244) Section 8 vs. Control (n = 188) Favorable difference in percent of teens arrested for property crime per quarter: Experimental vs. Control (n = 244) Section 8 vs. Control (n = 188)	1% 1%  -1% 0%	48% (.1) 44% (NS)  -50% (NS)

Appendix continued

Study & Year Design suitability Execution	Intervention	Measurement time from intervention	Measure used (sample size)	Absolute difference	Effect size <sup>a</sup> (p value)
<b>Mental health status</b>					
Katz, Kling & Liebman, 2000 <sup>7</sup> Greatest Good	MTO Study: Boston <sup>b</sup> Experimental: Housing voucher/certificate (restricted for use in low- poverty areas) & relocation services Section 8: Housing voucher/certificate	1–3.5 yr (mean = 2.2)	Self-report of feeling calm and peaceful a good bit of the time or more often during the past 4 wk: Experimental vs. Control Section 8 vs. Control (all groups = 508) Self-report of being happy a good bit of the time or more often during the past 4 wk: Experimental vs. Control Section 8 vs. Control (all groups = 506) Favorable difference in predictive probability of having had a major depressive episode: Experimental vs. Control Section 8 vs. Control (all groups = 511)	11% 14%  7% 5%  5% 6%	23% (.05) 30% (.05)  12% (NS) 9% (NS)  19% (NS) 24% (NS)

Appendix continued

Study & Year Design suitability Execution	Intervention	Measurement time from intervention	Measure used (sample size)	Absolute difference	Effect size <sup>a</sup> (p value)
Leventhal & Brooks-Gunn, 2000 <sup>9</sup> Greatest Fair	MTO Study: New York <sup>b</sup> Experimental: Housing voucher/certificate (restricted for use in low- poverty areas) & relocation services Section 8: Housing voucher/certificate	3 yr	Favorable difference in self-report of experiencing depressive behaviors some, most, or all of the time in past month: Feeling unhappy, sad, or depressed: Experimental vs. Control (n = 203) Section 8 vs. Control (n = 181) Feeling hopeless about the future: Experimental vs. Control (n = 203) Section 8 vs. Control (n = 181) Feeling nervous or tense: Experimental vs. Control (n = 203) Section 8 vs. Control (n = 181) Worrying too much about things: Experimental vs. Control (n = 203) Section 8 vs. Control (n = 181) Favorable difference in self-report of experiencing anxious behaviors some, most or all of the time in past month: Nervous or shakiness: Experimental vs. Control (n = 203) Section 8 vs. Control (n = 181) Trembling: Experimental vs. Control (n = 203) Section 8 vs. Control (n = 181) Suddenly scared for no reason: Experimental vs. Control (n = 203) Section 8 vs. Control (n = 181) Heart racing or pounding: Experimental vs. Control (n = 203) Section 8 vs. Control (n = 181) Favorable difference in self-report among youth of feeling unhappy, sad or depressed sometimes or often in past 6 mo: Experimental vs. Control (n = 236) Section 8 vs. Control (n = 267) Feeling too fearful or anxious: Experimental vs. Control (n = 236) Section 8 vs. Control (n = 267) Trouble concentrating or paying attention: Experimental vs. Control (n = 236) Section 8 vs. Control (n = 267)	18% 4% 6% -4% 14% 3% 17% 3%  22% 14% 13% 4% 5% 0% 12% 2%  24% 18% 8% 3% 11% 11%	35% (.01) 9% (NS) 20% (NS) -13% (NS) 35% (.05) 6% (NS) 27% (.01) 5% (NS)  59% (.001) 37% (.05) 75% (.001) 21% (NS) 29% (NS)  48% (.05) 8% (NS)  45% (.01) 34% (.05) 17% (NS) 6% (NS) 18% (NS) 17% (NS)

Appendix continued

Study & Year Design suitability Execution	Intervention	Measurement time from intervention	Measure used (sample size)	Absolute difference	Effect size <sup>a</sup> (p value)
<b>Physical health status</b>					
Katz, Kling & Liebman, 2000 <sup>7</sup> Good	MTO Study: Boston <sup>b</sup> Experimental: Housing voucher/certificate (restricted for use in low-poverty areas) & relocation services Section 8: Housing voucher/certificate	1–3.5 yr (mean = 2.2)	If child been to doctor for regular check-up or immunization during previous 6 mo: Experimental vs. Control Section 8 vs. Control (all groups = 566) Favorable difference in child experiencing an injury or incident requiring medical attention in past 6 mo: Experimental vs. Control Section 8 vs. Control (all groups = 569) Favorable difference in child experiencing an asthma attack requiring medical attention in past 6 mo: Experimental vs. Control Section 8 vs. Control (all groups = 570) Self-report that overall health is good or better: Experimental vs. Control Section 8 vs. Control (all groups = 511)	–4% –7%  6% 4%  5% 0%  12% 16%	–5% (NS) –8% (NS)  56% (.05) 35% (NS)  52% (.1)  20% (.05) 28% (.05)
Leventhal & Brooks-Gunn, 2000 <sup>9</sup> Fair	MTO Study: New York <sup>b</sup> Experimental: Housing voucher/certificate (restricted for use in low-poverty areas) & relocation services Section 8: Housing voucher/certificate	3 yr	Self-report that overall health is good or excellent: Experimental vs. Control (n = 203) Section 8 vs. Control (n = 181) Self-report of youth that overall health is good or excellent: Experimental vs. Control (n = 236) Section 8 vs. Control (n = 267)	11% 7%  11% 5%	32% (.1) 20% (NS)  19% (.1) 8% (NS)

C, comparison group; I, intervention group; MTO, Moving to Opportunity; NR, not reported; NS, not significant

<sup>a</sup>Standard Effect Size: (Mean I – Mean C) / Standard Deviation C  
Percent Difference: (Percent I – Percent C) / Percent C

<sup>b</sup>Moving to Opportunity (MTO) studies usually involved 3 groups: the Experimental group, which received Section 8 rental certificates or vouchers for use only in low-poverty areas, plus counseling and assistance in finding a private unit to lease; the Section 8 group, which received regular Section 8 rental certificates or vouchers (with no geographic restrictions) and standard briefings and assistance from public housing authorities; and the Control group, which continued to receive their current project-based assistance. (In Chicago, only the Experimental and Section 8 groups were included in the study.)

Appendix continued

## References

1. Abt Associates. Participation and benefits in the urban Section 8 program: new construction and existing housing (2 vols.). Cambridge, MA: Abt Associates Inc., 1981.
2. Kennedy SD. Housing Allowance Demand Experiment: final report. Cambridge, Massachusetts: Abt Associates Inc., 1980.
3. Kennedy SD, Finkel M. Section 8 rental voucher and rental certificate utilization study: final report. Washington, DC: U.S. Department of Housing and Urban Development, 1994.
4. Leger ML, Kennedy SD. Final comprehensive report of the freestanding housing voucher demonstration (2 vols). Cambridge, MA: Abt Associates Inc., 1990.
5. Rosenbaum E, Harris LE. Low-income families in their new neighborhoods: the short-term effects of moving from Chicago's public housing. 2000. Available at <http://www.wws.princeton.edu/~kling/mto/chicago.htm#Chi3/> Accessed June 20, 2002.
6. Atkinson R, Hamilton W, Myers D. Economic and racial/ethnic concentration in the housing allowance demand experiment. Cambridge, MA: Abt Associates Inc., 1980.
7. Katz LF, Kling JR, Liebman JB. Moving to Opportunity in Boston: early results of a randomized mobility experiment. Working Paper No. 441. 2000. Available at <http://www.wws.princeton.edu/~kling/mto/> Accessed July 12, 2002.
8. Katz LF, Kling JR, Liebman JB. The early impacts of Moving to Opportunity in Boston: final report to the U.S. Department of Housing and Urban Development. 2000. Available at <http://www.wws.princeton.edu/~kling/mto/> Accessed June 20, 2002.
9. Leventhal T, Brooks-Gunn J. Moving to Opportunity: what about the kids? 2000. Available at <http://www.wws.princeton.edu/~kling/mto/> Accessed June 20, 2002.
10. Meaden PM. Social integration and self-esteem outcomes among low-income black adolescents in middle-class white suburbs [Dissertation]. Evanston, IL: Northwestern University, 1993.
11. Peroff KA, Davis CL, Jones R, Curtin RT, Marans RW. Gautreaux housing demonstration: an evaluation of its impact on participating households. U.S. Department of Housing and Urban Development, Office of Policy Development and Research, Division of Policy Studies, 1979.
12. Pettit B, McLanahan S, Hanratty M. Moving to Opportunity: benefits and hidden costs. Working Paper 98-11. 2000. Available at <http://www.wws.princeton.edu/~kling/mto/> Accessed June 20, 2002.
13. Rusin-White J. Self-efficacy, residential integration and attainment in Gautreaux families: a longitudinal study [Dissertation]. Evanston, IL: Northwestern University, 1993.
14. Ludwig J, Duncan GJ, Hirschi P. Urban poverty and juvenile crime: evidence from a randomized housing-mobility experiment. JCPR Working paper 158. 2000. Available at <http://www.jcpr.org/wp/wpprofile.cfm?id=162/> Accessed July 12, 2002.

Reprinted by permission of Elsevier Science from:

Providing affordable family housing and reducing residential segregation by income: a systematic review.

Anderson LM, St. Charles J, Fullilove MT, Scrimshaw SC, Fielding JE, Normand J, Task Force on Community Preventive Services. *American Journal of Preventive Medicine* 2003; Vol. 24, No. 3S, pp. 47-67.