



# Annotated Bibliography: The Impacts of Affordable Housing on Health

May 2011

The abstracts in this annotated bibliography summarize studies that address affordable housing’s connection with health. Entries include details about the research methods and findings, and are organized by hypothesis.

*NOTE: This annotated bibliography updates and includes entries from a previous version published in July 2007.*

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## **1. Affordable housing may improve health outcomes by freeing up family resources for nutritious food and health care expenditures.**

**Alley, Dawn E., Beth J. Soldo, José A. Pagán, John McCabe, Madeleine deBlois, Samuel H. Field, David A. Asch, and Carolyn Cannuscio. 2009. Material Resources and Population Health: Disadvantages in Health Care, Housing, and Food Among Adults Over 50 Years of Age. *American Journal of Public Health* 99(S3): S693-S701.**

This report used logistic regression analysis and data from the 2004 and 2006 Health and Retirement Study, a nationally representative panel study of Americans aged 51 and over, to develop a better understanding of the relationship between material disadvantage and declines in health and walking ability among adults over age 50. Material disadvantage across three domains – health care, food, and housing – was measured using the following indicators:

- Health care disadvantage was indicated by having foregone prescription medication because of cost, a lack of health insurance, or a high ratio of out-of-pocket health care expenditures relative to income (underinsurance);
- Food disadvantage was indicated by receipt of food stamps in the past 2 years or self-reported food insufficiency; and
- Housing disadvantage was indicated by self-reported fair or poor housing quality or neighborhood safety, housing costs greater than 30 percent of monthly household income, or status as a renter.

In both 2004 and 2006 survey participants also reported self-rated health as “excellent”, “very good”, “good”, “fair”, or “poor”; and indicated whether they had difficulty walking across a room, walking one block, or walking several blocks.

Baseline statistics for the 14,609-person sample indicated differences in material disadvantage across a range of demographic characteristics, including age (51 to 64 years of age vs. 65+), gender, race/ethnicity, and educational attainment. Controlling for these and other baseline statistics, researchers found that respondents who reported at baseline *any* disadvantage across the three domains were significantly more likely than their non-disadvantaged counterparts to have experienced a decline in self-rated health or walking ability across the two waves of the study. Food disadvantage was most strongly associated with declines in these areas, with an odds ratio of 1.69 for worsening health and 1.64 for walking. (A number that is larger than 1.0 indicates a greater likelihood of decline; the larger the number, the greater the likelihood.) Odds ratios were more modest for housing disadvantage (1.20 for declines in self-reported health, 1.06 for walking ability), but still indicative of an association between the two variables.

**Digenis-Bury, Eleni C., Daniel R. Brooks, Leslie Chen, Mary Ostrem, and C. Robert Horsburgh. 2008. Use of a Population-Based Survey to Describe the Health of Boston Public Housing Residents. *American Journal of Public Health* 98(1): 85-91.**

Using data from the Boston Behavioral Risk Factor Surveillance System, the authors assessed overall health status, access to and utilization of care, and health behavior among Boston residents who receive housing assistance, as compared with the city's general population. Data used in the study were collected in 2001 and 2003 through a random-digit-dial telephone survey administered by the Boston Public Health Commission. Respondents in the "public housing resident" category, which included residents living in buildings owned by the Boston Housing Authority as well as those receiving rental assistance and living in privately-owned rental properties, accounted for about 10 percent of the 2,919-resident sample. The authors provided crude (unadjusted) comparisons to describe the experience of public housing residents as well as results adjusted to control for the influence of gender, age, race/ethnicity, education, and income.

Overall, public housing residents reported poorer health than other city residents, with an increased likelihood of having lost six or more teeth; experiencing asthma, depression, obesity, or disability; and ever having been diagnosed with hypertension or diabetes. (Logistic regression analysis controlling for the demographic factors identified above reduced but did not eliminate elevated risk for most of these conditions.) Despite these results, public housing residents appeared to enjoy better access to preventative health care and were twice as likely as other survey respondents to have had a recent cholesterol screening, clinical breast examination, or Papanicolaou test. (Dental care was an exception to these trends – the other city residents were roughly twice as likely as public housing residents to have had a preventative cleaning in the past 2 years.)

While somewhat more likely to be uninsured in the crude analysis, after controlling for other factors public housing residents were found to be half as likely as other city residents to lack health insurance. The authors suggested that public housing residents are more likely to qualify for public health insurance programs, which may explain higher levels of coverage. They also identified three factors that may contribute to higher levels of preventative care: (1) the co-location of public housing and community health centers, which may facilitate access to care among public housing tenants; (2) the Boston Public Health Commission's ongoing outreach to minority women regarding preventative care; and (3) increased contact with medical providers stemming from the need for treatment of chronic conditions. Moreover, the authors speculated that affordable rent levels allow residents receiving housing assistance to allocate a greater share of their household budget to health-related expenditures.

**Fletcher, Jason M., Tatiana Andreyeva, and Susan H. Busch. 2009. Assessing the Effect of Changes in Housing Costs on Food Insecurity. *Journal of Children and Poverty* 15(2): 79-93.**

The authors of this paper paired nationally representative data from the Early Childhood Longitudinal Study, Birth Cohort and the American Community Survey with HUD's Fair Market Rent datasets to assess the impact of "expenditure shocks" – specifically, increases in housing costs – on food insecurity status.

The U.S. Department of Agriculture defines household food insecurity as difficulty providing sufficient food for all household members at some point in the past year due to lack of resources. Prior research has demonstrated an association between food insecurity and negative physical and mental health outcomes.

Focusing on data collected in 2001 and 2003 for 1,400 children in households with incomes below 100 percent of the federal poverty threshold in both waves, the authors found that in metro areas or counties where monthly housing costs increased by as much as \$40 in one year, food insecurity rates increased by nearly three percent among renter families. The researchers also found that families receiving food stamps and housing subsidies were no more likely to be able to weather these expenditure shocks than families not receiving assistance; in fact, they may have been more likely to experience food insecurity as rental costs increased, although not at a level that reached statistical significance.

**Frank, Deborah A., Nicole B. Neault, Anne Skalicky, John T. Cook, Jacqueline D. Wilson, Suzette Levenson, Alan F. Meyers, Timothy Heeren, Diana B. Cutts, Patrick H. Casey, Maureen M. Black, and Carol Berkowitz. 2006. Heat or Eat: The Low Income Home Energy Assistance Program and Nutritional and Health Risks Among Children Less Than 3 Years of Age. *Pediatrics* 118(5): 1293-1302.**

This report compared health outcomes among children in households that received assistance through the Low Income Home Energy Assistance Program (LIHEAP) with those in income eligible households that did not. Data came from the Children's Sentinel Nutrition Assessment Program, an ongoing, multisite survey of caregivers of children younger than 3 years, who are recruited when they bring their children for medical care at emergency departments and primary care clinics. The study had a sample size of 7,074 caregivers, and 16 percent of the families received LIHEAP assistance. After controlling for receipt of Food Stamps and other programs, age, birth weight, and other confounding factors, children in non-recipient households were found to have a significantly greater likelihood of being at nutritional risk for growth problems, with weight-for-age scores significantly lower than Centers for Disease Control and Prevention reference data, as compared with children in households that received LIHEAP. Moreover, children whose families received LIHEAP assistance had lower odds of acute hospitalization from an emergency department visit on the day of the interview. The authors caution that these findings do not demonstrate causation.

**Harkness, Joseph and Sandra J. Newman. 2005. Housing Affordability and Children's Well-Being: Evidence from the National Survey of America's Families. *Housing Policy Debate* 16(2): 223-255.**

In this study, the authors used multivariate regression analysis to examine the effects of unaffordable housing on children's well-being, including behavior, physical and emotional health, and school engagement and performance. The authors relied primarily on data from the 1997 National Survey of America's Families, and included in this study only households with incomes below the poverty line and children between 6 and 17 years of age. Overall, findings indicate that poor children living in areas with

more affordable housing exhibit better outcomes in all areas than those living in less affordable areas. Moreover, the authors suggested the positive effects of affordable housing are cumulative, with stronger effects for older children (aged 12-17) than younger children (6-12).

The primary explanation offered for these differential effects is that housing unaffordability restricts residual income left for consumption of other basic needs. Families in unaffordable areas are more likely to postpone health care and worry about having enough food. The authors found limited evidence of parents' stress as a source of adverse effects on children living in unaffordable housing, but emphasize the need for further research.

**Lee, Wang, Eric Beecroft, Jill Khadduri, and Rhiannon Patterson. 2003. *Impacts of Welfare Reform on Recipients of Housing Assistance: Evidence from Indiana and Delaware*. Prepared for the U.S. Department of Housing and Urban Development by Abt Associates.**

In this study, the authors assessed whether welfare reform has different effects on families who receive housing assistance, as compared with those that do not. To address this question, the authors relied primarily on data from random assignment welfare reform evaluations in Indiana and Delaware, which were matched with Housing and Urban Development administrative data to identify families that also received federal housing assistance. The authors estimated impacts by comparing outcomes for families randomly assigned to a welfare reform group with those assigned to a control group receiving the traditional welfare program.

Findings indicate that welfare reform increases earnings and employment, and decreases Temporary Assistance for Needy Families and Food Stamp payments for families receiving federal housing assistance. The authors suggest that welfare recipients' receipt of housing assistance may result in positive effects beyond the benefit of housing itself, including increases in recipients' employment and reduced reliance on welfare, possibly because housing assistance allows welfare recipients to stabilize their lives and subsequently experience improved employment outcomes.

**Lipman, Barbara J. 2005. *Something's Gotta Give: Working Families and the Cost of Housing*. Washington, DC: Center for Housing Policy.**

In this report, the author used data from the Consumer Expenditure Survey and the 2002 National Survey of America's Families to explore the tradeoffs working families make when high housing costs consume a disproportionate share of the family budget. Findings indicate that severely cost-burdened homeowners are able to maintain relatively higher levels of spending on healthcare and insurance, as compared with renters, although both groups limit expenditures as housing cost burden grows; this difference may be due to homeowners' use of their home as an asset to borrow against. Compared with those paying less for housing, working families are also 23 percent more likely to have difficulty paying for food and 28 percent more likely to have a child or adult lacking health insurance. Finally, the author

demonstrated that poor children in cost-burdened families are more likely to be in fair or poor health than poor children whose families are not cost-burdened.

**March, Elizabeth, John T. Cook, Stephanie Ettinger de Cuba, Annie Gayman, and Deborah A. Frank. 2010. *Healthy Families in Hard Times: Solutions for Multiple Family Hardships*. Boston, MA: Children’s HealthWatch.**

The authors of this report presented updated evidence that children in low-income families receiving nutrition, housing, and utility support tend to fare better than children in similar but unassisted households. Children in assisted families were shown to have a greater likelihood of meeting “well child” criteria and a lower risk of hospitalization and developmental delays. In contrast, very young children in families facing multiple hardships – including a lack of nutritious food, unstable housing, and inconsistent access to residential utilities – were found to be vulnerable to an array of negative health and developmental outcomes. Data to inform the report came from a household-level survey of 33,588 mothers of children under the age of 3 conducted over a 10-year period at hospital emergency rooms and primary care clinics in five cities.<sup>1</sup>

**March, Elizabeth L., Stephanie Ettinger de Cuba, Annie Gayman, John Cook, Deborah A. Frank, Alan Meyers, JoHanna Flacks, Megan Sandel, and Samantha Morton. 2009. *Rx for Hunger: Affordable Housing*. Boston, MA: Children’s HealthWatch and Medical-Legal Partnership | Boston.**

Building on pediatricians’ observations that families with seriously underweight children often struggle to afford their housing costs, the authors summarized research findings from data on food insecurity, housing subsidy status, and child health outcomes collected between 1998 and 2008 by Children’s HealthWatch. The data indicate that children living in subsidized housing are more likely to have access to an adequate supply of nutritious food (i.e., to be “food secure”) and less likely to be seriously underweight than their peers whose families are on waiting lists for public housing or Section 8 assistance. Moreover, the researchers found that children living in subsidized housing are more likely to be classified as “well” – that is, no developmental concerns or hospitalizations, at a healthy weight, and in good or excellent health – compared with children of families on waiting lists. The brief concludes with recommendations issued to the City of Boston and Commonwealth of Massachusetts for protecting and expanding the supply of affordable homes, suggesting that nutrition programs alone will not be enough to end childhood hunger and food insecurity.

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<sup>1</sup> The cities are: Baltimore, MD; Boston, MA; Little Rock, AR; Minneapolis, MN; and Philadelphia, PA.

**Matthews, Karen A., Catarina I. Kiefe, Cora E. Lewis, Kiang Liu, Stephen Sidney, and Carla Yunis. 2002. Socioeconomic Trajectories and Incident Hypertension in a Biracial Cohort of Young Adults. *Hypertension* 39: 772-776.**

In this paper, the authors examined the relationship between socioeconomic trajectories and hypertension by using data from the Coronary Artery Risk Development in Young Adults Study, a 10-year longitudinal study of 3,827 individuals aged 18-30 years old at the time the study began. Participants' socioeconomic status was measured at four intervals throughout the study period, and indicated by achievement of a new educational degree, difficulties experienced in paying for basics, and changes in income category in relation to income at entry. All subjects had normal blood pressure at the initial assessment.

Using multiple logistic regression models that controlled for an array of initial characteristics, the authors found that participants who experienced difficulty paying for basics throughout the study period were significantly more likely to develop hypertension than those who did not. Income decline between years 5 and 10 was also found to be associated with the onset of hypertension. Overall, findings demonstrated that cumulative economic difficulties are associated with hypertension, indicating the importance of incorporating socioeconomic trajectories in risk estimates. The authors offer several potential explanations for this relationship, including less adequate health care, greater incidence of depression, and chronic stress exposure among those with economic difficulties, and suggest that policies that reduce economic disadvantage may also have an impact on levels of hypertension.

**Meyers, Alan, Diana Cutts, Deborah A. Frank, Suzette Levenson, Anne Skalicky, Timothy Heeren, John Cook, Carol Berkowitz, Maureen Black, Patrick Casey, and Nieves Zaldivar. 2005. Subsidized Housing and Children's Nutritional Status: Data from a Multisite Surveillance Study. *Archives of Pediatrics and Adolescent Medicine* 159: 551-556.**

In this study, the authors tested the impact of housing subsidies on the nutrition and health status of children in low-income families. Data were drawn from the Children's Sentinel Nutrition Assessment Program (CSNAP), an ongoing program in which a cross-sectional convenience sample of caregivers of children under the age of 3 years are asked about child health history, food security, and participation in public assistance and health programs while accessing medical care at sites in six cities across the United States. Data used in this analysis were gathered over 4 years, and include nearly 12,000 children; children in families with owner-occupied housing were excluded from this study.

Findings indicate that receipt of housing subsidies is associated with improved nutritional status among low-income renter families, as indicated by measures of weight for age. The authors used multivariate models that controlled for variables including participation in Women, Infants, and Children, Temporary Assistance for Needy Families, and/or the Food Stamp Program, and found a significant difference in the health of children whose families received housing subsidies, as compared with those that did not; findings were particularly robust (significant at  $p < .001$ ) among food-insecure families—those in which food availability, or socially acceptable food acquisition, is limited or uncertain. The authors caution that

these findings do not indicate causation, and may not be generalizable to the national population of similar children.

**Meyers, Alan, Dana Rubin, Maria Napoleone, and Kevin Nichols. 1993. Public Housing Subsidies May Improve Poor Children's Nutrition. *American Journal of Public Health* 83(1): 115.**

In this brief article, the authors reported the findings of a retrospective pilot study designed to test whether low-income children whose families receive public housing subsidies have better nutritional status than similar children whose families do not receive subsidies. Data were collected from more than 500 children between the ages of 6 months and 6 years during health maintenance visits at the Pediatric Primary Care Clinic at Boston City Hospital. The Boston Housing Authority and Metropolitan Housing Authority then classified each child's family by subsidy status. The authors found that 19 percent of children whose families received housing subsidies were iron deficient, compared with 30 percent of children whose families did not receive subsidies (significant at  $p = .055$ ). According to the authors, these findings suggest that subsidized housing may protect children against iron deficiency, possibly as a result of reduced pressure on family food budgets.

**Newman, Sandra. 2006. *How Housing Matters: A Critical Summary of Research and Issues Still to be Resolved* [Discussion Draft]. Baltimore, MD: Johns Hopkins Institute for Policy Studies, mimeo.**

In response to a 1980 critique in which John Weicher found insufficient evidence that the benefits of housing extend beyond the value of the actual units, the author examined findings from subsequent research on the effects of housing on social outcomes. The review was limited to studies of housing attributes, rather than neighborhood characteristics, and separately assessed the evidence related to five aspects of housing: quality, crowding, affordability, subsidized housing, and homeownership. The author considered questions of measurement and causality and focused on quantitative studies that met the standards of scientific rigor.

According to this review, a number of studies linking housing quality and crowding to health have found an association between these conditions and health outcomes, but fail to sufficiently establish any causal relationship. The author concludes that research to date has not been rigorous enough to justify departing from Weicher's initial conclusion. She argues for holding a "consensus conference" to develop a comprehensive and rigorous research agenda on these questions, validated measures of housing-related variables, and a minimum housing dataset for inclusion in major surveys of child and family outcomes.

**2. By providing families with greater residential stability, affordable housing can reduce stress and related adverse health outcomes.**

**Bartlett, Sheridan. 1997. The Significance of Relocation for Chronically Poor Families in the USA. *Environment and Urbanization* 9(1): 121-132.**

This study reported on ethnographic research conducted in Brattleboro, VT, following three poor families closely for a period of 18 months. Bartlett's ethnography revealed the toll frequent relocation takes on their emotional and mental health, and the power of decent, affordable housing to break the cycle of mobility. A brief literature review highlights studies that explore the association between relocation and stress or depressive illness. Bartlett's own research demonstrated the emotional damage children experience as their parents' search for better living conditions leads to repeated disruption of their social ties and living circumstances. Bartlett found that adequate affordable housing was the one factor influencing the mobile families studied to stay put.

**Bassuk, Ellen L. and Lynn Rosenberg. 1990. Psychosocial Characteristics of Homeless Children and Children with Homes. *Pediatrics* 85(3): 257-261.**

In this article, the authors reported the results from a case-control study in which a battery of standardized tests measuring developmental delays, behavior, and mental health was administered to 86 homeless children and a comparison group of 134 children with homes.<sup>2</sup> In both groups, children lived in single-parent families headed by women who had been receiving welfare payments for long periods. On nearly all tests, homeless children had worse scores than housed children; both groups had worse scores than children in the general population.

The authors suggested that frequent relocation and the uncertainties of daily life negatively impacted the homeless children, as indicated by their test scores. They pointed out, however, that differences in scores were statistically significant for only one of the tests, the Denver Developmental Screening Test ( $p < .05$ ), and warned that care should be taken in interpreting study findings, as difficulty accessing the target populations may have compromised the representativeness of the samples and limited sample sizes. Performance may also have been influenced by differences in setting: homeless children were tested in a shelter setting with little privacy, while those in the comparison group were tested at home.

**Goodman, Lisa, Leonard Saxe, and Mary Harvey. 1991. Homelessness as Psychological Trauma. *American Psychologist* 46(11): 1219-1225.**

In this article, the authors suggested that homelessness may be a risk factor for emotional disorder and psychological trauma and, as such, argue that psychological theory ought to be applied to the study of

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<sup>2</sup>The tests administered include: the Denver Development Screening Test and Simmons Behavior Checklist for children younger than 6 years of age; the Children's Depression Inventory, Children's Manifest Anxiety Scale, and Child Behavior Checklist for children 6 years and older.

homelessness in order to make shelters and other settings more responsive to clients' needs. The authors presented three pathways through which homelessness can lead to trauma, including: the event of becoming homeless and losing stable shelter, the ongoing conditions of homelessness and shelter life, and/or the exacerbation of symptoms of trauma among those with a history of victimization. Improvement in shelter conditions, including encouragement of social connections, establishment of routines that promote self-efficacy, and linkage to a comprehensive service program, could prevent or mitigate psychological trauma and its damaging symptoms, including social disaffiliation and learned helplessness.

**Guzman, Carolina, Rajiv Bhatia, and Chris Durazo. 2005. *Anticipated Effects of Residential Displacement on Health: Results from Qualitative Research*. Research Summary. Prepared by the San Francisco Department of Public Health and South of Market Community Action Network.**

In this research summary, the authors reported findings from two focus groups conducted with 24 tenants facing eviction from a rent-controlled apartment building slated for demolition in San Francisco. The authors reviewed several ways in which displacement from affordable housing threatens health, including loss of sufficient residual income to cover food and health care expenses; disruption of social ties and community relationships; and movement to substandard living arrangements, including homelessness. Focus group participants characterized healthy neighborhoods by their safety, access to transportation, and the presence of social capital and cohesion, and indicated that displacement caused stress by threatening to disrupt these characteristics. Tenants also expressed concern about the lack of stability in their children's lives, failure of landlords to keep up with basic repairs, and lack of decent affordable housing options.

**Haber, Mason G. and Paul A. Toro. 2004. *Homelessness, Mental Health, and Economic Justice*. PsyACT Policy Brief. Detroit, MI: Wayne State University, Research Group on Homelessness and Poverty.**

In this brief, the authors provided an overview of trends in homelessness and homelessness policy in the United States. The authors acknowledged a bidirectional relationship between homelessness and poor mental health, but emphasized that a recent increase in homelessness should be attributed to broad social and economic trends, rather than individual characteristics or behaviors. In addition to treating the mental health problems associated with homelessness, psychologists are advised to advocate for social, policy, and economic changes to address its causes.

**Kappel Ramji Consulting Group. 2002. *Common Occurrence: The Impact of Homelessness on Women's Health. Phase II: Community Based Action Research*. Final Report: Executive Summary. Prepared for Sistering—A Woman's Place.**

This paper presented findings and recommendations regarding homelessness and health, gleaned from interviews with 126 women experiencing homelessness in Toronto and 38 representatives of local

agencies. For the purposes of this analysis, homelessness was characterized as visible (including those sleeping in shelters, on the street, and in other places unfit for human habitation) and hidden. Hidden homelessness included women facing severe housing cost burdens or eviction, living in physically unsafe buildings or overcrowded conditions, temporarily staying with family or friends, and living in situations where they are prone to violence or conflict.

The authors reported that the severity of hidden homelessness is underestimated, and that related health impacts are similar to those incurred by the visibly homeless. Ninety-three percent of all respondents reported emotional and mental health issues stemming from their living conditions, including debilitating stress resulting from the unpredictability of their housing situation. Women also reported feelings of depression, despair, and hopelessness, and exacerbation of existing mental health issues as a result of homelessness. The women interviewed also indicated difficulty learning about available health care services and barriers to accessing services due, in part, to the lack of coordination among providers and judgmental attitudes of workers.

**Kyle, Tania and James R. Dunn. 2008. Effects of Housing Circumstances on Health, Quality of Life and Healthcare Use for People with Severe Mental Illness: A Review. *Health and Social Care in the Community* 16(1): 1-15.**

The authors of this paper reviewed 29 empirical studies on the relationship between housing status and health outcomes among adults with severe and persistent mental illness, 13 of which looked at healthcare utilization among study participants. Overall, the authors found evidence for a reduction in the number of days hospitalized following a housing intervention, with the strongest evidence base for formerly homeless individuals placed in housing with supportive services. Length of residence and a lower housing cost burden were also associated with fewer days in the hospital, although there was no evidence of a connection between these variables and the number of hospital admissions. The authors found limited evidence for a relationship between housing type (e.g., boarding house, private home, group home, etc.) and mental status, and weak but promising findings on the relationship between housing quality and sustained mental health improvements. Other studies assessed for this report suggested that neighborhood conditions and housing location may have a stronger influence on anxiety and depression than housing conditions.

According to the authors, the research examined for this paper was insufficient for drawing conclusions about the impact of housing instability among adults with severe and persistent mental illness, with the exception of formerly homeless individuals, for whom evidence of mental health benefit is strong. The authors concluded with a discussion of the shortcomings of existing research, suggestions for further investigation, and policy implications.

**Rafferty, Yvonne and Marybeth Shinn. 1991. The Impact of Homelessness on Children. *American Psychologist* 46(11): 1170-1179.**

In this review, the authors critiqued existing research on the effects of homelessness on children, and attempted to identify the specific pathways through which homelessness leads to adverse effects. Research indicates that homeless children have higher levels of health problems, with inadequate shelter conditions, lack of access to quality health services, and poor nutrition serving as the main mechanisms through which homelessness leads to these problems. Other areas addressed include developmental delays, psychological problems, and educational under-achievement.

**Robison, Julie, Jean J. Schensul, Emil Coman, Gretchen J. Diefenbach, Kim E. Radda, Sonia Gaztambide, and William B. Disch. 2009. Mental Health in Senior Housing: Racial/Ethnic Patterns and Correlates of Major Depressive Disorder. *Aging & Mental Health* 13(5): 659-673.**

To better understand the prevalence of mental health problems and correlates of major depressive disorder, the authors analyzed data collected during in-person diagnostic interviews with 635 residents aged 50+ in 13 subsidized senior housing buildings in Hartford, Connecticut. The diagnostic interviews were intended to identify the incidence of major depressive disorder and generalized anxiety disorder over the previous 12 months, risk for suicide and presence of psychosis, and occurrence of “nervous attacks”. Using multivariate analysis, the authors found that Latino residents who had moved into the building more recently were significantly more likely to experience depression than longer-term residents. Depression was also more likely among Latino residents who reported higher levels of perceived environmental stress<sup>3</sup>, as compared with those who reported lower levels of the same. This relationship did not persist for Black residents who, on average, had longer lengths of residence, suggesting that the relationship between relocation and depression diminishes after an adjustment period.

**Taylor, Mark P., David J. Pevalin, and Jennifer Todd. 2006. *The Psychological Costs of Unsustainable Housing Commitments*. Working Paper. Essex, UK: University of Essex, Institute for Social and Economic Research.**

In this study, the authors used data from the British Household Panel Survey (BHPS) gathered between 1991 and 2003 to assess the relationship between housing payment problems, including mortgage arrears and the threat of eviction or repossession, and the psychological well-being of owners and renters in Great Britain. Results showed that being in arrears is significantly associated with psychological costs at a level equivalent to those associated with unemployment or divorce among male heads of households. Among females, having persistent difficulties making housing payments has a negative impact on psychological well-being. Findings also indicated that unsustainable housing

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<sup>3</sup> As measured by the Perceived Environmental Stress Index, which includes three categories of stressors: apartment, building, and neighborhood. Items in the index include ‘theft and vandalism,’ ‘lack of information about programs and services,’ and ‘separation from family and friends,’ among others.

commitments result in larger psychological costs among homeowners, as compared with renters, perhaps because they have larger financial and emotional investments in their homes.

**Wood, David L., R. Burciaga Valdez, Toshi Hayashi, and Albert Shen. 1990. Health of Homeless Children and Housed, Poor Children. *Pediatrics* 86(6): 858-866.**

In this report, the authors presented findings from the Los Angeles Homeless Families Study, a cross-sectional survey of 196 homeless families and a comparison group of 194 stably housed poor families. The homeless families were sampled from clients at the 10 largest Los Angeles County shelters, while the housed families were sampled from visitors to four welfare offices located near the homeless families' last stable address; in each family one child was randomly chosen for study. Parents' responses to questions about the child's health and development, as well as anthropomorphic measurements of height and weight, were used to compare the health status of homeless and housed children.

Using regression analysis, the authors found that children in both groups were equally likely to be rated in fair or poor health by their mothers, and had very similar types and incidences of symptoms during the month prior to the interview, at rates far greater than the general population of children. Large proportions of children in both groups were found to eat inadequate, unbalanced diets; homeless children, however, were much more likely to be obese and frequently eat food from fast-food restaurants and convenience stores. They were also more likely to experience hunger because the family ran out of food or money. Along with increased behavior and academic problems, the authors attributed these differences to a "cumulative effect of multiple risk factors," rather than a single environmental or behavioral factor.

**Yen, Irene H., Wizdom Powell Hammond, and Margot B. Kushel. 2009. From Homeless to Hopeless and Healthless?: The Health Impacts of Housing Challenges Among Former Foster Care Youth Transitioning to Adulthood in California. *Issues in Comprehensive Pediatric Nursing* 32: 77-93.**

Although the 1999 *Foster Care Independence Act* requires states to provide social services to former foster youth until they reach the age of 21, researchers found that many young people leaving foster care have difficulty maintaining stable housing and good physical and mental health. Between January and June 2006, the authors conducted five focus groups with 31 Bay Area youth age 18 to 24 who had "aged out" of California's foster care system, in an effort to learn more about the health consequences of housing instability. Community organizations that serve foster youth and former foster youth recruited participants. With only two exceptions, participants in the focus groups reported dissatisfaction with their current housing circumstances, citing a desire for more space, privacy, or better neighborhood conditions. Thirteen percent of participants reported being in fair or poor health, compared to 9 percent of California residents in the same age group.

Researchers identified several direct and indirect connections between housing instability and health outcomes. Many of these "emerging adults" reported difficulty accessing and maintaining a relationship

with healthcare providers that accept Medi-Cal (the state's version of Medicaid). Access was a particular concern for participants who found housing or were placed in group homes or foster care in communities outside of San Francisco or Oakland. Frequent moves disrupted continuity of care and made it difficult to maintain contact with caseworkers who could help former foster care youth access health and other services. Other participants noted that competing demands – including fulfilling the administrative requirements of transitional housing programs – diminished the time and energy they had for meeting needs in other areas, including health care.

**3. Stable, affordable homeownership may positively impact mental health by increasing the control that homeowners have over their physical environment and minimizing the disruptions associated with frequent, unwanted moves. However, the stress and disruption associated with mortgage defaults and foreclosures suggest that unsustainable forms of homeownership may have strong negative impacts on health.**

**Balfour, Danny L. and Janet L. Smith. 1996. Transforming Lease-Purchase Housing Programs for Low Income Families: Towards Empowerment and Engagement. *Journal of Urban Affairs* 18(2): 173-188.**

In this article, Balfour and Smith evaluated a lease-purchase program run by the nonprofit Cleveland Housing Network (CHN) to help low-income families achieve home ownership. Through focus group interviews with 13 families at different stages in the program, the authors found that the opportunity to secure affordable housing and work toward home ownership appears to contribute to greater levels of self-esteem and empowerment among clients. However, the authors also suggested that living in stable, long-term housing situated within a supportive community network may have a greater influence than home ownership per se on clients' sense of efficacy and self-esteem. Based on this finding, as well as recognition of deficiencies in CHN program administration and the financial pressures of home maintenance, Balfour and Smith recommended that the program balance its focus on housing production and ownership with attention to community building and increased client involvement in program administration.

**Bennett, Gary G., Melissa Scharoun-Lee, and Reginald Tucker-Seeley. 2009. Will the Public's Health Fall Victim to the Home Foreclosure Epidemic? *PLoS Medicine* 6(6).**

This essay described several pathways through which a home foreclosure may result in negative psychological and physical health outcomes. They reported that stressful life events (e.g., undergoing a foreclosure) – in particular, those for which the individual assumes personal responsibility – are documented to have a causal relationship with the onset of depression. Moreover, chronic stressors (e.g., ongoing financial difficulties) and a lack of control over the situation can worsen the impact of stressful life events on depression outcomes. The authors also noted that individuals undergoing foreclosure and other stressful life events may turn to unhealthy behaviors such as tobacco and alcohol use to cope with the stress. While most people exhibit resilience even when faced with stressful

events, the authors pointed out that individuals with pre-existing psychiatric or health problems may be especially vulnerable to negative health outcomes.

**Cairney, John and Michael H. Boyle. 2004. Home Ownership, Mortgages and Psychological Distress. *Housing Studies* 19(2): 161-174.**

In this report, the authors used data from the General Social Survey on Health (GSS-H) to compare the mean level of distress experienced by home owners without mortgages, as measured on a standard scale of distress, with that of home owners with mortgages and renters. The GSS-H is a telephone survey of a national probability sample of Canadians over the age of 15; only those respondents aged 20 and over were included in this analysis, resulting in a sample size of 8,106 individuals. Findings indicated that renters experience the highest levels of distress, followed by home owners with mortgages. Home owners without mortgages have the lowest levels of distress.

The authors also measured age, gender, marital status, and stress, as well as education and household income, which were used as proxies for socioeconomic status. When controlling for these variables, variation in mental health status by housing tenure remained the same, indicating that the effect of tenure on distress is not merely an artifact of demographics, socioeconomic status, or stress levels. Moreover, housing tenure was found to have a moderating effect on the relationship between stress and psychological distress; renters with high levels of stress reported higher levels of distress than both groups of high-stress home owners. According to the authors, these findings can be explained by the sense of security and personal control incurred by a stable housing situation. Nevertheless, the authors cautioned that data limitations limit the confidence with which a causal relationship between housing status and mental well-being can be inferred.

**Connolly, Sheelah, Dermot O'Reilly, and Michael Rosato. 2010. House Value as an Indicator of Cumulative Wealth is Strongly Related to Morbidity and Mortality Risk in Older People: A Census-based Cross-sectional and Longitudinal Study. *International Journal of Epidemiology* 39: 383-391.**

In this large population-based study, researchers assessed the extent to which housing tenure and house value are predictive of poor health in older adults. The 191,848-person sample was identified using the Northern Ireland Mortality Study (NIMS), a prospective longitudinal study of a subset of the Northern Ireland population that includes non-institutionalized respondents age 65+. Analysts linked the NIMS dataset to valuation data compiled by the Valuation and Lands Agency, which estimated the market value for all residential properties as of June 2005 and sorted the records into seven housing tenure groups including public- and private-sector renters and five classes of homeowners (representing the spectrum of property value levels).

Analysis of the data demonstrated a correlation between health outcomes and housing tenure/house value. Specifically, compared with homeowners, public-sector renters had a higher risk of mortality and worse self-reported general health over a 5-year period, even after controlling for a wide range of

household, socio-economic, and environmental factors. Outcomes for private renters fell between these two groups. Moreover, owners of the highest-valued properties ( $\geq$ £200 000) fared better than owners of the lowest-valued owner-occupied properties ( $<$ £75 000), with only a slight attenuation when adjusted for educational attainment and social class (as indicated by occupation). The authors explained this relationship by suggesting that house value serves as an indicator of accumulated wealth, and noted the strong association between both variables and current health status and mortality outcomes.

**Elsinga, Marja and Joris Hoekstra. 2005. Homeownership and Housing Satisfaction. *Journal of Housing and the Built Environment* 20: 401-424.**

In this study, the authors used data from the European Community Household Panel to test the relationship between tenure and housing satisfaction among owners and renters in countries across the European Union.<sup>4</sup> Sample sizes in each country ranged from 1,760 to 5,570 households. Using regression analysis and controlling for housing quality, household characteristics, and housing costs, among other variables, the authors found that, in all countries except Austria, tenure has an independent influence on satisfaction and homeowners experience greater satisfaction than renters. The authors conceded that the cause of this relationship has not been determined, and reviewed an array of hypotheses other researchers have presented.

**Macintyre, Sally, Anne Ellaway, Geoff Der, Graeme Ford, and Kate Hunt. 1998. Do Housing Tenure and Car Access Predict Health Because They Are Simply Markers of Income or Self Esteem? A Scottish Study. *Journal of Epidemiological Community Health* 52: 657-664.**

In this article, the authors used survey data from the West of Scotland Twenty-07 Study to investigate whether housing tenure and car ownership actually predict health, or whether they are simply proxies for assumed underlying causal factors such as income or self-esteem. The sample for which data were analyzed consisted of 1,500 randomly selected Scottish adults between the ages of 30 and 60, for which the authors examined sex, age, housing tenure, car access, household income, self-esteem, and health.

After controlling for these other variables, the authors found that tenure and car access were still associated with a range of health measures, in the direction suggested by previous studies (home and car ownership predict better mental and respiratory health, fewer chronic illnesses, fewer symptoms, lower blood pressure, and smaller waist/hip ratio). These findings indicated that tenure and car access are not simply markers for other characteristics, but may actually contribute to health. The authors cautioned that measures of income and psychological traits used in this study are crude, and recommend further empirical examination to better understand this relationship.

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<sup>4</sup> The countries are: Ireland, the United Kingdom, Netherlands, Denmark, Austria, Greece, Italy, and Spain.

**National Association of Realtors Research Division. 2006. *Social Benefits of Homeownership and Stable Housing*. Washington, DC: Author.**

This paper explored the social outcomes associated with residential stability and/or homeownership. Among other outcome measures, the authors presented research indicating that home owners experience higher levels of self-esteem and control over their lives, as well as better self-ratings of physical health, even when controlling for factors such as age, income, and education levels. Other evidence showed that homeowners are able to use housing equity to access higher levels of care and pay medical bills, thus enjoying better health. The authors acknowledged the difficulty of distinguishing between the benefits associated with homeownership and those associated with stable housing, regardless of tenure.

**Nettleton, Sarah and Roger Burrows. 1998. *Mortgage Debt, Insecure Home Ownership and Health: An Exploratory Analysis*. *Sociology of Health and Illness* 20(5): 731-753.**

Using data from the British Household Panel Survey (BHPS), this report examined the impact on mental health and use of primary care services associated with the onset of mortgage arrears. The BHPS is a longitudinal study of a national representative sample of households and individuals within them; the authors used a total sample size of more than 7,000 individuals, and examined changes among those falling into arrears or having trouble making mortgage payments within two periods, from 1991 to 1992 and 1994 to 1995.

Using multiple and logistic regression analyses and controlling for changes in income, physical health problems, and employment, the authors demonstrated that the onset of mortgage problems is associated with a significant ( $p < .001$  in the first period, and  $p < .05$  for men and  $p < .01$  for women in the second period) decline in psychological well-being, as indicated by changes in GHQ12 (General Health Questionnaire) scores. In the first study period, the onset of mortgage problems was also significantly associated with an increase in visits to general practitioners among men. Nevertheless, the authors cautioned that a causal relationship between these factors has not been established, and identify three potential explanations for their findings: (1) the presence of a “constellation of factors” associated with mortgage indebtedness and leading to poor mental health; (2) the loss of personal status or self identity associated with entering into arrears, and the resulting insecurity and impact on mental health; and (3) the social isolation individuals feel when unable to take responsibility for their shelter, and its psychosocial consequences.

**Page-Adams, Deborah and Nancy Vosler. 1997. *Homeownership and Well-Being Among Blue-Collar Workers*. Working Paper No. 97-5. St. Louis, MO: Washington University, George Warren Brown School of Social Work Center for Social Development.**

In this paper, the authors examined the impact assets have on well-being by testing the relationship between homeownership and economic strain, depression, problematic alcohol use, and social support

among automobile manufacturing workers. Data were drawn from responses to a questionnaire sent to a random sample of 653 workers in two automobile manufacturing plants in the Midwest. A total of 193 usable questionnaires were returned, and the authors cautioned that the low response rate and limited population restrict the generalizability of their findings. Using multivariate and logistic regression analyses, and controlling for household income and educational attainment, the authors found that homeownership is significantly and negatively associated with economic strain (indicated by difficulty in being able to afford needed items and leisure activities, and/or difficulty paying bills), as well as with problematic alcohol abuse, and depression (indicated by responses to standard measurement instruments).

**Pollack, Craig Evan and Julia Lynch. 2009. Health Status of People Undergoing Foreclosure in the Philadelphia Region. *American Journal of Public Health* 99(10): 1833-1839.**

Between July and October of 2008, researchers collected data on health status and health care use from 250 people undergoing foreclosure who were recruited at a mortgage counseling agency in the Philadelphia region. Comparing survey results with data from the 2008 Southeastern Pennsylvania Household Health Survey, researchers found that individuals in the foreclosure sample were significantly more likely to lack insurance coverage and to have failed to fill a prescription in the past year due to cost. Moreover, this cross-sectional study revealed that members of the foreclosure sample were significantly more likely to have hypertension, heart disease, and/or a diagnosed psychiatric condition such as depression or anxiety, when compared to the general population. Roughly 9 percent of respondents in the foreclosure sample reported that a medical condition – their own or a family member’s – was the main reason they were undergoing foreclosure. Moreover, some 28 percent of cases in the foreclosure sample reported owing money to medical creditors.

**Rohe, William M. and Victoria Basolo. 1997. Long-Term Effects of Homeownership on the Self-Perceptions and Social Interaction of Low-Income Persons. *Environment and Behavior* 29(6): 793-819.**

This paper presented the third wave of findings in a quasi-experimental longitudinal study of homeowners in Baltimore, MD. Using a pretest-posttest design, the authors compared measures of personal and social well-being among 171 participants in a subsidized homeownership program with a comparison group of 140 renters receiving Section 8 housing vouchers. Interviews were completed before the treatment group purchased their homes, 18 months postpurchase, and 36 months after moving. By the third wave, 63 percent of homebuyers and 46 percent of renters remained in the study, but the authors found that attrition bias did not threaten the validity of their results.

Using multiple regression models, the authors assessed the impact of homeownership on self-esteem and perceived control, among other variables. Literature suggests that homeownership can increase self-esteem through three mechanisms: reflected appraisals, favorable comparison with others, and achievement of a personal goal; however, homeowners did not show significantly higher levels of self-esteem in any of the three waves of interviews—in the third wave, owners actually had lower self-

esteem than the renter group. Hypotheses also suggest that homeownership can influence owners' sense of personal control, through the ability to fix up and personalize the living environment and restrict entry to the dwelling. Again, over the 3-year period no significant relationship was found between perceived control and ownership.

**Rohe, William M., Shannon Van Zandt, and George McCarthy. 2001. *The Social Benefits and Costs of Homeownership: A Critical Assessment of the Research*. Low-Income Homeownership Working Paper Series. Cambridge, MA: Harvard University Joint Center for Housing Studies.**

In this review, the authors assessed the evidence for claims of the individual and societal benefits of homeownership. Among other things, the authors examined the relationship between homeownership and psychological health, as well as homeownership and physical health. Three mechanisms were offered to explain the potential relationship between homeownership and psychological health: (1) the social status and personal freedom linked to homeownership contribute to greater self-esteem and sense of personal control, (2) homeowners have access to assets that allow them to access better health care, and (3) the security of tenure that comes with homeownership leads to diminished stress levels. The authors pointed out, however, that little empirical evidence validates the presumed relationship between homeownership and self esteem; moreover, foreclosure or difficulty keeping up with home maintenance needs and mortgage payments can counteract any of the proposed benefits.

Arguments that homeownership positively influences physical health include: (1) home owners are able to draw on home equity to pay for health care and maintain a higher standard of care; and (2) homeownership promotes a general sense of well-being, which has a positive impact on physical health. The authors cautioned that evidence for this positive relationship is limited and that the mechanism through which ownership impacts health has not been identified; nevertheless, research generally finds a positive association between homeownership and physical health. Like psychological health, however, this relationship may be compromised when a household has difficulty making mortgage payments.

**Rossi, Peter H. and Eleanor Weber. 1996. *The Social Benefits of Homeownership: Empirical Evidence from National Surveys*. *Housing Policy Debate* 7(1): 1-35.**

In this report, the authors used data from the General Social Survey, the National Survey of Families and Households, and the American National Election Studies, to separate tenure status from dwelling attributes and socioeconomic characteristics, and examined the differences between renters and owners across a wide range of variables. Using regression analyses, the authors' findings supported claims that owners enjoy marginally higher levels of well-being than renters, as evidenced by measures of self-satisfaction, belief that they can do things as well as anyone else, confidence that their lives will work out, lower scores on depression scales, and higher self-ratings of physical health. Not all measures reached statistical significance (in some cases the sample sizes were too small), however, and when they do the coefficients were not large. Moreover, the cross-sectional data sets did not allow causality to be addressed.

**Smith, Susan J., Donna Easterlow, Moira Munro, and Katrina M. Turner. 2003. Housing as Health Capital: How Health Trajectories and Housing Paths Are Linked. *Journal of Social Issues* 59(3): 501-525.**

In this article, the authors discussed housing as a source of “health capital,” that is, a “store of resilience that is built up or depleted as part of the trajectory individuals, households, and communities take through...changing networks...that shape their lives.” Health capital was seen as part of a dynamic process of getting sick or becoming well, and housing is assumed to play an important role in this process. To test the notion that housing has therapeutic properties, the authors engaged in in-depth open-ended interviews with men and women with health problems in 84 households across Britain. In their interviews, the authors also explored the idea that people with health problems have more difficulty attaining and sustaining home ownership, relative to the general population. Participants were recruited primarily through self-help groups, and interviewees were not presented as a representative sample, but rather representatives of a spectrum of circumstances.

Initial responses indicated that many interviewees found physically and emotionally “curative” properties in homeownership through access to healthier homes and improved living spaces. However, the authors found that many respondents had difficulty accessing homeownership, through an inability to pay or secure a mortgage and/or find an accessible property. Interviewees reported that these obstacles can take a damaging psychological toll and undermine resilience. Moreover, worsening health often meant that owners had difficulty sustaining home ownership, as a result of decreasing incomes that make it difficult to make payments and maintain the physical conditions of the home. The authors suggested that the emotional stress associated with these circumstances makes homeownership an unrealistic, and potentially damaging goal for individuals with health problems.

#### **4. Well-constructed and managed affordable housing developments can reduce health problems associated with poor quality housing by limiting exposure to allergens, neurotoxins, and other dangers.**

**Braubach, Matthias and Jon Fairburn. 2010. Social Inequities in Environmental Risks Associated with Housing and Residential Location – A Review of Evidence. *European Journal of Public Health* 20(1): 36-42.**

This review assessed the European evidence for inequities in housing and neighborhood quality among low socio-economic status households as compared with more affluent population groups. Research included in the review, which comprised studies published by national and international organizations and/or identified through a search of scholarly publications databases, indicated that low-income families experience greater exposure to a range of environmental health risks. These include chemical contamination and moisture, temperature, and sanitation problems in the home, and traffic-related pollution, lack of green space, and proximity to contaminated sites in the residential neighborhoods. Methodological variation across studies and a lack of evidence from many countries prevented the authors from making a conclusive assessment of the extent of the inequities in Europe.

**Brenner, Barbara L., Steven Markowitz, Maribel Rivera, Harry Romero, Matthew Weeks, Elizabeth Sanchez, Elena Deych, Anjali Garg, James Godbold, Mary S. Wolff, Philip J. Landrigan, and Gertrud Berkowitz. 2003. Integrated Pest Management in an Urban Community: A Successful Partnership for Prevention. *Environmental Health Perspectives* 111(13): 1649-1653.**

This article reported the results of an Integrated Pest Management (IPM) intervention intended to reduce cockroach infestation in East Harlem, NY. Participants were recruited at local health care facilities; three-quarters of all participating families reported a cockroach problem at baseline. After comparing initial cockroach levels, a treatment group of 76 families received an individually tailored IPM program, including sealing of cracks and crevices, repair of plumbing leaks, instruction in better housekeeping and sanitation, application of least-toxic gel pesticides, and advocacy for safe pest control practices with building management. The control group of 55 families received home safety education. After 6 months of IPM, cockroach infestation in the treatment households declined from 80.5 to 39.0 percent ( $p < .0001$ ) while control households showed no reduction in infestation.

**Breyse, Patrick, Nick Farr, Warren Galke, Bruce Lanphear, Rebecca Morley, and Linda Bergofsky. 2004. The Relationship Between Housing and Health: Children at Risk. *Environmental Health Perspectives* 112(15): 1583-1588.**

This article summarized proceedings from The Relationship Between Housing and Health: Children at Risk Workshop, in which experts reviewed current knowledge on the effects of housing on children's health and discussed best practices, research opportunities, and policy gaps. The authors reported that housing quality continues to be an important component of health disparities, citing recent findings that up to 25 percent of health status variability in Japan can be explained by variation in urban residential quality.

Workshop participants discussed ways in which the home environment may present hazards that are especially detrimental in early childhood. For example, chronic exposure to allergens from mold, vermin, cockroaches, and dust mites can cause and exacerbate asthma in children, particularly in homes with indoor moisture problems. Environmental tobacco smoke and other indoor air pollutants can have the same effect. Exposure to neurotoxicants, such as lead, pesticides, and tobacco smoke, is linked to neurodevelopmental and behavioral problems, some of which are irreversible. Risk of unintentional injury and death in the home is increased by a lack of safety devices, including window guards, safety gates, and smoke alarms. Future research and policy should address the home as an arena for strategic intervention to prevent negative health impacts.

**Chenoweth, David, Chris Estes, and Christopher Lee. 2009. The Economic Cost of Environmental Factors Among North Carolina Children Living in Substandard Housing. *American Journal of Public Health* 99(S3): S666-S674.**

The authors of this report estimated that the combined direct (medical) and indirect (nonmedical – e.g., school days and wages lost, cost of home modifications and developmental services, etc.) economic

costs of medical conditions associated with exposure to environmental risk factors among children living in substandard housing in North Carolina surpassed \$92 million in 2006 and \$108 million in 2007. Estimates were based on the assumption that 20 percent of the state's 2.15 million residents under age 18 lived in substandard housing during this period. The health conditions included in the assessment were identified through a review of related literature and met the following three criteria: (1) the condition had been included in a previous cost analysis; (2) an etiological basis for the condition had been identified; and (3) health care use and cost valuations could be applied. Environmental risk factors included those that originate in an "environmental medium;" are generally understood to adversely impact children's health; can be classified as a chemical, gas, metal, etc.; and are commonly found in substandard housing. Along with data on actual trends among North Carolina children and homes, a proportionate risk factor cost appraisal framework was used to estimate the cost of risk factors linked to certain medical conditions.

**Cohn, Richard D., Samuel J. Arbes Jr., Renee Jaramillo, Laura H. Reid, and Darryl C. Zeldin. 2006. National Prevalence and Exposure Risk for Cockroach Allergen in U.S. Households. *Environmental Health Perspectives* 114(4): 522-526.**

In this study, data from the National Survey of Lead and Allergens in Housing (NSLAH), a nationally representative, cross sectional survey of 831 housing units, were used to assess cockroach allergen prevalence in different types of housing and among different demographic groups. Environmental samples were collected from the homes of survey participants, including dust samples from the kitchen, bedroom, and living room floors. Detectable levels of cockroach allergen were found in 63 percent of all homes, with the highest prevalence of elevated concentrations in high-rise apartments. In general, higher concentrations were also found in homes built before 1940, urban areas, households with incomes below \$20,000, and units in multifamily buildings. The authors suggested these findings can help clinicians assess the likelihood of patient exposure to cockroach allergen.

**Committee on Environmental Health. 2005. Lead Exposure in Children: Prevention, Detection, and Management. *Pediatrics* 116(4): 1036-1046.**

This policy statement reviewed trends in lead poisoning in the United States, sources of lead exposure, and clinical effects in children related to the toxicity of lead. The authors reviewed studies that demonstrate the irreversibility of cognitive impairment resulting from lead exposure and present findings from cost-benefit analyses indicating the short- and long-term cost effectiveness of removal of lead paint hazards. The authors also presented methods for lead paint screening and management of children with elevated levels of blood lead concentration, as well as a range of recommendations for pediatricians and government officials.

**DiGuseppi, Carolyn, David E. Jacobs, Kieran J. Phelan, Angela D. Mickalide, and David Ormandy. 2010. Housing Interventions and Control of Injury-Related Structural Deficiencies: A Review of the Evidence. *Journal of Public Health Management Practice* 16(5): S34-S43.**

This article reviewed the various ways in which housing conditions and the presence or absence of home safety measures can impact residents' well-being and risk of injury or death. Health outcomes discussed included falls, burns and other fire-related injuries, and carbon monoxide poisoning, among others. The authors found evidence that supports the use of 3 of the 17 interventions discussed: installation of working smoke alarms; the presence of four-sided fencing around swimming pools; and controls on hot water heaters to keep temperatures at safe levels. Other interventions appear to need more research to determine their effectiveness.

**Gaitens, Joanna M., Sherry L. Dixon, David E. Jacobs, Jyothi Nagaraja, Warren Strauss, Jonathan W. Wilson, and Peter J. Ashley. 2009. Exposure of U.S. Children to Residential Dust Lead, 1999-2004: I. Housing and Demographic Factors. *Environmental Health Perspectives* 117(3): 461-467.**

Using data from the nationally representative cross-sectional National Health and Nutrition Examination Survey (NHANES) collected from 1999 through 2004, the authors assessed the extent to which housing and demographic characteristics are associated with lead dust levels in the homes of 2,155 children between the ages of 1 and 5. Regression analysis suggested that higher floor lead levels are associated with homes built before 1978 and pre-1950 homes that have undergone window, cabinet, or wall renovation in the previous 12 months. They also found that homes with deteriorated paint are more likely to have higher windowsill lead levels. In addition, after controlling for factors other than demographic characteristics, homes of non-Hispanic black families were shown to have significantly higher lead dust levels than those of non-Hispanic white families. Somewhat surprisingly, tenure – i.e., whether a family rented or owned – was not significantly associated with lead dust levels.

**Gould, Elise. 2009. Childhood Lead Poisoning: Conservative Estimates of the Social and Economic Benefits of Lead Hazard Control. *Environmental Health Perspectives* 117(7): 1162 – 1167.**

This report used cost-benefit analysis to compare the investment needed to mitigate exposure to residential lead paint hazards among children age 6 and under with the social and economic benefits of lead paint control. Using an array of previously published data sources, the author estimated that each dollar invested in the abatement of lead paint hazards in the home yields a return of \$17 to \$221, for a total savings of \$181 to \$269 billion nationwide. Specific areas assessed for potential savings included medical costs (e.g., diagnostic testing and treatment for adverse health effects); forgone lifetime earnings and tax revenue associated with cognitive damage and impaired intellectual function; and the effects of violent crime and other antisocial behavior which are strongly connected to early childhood lead exposure.

**Jacobs, David E., Jonathan Wilson, Sherry L. Dixon, Janet Smith, and Anne Evens. 2009. The Relationship of Housing and Population Health: A 30-Year Retrospective Analysis. *Environmental Health Perspectives* 117(4): 597-604.**

The authors used historical data from two nationally representative data sets – the American Housing Survey (AHS) and National Health and Nutrition Examination Survey (NHANES) – to assess the relationship between housing conditions and health outcomes between 1970 and 2000. Overall, statistical analyses of the data (chi-square test and analysis of variance) indicated five major trends over the study period: (1) a strong and persistent association between housing age/condition and lead poisoning; (2) increases in forced air heating and central air conditioning that corresponded with a greater prevalence of asthma; (3) increases in central air conditioning that were associated with higher obesity levels; (4) associations between cardiovascular health and environmental factors, including proximity to open space, improved air quality, and decreases in bothersome street noise; and (5) disparities in health and housing quality among some racial and ethnic groups that persisted over time.

**Kass, Daniel, Wendy McKelvey, Elizabeth Carlton, Marts Hernandez, Ginger Chew, Sean Nagle, Robin Garfinkel, Brian Clarke, Julius Tiven, Christian Espino, and David Evans. 2009. Effectiveness of an Integrated Pest Management Intervention in Controlling Cockroaches, Mice, and Allergens in New York City Public Housing. *Environmental Health Perspectives* 117(8): 1219-1225.**

Evidence from interventions in five New York City public housing developments indicated that a single building-level integrated pest management (IPM) treatment was more effective in controlling cockroaches and cockroach allergens than repeated applications of pesticides. The selected developments included 13 buildings that met three conditions: (1) location in a neighborhood with higher-than-average rates of asthma hospitalization; (2) no major capital improvements planned for several years and good structural condition; and (3) the presence of an active residents association.

Within the developments, buildings were assigned to the treatment group, which received a single, building-wide integrated pest management treatment, or the control group, which continued to receive standard pest management (voluntary application of spray pesticides every 3 to 6 months). One-half of the units in treatment group buildings were randomly selected to participate in the study; of these 516 units, baseline evaluations were completed in 323 apartments between 2002 and 2004 and a total of 280 apartments provided follow-up information over a 3 or 6-month period. (All units in treatment group buildings received an IPM intervention, whether or not they were participating in the study.) IPM interventions included mechanical and steam cleaning throughout the home; sealing of cracks, crevices, and other gaps; application of boric acid and solid or gel baits; and instruction on proper food and garbage storage.

The number of cockroaches trapped in participating treatment group kitchens was 0.57 times that of control group kitchens 3 months after the IPM intervention and 0.86 times that of control group kitchens at 6 months. Self-reported sightings of cockroaches in apartment kitchens were also much lower among residents of treatment group units. Levels of cockroach allergen were significantly

reduced in IPM units, but not in control-group units. IPM had the added benefits of reducing professional and personal use of pesticides and, therefore, exposure to chemicals and toxins, and increasing resident satisfaction with the quality of building services.

**Krieger, James and Donna L. Higgins. 2002. Housing and Health: Time Again for Public Health Action. *American Journal of Public Health* 92(5): 758-768.**

In this article, public health practitioners were advised to become more involved in issues related to housing quality and accessibility. The authors cataloged the myriad ways in which substandard housing is linked to negative health outcomes, including: the onset and exacerbation of infectious and chronic diseases; incidence of accidental injuries; poor childhood development and nutrition; adverse mental health outcomes; and deleterious neighborhood effects. The authors provided a brief review of the history of public health involvement in housing as well as current efforts to improve housing conditions, and offered suggestions for further engagement of public health practitioners in housing issues.

**Lambertino, Anissa, Mary E. Turyk, Luke Curtis, and Victoria W. Persky. 2009. Asthma Morbidity in Adult Chicago Public Housing Residents. *Journal of Asthma* 46: 202-206.**

Using multivariate regression analysis, the authors of this study identified factors that are predictive of asthma-related emergency department visits and hospitalization. Participants include 103 African American adults age 18 to 55 with self-reported asthma diagnoses and symptoms in the last year. Data used in the study were collected between 2002 and 2003 as part of the Asthma and Lead in Chicago Public Housing Residents study, a randomized trial of a home intervention designed to reduce residential exposure to asthma triggers among residents of four Chicago public housing developments. While household conditions related to asthma triggers, such as rodent sightings and peeling paint, plaster, or wallpaper were not associated with emergency department visits, they were significantly associated with asthma-related hospitalizations in the 12 months before the survey. The authors noted that at the time of the study, the Chicago Housing Authority was undertaking the demolition and transformation of high-rise and mid-rise public housing buildings, which may have affected building maintenance and exacerbated poor housing conditions.

**Lanphear, Bruce P., Michael Weitzman, Nancy L. Winter, Shirley Eberly, Benjamin Yakir, Martin Tanner, Mary Emond, and Thomas D. Matte. 1996. Lead-Contaminated House Dust and Urban Children's Blood Lead Levels. *American Journal of Public Health* 86(10): 1416-1421.**

In this paper, the authors investigated the association between lead-contaminated house dust and urban children's blood lead levels, using children's blood samples and environmental samples of water, soil, and dust taken during a home visit. Subjects were drawn from a random sample survey of 205 children in Rochester, NY; all were between 12 and 31 months of age and had lived in the same house since they were 6 months old.

Using a multiple regression model, the authors found significant correlations between children's blood lead levels and lead-contaminated household dust and soil, with a mean blood lead level of 7.7 µg/dL. According to the authors, these findings indicate that settled, lead-contaminated house dust is an important contributor of lead to children with low-level blood lead elevation. Moreover, a considerable portion of children in the study had elevated blood-lead levels even though dust lead levels in the home were lower than current Housing and Urban Development and Environmental Protection Agency standards. This finding suggests the need for lowering dust lead standards and more rigorous dust lead sampling of older housing to improve primary prevention of childhood lead exposure.

**Miles, Rebecca and David E. Jacobs. 2008. Future Directions in Housing and Public Health: Findings From Europe With Broader Implications for Planners. *Journal of the American Planning Association* 74(1): 77-89.**

The authors of this paper used data from the Large Analysis and Review of European Housing and Health Status survey, carried out by the World Health Organization in 2000-2001, to assess evidence for a relationship between housing and neighborhood conditions and asthma and other related respiratory symptoms. Logistic regression analysis of household data from 6,789 respondents in seven European cities indicated that, after controlling for other factors, residents who reported being strongly annoyed by neighbor and traffic noise were substantially more likely than non-annoyed residents to have experienced a doctor-diagnosed asthma attack or other respiratory symptoms in the prior 12 months.<sup>5</sup> The authors speculated that this indirect association may be the result of heightened stress levels among affected residents. Drainage and other structural problems in buildings were also associated with a higher likelihood of respiratory symptoms.

**Nevin, Rick and David E. Jacobs. 2006. Windows of Opportunity: Lead Poisoning Prevention, Housing Affordability, and Energy Conservation. *Housing Policy Debate* 17(1): 185-207.**

In this article, the authors reported on the accuracy of a predictive model used to forecast childhood lead poisoning and paint hazards, and confirmed that window replacement played a large role in reducing the number of children with elevated blood lead levels (at or above 10 µg/dL) between 1990 and 2000. The model was created using data from an array of sources, and forecasts suggested that the number of housing units with interior lead paint would fall by nearly 11 million between 1989 and 2000, with 70 percent of this decline attributable to window replacement and the balance due to demolition.

The authors indicated that this model has been validated, and suggest that single-pane window replacement, in conjunction with other strategies, can help eliminate childhood lead poisoning by 2010. Further, window replacement can lead to increased energy efficiency, and has implications for housing affordability and indoor air quality. The authors also provided an overview of the effects lead exposure

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<sup>5</sup> The cities are: Vilnius, Lithuania; Bratislava, Slovakia; Budapest, Hungary; Forli, Italy; Angers, France; Geneva, Switzerland; and Bonn, Germany

has on children, trends in childhood lead poisoning levels that indicate the success of regulatory actions to date, and policies and practices that have helped reduce lead paint hazards.

**Peters, Junenette L., Jonathan I. Levy, Michael L. Muilenberg, Brent A. Coull, and John D. Spengler. 2007. Efficacy of Integrated Pest Management in Reducing Cockroach Allergen Concentrations in Urban Public Housing. *Journal of Asthma* 44: 455-460.**

Cockroach allergen levels were significantly reduced in 39 apartments in three Boston, MA public housing developments following an integrated pest management treatment that included industrial cleaning, mattress replacement, use of mousetraps and pest control treatments, sealing of cracks and holes, and resident education. Six months after the intervention, allergen concentrations in dust samples taken from kitchens were reduced by 71 percent from baseline, and concentrations in beds were reduced by 53 percent (although in some apartments, concentration levels remained above the threshold for exacerbating existing asthma). However, after 6 months allergen concentrations started to increase, suggesting a U-shaped curve in allergen levels following initial treatment.

The study was conducted as part of the Boston Healthy Public Housing Initiative, a multi-partner research project. Eligible participants included families from the selected developments with a child between the ages of 4 and 17 who had self-reported doctor-diagnosed asthma. Baseline sampling was conducted between July 2002 and May 2003, with follow-up at 3-, 6-, 9-, and 12-month intervals through February 2004.

**Sandel, Megan and Joshua Sharfstein. 1998. *Not Safe at Home: How America's Housing Crisis Threatens the Health of Its Children*. Boston, MA: Children's Hospital Medical Center, The Doc4Kids Project.**

In this report, the authors compiled stories submitted by caregivers that detail the effects of inadequate or unaffordable housing on children. The report detailed the mechanisms through which substandard housing influences child health, including: asthma attacks and respiratory viruses triggered by exposure to tobacco smoke, cockroaches and rats, dust mites, mold, and lack of heat; burns from house fires, hot water, and other home heating sources; psychological disorders due to exposure to violence in unsafe neighborhoods or living arrangements; lead poisoning resulting from exposure to lead paint and dust; homelessness and the attendant health risks; and malnutrition as families make a tradeoff between food and housing costs. Consequences are heightened for children already living with a chronic disease.

**Stone, Kimberly E., Emmanuella M. Eastman, Andrea C. Gielen, Barbara Squires, Glenda Hicks, Dana Kaplin, and Janet R. Serwint. 2007. Home Safety in Inner Cities: Prevalence and Feasibility of Home Safety-Product Use in Inner-City Housing. *Pediatrics* 120(2): e346- e353.**

Researchers administered questionnaires and undertook home inspections to (a) assess the extent to which families use recommended home safety products and practices, and (b) identify barriers to the

adoption of these interventions in existing homes. Eligible participants included pregnant women and mothers age 16+ who had an infant younger than 12 months and were enrolled in East Baltimore's Healthy Start Program. (Enrollment in the Healthy Start program is open to families in a one square mile low-income neighborhood.) The study was undertaken as part of a larger evaluation, and questionnaires and inspections were administered after participants completed a home safety protocol intervention that included distribution of home safety information along with product coupons and completion of a pre-intervention baseline questionnaire.

In the questionnaire, participants were asked about the presence of working smoke alarms on every level of the home, stair gates at the top and bottom of staircases, and locks on cabinets containing adult medication, all of which are recommended by the American Academy of Pediatrics to lower the risk of accidental in-home injury or death. Among the 32 participants who completed the study, self-reported use of these preventative measures tended to be substantially greater than conditions observed in the home by investigators; among respondents, actual use of home safety practices and products was low. The investigators also found that many of the assessed homes could not physically accommodate the installation of gates at the top or bottom of the staircase. Moreover, other environmental hazards were found in nearly 20 percent of the homes, including exposed wiring and broken banisters or railings.

### **5. Stable, affordable housing may improve health outcomes for individuals with chronic illnesses and others by providing a consistent and efficient platform for the ongoing delivery of health care and reducing the incidence of certain forms of risky behavior.**

**Aidala, Angela A., Peter Messeri, David Abramson, and Gunjeong Lee. 2001. *Housing and Health Care Among Persons Living with HIV/AIDS*. Update Report #37. New York, NY: Columbia University.**

This report presented research from the CHAIN project, a longitudinal study of people living with HIV in New York City. Findings presented demonstrated the significant relationship ( $p \leq .01$  or  $p \leq .001$ ) between (1) homelessness or unstable housing, and (2) failure to receive and maintain adequate medical care, as well as the critical role of housing and support services in ensuring appropriate care among people living with HIV/AIDS who have a history of homelessness. Results were obtained through ongoing interviews with a representative sample of individuals living with HIV. The initial sample of 700 participants was recruited from 43 local agencies in 1994; participants were interviewed every 6-12 months, with an additional "refresher" sample of 267 individuals introduced in 1998.

"Event history analysis" revealed that homeless or unstably housed participants who received housing assistance in the form of rental assistance, placement assistance, or placement in AIDS housing between 1994 and 1998 were 3.8 times more likely to enter into medical care, and twice as likely to enter into and maintain quality care, than those who did not receive assistance during this period. Among participants in need of service coordination (those who (1) reported being homeless or had housing problems during the 6 months prior to the interview, (2) lacked a regular medical provider when diagnosed with HIV, (3) scored below an established cut-off point indicating a mental disorder on a

standardized test, or (4) reported having transportation problems), those who received case management related to securing housing and supportive services were more likely to enter into appropriate medical care than those who received only medically oriented case management, and were 9.4 times more likely to initiate medical care than those who did not receive case management at all.

**Buchanan, David, Bruce Doblin, Theophilus Sai, and Pablo Garcia. 2006. The Effects of Respite Care for Homeless Patients: A Cohort Study. *American Journal of Public Health* 96(7): 1-4.**

This paper reported on the effectiveness of respite care in reducing hospital use among homeless adults in Chicago. During a 1-year period following discharge from a public hospital, the authors compared hospital days, emergency room visits, outpatient clinic visits, and mortality among two groups of patients: 161 homeless adults that were accepted into respite care and 64 members of a “usual care group” that were refused care because of lack of available beds. During the 12 months after hospital discharge, the authors found that the respite care group used 58 percent fewer inpatient days than the usual care group, and had a 49 percent reduction in hospital admissions, after adjusting for a variety of variables including previous use of health services (both significant at  $p = .002$ ). The authors also demonstrated the cost-effectiveness of respite care, which cost \$706 per hospital-day avoided, as compared with an average per day hospital cost of \$1,500 during the same time period. While there were also reductions in emergency department use among the respite care group during the follow-up period, they did not reach statistical significance. The authors emphasized the need for a randomized trial to further assess the health benefits of respite care.

**Buchanan, David, Romina Kee, Laura S. Sadowski, and Diana Garcia. 2009. The Health Impact of Supportive Housing for HIV-Positive Homeless Patients: A Randomized Controlled Trial. *American Journal of Public Health* 99(S3): S675-S680.**

In this randomized trial, researchers evaluated the health impact of the Chicago Housing for Health Partnership (CHHP) program model, which provides permanent supportive housing and intensive case management upon discharge from a hospital to homeless people with a chronic medical illness. The analysis was limited to HIV-positive patients who had no source of stable housing during the 30 days prior to hospital admission and who were able to care for themselves in an independent living environment. Control group patients received standard discharge planning, including referral to an overnight shelter or other housing provider and access to case management through a hospital-affiliated clinic, while patients in the treatment group worked with case managers and were placed in permanent supportive housing at a CHHP partner agency.

Twelve months after enrollment in the study, more than half (55 percent) of surviving patients in the treatment group had intact immunity – defined as a CD4 count greater than or equal to 200 and viral load of less than 100,000 – compared with roughly one-third (34 percent) of patients in the control group, a difference that reached statistical significance. The authors suggested that these findings

provide evidence for the effectiveness of a “Housing First” strategy in improving the health of HIV-infected homeless people.

**Cameron, Ailsa, Liz Lloyd, William Turner, and Geraldine Macdonald. 2009. Working Across Boundaries to Improve Health Outcomes: A Case Study of a Housing Support and Outreach Service for Homeless People Living with HIV. *Health and Social Care in the Community* 17(4): 388-395.**

This paper assessed the effectiveness of England’s Supporting People program, which provides coordinated services to enable vulnerable people to live independently and care for themselves. Specifically, the report looked at the Housing Support, Outreach and Referrals pilot program, established in 2003 as one of six pilots within the Supporting People program. The pilot was intended to demonstrate the importance of cross-sector cooperation and the contributions that housing and supportive services can make in improving the health of HIV-positive people experiencing or at risk of experiencing homelessness.

The pilot program served two London boroughs with high rates of homelessness and HIV infection. Through outreach to eligible participants, 27 referrals were received and accepted during a 15-month period; of these, 15 people received tenancy support and 12 gained access to temporary housing with the assistance of two support workers. Support workers also provided information and referred clients to local services; at the conclusion of the pilot, all participants had registered with a general practitioner (only 9 of 27 were registered at baseline), while 13 had registered with an HIV clinic and 5 had re-engaged with one.

Although participants saw only modest improvements in health status after 6 months (as indicated by CD4 counts), 22 reported that their health status had improved since they started the program. Moreover, engagement with healthcare services improved dramatically. Interviews with 13 clients indicated that those using services credited this outcome to the availability of support workers, who focused on clients’ self-reported needs and helped link them with the appropriate agencies on an as-needed basis.

**Coady, Micaela H., Mary H. Latka, Hanne Thiede, Elizabeth T. Golub, Larry Ouellet, Sharon M. Hudson, Farzana Kapadia, and Richard S. Garfein. 2007. Housing Status and Associated Differences in HIV Risk Behaviors Among Young Injection Drug Users (IDUs). *AIDS Behavior* 11: 854-863.**

This cross-sectional analysis of 3,266 respondents age 15 to 30 found that risk of HIV infection among young injection drug users in five U.S. cities<sup>6</sup> varied by housing status, with homeless and “equivocally housed” users more likely to engage in risky behaviors than their stably housed peers.<sup>7</sup> Specifically, as

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<sup>6</sup> The cities are: Baltimore, MD; Chicago, IL; Los Angeles, CA; New York City, NY; and Seattle, WA.

<sup>7</sup> Respondents were characterized as equivocally housed if they gave discordant responses to inquiries about whether they were experiencing subjective homelessness (i.e., thinking of oneself as homeless) and objective homelessness (e.g., sleeping in a shelter).

housing stability declined, the likelihood of daily injection drug use increased, with homeless participants the most likely and those in stable housing the least likely to inject drugs at least daily. Similar trends were seen for other risk behaviors, including using shooting galleries (settings where other users are injecting drugs and paraphernalia are provided) and backloading (using a shared syringe to measure and divide drugs). The homeless and equivocally housed were also more likely to have engaged in sex work (i.e., received monetary compensation or drugs in exchange for sex) and to have had three or more sex partners than those in stable housing. The authors used baseline data collected between May 2002 and January 2004 for the Collaborative Injection Drug Users Study III/Drug Users Intervention Trial. All participants had injected drugs in the previous 6 months; they were asked about HIV-related risk behaviors in the previous 3 months.

**Culhane, Dennis P., Stephen Metraux, and Trevor Hadley. 2002. Public Service Reductions Associated with Placement of Homeless Persons with Severe Mental Illness in Supportive Housing. *Housing Policy Debate* 13(1): 107-163.**

In this study, the authors assessed the impact placement in the New York/New York (NY/NY) supportive and community housing program had on levels of service use among more than 3,000 formerly homeless persons with severe mental illness (SMI). Using data collected by eight agencies, the authors measured utilization of shelters, hospitals, and correctional facilities among the study group during the 2 years immediately following placement in NY/NY housing. Levels of use were then compared with each individual's history of service use during the 2 years prior to placement, as well as with service use during the same period among a matched-pair control that did not receive NY/NY placement. Cases were matched on the basis of demographics, indicators of mental illness and substance abuse, and similar preplacement history of service use.

Using a regression model, findings indicated that persons placed in supportive housing experience striking reductions in the frequency and duration of public service use as compared with the control group and with their own preplacement utilization rates, resulting in a \$16,281 reduction in service costs per housing unit per year and overall net program cost of \$995 per unit per year over the first 2 years. Eighty-six percent of preplacement expenditures were in health services, and the authors suggested that housing placement allows individuals to engage more effectively in outpatient regimes that may prevent the need for hospitalization and reduce the duration of hospitalization when it occurs. Readers are cautioned, however, that results may not be generalizable to all homeless people with SMI, and that reductions in service indicated in the report are conservatively measured.

**Dickson-Gomez, Julia, Helena Hilario, Mark Convey, A. Michelle Corbett, Margaret Weeks, and Maria Martinez. 2009. The Relationship Between Housing Status and HIV Risk Among Active Drug Users: A Qualitative Analysis. *Substance Use & Misuse* 44: 139-162.**

To assess the relationship between housing status and HIV risk, the authors of this paper paired qualitative data collected through the Housing Status/Stability and HIV Risk among Drug Users study

(Housing study) with observations and interviews conducted by ethnographers as part of a Risk Avoidance Partnership (RAP project) program evaluation. The Housing study consisted of longitudinal interviews with a purposeful sample of 65 drug users in Hartford, Connecticut. Targeted sampling was used to identify participants in an array of housing situations, ranging from living in nonsubsidized, subsidized, or supportive housing and doubling-up with friends or family to homelessness and residing in shelters or on the street. The RAP project involved observation of 55 participants in a peer-led HIV prevention program targeting active adult users of cocaine and heroin, 28 of whom also participated in in-depth interviews. More than half of the Housing Study participants (36) were also involved in the RAP project.

Overall, the authors found evidence that HIV risk behaviors were more prevalent among homeless or unstably housed drug users than among those in more stable housing. Participants living on the street or in shelters reported higher levels of stress related to their housing situation and more frequent exposure to drug dealers and other users, both of which increased the likelihood that they would also use drugs. Further, homeless drug users often lacked a place to store syringes and were more likely to share syringes and other paraphernalia. Results were mixed for participants who doubled up with family members or friends; in some cases housing was provided in exchange for sexual favors and drugs, increasing the likelihood of drug use. When participants stayed with non-drug-using friends or family, however, doubling-up had a protective effect and resulted in reduced engagement in risk activities.

**Hwang, Stephen W. and Ann L. Bugeja. 2000. Barriers to Appropriate Diabetes Management Among Homeless People in Toronto. *Canadian Medical Association Journal*. 163(2): 161-165.**

This study presented results from a survey completed by 50 homeless adults with diabetes staying in Toronto shelters. When asked about difficulties managing their diabetes, 64 percent of respondents reported concerns related to the appropriateness of food available at the shelters. Shelter residents also indicated that they experienced difficulties adhering to recommended insulin injection schedules and/or coordinating medication with mealtime; others feared theft of needles used for injections. Access to health care services and prescription medications were not mentioned as problems, although some respondents reported difficulties keeping their appointments and storing their medications in a safe place.

**Larimer, Mary E., Daniel K. Malone, Michelle D. Garner, David C. Atkins, Bonnie Burlingham, Heather S. Lonczak, Kenneth Tanzer, Joshua Ginzler, Seema L. Clifasefi, William G. Hobson, and G. Alan Marlatt. 2009. Health Care and Public Service Use and Costs Before and After Provision of Housing for Chronically Homeless Persons with Severe Alcohol Problems. *Journal of the American Medical Association* 301(13): 1349-1357.**

This quasi-experimental study assessed the relationship between a “Housing First” approach and reliance on costly public health and criminal justice services among chronically homeless individuals with severe alcohol problems. Drawing from a rank-ordered list of heavy services users, researchers

compared outcomes for 95 treatment group members placed in housing at 1811 Eastlake – a Housing First program in Seattle – and a control group of 39 wait-listed participants.<sup>8</sup> Housing placements were offered on a “first found, first assigned” basis, meaning that some control-group members moved off of the waitlist before the first 3-month assessment; these 14 individuals were considered part of the treatment group.

Outcome measures were based on administrative data collected from several sources, and included jail bookings and days incarcerated, shelter and sobering center use, hospital-based medical services, publicly-funded alcohol and drug detoxification treatment, emergency medical services, and Medicaid-funded services. Six months into the study, housed participants consumed \$3,569 less in monthly services costs relative to control participants; after deducting monthly housing costs of \$1,120, a net savings of \$2,449 per month was realized. After 12 months, the median monthly cost of services for the treatment group decreased by more than 75 percent, from \$4,066 per person to \$958. Researchers found that the length of time in housing was significantly associated with reductions in the use and cost of services. The amount of alcohol consumed per day and the number of days drinking to intoxication also dropped among housed participants over the course of the study. The authors cautioned that participants selected for the study were the heaviest users of costly services, meaning that offsets for other groups would likely be less extreme.

**National AIDS Housing Coalition. 2005. *Housing Is the Foundation of HIV Prevention and Treatment: Results of the National Housing and HIV/AIDS Research Summit*. Washington, DC: Author.**

This paper presented the results of the 2005 National Housing and HIV/AIDS Research Summit, which focused on the ways that homelessness and unstable housing affect HIV risk behaviors and treatment access. Emphasizing the cost-effectiveness and savings achieved by viewing housing as a prevention and treatment intervention, experts at the Summit came up with policy priorities based on existing research.

Findings upon which these priorities are based included: the higher rates of infection and death from HIV/AIDS among those experiencing homelessness as compared with HIV positive persons who are housed; the continued unmet housing need among those living with HIV/AIDS; and the need for accessible housing models to serve this population. Evidence also shows that unstable housing or homelessness can lead to increased engagement in risk behaviors, while stable housing can serve as a protective force, limiting “exposure” to health threats and facilitating ongoing engagement in health services as well as treatment adherence and success. The report also identified a range of issues related to the impact of housing models, for which further research is needed.

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<sup>8</sup> While Housing First programs remove sobriety and treatment requirements, 1811 Eastlake is unique in that residents are also permitted to drink in their rooms.

**Schwarcz, Sandra K., Ling C. Hsu, Eric Vittinghoff, Annie Vu, Joshua D. Bamberger, and Mitchell H. Katz. 2009. Impact of Housing on the Survival of Persons with AIDS. *BMC Public Health* 9: 220.**

Using data from the San Francisco AIDS registry, the authors of this report compared survival rates among 6,558 homeless and housed individuals diagnosed with AIDS between 1996 and 2006. Nearly 10 percent of the adults and adolescents in this nonrandomized observation study were homeless at diagnosis; of these cases, 67 percent were still alive 5 years later. In contrast, 81 percent of individuals who were housed at the time of diagnosis survived the next 5 years, a difference that was significant at the  $p < 0.0001$  level. Seventy individuals who were homeless at diagnosis moved into supportive housing during the study period; obtaining supportive housing significantly reduced five-year mortality rates in this group by 80 percent.

**6. By providing families with access to neighborhoods of opportunity, certain affordable housing strategies can reduce stress, increase access to amenities, and generate important health benefits.**

**Acevedo-Garcia, Dolores, Theresa L. Osypuk, Rebecca E. Werbel, Ellen R. Meara, David M. Cutler, and Lisa F. Berkman. 2004. Does Housing Mobility Improve Health? *Housing Policy Debate* 15(1): 49-98.**

In this article, the authors critically reviewed 13 empirical evaluations of five housing mobility programs in the United States, ranked the studies according to the strength of their designs, and summarized the research evidence that housing mobility programs improve health outcomes. Mobility programs evaluated by reviewed studies include: the Moving to Opportunity experiment, the Gautreaux program, the Yonkers scattered-site public housing program, the Section 8 program, and the Cincinnati Special Mobility Program.

Overall, the authors found evidence that mobility policies may contribute to improved health and a reduction in harmful health behaviors, such as substance abuse. Studies indicated that relocation to better neighborhoods can result in lower rates of depression and anxiety, reduced incidence of violent or traumatic events, and significantly lower levels of obesity among residents of public housing. These findings suggest that housing policy has the potential to improve individual health by influencing where families live. Nevertheless, the authors acknowledged that these findings are preliminary and that studies to date do not evaluate specific pathways between housing and health and – with a few exceptions – do not utilize an experimental (or similarly rigorous) research design.

Recommendations for future research included the development of conceptual frameworks that address the specific mechanisms through which neighborhood effects and racial discrimination impact health, as well as further examination of the relationship between health improvement and success in the labor force. Other recommendations included use of multilevel data and qualitative research methods, larger sample sizes, and development of better health, housing, and neighborhood data.

**Bennett, Gary G., Lorna H. McNeill, Kathleen Y. Wolin, Dustin T. Duncan, Elaine Puleo, and Karen M. Emmons. 2007. Safe to Walk? Neighborhood Safety and Physical Activity Among Public Housing Residents. *PLoS Medicine* 4(10): 1599-1607.**

In this study, which employed a randomized cluster design, pedometers were used to evaluate the extent to which crime and perceptions of neighborhood safety impacted physical activity levels among 1,180 adult residents of 12 Boston-area low-income housing developments. Overall, more than 80 percent of respondents reported feeling safe in their neighborhood during the day, while only 37 percent reported feeling safe at night. For both men and women, researchers found no association between reported feelings of daytime safety and physical activity; there was also no connection between night-time safety and physical activity among men. Pedometers measured significantly fewer steps per day, however, among women who reported feeling unsafe at night (4,302 versus 5,178 steps per day for women who felt safe at night;<sup>9</sup>  $p < .01$ ). Men who reported feeling a little unsafe or unsafe were significantly less likely to have high self-ratings of physical activity self-efficacy, as indicated by the self-rated ability to “stick to” an exercise regimen and “make time for exercise;” however, this relationship did not apply to women.

**Heinrich, Katie M., Rebecca E. Lee, Richard R. Suminski, Gail R. Regan, Jacqueline Y. Reese-Smith, Hugh H. Howard, C. Keith Haddock, Walker S. Carlos Poston, and Jasjit S. Ahluwalia. 2007. Associations Between the Built Environment and Physical Activity in Public Housing Residents. *International Journal of Behavioral Nutrition and Physical Activity* 4: 56.**

This cross-sectional study of 452 adult residents in 12 low-income housing developments assessed the relationship between participants’ self-reported physical activity and neighborhood environmental factors. Data on physical activity came from the Pathways to Health study and was collected at fairs open to all residents of the developments. Environmental data came from the Understanding Neighborhood Determinants of Overweight and Obesity in Kansas City (UNDO-KC) study, which included information on street connectivity (indicated by three or more streets intersecting at the same point) and the number and characteristics of physical activity resources (e.g., parks and trails, community centers, and sports fields, along with benches, drinking fountains, and other amenities) within 800 meters of the developments. UNDO-KC researchers also recorded the presence of a set of predefined “incivilities,” including litter, vandalized buildings, and graffiti, at these resources.

At the neighborhood level, fewer incivilities ( $p < .05$ ) and greater street connectivity ( $p < .01$ ) were significantly associated with more days walked per week, accounting for 83 percent of this variable’s variance in regression analysis ( $p < .001$ ). Greater connectivity was also significantly associated with meeting moderate physical activity guidelines ( $p < .01$ ), accounting for 90 percent of the variance in the percent of residents meeting these guidelines. Finally, having a greater share of free physical activity resources was positively and significantly associated with the number of days in which vigorous physical

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<sup>9</sup> Both figures fall short of the 10,000 steps per day recommended by the U.S. Centers for Disease Control and American College of Sports Medicine.

activity was performed in the past week ( $p < .05$ ) and predictive of 34 percent of the variance in days per week of vigorous physical activity among participating neighborhood residents.

**Kim, Janice J., Karen Huen, Sara Adams, Svetlana Smorodinsky, Abby Hoats, Brian Malig, Michael Lipsett, and Bart Ostro. 2008. Residential Traffic and Children's Respiratory Health. *Environmental Health Perspectives* 116(9): 1274-1279.**

This cross-sectional study used data from the East Bay Children's Respiratory Health Study and other sources to assess the relationship between exposure to traffic-related pollutants and respiratory health outcomes. The authors geo-coded the location of 1,080 children's homes in the San Francisco Bay Area and obtained information from parents on children's respiratory health, including current asthma (ever diagnosed by a physician with an episode in the past 12 months) and bronchitis symptoms in the past 12 months. Homes were then ranked in quintiles according to (a) maximum annual average daily traffic (AADT) within 150 meters, (b) closest annual average daily traffic within 150 meters, and (c) traffic density within 150 meters. The authors also measured the distance from each child's residence to the nearest freeway or highway.

Accounting for wind orientation and other factors, a comparison of the highest and lowest quintiles revealed a relationship between current asthma and traffic density and maximum AADT; that is, children with the highest levels of exposure to traffic-related pollutants were more likely to have asthma than children with the lowest levels of exposure. Researchers also found evidence for an association between current asthma or bronchitis symptoms in the previous 12 months and proximity to a highway or freeway among those who lived closest (at a distance of less than 75 meters).

**Krieger, James, Janice Rabkin, Denise Sharify, and Lin Song. 2009. High Point Walking for Health: Creating Built and Social Environments That Support Walking in a Public Housing Community. *American Journal of Public Health* 99(S3): S593- S599.**

This paper presented the findings of a comprehensive program designed to promote walking among residents of High Point, a culturally diverse mixed-income community developed by the Seattle Housing Authority and local developers. The High Point Walking for Health program was created and led by High Point residents, community-based organizations, Seattle Housing Authority staff, and other partners. Interventions within the program ranged from sponsoring walking groups and providing information about walking to improving pedestrian routes and advocating for pedestrian safety. Using a pretest-posttest design, researchers found that among 53 program participants, self-reported walking for exercise and errands increased from 65 to 109 minutes per day at the 3-month follow-up. More than 80 percent of participants reported engaging in moderate activity for at least 150 minutes per week, up from 62 percent at the start of the study. Self-reported general health improved among participants, as did social connectedness among residents, with the walking groups appearing to offer the greatest benefit to participants.

**Lindberg, Ruth A., Edmond D. Shenassa, Dolores Acevedo-Garcia, Susan J. Popkin, Andrés Villaveces, and Rebecca Morley. 2010. Housing Interventions at the Neighborhood Level and Health: A Review of the Evidence. *Journal of Public Health Management Practice* 16(5): S44-S52.**

The authors of this article assessed the research evidence for a relationship between health outcomes and neighborhood-level housing interventions, including tenant-based voucher assistance, mobility assistance, and zoning and land use policies. The Housing Choice Voucher Program was the only intervention for which the authors identified sufficient evidence of effectiveness in achieving improved health outcomes. Research cited in the article found that children in families that received a housing voucher were much more likely to be at a healthy weight than those in comparable families that did not receive housing assistance. The authors also noted that mobility assistance provided to voucher-holders could enable them to find housing in higher quality neighborhoods with low crime rates and access to healthy food.

Additionally, the authors found evidence of a relationship between health outcomes and mobility assistance, although they noted the need for additional field research to answer unresolved questions. For example, data from the Moving to Opportunity initiative, an experimental voucher and mobility program, indicated the experimental group, which received vouchers that could only be used in low-poverty neighborhoods, experienced dramatic reductions in adult obesity and improvements in perceived neighborhood safety. Adolescent girls (age 12-19) in the experimental group reported mental health improvements, including reductions in psychological distress, depression, and generalized anxiety disorder. Girls age 15-19 in the experimental group also had lower rates of smoking and marijuana use than other participants in the study. The authors of the article noted that additional research is needed to evaluate other health outcomes related to mobility assistance offered through the Moving to Opportunity program, including incidences of asthma, high blood pressure, and alcohol use.

**Popkin, Susan J. and Liza Getsinger. 2010. Tackling the Biggest Challenge: Intensive Case Management and CHA Residents' Health. *Supporting Vulnerable Public Housing Families Policy Brief #3*. Washington, DC: Urban Institute.**

This brief supplemented findings from the Urban Institute's ongoing HOPE VI Panel Study research with data on a subset of respondents who participated in the Chicago Family Case Management Demonstration. The demonstration program, offered by the Urban Institute, the Chicago Housing Authority (CHA), Heartland Human Care Services, and Housing Choice Partners, was intended in part to improve participants' mental and physical health and was underway from March 2007 to March 2010. Participation was limited to vulnerable residents of public housing (i.e., those with multiple, complex challenges including mental illness, substance abuse, and lease violations) and these individuals received intensive supportive services including case management, transitional jobs, financial literacy training, and relocation counseling. Services were supplemented by a partnership with a local hospital that provided visiting nurse services and periodic health screenings.

Outcomes relative to the larger CHA Panel Study sample were mixed. Researchers found that in contrast to the worsening health outcomes reported by the Panel Study sample, demonstration program participants' physical and mental health remained stable from baseline to follow-up. Anxiety levels among enrollees in the demonstration program declined by nearly 10 percentage points, improving as much or more than Panel Study respondents (although remaining higher overall), and in a shorter period of time. However, mental illness, substance abuse problems, and chronic illness and mortality rates remained extremely high among demonstration program and Panel Study participants alike. The authors concluded with four policy recommendations for the CHA, including providing on-site clinical mental health services for public housing residents and making those services accessible to voucher-holders.

**Popkin, Susan J., Diane K. Levy, and Larry Buron. 2009. Has HOPE VI Transformed Residents' Lives? New Evidence from the HOPE VI Panel Study. *Housing Studies* 24(4): 477-502.**

In this follow-up assessment of public housing residents affected by revitalization activities under the HOPE VI program researchers found strong improvements in respondents' sense of safety and fear of crime – both of which can cause stress and social isolation. Using data from the HOPE VI Panel Study, which tracked residents from five sites undergoing revitalization activities,<sup>10</sup> researchers found that improvements were greatest for those who moved to private rental units or new mixed-income housing developments, rather than remaining in the original development or moving to other public housing. Safe neighborhoods have led to more playing outside and fewer fights among children, better sleep habits, and less anxiety. While respondents who relocated with vouchers reported less worry and anxiety and had lower depression scores than respondents who remained in traditional public housing developments, voucher holders were more likely than public housing households to report problems paying for food (62 percent vs. 47 percent) and utility bills (45 percent vs. 8 percent). Finally, while relocation helped to reduce anxiety and depression, self-rated physical health did not improve and actually seemed to have deteriorated over time among respondents.

**Price, David J. and Susan J. Popkin. 2010. The Health Crisis for CHA Families. *CHA Families and the Plan for Transformation Policy Brief #5*. Washington, DC: Urban Institute.**

This brief summarized findings from a 2009 follow-up study of participants in the Chicago Housing Authority Panel Study, which tracked former residents of two Chicago public housing developments undergoing redevelopment under the federal HOPE VI program. With regard to residents' health outcomes, researchers found mixed results. While respondents lived in higher-quality homes and safer neighborhoods, their health continued to deteriorate from already-poor levels. A reduction in anxiety and worry represented the only exception to this trend, with 17 percent of 2009 respondents reporting anxiety episodes after relocation, compared with 28 percent at baseline in 2001.

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<sup>10</sup> Sites include Shore Park/Shore Terrace in Atlantic City, NJ; Ida B. Wells Homes/Wells Extension/Madden Park Homes in Chicago, IL; Few Gardens in Durham, NC; Easter Hill in Richmond, CA; and East Capitol Dwellings in Washington, DC.

**Roman, Caterina G. and Carly Knight. 2010. *An Examination of the Social and Physical Environment of Public Housing Residents in Two Chicago Developments in Transition*. Washington, DC: The Urban Institute.**

This descriptive study used data from the Chicago Family Case Management Demonstration to assess baseline social and physical conditions in 2007 for families in two Chicago public housing developments set to undergo redevelopment through the HOPE VI program. While the paper covered a wide range of variables, with regard to health, more than half the residents at both developments reported their health as “poor” or “fair.” Nearly three-quarters of respondents were overweight or obese, half had been diagnosed with hypertension, and about one-quarter had been diagnosed with asthma. Residents also reported high rates of anxiety, with 45-46 percent of residents indicating that they had “worried more than others in the last year,” and roughly one-third reporting they had felt “worried or anxious for a month or longer over the last year”. Other areas of inquiry included perceptions of neighborhood crime and disorder, social capital, and housing quality ratings.

**Roman, Caterina G., Carly R. Knight, Aaron Chalfin, and Susan J. Popkin. 2009. *The Relation of the Perceived Environment to Fear, Physical Activity, and Health in Public Housing Developments: Evidence from Chicago*. *Journal of Public Health Policy* 30: S286-S308.**

The authors of this report identified environmental and social factors that contribute to a fear of crime, and the impact of this fear on activity levels and health among residents of two Chicago public housing developments. Data were taken from a survey of 328 heads of household living in the developments as of March 2007, most of whom were female (82 percent) and all of whom were African American. Overall findings were mixed. Perceived violence (e.g., robberies or attacks, shootings, etc.) was directly related to fear of walking outdoors, although neighborhood disorder (e.g., loitering, selling or using drugs, gang presence) was not. While researchers found a marginally significant relationship between fear of walking outdoors and poor physical health – including self-rated health, physical functioning, and the presence or absence of chronic conditions – the data did not show a relationship between fear of walking outdoors and physical activity levels, suggesting that residents may not change their behavior in response to environmental conditions.

**Treuhart, Sarah and Allison Karpyn. 2010. *The Grocery Gap: Who Has Access to Healthy Food and Why It Matters*. Oakland, CA: PolicyLink and Philadelphia, PA: The Food Trust.**

The authors reviewed 132 studies to present existing evidence on disparities in access to healthy food in the U.S. Overall, they found that full-service grocery stores, farmers’ markets, and other sources of fresh, healthy food are less readily available in low-income communities of color and sparsely populated rural areas than in wealthier neighborhoods. Studies showed that access to fresh, healthy food is associated with healthier eating, and the absence of these outlets contributes to a higher risk of diet-related chronic diseases among underserved groups. The authors concluded with policy implications and recommendations for helping increase access to fresh food markets in “food deserts” that currently lack healthy alternatives.

**7. By alleviating crowding, affordable housing can reduce exposure to stressors and infectious disease, leading to improvements in physical and mental health.**

**Cardoso, Maria Regina Alves, Simon Nicholas Cousens, Luiz Fernando de Goes Siqueira, Fatima Maria Alves, and Luiz Antonio V. D'Angelo. 2004. Crowding: Risk Factor or Protective Factor for Lower Respiratory Disease in Young Children? *BMC Public Health* 4(19): 19-26.**

In this report, the authors used a case-control method to assess the association between residential crowding and lower respiratory diseases in children under 5 years old in Sao Paulo, Brazil. Four hundred and eleven children diagnosed with bronchitis, pneumonia, asthma, and other lower respiratory tract diseases by pediatricians in local hospitals were matched with 347 neighborhood children on the basis of age and other eligibility criteria. Field workers compared the residential conditions for a total of 313 pairs, including ventilation, household crowding, the presence of environmental contaminants, sanitation, and other factors. Findings showed that household crowding – as measured by the number of people sharing the child's bedroom – placed children at an increased risk of developing acute lower respiratory infection, possibly by increasing the opportunity for cross-infection among family members. Interestingly, however, the authors also found that crowding may protect against asthma by exposing children to infections at early ages.

**8. By allowing victims of domestic violence to escape abusive homes, affordable housing can lead to improvements in mental health and physical safety.**

**Barata, Paula C. and Donna E. Stewart. 2010. Searching for Housing as a Battered Woman: Does Discrimination Affect Reported Availability of a Rental Unit? *Psychology of Women Quarterly* 34: 43-55.**

This paper described the results of research undertaken to measure the extent to which landlords discriminate against women fleeing from an abusive partner. The research involved three phases. In the first two phases, a tester placed calls to landlords to inquire about the availability of rental units advertised in the *Toronto Star* newspaper. More than 180 prospective landlords answered the call and were presented with one of three scenarios: The caller either did not comment on her current accommodations, indicated that she was staying at a shelter for battered women, or said that she was currently staying with friends. In some calls she added that she had a young child. (Calls were randomized across all conditions.) The caller left a message for an additional 92 landlords, inquiring about available apartments and presenting the same three housing scenarios. In this phase, the caller did not mention children but asked the landlords to call her back at work. Of the 92 messages left, 62 landlords returned the call. Finally, an additional group of 31 landlords completed a brief open-ended survey measuring their willingness to rent an available apartment to a battered woman.

In the live caller phase, a caller who did not mention her current arrangements was nearly 10 times more likely to be told that a unit was available than a caller staying in a shelter. Regression analysis revealed that the presence of a young child made no difference in unit availability, and that callers who

stated that they were staying with friends were as likely to be told that a unit was available as those who did not mention their housing status. Interestingly, in the second phase of the study, where the landlord was asked to return a call at the caller's workplace, a tester who reported staying in a shelter was no less likely than one who did not mention her current arrangements to be told that a unit was available. Finally, in the survey, two-thirds of the 31 landlord respondents said they would rent to a battered woman, indicating that they were most concerned about a tenant's ability to pay the rent. However, four did not conclusively answer the question and seven responded that they would not rent to a battered woman, largely due to concerns about danger posed by the abusive partner.

**Holt, Stephanie, Helen Buckley, and Sadhbh Whelan. 2008. *The Impact of Exposure to Domestic Violence on Children and Young People: A Review of the Literature*. *Child Abuse & Neglect* 32: 797-810.**

This literature review assessed the evidence for connections between domestic violence and the development of emotional and behavioral problems in children and adolescents. Overall, research suggests both indirect and direct impacts from exposure to domestic violence in the home. Indirect impacts relate to the challenges of caring for a child during periods of stress and depression, and the effects of emotionally distant parenting behaviors on children, while direct impacts may be evident in children who exhibit psychosomatic problems related to extreme fear, with the severity and duration of the violence impacting the level of trauma experienced by the child. The authors also found that living in a household affected by domestic violence puts young people at increased risk of emotional, physical, and sexual abuse, but note that protective factors, including a strong relationship with a caring adult, can help to mitigate these impacts.

**Renzetti, Claire M. with Vivian M. Larkin. 2009. *Economic Stress and Domestic Violence*. Harrisburg, PA: National Online Resource Center on Violence Against Women.**

This paper reviewed research on the cyclical relationship between economic hardship and domestic violence. The findings indicate that financial status and risk of domestic violence are related, with the likelihood of abuse decreasing as a family's financial status increases.<sup>11</sup> Work outside the home provides financial and psychological resources for women coping with abuse, but may be jeopardized by an abusive partner and related physical and mental health problems, threatening women's financial stability and future employment prospects. The ability to rely on family and friends to escape an abusive situation can be negatively affected when these contacts in women's social support networks experience financial difficulties of their own.

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<sup>11</sup> The authors acknowledge that financially secure women may be less likely to rely on victims' services, which may result in some underreporting among higher-income families.

**9. Use of green building strategies reduces environmental pollutants, lowers monthly energy costs, and improves home comfort and indoor environmental quality.**

**Thomson, Hilary, Sian Thomas, Eva Sellstrom, and Mark Petticrew. 2009. The Health Impacts of Housing Improvement: A Systematic Review of Intervention Studies from 1887 to 2007. *American Journal of Public Health* 99(S3): S681-S692.**

This review presented findings from 40 studies published between 1887 and 2007 that address the many ways home improvements may impact health. The authors used relevant search terms to find and evaluate reports from 42 databases, and identified evidence for the impact of such improvements on general, respiratory, and mental health and illness or symptoms. In general, the studies assessed for this review found that housing improvements had a positive influence on health; most notably, improvements in home warmth and energy efficiency – including insulation and installation or upgrades to central heating systems – appeared to have the greatest potential for improving health outcomes. The authors did not include studies of modifications intended to remove or reduce exposure to lead, radon, or allergens, or other air quality improvements, nor did they look at reports related to modifications for medical reasons, accident prevention, or improved mobility among disabled residents.

**10. Affordable and accessible housing linked to supportive services enables older adults and others with mobility limitations to remain in their homes.**

**Donald, Ian P. 2009. Housing and Health Care for Older People. *Age and Ageing* 38: 364-367.**

In this paper, the author argued that geriatricians should develop familiarity with local housing options for older adults, noting that the availability of a suitable home environment impacts hospital discharge rates and patient outcomes. Following a brief review of the connections between housing conditions and health in the UK, the article described growing inequities regarding housing quality for poor households. Policy solutions described in the paper include creation of home improvement agencies to assist with home repairs and minor adaptations; establishment of a disabled facilities grant fund to provide financial support to people with disabilities; and adoption of Lifetime Homes Standards to ensure that new developments remain accessible as occupants age and experience mobility limitations.

**Rasmussen, David W., Isaac F. Megbolugbe, and Barbara A. Morgan. 1997. The Reverse Mortgage as an Asset Management Tool. *Housing Policy Debate* 8(1): 173-194.**

Addressing the queries of observers questioning the growth potential of the reverse mortgage market, the authors of this article identified nontraditional market segments and potential uses for this instrument. Among other uses, the authors discussed the reverse mortgage as a means to access equity to sustain home health care for a longer period of time. The mortgages can be used to finance home retrofitting and increase accessibility for disabled persons, or cover the cost of caregivers. Presumably, according to the authors, this resource allows the elderly to maintain a better quality of care than

available through Medicaid. Moreover, reverse mortgages can make private long-term care insurance more affordable, allowing beneficiaries more flexibility in their long-term care.

**Smith, Stanley K., Stefan Rayer, and Eleanor A. Smith. 2008. Aging and Disability: Implications for the Housing Industry and Housing Policy in the United States. *Journal of the American Planning Association* 74(3): 289-306.**

The authors of this paper presented projections for (a) the number of households that will have at least one person with long-term mobility impairment who needs accessible housing, and (b) the likelihood that a single-family home built in 2000 will house a resident with long-term mobility impairment over its lifecycle. The projections, which are extended from 2000 to 2050, rely on current demographic and disability data from the U.S. Census Bureau's Public Use Microdata Sample.

In a scenario that holds disability rates constant over time, the number of people with physical and self-care limitations (i.e., long-lasting conditions that limit one's ability to engage in physical activities and make it difficult to dress, bathe, or get around inside the home) was expected to double between 2000 and 2050, with 21 percent of households having a member with a physical limitation and 7 percent having a member with a self-care limitation in 2050. Similarly, the authors calculated a 60 percent likelihood that a new home built in 2000 will house a resident with physical limitations and a 25 percent likelihood that it will house an individual with self-care limitations (assuming that all homes have an equal likelihood of being occupied by a household with at least one member who has a physical limitation). They projected an even greater likelihood that homeowners will have a visitor with physical limitations, suggesting a growing need for accessibility features in new and existing homes.