TO
US Research and Measurement Team, Habitat for Humanity International

FROM
Project Evident

DATE
2020

LITERATURE REVIEW

Effects of Affordable Homeownership and Home Repairs on Key Outcomes

In partnership with

PROJECT EVIDENT

Literature Review

Potential Outcomes Associated with Affordable Homeownership and Home Repairs

Final

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Introduction

This literature review is designed to inform the measurement framework and research agenda for Habitat for Humanity International (HFHI) US Programs, with the aim of understanding how to prioritize research topics and relevant approaches, and develop knowledge products on selected topics that are relevant to HFHI's mission. Consistent with these purposes, this strategic review surveys a wide range of topics related to HFHI's work, with a particular focus on exploring pathways through which the affordable homeownership and home repairs achieved through the work of HFHI affiliates may affect the well-being of individuals, families and communities. These topics were identified in partnership with the US Research and Measurement team primarily through a consultative process with advisory groups composed of 1) Habitat Affiliates and State Support Organizations and 2) HFHI stakeholders to determine the most salient research topics. The topics were also informed by the draft logic models for three of HFHI's main program areas: Home Construction, Home Repairs and Housing Plus. Those logic models were developed in a consultative process with the same advisory teams.

The review is divided into the following sections:

1. **Who has access to homeownership?**: This section describes trends in homeownership over time and documents differences by race, ethnicity, age, and income. It also discusses barriers to homeownership and trends in foreclosure rates over time.

2. **The asset-building potential of homeownership**: This section analyzes the extent to which homeownership helps people of different incomes, races and ethnicities to build and transfer wealth to future generations. It also examines the asset-building potential of shared equity homeownership, an alternative model of affordable homeownership.

3. **The potential health effects of affordable housing, home repair, and residential stability**: This section examines a range of hypotheses on how affordable homeownership and home repairs may influence health outcomes. The examined pathways include increases in residual income, improved housing quality, and reductions in housing instability. This section also reviews data on the extent of the need for home repair.

4. **The potential effects of homeownership on educational outcomes**: This section examines a range of hypotheses on how affordable homeownership may influence children's educational outcomes. The examined pathways include improvements in residential stability, increased access to neighborhoods with stronger schools, reductions in crowding, and improvements in health outcomes that increase attendance and/or influence cognitive functioning.

5. **The potential of homeownership to contribute to social and community development outcomes**: This section examines the evidence on how homeownership may influence social and political participation, neighborhood perceptions, and social capital. It also explores the potential role of concentrated investments in homeownership to contribute to positive community development outcomes.

6. **The potential environmental benefits of homeownership and home repairs**: Among other pathways, this section focuses on the potential for energy-efficiency home repairs to reduce energy use, utility costs, and greenhouse gas emissions. It also examines the role of a home's location in influencing these outcomes.

The papers included in the review were identified through an iterative process starting with systematic reviews related to the key topics above identified by our subject matter expert at Abt Associates. Each systematic review provided a list of relevant research that we reviewed separately, including published academic articles, working papers, and case studies that offered evidence and methodology particularly relevant to Habitat's work in affordable home construction and home repairs. In addition, we conducted a search of more recently published papers where appropriate. The review focused primarily on peer-reviewed articles and other articles by well-regarded researchers, and substantiated any claims not covered by academic research with case studies and, in rare instances, blogs authored by subject matter experts. Detailed study design methodology for the academic articles referenced in the review are included in the corresponding summary table.

The literature review is a joint project of Project Evident and Abt Associates. Project Evident staff contributed to this review are Kevin Rafter, Matt Hillard, and Ratna Sinroja. This review has also benefited from the subject matter expertise of Jeffrey Lubell, Director of Housing and Community Initiatives at Abt Associates and feedback on an earlier draft by Abt Fellow Jill Khadduri. Simone Boyce, with support by other members of the U.S Research and Measurement team (Sam Azar, Korinne Chiu, Melissa Rivera, and Laura Stram), provided substantial guidance on drafts of this review that increased its relevance to Habitat's work and important research and learning questions for the organization.

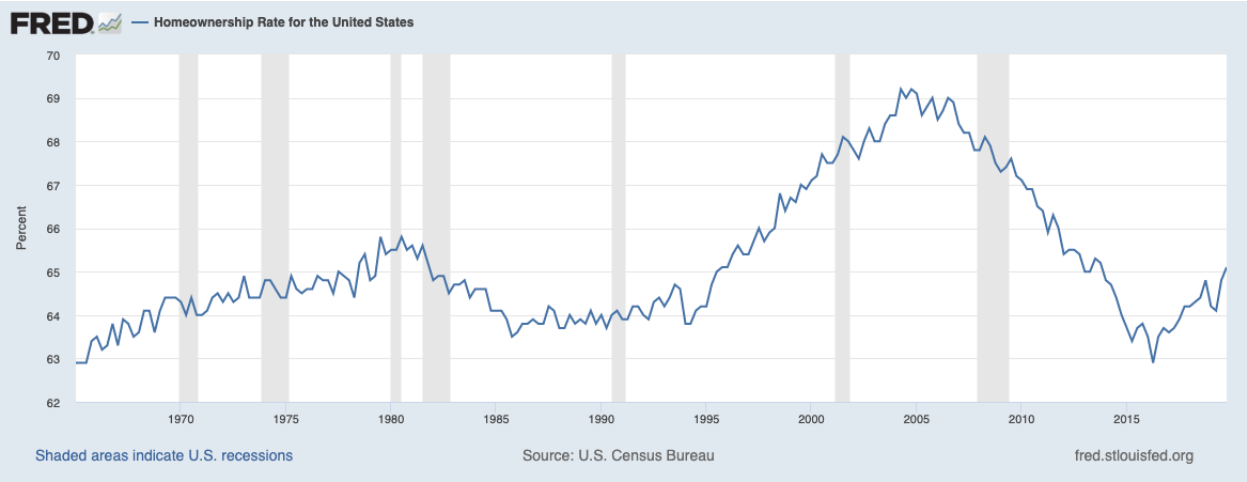
Who has access to homeownership?

Much of the reviewed literature on affordable homeownership has focused on the barriers faced by racial and ethnic minorities in becoming homeowners and in sustaining homeownership during economic downturns such as the Great Recession. Homeownership rates vary by race/ethnicity, and while black and Hispanic households represent a growing share of the U.S. population, these groups also have lower homeownership rates than white and Asian households, and also experienced greater rates of foreclosure during the financial crisis.

Homeownership Rates and Trends

Figure 1.1 displays the homeownership rate by quarter as the proportion of households that are owner-occupied from 1965 through 2020 (the latest year that data was available). After increasing only modestly for 30 years, between the first quarter of 1994 and the fourth quarter of 2004, the U.S. homeownership rate increased rapidly from 63.8% to 69.2% (U.S. Census Bureau, 2020a). The figure illustrates the impact of the Great Recession on homeownership - between the fourth quarter of 2006 and the second quarter of 2016, the homeownership rate fell rapidly, bottoming out at 62.9% in Q2 of 2016 (U.S. Census Bureau, 2020a). Since then, the homeownership rate has recovered somewhat, reaching 65.3% in the first quarter of 2020, although it remains to be seen how this rate will be affected by COVID-19.

Figure 1.1: Homeownership Rate for the United States



Source: U.S. Census Bureau via Federal Reserve Bank of St. Louis

In an analysis of homeownership trends, Spader, McCue, and Herbert (2016) hypothesize that the dramatic fall in the homeownership rate that began in 2006 was due primarily to five factors associated with the Great Recession[1]:

1. Stagnant incomes;
2. Rising student loan debt;
3. Delayed marriage and child bearing;
4. The sharp fall in home values; and
5. The enormous wave of foreclosures.

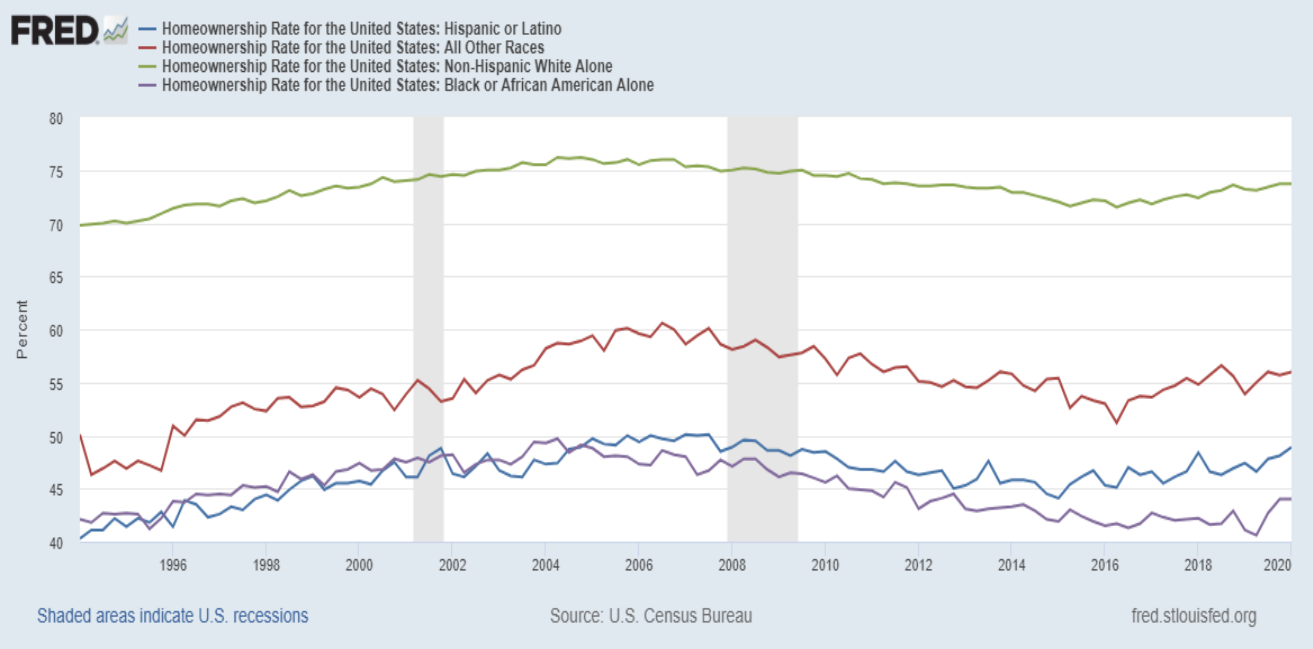
Goodman et al. (2017) focus as well on another factor – the tighter lending standards adopted by lenders in the wake of the Great Recession. Their analysis points to a considerable increase in median credit scores of new purchase mortgage originations in the postcrisis period, which suggests that lenders increased their credit requirements for new mortgages, limiting access for buyers with poorer credit histories.

Figure 1.2 (from the Federal Reserve Bank of St. Louis) displays homeownership rates in the United States by race /ethnicity between 1994 and 2020 based on data from the U.S Census Bureau[2]. As shown here, **the homeownership rate of black and Hispanic households was well below that of whites and Asian/other households throughout the period**. The rise and fall of homeownership rates can be seen for each of the racial/ethnic groups, but the net change over time differs somewhat by group. Black households in particular stand out for having a lower homeownership rate in 2020 than they did in 2005.

[1] It will be important for HFHI to consider these factors in light of the more recent economic recession associated with COVD-19, with particular emphasis on the additional consequence of historic levels of unemployment.

[2] The data from these charts are available for download from https://fred.stlouisfed.org/.

Figure 1.2: Homeownership Rates by Race and Ethnicity, 2015-2020[3]



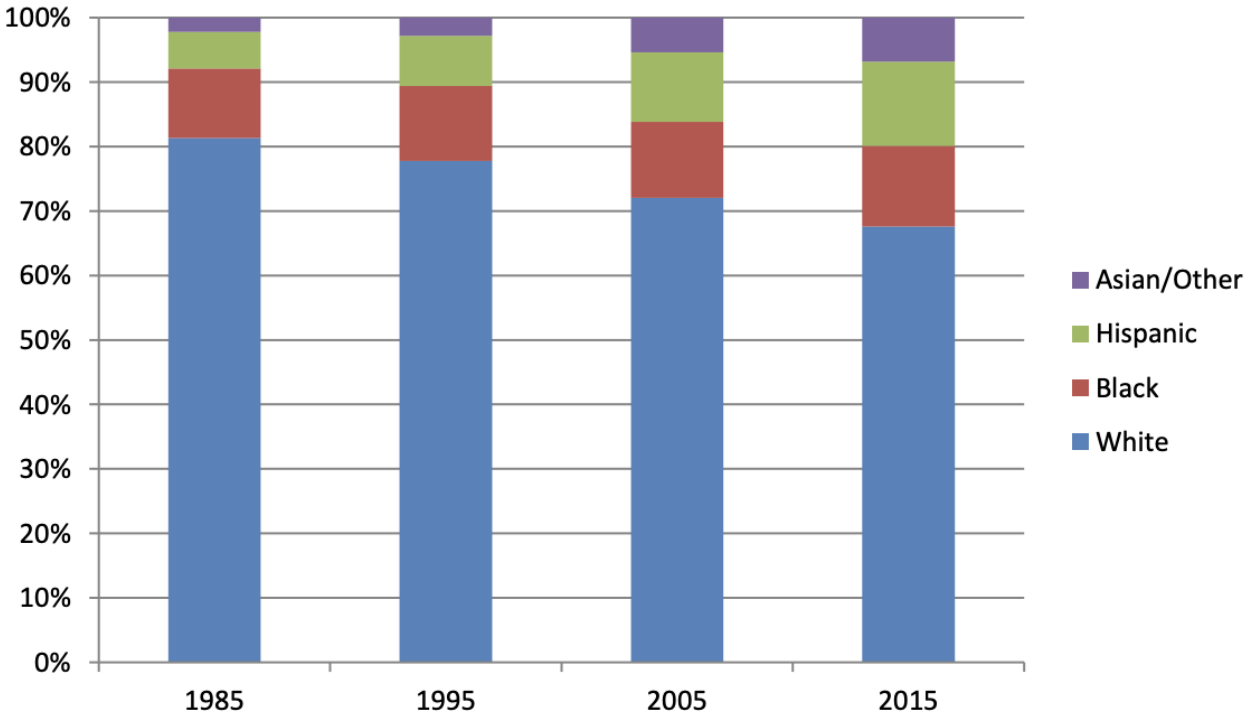
Source: Federal Reserve Bank of St. Louis (link)

One of the reasons why homeownership varies by race/ethnicity is that income and education levels also vary by race/ethnicity. However, **differences in income and education only explain part of the homeownership gap** (Choi et al., 2019) (Choi et al., 2018) (Acolin et al., 2018) (Becketti and Atreya 2017). Homeownership rates also vary by age and differences in age distribution account for a small additional percentage of the racial/ethnic homeownership gap (see section 3.3.1, Herbert et al., 2005). Most of the remaining gap cannot be explained by demographic factors and could potentially represent a number of factors, such as the inequitable distribution of wealth, the residual effects of discriminatory policies, and other racial and ethnic inequities (Choi et al., 2018).

In addition to having lower homeownership rates, black and Hispanic households represent a growing share of the U.S. population. As shown in **Figure 1.3** (from Spader and Herbert, 2016), between 1985 and 2015, the share of white non-Hispanic households declined by about 13 percentage points while the share of black, Hispanic, and Asian households increased (Spader and Herbert, 2016).

[3] 'Black Alone' or 'White Alone' refer to people who reported Black or White and did not report any other race category. 'All Other Races' includes people who reported Asian, Native Hawaiian or Other Pacific Islander, or American Indian or Alaska Native regardless of whether they reported any other race, as well as all other combinations of two or more races.

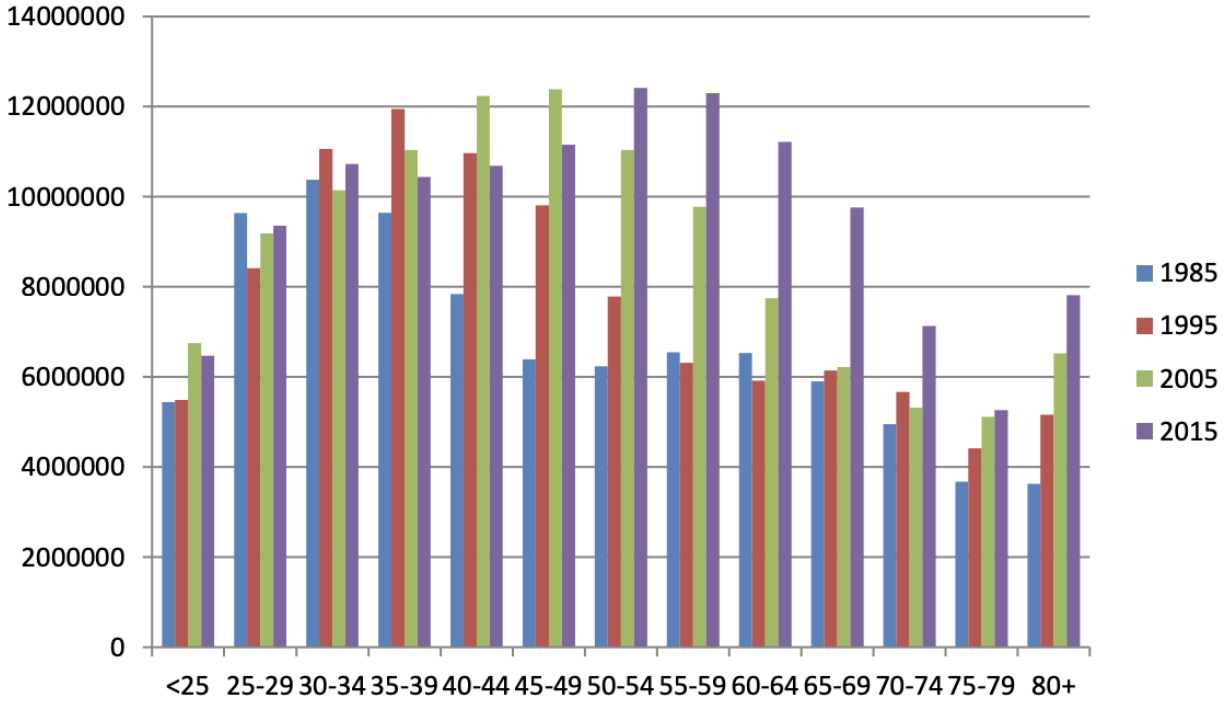
Figure 1.3: Share of Households by Race and Ethnicity



Source: Spader and Herbert, 2016

Figure 1.4 displays trends in homeownership rates by age. As the figures highlight, the aging of the baby boomer population has increased the number of households in older age cohorts (Spader and Herbert, 2016). Because homeownership rates tend to rise with age – rising steadily by age until a peak among household heads aged 70-74 – this has had the effect of boosting homeownership rates above what they would have been had the age distribution remained constant. (Historical data on homeownership by age are available here: https://www.census.gov/housing/hvs/files/annual19/ann19t_17.xlsx)

Figure 1.4: Number of Households by Age Group

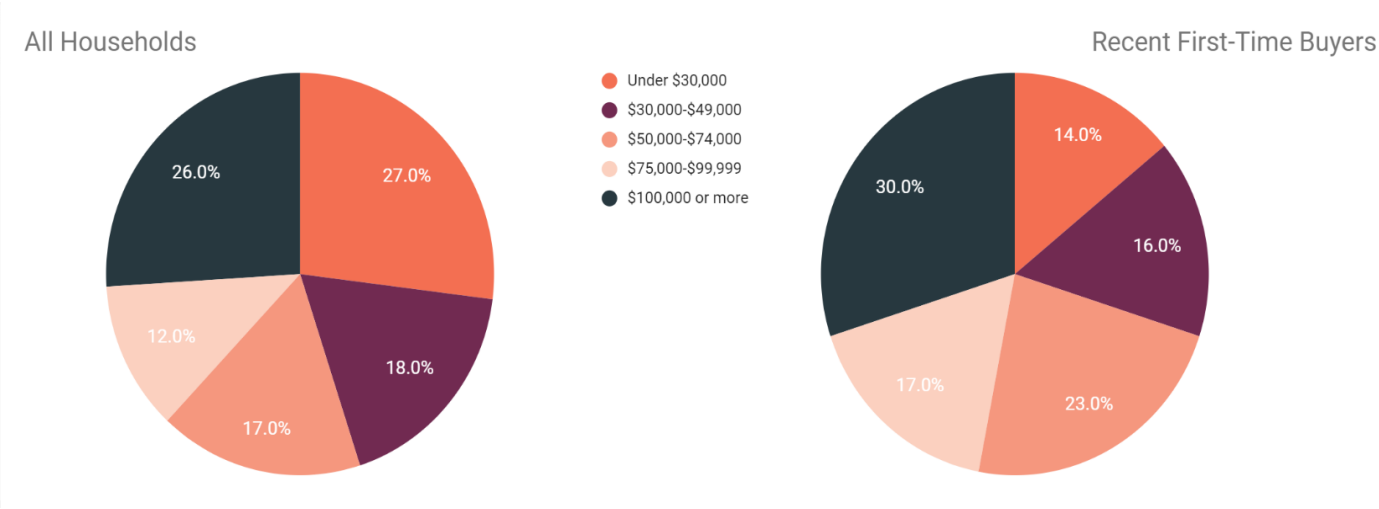


Source: Spader and Herbert, 2016

In addition to trends in homeownership rates, the literature also investigates the profile of first-time homebuyers. Rieger et al. (2019) focus on the first-time home buying rate, which is the ratio of the number of first-time home purchases in the past year to the total number of households. While the Census Bureau and figures shown above display the homeownership rate for all households, Rieger et al. (2019) analyzed data from the biennial American Housing Survey to find that **the ratio of the number of first-time home purchases to the total number of households in 2017 was highest among households headed by an individual who is Asian/Other (2.3%), followed by Hispanics (1.5%), whites (1.5%) and African Americans (1.0%)**.

As **Figure 1.5** displays, first-time buyers tend to be wealthier and low-income households are underrepresented among first-time buyers (Rieger et al. 2019).

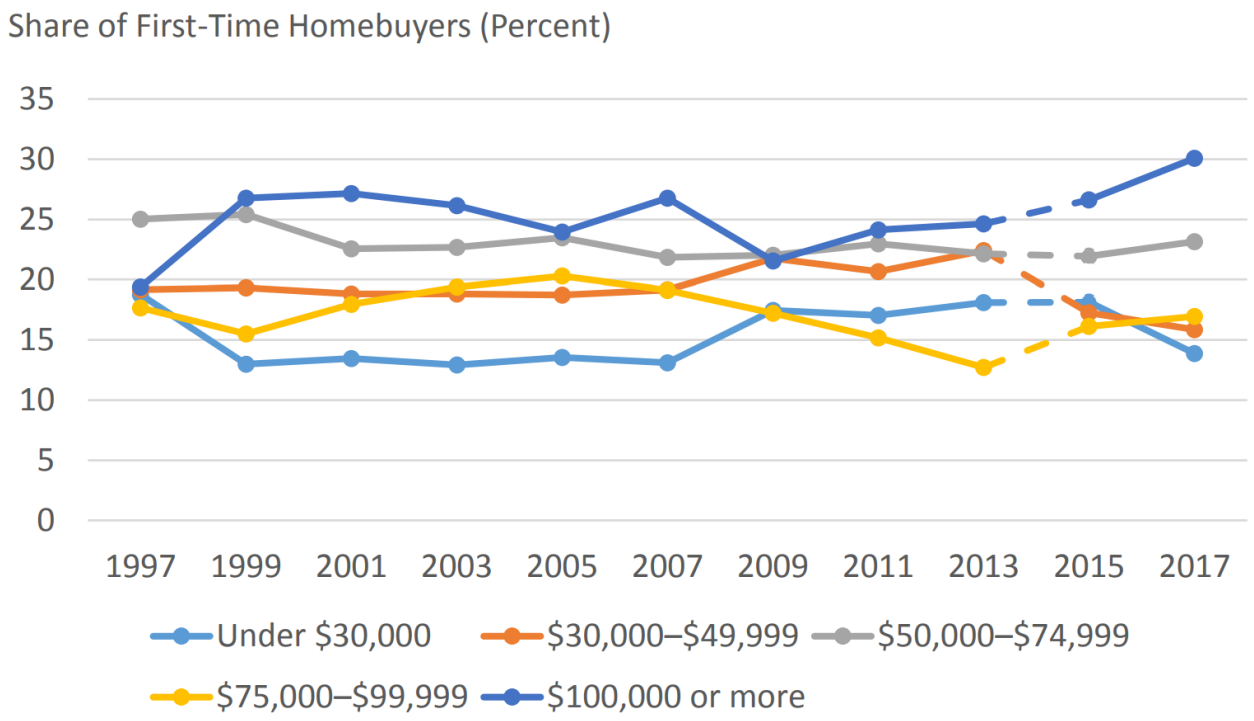
Figure 1.5: Household Income Among First-Time Homebuyers (2017)



Source: Rieger et al. 2019

Figure 1.6 shows the proportion of first-time homebuyers by income group from 1997 to 2017. The data suggests no clear trend, with the possible exception of a compression of the income distribution during the recession years from 2009 to 2013, with fewer first-time homebuyers appearing in both the lowest- and highest-income categories. Additionally, point in time data from 1997 and 2017 highlight that the share of first-time homebuyers declined for all income categories but the highest. It is notable, however, that throughout the period, there were measurable shares of first-time homebuyers in each of the income categories analyzed.

Figure 1.6: Household Income of First-Time Homebuyers by Year



Source: Rieger et al. 2019

Note: The dashed line between 2013-2015 corresponds to an AHS survey re-design and re-drawing of a new sample, which could influence changes observed between 2013 and 2015.

Barriers to Homeownership Among Low- or No-Credit Homebuyers with Limited Down Payment Savings

As discussed above, **a key factor affecting the declining homeownership rate between 2006 and 2016 were the tightened lending standards adopted in the wake of the 2008 recession** (Goodman et al. 2018). Rising home prices following the rebound of the housing market also played a role. Additionally, mortgage interest rates affect affordability. While interest rates did not change much in the 10-year period, historically they have varied. If interest rates were to rise appreciably, home affordability would be significantly reduced. These challenges are especially difficult for low-to-median-income borrowers and potential first-time borrowers that face a greater challenge saving for a down payment and pay a higher percentage of their income on mortgage payments.(Goodman et al. 2018).

The 2019 Consumer Financial Literacy Survey, conducted online by Harris Poll in March 2019 among 2,086 U.S. adults ages 18 and older, shows that one out of every two American adults face increasing barriers to homeownership. Specifically, 18% cited “rising home prices”, 14% mentioned “lack of funding for down payment / or closing costs”, 13% identified both “existing debt” and “limited options within my budget”, and 11% noted “poor credit history” (NFCC Consumer Financial Literacy, 2019).

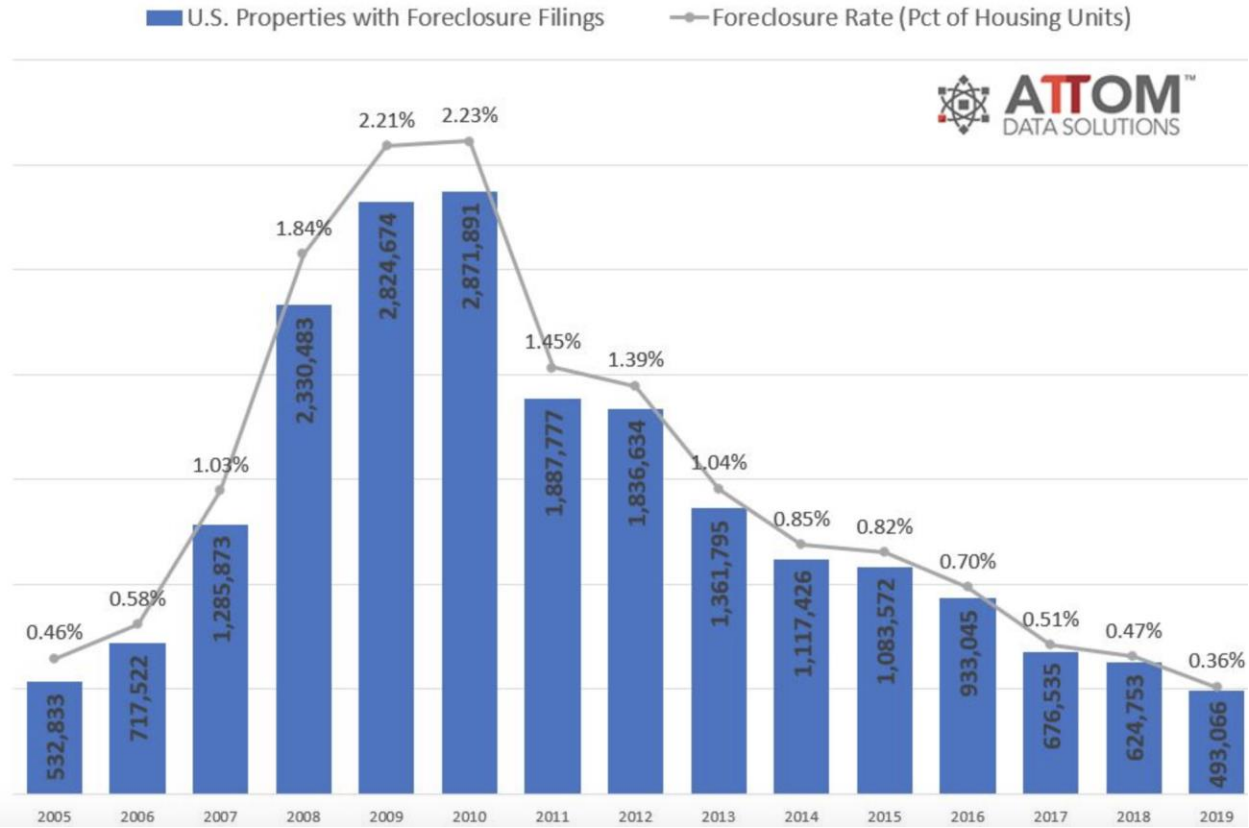
Importantly, of those who have reported encountering obstacles on the road to homeownership, 66% identified as black/African American, and 54% identified as Hispanic, compared to 44% that identified as white.

Foreclosures

As discussed in the housing and health section of this literature review, foreclosures can have severe adverse impacts on individuals’ health. Foreclosures also have obvious negative impacts on households’ asset accumulation. Foreclosures thus represent an important risk associated with homeownership. During the foreclosure crisis associated with the Great Recession, foreclosures affected a large share of homeowners. **According to RealtyTrac[4], a total of 2.8 million properties had foreclosure filings during 2009, or 1 out of every 45 residences. That foreclosure rate was 21% higher than in 2008 and 120% higher than in 2007**. Foreclosure filings peaked in 2010, at nearly 2.9 million filings, before dropping dramatically each year after, from a little under 1.9 million in 2011 to just under 500,000 in 2019 (See **Figure 1.7**).

[4] Founded in 1996, RealtyTrac® is a leading mobile and online real estate resource that provides comprehensive foreclosure and housing data for home buyers and investors looking to purchase distressed real estate. RealtyTrac provides all types of foreclosure listings (pre-foreclosure, auction, bank-owned) as well as current for sale and recently sold properties in 2,200 counties across the nation. RealtyTrac also supplements property profiles with extensive background on surrounding communities, including their schools, crime statistics, environmental features, and other factors of vital interest to home buyers and real estate professionals.

Figure 1.7: U.S. Historical Foreclosure Activity and Rates



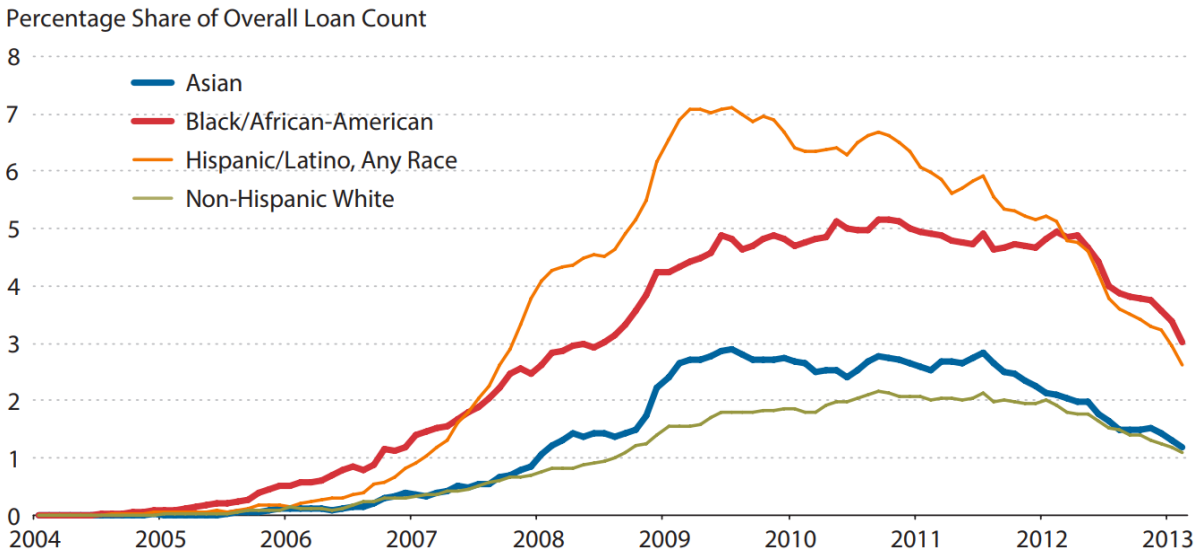
Source: RealtyTrac

Recent research by Bayer et al. (2016) suggests that mortgage delinquency and foreclosure during the financial crisis was higher among Black and Hispanic borrowers, even when detailed borrower and loan risk factors were considered, including loan characteristics, credit scores, demographics, house type, neighborhood, and lender. Collectively, these results imply that the relatively poor mortgage outcomes for minority borrowers are not simply a function of greater participation in the subprime sector or greater exposure to neighborhood housing price declines or unemployment rates. Instead, African Americans and Hispanic borrowers appear to be much more vulnerable to changes in market employment rates, declines in housing prices and having originally high debt-expense-to-income ratios.

In addition, data analyzed from a dataset matching McDash loans and confidential Home Mortgage Disclosure Act (HMDA) datasets, comprising over 89 million loans originated between 1992 and 2014, show that **foreclosure rates were far greater for Black and Hispanic borrowers than White and Asian borrowers** (see **Figure 1.8**) (Garriga et al., 2017). Due to these high rates of foreclosure, **during the financial crisis, all homeownership gains among Black families from 1994-2006 were erased between 2006-2015, while approximately half of the gains were undone for Hispanics and Asians** (see **Figure 1.9**).

Results from regression analyses suggest that underwriting standards and loan structure explain a significant amount of the greater likelihood of foreclosure among Black and Hispanic borrowers. Underwriting standards explained more of the gap for Black borrowers, while loan structure was a stronger factor among Hispanic borrowers. Geographical factors also played an important part, particularly for Hispanic borrowers. Even after these factors were considered, however, the foreclosure rates of Black and Hispanic borrowers were higher than for white borrowers, suggesting additional forces may also have contributed.

Figure 1.8: Foreclosure Rate by Race and Ethnicity, 2004-2013



SOURCE: McDash data from Black Knight Financial Services, HMDA data from Board of Governors of the Federal Reserve System.

Source: Garriga et al., 2017

Figure 1.9: Homeownership Rates by Race and Ethnicity

	Percent				
Race	1994	2006	2015	Change (1994-2006)	Change (2006-15)
Non-Hispanic White	70.0	75.9	71.9	5.9	–3.9
Black	42.3	47.8	42.3	5.5	–5.5
Hispanic, of any race	41.2	49.7	45.6	8.5	–4.1
Asian and other	47.7	59.9	53.8	12.2	–6.1

SOURCE: U.S. Census Bureau.

Source: Garriga et al., 2017

While detrimental to a household, **foreclosures also impact the immediate neighborhood and surrounding municipality**. Kinglsey, Smith, and Price (2009) reviewed available research and other sources to assess how much is known about the way foreclosures impact families and communities. Their findings highlight three major types of impacts on neighborhoods and communities:

1. Declining property values and physical deterioration;
2. Crime, social disorder, and population turnover; and
3. Local government fiscal stress and deterioration of services.

The authors emphasize that within each of the categories the extent of the impacts can vary dramatically across different neighborhoods and cities. For example, in some cases, where there are only a few foreclosures and steps are taken to minimize the time the properties stand vacant, impacts may be slight. In contrast, where the number of foreclosures is sizable in a compact area, there may be strong secondary effects on nearby properties and the impact on the neighborhood as a whole can be dramatic.

Based on an analysis of mortgage banking industry data from McDash Analytics combined with concentrations of foreclosure , delinquency, and vacancy rates in major metropolitan areas, rising foreclosures during the financial crisis in all types of markets demonstrated these neighborhood impacts, exacerbating underlying problems of vacancy and abandonment, diminishing area property values, destabilizing neighborhood economic and social conditions, and eroding state and local fiscal capacity to address these problems (Mallach, 2009). It stands to reason, then, that researchers, policymakers, and advocates are particularly interested in alternative housing models that might reduce these rates of foreclosure, specifically for low-income households that are more susceptible to foreclosure (Immergluck 2009).

There is evidence from the foreclosure crisis of the mid-2000s that foreclosure rates were lower among borrowers with safer and more affordable mortgages. For example, a study of the Community Advantage Program (CAP), a mortgage initiative that has provided nearly 50,000 low- and moderate-income and minority homeowners with low down payment and affordable mortgages, focused on identifying specific lending practices that enable and inhibit successful homeownership. Using these data, the UNC Center for Community Capital investigated the experience of 46,000 low- and moderate-income and minority homeowners since 2003, and found that homeownership expanded over a 10-year period without introducing excessive risk to households and lenders. **At the height of the subprime crisis in the fourth quarter of 2009, CAP loans had a default rate of 9.6%, compared with 47.7% for subprime adjustable-rate mortgages and 22.1% for subprime fixed-rate mortgages**. The research suggests that homeownership has proven a solid investment for CAP borrowers over the long-term. The equity of CAP homes purchased between 1999 and 2003 appreciated at a median annualized rate of 25 percent by the second quarter of 2013, leading to a median increase in equity of $18,429 (Center for Community Capital, 2014).

Similarly, in one of the few analyses of foreclosure rates in alternative housing models, research on Community Land Trusts[5] (CLTs) found delinquencies and foreclosures to be far lower among the owners of CLT homes than the owners of unrestricted, market-rate homes during the market downturn of 2007 - 2009 (Thaden and Rosenberg, 2010). While the Mortgage Bankers Association (MBA) reported that 30.6% of subprime loans and 7.0% of prime loans were "Seriously Delinquent" in 2009, only 1.6% of CLT loans were. Additionally, 15.6% of the MBA-reported subprime loans and 3.3% of prime loans were in foreclosure in 2009, compared to just 0.56% of CLT loans (Thaden and Rosenberg, 2010).

[5] CLTs share many features with Habitat programming. They are nonprofit organizations that utilize public and private funds to provide affordable home ownership opportunities for low-income households (usually those with gross incomes less than 80% of the area median income). Traditionally, CLTs purchase and retain title to the land under detached homes, attached townhouses or multi-unit condos. They then lease the land to residents who purchase and hold a deed to their individual homes. CLTs provide homeowners with pre-purchase and post-purchase stewardship services to protect them from high-cost or predatory mortgage lending. They also sometimes intervene to cure delinquencies and prevent foreclosures. In exchange, homeowners accept limitations on the resale price and the equity they may remove from their homes.

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The effects of homeownership on asset-building and wealth

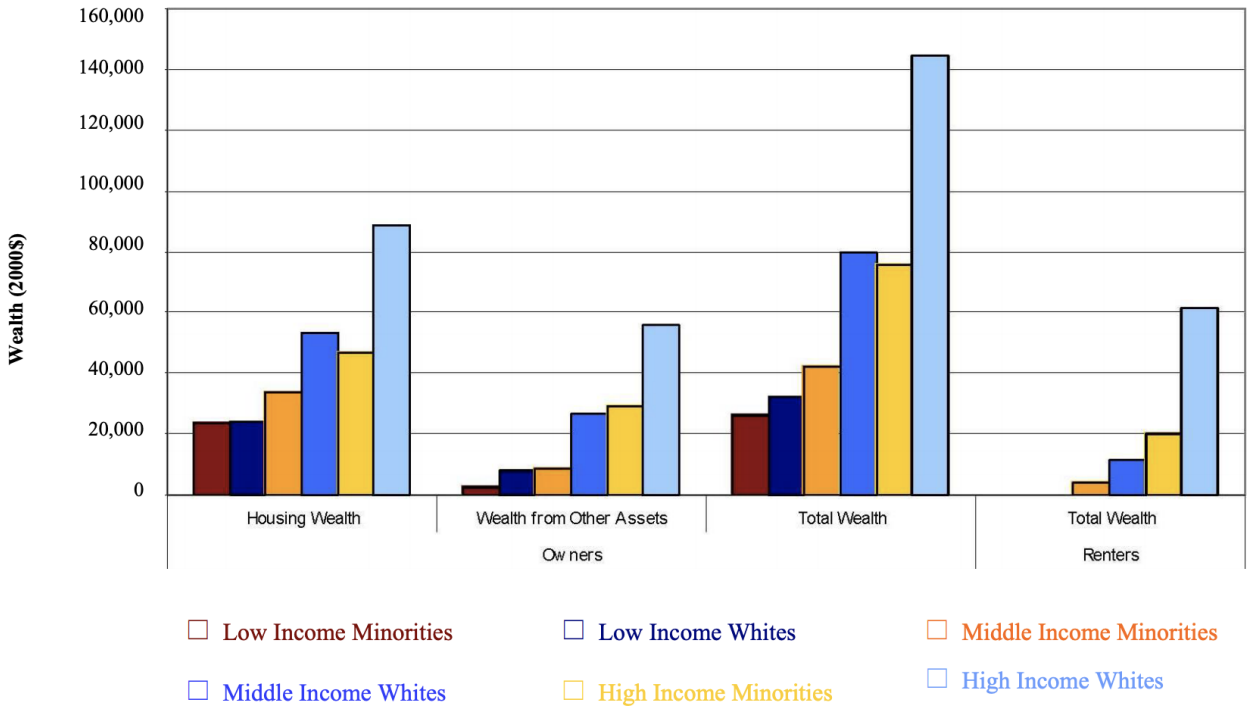
Homeownership is a particularly important source of wealth for low-income homeowners, yet there are significant disparities in the financial return of homeownership by income, race/ethnicity, and gender. This section includes a discussion of the value of shared equity homeownership programs as an increasing number of Habitat affiliates are experimenting with alternative forms of affordable housing financing.

Effects of homeownership on household asset-building, by income, gender and by race/ethnicity

Based on the Survey of Income and Program Participation (SIPP), a nationally representative panel survey administered by the Census Bureau, home equity accounted for the largest portion of net worth of US households in 2016 (the latest year data was available), at 34.5%[6](Eggleston, 2019). Homeownership is a particularly important source of wealth for low-income homeowners. **Home equity contributes a much larger share (at 81%) of net wealth among the typical homeowner in the lowest income quartile, compared with just under a quarter (24%) among those in the highest quartile** (Joint Center for Housing Studies, 2015). In addition, **home equity also represents a larger share of the net worth of the typical black or Hispanic homeowner (58%) than of the typical white homeowner (37%)** (Joint Center for Housing Studies, 2015). While these statistics focus on low-income homeowners specifically, rather than all low-income households, low-income renters generally have little or no wealth (Reid, 2005). As **Figure 2.1** demonstrates, overall, homeowners are wealthier than renters and, in addition to wealth wrapped up in owning a house, low-income homeowners had higher non-housing wealth than their renter counterparts.

[6] For context, the next largest portion of net wealth is from retirement accounts, at 28.6%

Figure 2.1: Differences in Household Wealth, Renters Versus Owners, 1994



Source: Reid, 2005

This point is strengthened by analysis of more recent data from the Survey of Consumer Finances by Thompson and Suarez (2015) that sought to extend the literature on the contribution of observable factors (which included homeownership, among others) to the racial wealth gap. The authors used regression analysis that controlled for demographic, education, real estate, labor force parameters and also had separate controls for earnings, income, home ownership status, and stock ownership. The results show that "[the] average net worth for homeowners is more than 400 percent higher as compared to those not owning homes, conditional on all of the other factors being controlled."

Given the importance of home equity to a household's ability to grow wealth, it is useful to consider the factors that determine the extent to which a household can build equity. In a paper focused on the financial returns to homeownership utilizing regression analysis based on the 1997-2013 American Housing Survey, Herbert et al. (2019) identify five primary factors that influence a household's ability to build home equity:

1. The rate of home appreciation in the neighborhood where the home is located;
2. The duration and timing of the homeownership tenure;
3. The terms of the financing used to purchase the home;
4. Whether home equity is tapped over time;
5. Whether the home is adequately maintained.

Below we focus on research related to the first three factors which are particularly relevant to Habitat's home construction work.

Much of the research on the asset-building potential of low-income homeownership has focused primarily on the first factor: that low-income households generally, and minority households specifically, are more likely to purchase homes in neighborhoods that are likely to experience limited or even negative home appreciation (Herbert et al., 2019). For example, a study conducted by the Brookings Institution indicates that **in neighborhoods where African Americans represent the majority of the population, homes are valued at about half the price of homes in neighborhoods where there are no African American residents (Perry et al., 2018).** Differences in home and neighborhood quality do not fully explain this devaluation. **Homes of similar quality in neighborhoods with similar amenities are worth 23 percent less in majority black neighborhoods, compared to those with very few or no black residents**.

While acknowledging that low-income and minority households tend to purchase homes in places where home price appreciation is limited, Herbert and his co-authors argue that analyses that focus solely on house price appreciation miss a significant portion of the total financial return, particularly in low priced markets. Building upon work by Eisfeldt and Demers (2015), the authors highlight the importance of imputed rental income from residing in a property.

Imputed rental income is the difference between the rental value of the home and the costs of owning (i.e paying the mortgage, property taxes, insurance, and maintenance). Since a standard mortgage payment is largely fixed over time (and so declines in real terms in light of inflation), there is a substantial difference between the monthly costs of owning a home and what a household would instead have to pay in rent (which generally rises over time). Focusing only on metro areas, Herbert et al. (2019) include a robust estimate[7] of imputed rental income to calculate the total financial return of homeownership. The results tell an interesting story: for homeowners of lower valued homes and in lower priced metro areas who purchased a home between 1997 and 2013, imputed rents represent a more significant portion of the financial returns to homeownership. Additionally, looking across categories of homebuyers, the highest returns were realized by Hispanics (11.1%) and African Americans (9.4%), while Asians (4.4%) and whites (6.8%) realized the lowest returns. There was not a clear pattern to returns by household income. Thus, **imputed rent is an important component of the overall returns to homeownership, particularly when calculating the returns to homeownership for lower-income households, and for Hispanic and African-American households**.

[7] To estimate the imputed rental income, the authors compute the likely monthly rent of the owner-occupied unit that renters would be willing to pay if the unit were in the rental market, using hedonic price analysis for the renter-occupied units in a local housing market (i.e. Metropolitan Statistical Area) and applying estimated coefficients to the owner-occupied units within the same local housing market to predict the would-be rents

With respect to the duration and timing of the homeownership tenure (factor #2), Herbert and his co-authors find that the estimated financial returns of homeownership are highly dependent on the timing of the homeownership in the cycle of housing values rather than length of tenure. Returns were highest for homeowners who purchased in the late 1990s/early 2000s and fell sharply for owners who purchased between 2003 and 2005. Coinciding with the housing crisis, estimated financial returns are negative for all homeownership spells between 2007 and 2013[8]. **Despite the impact of the housing crisis, those that managed to weather the downturn and hold onto their homes still had a positive financial return, demonstrating that asset-building for homeowners can still be positive even when home prices decline significantly. The research shows that sustaining homeownership over time is a key variable affecting the ability of homeowners to benefit from asset growth[9]**. Other sections of this literature review discuss the loss of equity by minority and low-income homeowners during the Great Recession when those populations were not able to sustain homeownership.

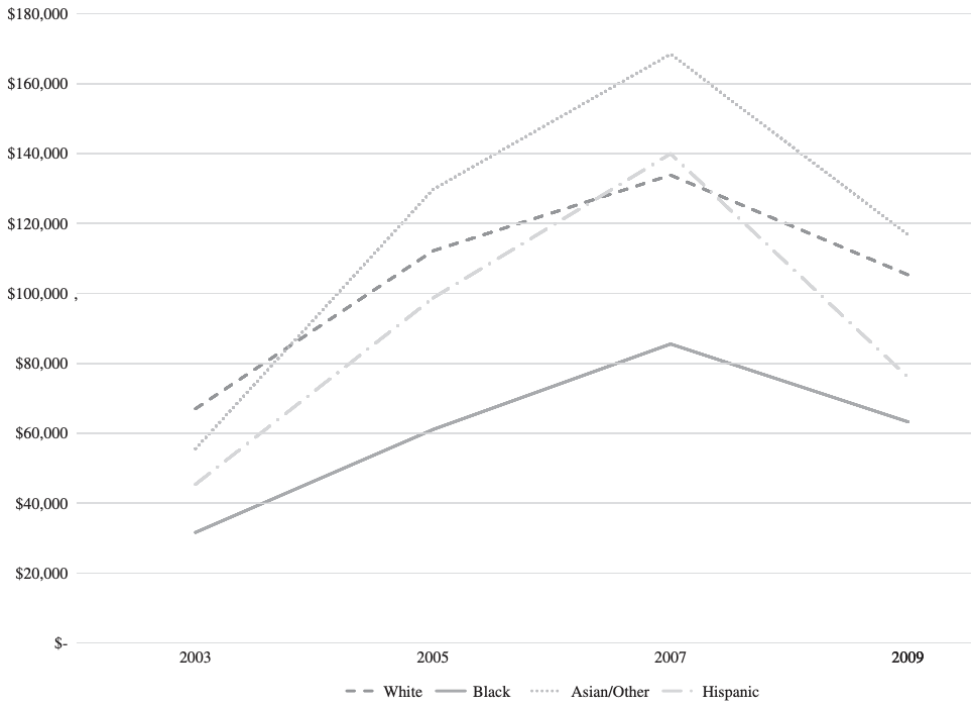
In a paper focused on the racial disparities in home appreciation, Michela Zonta highlights the importance of the terms of the financing used to purchase the home (factor #3) in the disadvantage African Americans face in their ability to build equity. The US has a history of introducing structural barriers to economic equality, including discriminatory practices in the real estate markets (redlining, "steering," variations in appraisal methods, and appraisers' racialized perspectives of neighborhoods) (Zonta, 2019). Bartlett et al (2017) show that this historic discrimination is being perpetuated by financial technology lenders that typically charge borrowers of color interest rates that are eight basis points higher than they charge white borrowers (Bartlett et al., 2017).

[8] Total median IRR (internal rate of return) for homeownership spells beginning in 1997 was 29.6, compared to -12.6 in 2007, -11.5 in 2009, -2.1 in 2011, and -1.6 in 2013 (Herbert et al., 2019).
[9] The economic impact of the COVID pandemic may lead to another downturn in the housing market of unknown duration, but it is too early to forecast in this unprecedented moment.

Faber and Ellen (2016), build upon the evidence of racial disparities in home appreciation by looking at homeowners who purchased homes before the subprime boom and who managed to stay in their homes through the market's 2007 to 2009 decline to discern ethnic gaps in housing wealth beyond the well studied disproportionate impacts of foreclosure of low-income and minority homeowners during the housing crisis. Using data from the American Housing Survey, the authors find that for a representative sample of households that sustained homeownership from 2003 to 2009, homeowners from each of the four ethnic groups (White, Black, Asian/Other, and Hispanic) experienced a gain in equity, though at different trajectories, as shown in **Figure 2.2**. Hispanic households experienced significantly smaller increases, even after controlling for unit characteristics, socioeconomic status, starting equity position, starting home value, and the metropolitan area's change in housing prices. Black homeowners also gained less equity than whites did, though these disparities can largely be explained by differences in education and income, as well as differences in types of homes purchased[10]. Finally, the authors find that **white homeowners who held onto their homes throughout the market downturn were significantly less likely than Hispanic or black homeowners to end the period underwater, even after controlling for initial equity position**.

[10] The magnitude of the coefficient on the black indicator variable shrinks as the authors add more controls and loses significance with the inclusion of variables for income and educational attainment (Model 4), suggesting that some of the disparity between black and white homeowners is explained by differences in socioeconomic status. The same cannot be said for the Latino–white disparity, which is largely unaffected by the inclusion of these measures.

Figure 2.2: Average Equity by Race, 2003-2009



Source: Faber & Ellen, 2016

In addition to disparities in the financial return of homeownership by income and race/ethnicity discussed above, recent research has highlighted a gender bias in the housing market. A study by researchers at the Yale School of Management looks at differences in financial outcomes among single women and men when they buy a home. The authors leverage detailed data on a sample of 9 million housing transactions across the US from CoreLogic[11] to find that single men earn approximately 7.9 percentage points higher levered returns[12] on housing investment relative to single women (Goldsmith-Pinkham & Shue, 2020). The authors also use data on repeat sales to show that women pay approximately 2% more and sell for 2% less than men for comparable properties. Importantly, the authors replicate the main results after controlling for age, education, ethnicity, number of children, and income. While robust in its methods and data

[11] CoreLogic is a supplier of U.S. real estate, mortgage, consumer, and specialized business data. The dataset includes 50 million housing transactions and matched property listings across the US from 1991 to 2017 from county deeds records. For each deed record, CoreLogic reports the full name of the first and second owner on a deed and in the case of sale, the full name of the first and second seller. The authors identify two pieces of information from these name fields: first, they parse the fields to identify exactly how many parties exist on each side of the transaction, since in some cases, couples are transcribed as "John and Mary Smith" in one field, rather than being split across fields as "John Smith" and "Mary Smith." Second, they use the first names to probabilistically assign a gender to each party in the transaction.

[12] The majority of homeowners in the United States buy their homes using debt, with leverage of five-to-one or higher. Moreover, this leverage tends to persist over a long period of time, with long duration mortgages whose fixed amortization schedules pay mainly interest upfront. Therefore, the real return earned is typically a levered return. The authors also calculate an unlevered return and find the men earn 1.5 percentage points higher unlevered annualized returns relative to single women.

sources, the authors acknowledge limitations to their analysis, including that they focus only on a gender gap among men and women that choose to own housing, rather than the potential housing returns for the universe of all men and women. Additionally, the estimates focus on wealth accumulation by women and men who remain single until retirement, which represent approximately 10 and 13 percent of the US population, respectively.

Beyond the effects of homeownership on a household's ability to build wealth, there are important, related findings of the role location plays on the economic mobility of a household. In their frequently cited paper, researchers Chetty & Hendren (2018) investigate the impacts of neighborhoods on intergenerational mobility. Using a quasi-experimental design, and federal income tax record data from 1996-2012, the authors investigate to what extent a child's upward economic mobility is shaped by the neighborhoods they grow up in. Their analysis shows that **every extra year a child spends in a better environment[13] improves that child's outcomes in adulthood through what is referred to as a "childhood exposure effect."**[14] Outcomes of interest include pre-tax income, their employment status, college attendance, teenage birth rates, and marital status.

The authors, in the second part of their analysis, estimate the causal childhood exposure effect of every county in the U.S. by studying the outcomes of children who moved between counties at different ages and measuring the percentage change in earnings from spending an additional year of one's childhood in a particular county (relative to the national average). They find large variations in the extent to which different locations support economic mobility. Counties that have higher rates of upward mobility tend to have:

1. Less concentrated poverty;
2. Lower levels of income inequality;
3. Better schools;
4. Lower rates of violent crime; and
5. A larger share of two-parent households.

An implication of this analysis for housing policy is the finding that **high housing prices remain a persistent barrier that prevents families from moving to high opportunity neighborhoods and the associated upward mobility**. To address this problem, the authors suggest policies that provide subsidized housing vouchers that enable families to move to neighborhoods associated with stronger economic mobility.

[13] "Better environment" is defined by the outcomes of other children already living in that neighborhood.

[14] Every additional year of childhood spent in a better environment improves a child's long-term outcomes. The outcomes of children who move converge linearly to the outcomes of permanent residents in the destination over the age range studied (ages 9 to 23). Hence, annual exposure effects are approximately constant: moving to a better area at age 9 instead of 10 is associated with the same increase in income as moving to that area at age 15 instead of 16. The exposure effects persist until children are in their early twenties.

While finding that areas associated with increased economic mobility tend to have higher home prices, Chetty and Hendren also find some neighborhoods to be “bargains” in the sense that their home prices are low relative to the economic benefits conferred by the location. Further investigation of these “opportunity bargain” neighborhoods could be useful to identify places where land costs could potentially be low enough to facilitate acquisition of homes by Habitat affiliates. Additional information regarding these areas can be found here.

Intergenerational wealth

Homeownership, in addition to being an important source of wealth for a homeowner, is also an important vehicle for wealth transfers and asset building across generations. In a study comparing children of a representative group of homeowners to children of renters, Boehm and Schlottman (2001) employ the Panel Study of Income Dynamics to demonstrate that children of homeowners are more likely to own a home sooner than children of renters after controlling for demographic characteristics as well as educational attainment and income . In addition, the authors find that children of homeowners are more likely to achieve higher levels of education and, relatedly, income. Notably absent from this analysis, though, was a consideration of the recent housing booms and busts in the early 2000’s.

In a more recent study focused on the role of parent wealth and family transfers in transitions to homeownership, Begley (2017) also employs the Panel Study of Income Dynamics and finds that increases in parent housing values generally increase the probability that homeowners parents will transfer money to their children, that these transfers will be larger, and that their children will purchase homes. Moreover, the study focuses on the differences in these relationships across the most recent housing boom and bust periods in the US. Through this analysis, the author finds that the effects noted above are concentrated during housing bust years, suggesting that family resources, and housing wealth specifically, matters more during periods of economic decline.

Shared Equity Homeownership

Given the high cost of homeownership in many markets, an approach known as “shared equity homeownership” has been developed that seeks to maximize the number of households capable of benefiting from a single investment in affordable homeownership. As described in Davis (2006) and Lubell (2014), shared equity homeownership is an approach to affordable homeownership programs that seeks to balance two interests:

1. The individual homeowner’s interest in building assets; and
2. The program sponsor’s interest in maintaining the long-term affordability of the home so that a single investment in affordable homeownership can help multiple generations of homebuyers.

Shared equity homeownership programs use a subsidy to lower the cost of a home, which is then sold to an income-qualifying homebuyer at a price well below market. The homebuyer purchases the home at the lower price using conventional mortgage financing and lives in the home for as long as they wish. When the homeowner sells the home, they are required by the terms of the deed or other binding legal agreements to sell for a price determined by formula and designed to balance the two interests noted above. Examples of resale formulas given by Lubell (2014) include:

1. Appraisal-based formula – sale at the original purchase price plus home improvements plus 25 percent of the increase in appraised value; or
2. Index-based formula – sale at the purchase price plus home improvements plus the (percentage change in the area median income times the initial purchase price).

These and other commonly used formulas help ensure the home stays affordable to future purchasers while also allowing the homeowner to benefit from a share of home price appreciation. The homeowner also benefits from the forced savings from paying down the principal balance on their mortgage. An increasing number of Habitat affiliates are turning to shared equity homeownership programs, such as community land trusts, as a way to provide more families with affordable housing and preserve scarce housing subsidies (Habitat for Humanity, 2017).

Lubell (2014) estimates that, as compared to a grant program with the same amount of subsidy, a shared equity program could provide affordable ownership opportunities to two to three times as many homebuyers over a 30-year period and three to five times as many homeowners over a 50-year period, depending on how long families remain in their homes.[15] The data behind these calculations are available here. The ability to service more households with limited subsidy dollars is one of the chief selling points of shared equity homeownership.

There have been only a few studies of the financial returns of shared equity homeownership programs. The most comprehensive examination is a retrospective study by Temkin et. al. (2010) that included case studies and a cross-site report that examined outcomes for households that purchased and then sold homes at seven shared equity homeownership programs operating during a period from 1972 and 2009. They found that the **homeowners' return on their down payment investment (both overall and for six out of the seven programs) exceeded that of the stock market or a U.S. Treasury Bond, even as the programs ensured the homes were affordable both to the initial purchasers and at resale**.

[15] The same conclusions apply to programs that provide forgivable loans that essentially convert to grants over time.

As discussed in Jacobus and Sherriff (2009), shared equity homeownership can sometimes be controversial. Broadly speaking, the concern is that wealthy people are allowed to make an unlimited amount of money when homes prices go up, so why shouldn't low-income people, including low-income people of color, have the same opportunity? The counterargument is two-fold: (a) given the limited amount of funding available for affordable homeownership, it's more important to provide homeownership and sizable wealth-building opportunities to a larger number of people than to provide a large financial windfall for a small number; and (b) as confirmed by Temkin et. al. 2010, purchasers in shared equity programs still build life-altering amounts of wealth despite limits posed by the model. As Lubell (2014) explains, shared equity homeownership also provides an important benefit that market-rate homeownership does not, i.e., it insulates the borrower from some amount of downturn in the markets. Since the shared equity purchaser buys his or her home at levels well below market, they may be able to sell at the price that they paid for the home, even if market values go down.

Shared equity homeownership is most often used in high-cost markets where home sales prices are well out of reach of low- and moderate-income households and where rapidly rising home values allow the homeowner to receive some benefit from home price appreciation. In places where home values are not rising, it may be desirable to adjust the resale formula to provide for greater asset accumulation by the homeowner, even if it means the home remains affordable only through several cycles of homeownership and not in perpetuity. In any event, the model is generally only attractive to home purchasers when the homes are sold at a substantial discount relative to market levels.

Beyond the research cited above, there is a considerable amount of information available on shared equity homeownership including:

- The website of Grounded Solutions Network – an organization that reflects the merger of two organizations that specialized in different aspects of shared equity homeownership
- A LocalHousingSolutions.org article on deed-restricted homeownership that also provides helpful background
- A lengthy literature review on shared equity homeownership by Carlsson (2019).

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The health effects of affordable housing, home repair, crowding, and residential stability

Housing affordability has become more of a problem for a larger share of households in recent years, and low-income families face tradeoffs between housing and other necessities, including food and health care. In addition to affordability, the quality of housing, as well as residential stability are important determinants of physical and mental health for homeowners.

Housing is well understood to be an important social determinant of physical and mental health and well-being. Overall, **the research supports the link between stable, decent, and affordable housing and positive health outcomes** (Maqbool et al., 2015). Below we interrogate four specific hypotheses on the contribution of affordable housing and home repair to supporting positive health outcomes:

1. Affordable housing can improve health outcomes by stabilizing or reducing costs and freeing up family resources for other essential expenditures;
2. Physical improvements to the home can lead to positive health outcomes by reducing exposure to toxins and asthma-promoting conditions, providing modifications to adapt to homeowner mobility needs, and improving the physical comfort of the home;
3. Avoidance of challenging situations such as reductions in stress associated with crowding and domestic abuse can lead to improved health outcomes; and
4. Improved residential stability can lead to improved health outcomes by reducing stress and enabling chronically ill individuals to maintain a consistent treatment regime.

Overall, while the evidence supports the associations explored in these hypotheses, it remains difficult to prove that homeownership is actually the cause of these benefits, as opposed to an outcome of other factors that are also associated with improved health outcomes for individuals and families. For example, as will be discussed below, homeowners report better physical health than renters, but researchers do not have a precise explanation for why that is the case. Homes occupied by homeowners might, on average, be in better condition and present fewer hazards than homes occupied by renters. Alternatively, homeownership might provide greater residential stability, which enables homeowners to form long-term relationships with healthcare providers, which provides access to needed medical care. Still another possibility is that the people who can afford and choose to become homeowners have better physical health outcomes than those who are unable to or choose not to purchase a home for reasons having nothing to do with housing.

1. Affordable housing can improve health outcomes by freeing up family resources for other essential expenditures

Housing affordability has become more of a problem for a larger share of households in recent years (Rieger, 2016). Rising cost burdens have hit the lowest income households especially hard. **Among households with annual incomes under $15,000, 83.4% are considered housing cost burdened (those paying 30% or more of income toward housing), and 70% face severe cost burden (paying at least 50% of income toward housing)** (Rieger 2016).

An alternative affordability measure of residual income provides a fuller picture of how much money a homeowner has remaining to meet basic non-housing costs (food, transportation, health care, child care, etc.) after paying for housing (Herbert et al. 2018). Using this measure, Rieger analyzes the Consumer Expenditure Survey between the years 2000 and 2013 and finds that **households in the bottom income quartile experienced a 20% increase in housing expenditures while also experiencing a drop of real average income of almost 4%**. Thus, households with the least cushion in their budgets are the most vulnerable to increases in the cost of housing (Rieger 2016).

How, then, do these low-income households cope with these increases in the cost of housing? The Center for Housing Policy analyzed the Consumer Expenditure Survey to look at the "line items" of household budgets to determine the shares of income and expenditures spent on housing and other necessities and the tradeoffs that families make (Lipman 2005). Their analysis finds that **families spending more than half of their household expenditures for housing reduce expenditures for other essentials such as food, clothing, and healthcare, with the biggest tradeoff being transportation**[16]. Such reductions entail significant hardships for cost-burdened households. These households are 23% more likely than those paying less for housing to encounter difficulties purchasing food. They are also 28% more likely to have either a child or an adult lack health insurance and almost twice as likely to lack a car (Lipman 2005).

It is thus logical to expect that reducing a family's cost burden through access to affordable housing can enable families to spend more on food and health care, which can improve health outcomes (Maqbool et al., 2015). Support for this theory comes from analyses of the health outcomes and expenditure patterns of households receiving rental assistance. For example, researchers in Boston found that children living in subsidized housing were more likely to be food secure and less likely to be seriously underweight than children whose families were on the waitlist for subsidized housing (March et al., 2009; see summary table for detailed explanation of methods and data sources). Similarly, Sanz (2017) found that households receiving rental assistance spent more on food, apparel, entertainment, and housewares than similar households not receiving rental assistance.

[16] Those cost-burdened families spend 77 cents on transportation for every dollar decrease in housing costs. They also put 7.5% of their expenditures toward transportation, in contrast with families in affordable housing (i.e. less cost-burdened) spent 24% of their household budget on transportation.

2. Improvements in the physical condition of homes can lead to better health outcomes

While much emphasis is placed on the issue of housing affordability, particularly for low- and moderate-income households, housing quality is also an important component of housing security (Routhier, 2019). The most widely used measure of housing quality is a composite indicator of housing adequacy available in the American Housing Survey (AHS)[17]. In a report for the Federal Reserve Bank of Philadelphia, Divringi et al. (2019) rely upon this measure to weigh each housing "problem" reported in the AHS by the average cost of a reasonable repair[18]. The authors also develop typologies of owners and renters with repair needs using a hierarchical clustering algorithm based on key household and unit characteristics. This allows for an analysis of repair needs segmented by ratio of income to poverty level, race/ethnicity of the householder, household type, housing structure type, year built, location[19], and census region.

Findings from the analysis are, unsurprisingly, consistent with prior research on housing outcomes: that **the prevalence and severity of home repair needs overlap strongly with broader measures of socioeconomic disadvantage**. The authors find more acute housing problems among low-income renters and homeowners, such as holes in walls or floors or peeling paint, with extremely low-income renter households living in single-family units typically experiencing the costliest repair needs. **Figure 3.1** reports the percent with repair needs and the associated costs for households with different characteristics. Of particular note is the disaggregation of repair needs by race/ethnicity of the householder, demonstrating that households of color were generally more likely than non-Hispanic white householders to report at least one housing problem, and that Native American householders experienced particularly acute levels of disrepair.

[17] This measure identifies units as "adequate," "moderately inadequate," or "severely inadequate" based on the presence of one or more housing problems and is discussed in the influential *Worst Case Housing Needs* report provided by the U.S. Department of Housing and Urban Development (HUD) biennially to Congress (Divringi et al., 2019)

[18] The composite indicator available in the AHS identifies units as "adequate", "moderately adequate", or "severely inadequate" based on the presence of one or more housing problems. Such broad categories make it difficult to translate the indicator into actionable, policy-relevant information.

[19] The 2017 AHS survey used throughout the report was sent to 85,000 units, combining a nationally representative sample with an intentional oversampling of selected metropolitan statistical areas and HUD-assisted units.

Figure 3.1: Home Repair Needs and Costs

	Percent with Repair Needs	Number with Repair Needs (Millions)	Repair Costs		
			Aggregate (Billions)	Median	Average
All Occupied Units	35.8%	43.4	$126.9	$1,449	$2,920
Tenure					
Owner-Occupied	33.6%*	26.0	$81.8	$1,449	$3,142*
Renter-Occupied	39.5%*	17.4	$45.0	$1,355*	$2,587*
Ratio of Income to Poverty Level					
Less than 100%	42.9%*	7.3	$25.4	$1,556*	$3,482*
100-199%	38.6%*	8.3	$25.4	$1,449	$3,063
200% or Above	33.6%*	27.9	$76.1	$1,426	$2,730*
Race/Ethnicity of Householder					
Asian or Pacific Islander†	31.3%*	1.9	$4.3	$1,219*	$2,249*
Black or African American†	39.6%*	6.2	$19.2	$1,502	$3,069
Hispanic or Latino (Any Race)	39.9%*	6.6	$18.8	$1,449	$2,859
Native American†	47.7%*	0.5	$2.5	$2,570*	$5,010*
White†	34.1%*	27.5	$80.0	$1,449	$2,914
Other/Two or More Races†	48.0%*	0.7	$2.1	$1,430	$2,770
Household Type					
Married Couple	33.5%	19.8	$57.5	$1,449	$2,904
With Children	37.7%*	9.2	$27.0	$1,449	$2,942
Single Female Householder	39.1%*	14.3	$42.0	$1,449	$2,932
With Children	46.8%*	4.3	$13.8	$1,599*	$3,186*
Single Male Householder	36.2%	9.3	$27.4	$1,449	$2,934
With Children	42.7%*	1.4	$4.1	$1,449	$2,871
Structure Type					
Manufactured Home	45.5%*	3.1	$11.0	$1,743*	$3,587*
Single-Family Home	35.3%	30.3	$98.2	$1,502*	$3,240*
Small Multifamily (2–9 Units)	35.7%	5.0	$9.0	$1,200*	$1,783*
Large Multifamilty (10+ Units)	34.0%*	5.0	$8.7	$1,095*	$1,727*
Year Built					
1939 or Earlier	45.4%*	7.5	$24.1	$1,556*	$3,200*
1940–1969	40.1%*	12.5	$38.6	$1,449	$3,087*
1970–1999	34.6%*	17.4	$50.3	$1,449	$2,894
2000 or Later	25.7%*	6.0	$13.7	$1,333*	$2,292*
Location					
Metropolitan Area	35.4%	36.4	$102.1	$1,449	$2,804*
Nonmetropolitan Area	37.9%*	7.0	$24.8	$1,502	$3,519*
Census Region					
Northeast	35.5%	7.7	$19.8	$1,355*	$2,552*
Midwest	34.8%	9.4	$27.9	$1,449	$2,958
South	36.5%	16.6	$51.3	$1,449	$3,094*
West	35.7%	9.7	$27.9	$1,449	$2,878

Sources: Authors' analysis of 2017 AHS PUF and 2018 RSMeans data from Gordian.
Note: Medians and averages are calculated for units with estimated repair costs > $0. Repeated median values reflect the costs of common individual repairs or combinations of repairs.
* Denotes statistically signficant difference from all occupied units at p <0.10 level. Only calculated for share of units with repair needs, median repair cost, and average repair cost.
†Non-Hispanic or Latino

Source: Divringi et al. (2019)

Among homeowners, low-income older adults who were long-term occupants of their units had the costliest average repair needs. **Figure 3.2** provides further data on this finding as well as the home repair needs broken out by income generally. As the data show, **low-income households face statistically significantly larger median and average repair costs as compared to middle and upper-income households**. In aggregate, the cost of addressing repairs reported by low-income households (renters and homeowners), was $50.8 billion in 2018. According to 2017 AHS data, households with incomes less than $30,000 occupied 53% of the homes deemed "Severely Inadequate" and 44% of the homes deemed "Moderately Inadequate" while only accounting for 27% of the total number of households. In addition to low-income homeowners, housing problems disproportionately appear in units occupied by the lowest-income renters (see **Figure 3.3**) (Lew, 2016).

Figure 3.2: Cost of Home Repair by Income

	Low-Income				Middle-/Upper-Income		
Median Costs	$1,776*				$1,449		
Average Costs	$3,842*				$2,905*		
Number of Units (Millions)	6.6				19.5		
Aggregate Costs (Billions)	$25.3				$56.6		
	Moderate-Age Units			Older Units	Newer Units	Moderate-Age Units	Older Units
	New Owners	Medium-Term Owners	Long-Term Owners	Medium-Term Owners	Medium-Term Owners	Long-Term Owners	Medium-Term Owners
Median Costs	$1,449	$1,680	$1,844*	$2,004*	$1,449	$1,467	$1,449
First Quartile-Third Quartile	$765–$4,426	$765–$4,793	$836–$5,719	$836–$5,719	$765–$3,435	$836–$3,650	$765–$3,810
Average Costs	$3,112	$3,783*	$4,187*	$3,917*	$2,770*	$3,009	$2,997
Number of Units (Millions)	1.3	1.1	2.6	1.6	8.2	5.9	5.4
Share of Units	5.0%	4.1%	9.9%	6.3%	31.4%	22.6%	20.7%
Aggregate Costs (Billions)	$4.0	$4.1	$10.7	$6.4	$22.7	$17.7	$16.1
Share of Agg. Costs	4.9%	5.0%	13.1%	7.9%	27.7%	21.7%	19.7%

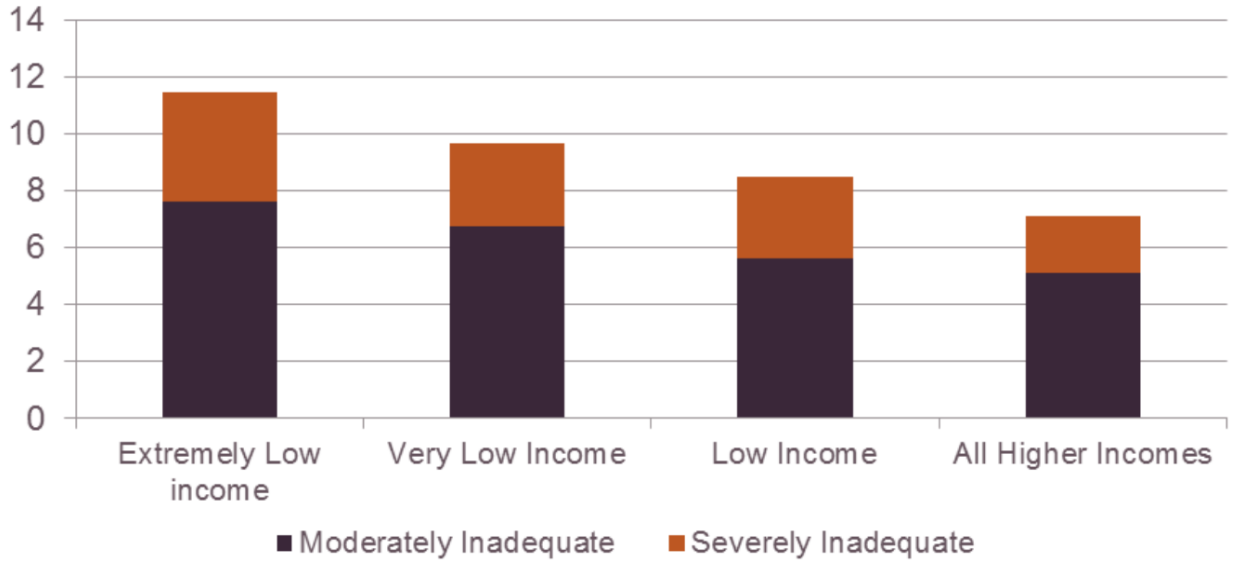
Sources: Authors' analysis of 2017 AHS PUF and 2018 RSMeans data from Gordian.
Note: Medians and averages are calculated for units with estimated repair costs > $0.
* Denotes statistically signficant difference from all owner-occupied households with repair needs at p <0.10 level. Only calculated for median repair cost and average repair cost.

Source: Divringi et al., 2019

While housing problems are more acutely felt by low-income renters and homeowners, the share of households with housing quality problems as measured by the AHS has declined over time. As of 2013, just 9% of occupied rental units were categorized as physically inadequate, down from 11% in 2003 (Lew, 2016). This is due in significant part to improvements in construction standards and building codes. However, as Eggers and Moumen observe, the AHS composite indicator of housing quality is oriented toward the lowest level standard of housing quality. A unit can suffer from various deficiencies and still be considered "adequate" shelter (Eggers & Moumen, 2013). Moreover, the AHS definition of housing quality, which was developed at a time when a significant share of Americans did not have indoor plumbing, does not focus on all of the aspects of housing quality likely to matter for residents' well-being. For example, the AHS has historically not focused on measuring the housing conditions that are associated with asthma. In 2015, the AHS included a special supplement on asthma that found

a negative association between housing conditions and the presence of a child with asthma (Ganesh et al., 2017).

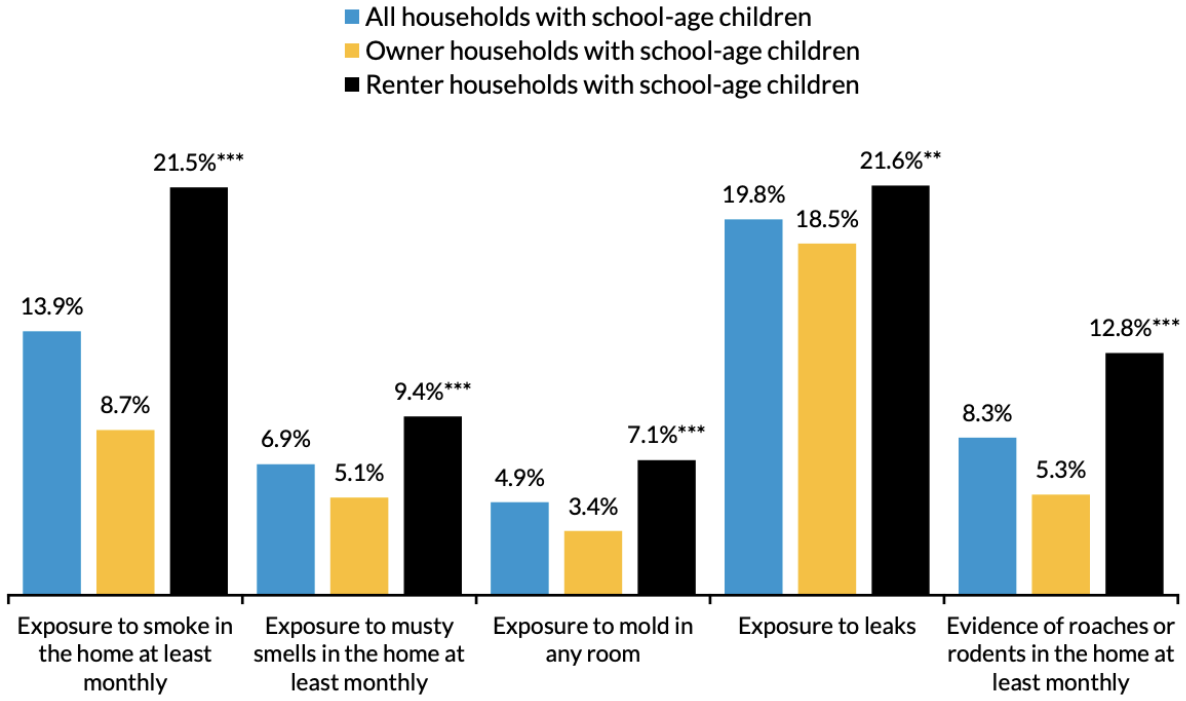
Figure 3.3: Share of occupied units (percent) with inadequate housing conditions



Source: Ganesh et al., 2017

Though improvements in housing quality are encouraging, persistent housing conditions such as leaky roofs, peeling paint, structural problems, chronic dampness, improperly vented combustion appliances, and poor ventilation can cause injury and illness (Kuholski, et al., 2010). As mentioned, these problems disproportionately affect families with limited incomes because of their lack of affordable housing choices. As Kuholski and co-authors summarize in their case study, **chronic exposure to allergens in the indoor environment from mold, pets, mice and rats, cockroaches, and dust mites is associated with asthma**. Moreover, indoor moisture sustains air pollutants that have been associated with the development and exacerbation of asthma (Kuholski, et al., 2010). According to an analysis of the 2015 American Housing Survey, exposure to asthma triggers are common among households with school-age children, and significantly more prevalent in renter households compared to owner households (see **Figure 3.4**) (Ganesh et al., 2017). **The incidence of asthma disproportionately impacts the most vulnerable children and communities - African-American children are twice as likely to have asthma and are six times more likely to die from it than white children** (Jacobs, 2017).

Figure 3.4: Exposure to Asthma Triggers among Households with School-Age Children, Overall and by Tenure



Source: Authors' analysis of the 2015 American Housing Survey.
Notes: Households with school-age children include households with children ages 5 to 17. All asthma triggers are measured over the past 12 months. ** Estimate is significantly different from estimate for owner households at the 0.05 level. *** Estimate is significantly different from estimate for owner households at the 0.01 level.

Source: Ganesh et al., 2017

In addition to asthma, an often cited consequence of poor-quality housing is the prevalence of lead-based paint hazards. There is overwhelming evidence suggesting that lead toxicity affects the brain and neurodevelopment processes, and that these detrimental effects are irreversible (Kuholski, et al., 2010). The CDC's most recent estimate is that about 535,000 children aged 1-5 in the U.S. (about 2%) have elevated blood lead levels. **Households with annual income less than $30,000 are twice as likely as others to have lead hazards in their homes. Children of low income families are eight times more likely to be lead-poisoned than those of higher income families, and African-American children are five times more likely than white children to be lead poisoned** (Jacobs, 2017).

Some homes have multiple health hazards, which could exert a combined effect on children's health and education outcomes. As David E. Jacobs of the National Center for Healthy Housing explains in an issue brief for HUD's Office of Lead Hazard Control and Healthy Homes, "Inadequate ventilation increases the concentration of lethal indoor air pollutants such as radon and carbon monoxide, and exacerbates moisture and humidity problems. Moisture causes paint deterioration, which puts children at risk of exposure to leaded dust and paint chips. Moisture also encourages growth of mold, mildew, dust mites, and microbes, which contribute to asthma and other respiratory diseases. Asthma is exacerbated by allergic reaction to certain triggers such as dust, mold, pests (such as cockroaches, rats, and mice), cold air, and dry heat. Use of common pesticides to control infestations can contaminate homes"(Jacobs, 2017).

A number of interventional studies demonstrate the potential for improving health through improved housing quality and safety (Taylor, 2018). For example, a study evaluating the costs and benefits of the Boston Children's Hospital Community Asthma Initiative found that **when asthma triggers are removed there are demonstrated health improvements and cost reductions among both children and adults** (Bhaumik et al., 2013). Efforts, such as the HUD Lead-Based Paint Hazard Control Grant Program, have been found to substantially reduce dust lead levels on floors, window sills and troughs and are associated with substantial declines in children's blood lead levels (37% two years after treatment) (National Center for Healthy Housing, 2004). Additionally, comparing the time period between 1976-1980 to 2015-2016, due to regulatory and selected applied public health efforts, the blood lead level of the US population aged 1-74 years dropped from 12.8 to .82 micrograms per deciliter, a decline of 93.6% (Dignam, 2019). Despite these regulatory and public health efforts, an estimated 3.6 million homes with children under 6 years of age still have one or more lead-based paint hazards, including 1.1 million low-income households, as of March 2006 (the latest year available from the American Healthy Homes Survey) (Cox et al., 2011).

Structural problems with poor-quality housing can also have significant negative effects on health, particularly for children and older adults. Between 1985 and 1997, **home injuries accounted for almost two-thirds of all fatal unintentional injuries occurring to US children and adolescents** (Kuholski, et al., 2010). The primary residential hazards associated with falls are lack of safety devices such as grab bars, safety gates or window guards, structural defects in the home, and insufficient light on stairs and other areas (Breysse et al., 2004). Disturbingly, **residential injury death rates are substantially higher for African-American children than for other race groups, a trend that remains unexplained in the literature that could be related to worse housing quality for housing occupied by African Americans** (Breysse et al., 2004). For aging populations, obstacles such as stairs can make it difficult to safely live in their homes (Maqbool et al., 2015).

Being able to age in place is associated with better physical and mental well-being (Viveiros & Brennan, 2014). For the frail elderly, this may require a combination of physical adaptations to the home and social services to help individuals successfully manage chronic conditions.[20] Building on a small but successful early pilot, researchers at Johns Hopkins University have designed a randomized clinical trial of the CAPABLE (Community Aging in Place, Advancing Better Living for Elders) program,[21] where an interdisciplinary team of a nurse, occupational therapist, and handyman jointly address both personal and environmental risk factors for disability based on participants' functional goals. Treatment group members receive up to $1,200 in safety and functional modifications and repairs from a licensed handyman, up to six sessions with an occupational therapist and up to four sessions with a registered nurse. Outcomes for households in the treatment group are being compared to a control group of low income older adults that receive the same number of in-home sessions as households in the treatment group, but in lieu of functional modifications and repairs from a licensed handyman and sessions with an occupational therapist and registered nurse, receive reminiscence and activities like scrapbooking. While results are forthcoming, the authors' primary outcomes of interest are decreased disability in self-care as well as improvement in instrumental activities of daily living (ADLs), strength, balance, walking speed, and health care utilization (Szanton et al., 2014).

3. Affordable housing programs can improve health outcomes by reducing crowding and allowing people experiencing domestic abuse to access alternative housing

When housing is not affordable, families may be forced to double up with others or to otherwise live in overcrowded conditions (Maqbool et al., 2015). Among children, overcrowding, captured through a continuous measure of persons per room, is associated with diminished physical health and other negative outcomes. Based on analyses of Panel Study of Income Dynamics' Child Development Supplement and the Los Angeles Family and Neighborhood Survey, Solari and Mare (2012) find that "**living in crowded housing conditions has an independent negative effect on math and reading achievement in the pooled national analysis, on external behavioral problems and physical health in the fixed effects national analysis, and all the child wellbeing outcomes** in Los Angeles County."

[20] A number of prior studies have examined the benefits of coordination of care for facilitating aging in place. For example, a study of the Program for All-Inclusive Care for the Elderly (PACE), a national program offering a continuum of acute and long-term care for individuals age 55 or older, found that PACE participants have better health outcomes, better self-reported health, and lower rates of admission to nursing home facilities than non-participants (Petigara & Anderson, 2009). Similarly, a study on the Aging in Place (AIP) program in Missouri found that AIP program participants had better clinical health outcomes than similar individuals in nursing home facilities and at lower costs (Marek et al., 2005).

[21] A handful of Habitat affiliates are also piloting the CAPABLE model, outside of the clinical trial.

Access to affordable housing can also help individuals experiencing domestic violence to escape abusive homes, which can improve mental health and physical safety. Domestic violence is one of the leading causes of homelessness for women and children in the United States. Many women choose to stay in or return to an abusive situation rather than face homelessness (Maqbool et al., 2015). In a study exploring abused women's experiences accessing affordable, safe, and stable housing, Clough et al. (2014) find that the rate of women returning to their abusers increases during times of reduced affordable housing availability.

With regards to the measure of overcrowding as described above, a report commissioned by the Department of Housing and Urban Development (HUD) (Blake et al., 2007) investigated several definitions of overcrowding and concluded that persons-per-room is the most prevalent approach in the literature. This quantitative approach does not consider research suggesting that households with different cultural backgrounds may have differing norms and preferences that influence their perception and experience of overcrowding.

For example, a paper by Evans, Lepore and Allen (2000) distinguished between cross-cultural *perceptions* of crowding and *tolerance* for crowding (the latter being defined as the ability to withstand the adverse effects of high-density living conditions). Based on phone interviews with 454 households in four communities[22], the authors evaluated the statistical interaction between density and culture on measures of perceived crowding as well as a standardized index of psychological distress for four ethnic groups - African Americans, Anglo Americans, Vietnamese Americans and Mexican Americans. Results indicated that as density rises, Anglo-American and African Americans were more sensitive to crowding compared to Vietnamese Americans and Mexican Americans. However, cultural differences in perception of crowding did not equate to differential psychological impact of high density - all four ethnic groups suffer similar, negative psychological distress as a result of high-density housing. These results held up even after controlling for household income. Stated differently, there was no compelling evidence that psychological distress in relation to density varies by culture.

4. Improved residential stability can lead to improved health outcomes by reducing stress and enabling chronically ill individuals to maintain a consistent treatment regime.

[22] Defined as Standard Metropolitan Statistical Areas for Los Angeles, CA, Orange County, CA, Pittsburgh, PA, and Syracuse, NY.

There is no agreed-upon definition of residential stability, but Lubell et. al (2012) suggest that it be defined as "a household's ability to control when and under what circumstances it moves to a new dwelling unit." While this definition poses measurement challenges compared to definitions focused on how many moves a household makes within a certain period of time, it has the advantage of recognizing that people move for a variety of reasons and that not all moves are harmful for health. Under this definition, only moves that are unplanned and unwanted contribute to residential instability.

For purposes of analyzing the literature on the relationship between residential instability and health outcomes, it is helpful to recognize that the intensity of residential instability can vary from extreme instability (i.e. homelessness) to serious instability (i.e. foreclosure and eviction), to moderate instability (i.e. difficulty keeping up with utility bills or completing necessary home repair projects). This summary encompasses evaluations that use a range of different definitions of mobility, without trying to distinguish between more or less appropriate definitions.

At the extreme, there is little question that residential instability has adverse health impacts (Maqbool et al., 2015). People who are chronically homeless face substantially worse health outcomes in terms of both physical and mental health and of increased mortality (Auerswald, 2016). Additionally, many people experience traumas while living on the street or in shelters, which can lead to long-term adverse impacts on psychological well-being (Schmitt et al., 2017). While these challenges are important for communities and society to address, they are not experienced by the target population for Habitat's programs.

Less extreme though still serious housing instability, including frequent moves, living in doubled-up housing, eviction, and foreclosure, is also related to elevated stress levels, depression, and hopelessness (Maqbool et al., 2015). Tsai (2015) reviewed 42 publications representing 35 unique studies about foreclosure, health, and mental health. **The majority of studies (91%) concluded that foreclosure had adverse effects on health or mental health. Among other adverse outcomes, these studies reported that foreclosure was associated with depression, anxiety, increased alcohol use, psychological distress, and suicide** (Tsai, 2015).

Moderate instability, such as difficulty keeping up with utility bills, mortgage payments, or home repairs, has been linked to lower levels of psychological well-being and more intensive use of medical services (Maqbool et al., 2015). In a study of over 22,000 low-income caregivers across five urban areas from 2009-2015, Sandel et. al. (2018) found that three forms of varying severity of housing instability (being behind on rent, experiencing multiple moves, and having a history of being homeless) were associated with adverse caregiver and child health among low-income renter households. Caregiver health outcomes were self-reported current health statuses and maternal depressive symptoms, as measured through a household-level survey and a 3-item screening test developed for maternal depression. Caregivers reported their perception of their child's health as fair, poor, good, or excellent in response to a validated question from the Third National Health and Nutrition Examination Survey. Further information related to a child's health was gained through medical records (Sandel et al., 2018).

Extreme residential instability, i.e. homelessness, poses another challenge for individuals living with chronic diseases such as HIV/AIDS, diabetes, and hypertension, who may have difficulty maintaining their treatment regimens due to the lack of a stable residence (Lubell et al., 2012). This is particularly difficult for patients experiencing homelessness that may have difficulty properly storing medications and syringes (Buchanan et al., 2009).

There is mixed evidence of a connection between the length of homeownership tenure and health. Rohe & Lindblad observe that there is a lack of research on the independent role of housing tenure on health, and that the few studies investigating this relationship fail to control for key correlates of housing tenure or to account for selection bias (Rohe & Lindblad, 2013). For example, homeownership is associated with longer tenure in the same neighborhood, which may result in both a greater knowledge of local health care resources, more extensive social support networks, and lower levels of stress (Rohe & Lindblad, 2013). On the other hand, research exploring the relationship between housing and health inequalities finds that health outcomes may be negative for homeowners who would like to move due to difficulties maintaining their properties, paying their mortgage, or undesirable neighborhood conditions, but cannot because their property is worth less than they owe on their mortgages (Smith et al., 2003).

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The effects of homeownership on educational outcomes

Despite challenges with identifying the independent role housing plays on educational outcomes, the research is clear that affordable housing is associated with a range of positive educational outcomes for children.

There are a number of different hypotheses about why housing might positively impact children's educational outcomes. These include hypotheses related to:

1. The educational benefits provided by residential stability (i.e. fewer moves), to the extent it leads to school stability;
2. The educational benefits of moving to areas with stronger schools and/or schools where the households have higher incomes;
3. Avoidance of the health hazards of poor quality housing, such as lead paint exposure and higher rates of asthma; and
4. Reductions in parental and child stress associated with less crowding and parental stress associated with unaffordable rent and mortgage payments.

Despite the significant amount of research supporting these hypotheses, estimating the true effect of any particular component of housing is challenging because housing is a bundle of different attributes. For example, researchers seeking to understand the effects of homeownership on education have struggled to disentangle homeownership from the bundle of features associated with homeownership (such as residential stability and features associated with the people who choose and succeed at homeownership) that might impact child outcomes (Brennan et al., 2014). Instead of benefitting from growing up in an owned house itself, children might benefit from the factors often accompanying homeownership (Ma'rof, 2012).

Hypothesis 1: The educational benefits provided by reducing residential mobility

Although the definition of residential mobility varies, it generally refers to a household or individual moving from their primary residence to another residence (Theodos et al., 2018). A household might move for a variety of reasons, some of which might lead to lower educational outcomes for children, while others might lead to stronger outcomes. For example, if a family moves due to unstable housing situations, rising housing costs, or other difficulties, there can be adverse impacts on child educational outcomes (Brennan et al., 2014). On the other hand, if a family moves so the parent can take a better paying job or if the family moves to an area with stronger schools, the move could potentially lead to positive educational outcomes.

To date, there is not yet an agreed-upon measure of mobility that clearly separates out positive from negative moves. Some researchers have focused on the frequency of moves; for example, Leventhal and Newman (2010) define residential instability as a situation where residential moves are frequent and occur over short intervals. Another approach, which has been used in a number of studies but not yet validated or standardized, focuses on whether a family moves for planned/voluntary or unplanned/involuntary reasons, with the assumption that moves that are voluntary and planned are more likely to be beneficial for children than moves that are involuntary or unplanned. The latter approach is being taken by an ongoing randomized study of the effects of housing on young children led by Leventhal and Newman, but results are not yet available.[23]

Particularly when unplanned, **frequent residential moves often lead to interruptions in instruction, extended absenteeism, chaotic environments not conducive to studying, stress, disruptions of peer networks, and interference with the development of close, personal relationships** (Brennan et al., 2014). Related research in child development has found that moving often has a negative impact on educational performance, particularly among young low-income children. Ziol-Guest and McKenna (2014) find that among impoverished children aged 0 to 5, those who move three or more times prior to turning six years old demonstrate increased behavior and attention problems.

Unplanned moves can also lead children to attend lower performing schools. In Baltimore, students affected by foreclosure were more likely to attend worse performing schools in the academic year after their move. As a result, students who had scored proficient or advanced in years prior to moving were less likely to score proficient or advanced on standardized tests subsequent to their move across grade levels (Kachura, 2012). The experience of students in Baltimore is, unfortunately, not unique. According to U.S. Census Bureau data, **about 10% of movers in 2012 to 2013 moved to find less expensive housing or as a result of foreclosure or eviction**[24]. Unsurprisingly, housing costs were more likely to drive the moves of households living under the poverty line (13.2%) than among those with incomes of at least 150% of the poverty line (8.7%) (Brennan et al., 2014).

[23] Per Jeffrey Lubell, a member of the study's advisory committee, the question asked on the survey is: "Overall, would you say you moved because you wanted to or because you had to?"
[24] Calculations from U.S. Census Bureau, Current Population Survey, 2013 Annual Social and Economic Supplement, Table 23: Reason for Move: 2012 to 2013.

While compelling, the evidence of the impacts on the educational outcomes of children due to residential moves is difficult to disentangle from other factors, associated with moving, that may affect a child's educational outcomes. A National Academies workshop convened by the Board on Children, Youth, and Families in 2009 focused on the impacts of frequent moves on achievement. Participants at this workshop highlighted methodological challenges in collecting and analyzing data about the effects of mobility on children's outcomes. Specifically, workshop participants discussed that mobility is not a single event that happens at a particular time, but a series of processes and change that may have complex and cumulative effects (National Research Council and Institute of Medicine, 2010). For example, neighborhood characteristics are important determinants of both the propensity for moving and the likelihood of dropping out of school, a topic which will be discussed further below (Gasper et al., 2012). Also, some of the factors that lead households to move frequently could have independent negative effects on educational outcomes, complicating efforts to isolate the effects of residential mobility on educational outcomes.

Hypothesis 2: The educational benefits of moving to neighborhoods with high-quality schools

As previously discussed, frequent moves are correlated with negative educational achievement. At the same time, evidence suggests that moving to access stronger school systems may have an independent positive impact on educational outcomes. A quasi-experimental study of families impacted by the Gautreaux litigation[25] in Chicago found that moves from inner city neighborhoods to suburban neighborhoods led to better educational outcomes, such as an increased likelihood of enrolling in college prep courses, completing high school, and enrolling in college (Rosenbaum, 1995). However, a comprehensive review and analysis of mobility literature from 2012 found that no program had successfully replicated the rigorous design and implementation of Rosenbaum's finding post-Gautreaux (Johnson Jr., 2012).

[25] The *Gautreaux* lawsuit charged that by concentrating thousands of public housing units in isolated African-American neighborhoods and segregating tenant assignment by race, the Chicago Housing Authority (CHA) and the U.S. Department of Housing and Urban Development (HUD) had violated the U.S. Constitution, which guarantees all citizens equal protection of the laws, and Title VI of the Civil Rights Act of 1964. Decisions at the district appellate, and, ultimately, the U.S. Supreme Court levels affirmed the *Gautreaux* plaintiffs' position, finding both CHA and HUD guilty of discriminatory housing practices (Source: https://www.bpichicago.org/programs/housing-community-development/public-housing/gautreaux-lawsuit/)

Up until 2016, the consensus in the literature had been that the Moving to Opportunity demonstration failed to demonstrate that moving to a low-poverty area had positive impacts on children's education outcomes (Brennan et al., 2014).This changed with a paper by Chetty, Hendren and Katz in 2016, which generated the most definitive evidence of the impact of neighborhoods on educational outcomes, based on a long-term follow up analysis of data from the randomized Moving to Opportunity Demonstration. Using linked IRS tax return data between 1996 and 2012 in five large U.S. cities, they found that **moving to a low-poverty neighborhood had a positive impact on college attendance and quality for children who moved before the age of 13 but a negative impact for children who moved at an older age, possibly because of the disruption of moving**.

One lesson from Chetty's research is that it may take a very long time—a decade or more—to understand the impacts of moving to a new neighborhood. Another lesson is that the impacts may well depend on the age of the child when they move, with children more likely to experience benefits when they move at a younger age. For older children, by contrast, moves to lower-poverty areas can actually be detrimental to school success, possibly because of the disruption of the move. Similarly, Johnson Jr. (2012) found that children may have been unable to acclimate and create new social networks in their new neighborhoods.

A longitudinal study using four survey waves of the National Longitudinal Survey of Youth from 2000 to 2006 investigates the relationship between geographic mobility and adolescent academic achievement and behaviour problems (Gillespie, 2013). . Specifically, the authors test the hypothesis that geographic mobility will be negatively associated with academic achievement and find that, while behavior problems are positively associated with moving, the relationship does not hold for academic achievement, where geographic mobility is insignificant in the models.

Researchers in Montgomery County, Maryland, took advantage of a natural experiment in which families moving into scattered site public housing were randomly assigned to a unit in different buildings. The findings indicated that children that moved into inclusionary housing units[26] who attended low-poverty schools had higher reading and math scores compared to children who moved into inclusionary units that led them to attend moderate-poverty[27] schools. Furthermore, by the end of elementary school, the initial, large achievement gap between children in public housing who attended the district's most advantaged schools and their non-poor students in the district was cut by half for math and one-third for reading. These results suggest that children from highly disadvantaged circumstances benefit from long-term exposure to advantaged school settings (Schwartz, 2010). Another study found that children in low-income households that receive Section 8 housing choice vouchers live in better neighborhoods, as defined by lower poverty rates, a higher employment rate, and lower welfare concentration, are less likely to miss school than other low-income children (Mills et al., 2006). The study also found, however, that the children of families that received vouchers were more likely to repeat a grade, perhaps because of the stronger standards of the children's new schools (Brennan et al., 2014).

Hypothesis 3: The educational benefits of better health through improved housing quality

Substandard housing tends to be associated with poor developmental outcomes for children. Researchers from Boston College and Tufts University employed a bioecological[28] conceptual model to test whether the housing context may have direct as well as indirect associations with children's development. The study drew on data from the main survey component of the *Three-City Study*[29] for 2,437 children and found that, of the four characteristics of housing considered (housing quality, stability, type, and affordability), **poor quality housing, including structural and maintenance deficiencies[30], was the most consistently and strongly predictive of children's negative well-being across the span of childhood, including worse emotional and behavioral functioning and lower cognitive skills** (Coley et al., 2013).

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[26] A policy that requires real estate developers to set aside a portion of the homes they build to be rented or sold at below-market rates.

[27] 20-40% of first grade-mates qualify for free and reduced price meals

[28] Bioecological models of human development propose a multidirectional system in which individuals select and affect their primary contexts. Characteristics of and experiences within contexts, in combination with individual characteristics, in turn affect proximal processes, thereby influencing individuals' growth and development. In terms of housing selection, the bioecological model highlights how individual and family characteristics such as personal preferences, family needs and resources, as well as external opportunities and constraints, may influence the housing contexts that families access.

[29] A rigorous longitudinal, multi-method study of the well-being of low-income children and families in the wake of welfare reform.

[30] The physical quality of housing was assessed with both mother and interviewer reports. Eight items were reported by mothers addressing structural, maintenance, and environmental deficiencies such as leaking roofs, broken windows, rodents, heater or stove not working, or peeling paint or exposed wiring, with items similar to those used in the American Housing Survey. An additional four items were assessed by interviewer observational ratings from the HOME-Short Form

There are many different aspects of housing quality that may each have different (or no) impact on health (discussed previously) and education outcomes. Lead paint is one of the most impactful factors. Numerous studies have found exposure of children to lead through poorly contained lead paint in older homes can lead to developmental and educational deficits (National Center for Housing, 2005). Children poisoned by lead are seven times more likely to drop out of school (Jacobs, 2017). In addition to the housing-related health hazards of lead, poor housing conditions can contribute to the incidence of asthma, which can lead to absenteeism, even among children whose asthma is mild or moderate (Rauth et al., 2008). In 2014, an estimated 6.2 million children from birth to age 17 had asthma, or 8.6% of all children in the US. **Among school-age children with asthma, 49% missed at least one school day because of their asthma in 2013** (Ganesh et al., 2017). More severe problems are associated with higher numbers of school absences, a lack of connectedness to school, and cognitive deficiencies (Moonie et al., 2008).

Hypothesis 4: The educational benefits due to less crowding

The relationship between overcrowding and children's educational outcomes is the least supported hypothesis of the four theories presented here (Newman, 2008). This is primarily due to the difficulty of comparing research findings across studies, which often employ different definitions of crowding while investigating settings and populations that are not generalizable (Solari & Mare, 2012).

Despite these challenges, there is some evidence supporting the association between overcrowding and reduced academic performance for children, including direct effects (children may not have a place to do their homework) and indirect effects (parents experience stress that translates to reduced responsiveness to a child's needs). A study of crowding and early childhood cognitive development found evidence of indirect effects, connecting lower cognitive development with reduced parental responsiveness in more crowded homes (Evans et al., 2010). Additionally, studies have found that children growing up in overcrowded housing have lower math and reading scores, complete fewer years of education, more commonly fall behind in school, and are less likely to graduate from high school than their peers (Conley, 2003). Beyond overcrowding, other sources of parental stress, including unaffordable rent and mortgage payments and the threat of eviction, are associated with reduced parental responsiveness (see Vasquez-Vera et al., 2017, for a systematic review of available evidence of the health effects associated with home eviction).

There remains, though, lingering questions about the connection between crowding and children's education achievement, including whether crowding's connection with reduced educational achievement holds true for households that prefer a higher number of people per room and for multi-generational households (Brennan et al., 2014).

Other Hypotheses

There are a number of other hypotheses that have been advanced to explain the effects of housing on educational achievement. For example, Newman and Holupka (2015) found that the children of low-income households with very low or very high housing cost burdens had lower levels of cognitive achievement than the children of low-income households with more moderate burdens. One potential explanation for the lower levels of achievement among households with very high housing cost burdens is that they had fewer resources available for child enrichment expenditures, such as child care and reading materials, a finding confirmed by Newman and Holupka's (2014) analysis of Consumer Expenditure Survey data. Newman and Holupka (2015) suggest that the somewhat counterintuitive finding that children of households with very low housing cost burdens have worse cognitive outcomes could be explained by the possibility that the households were living in poor quality housing or neighborhoods.

These analyses confirm the importance of considering the interaction of the many dimensions of housing, rather than simply focusing only on affordability. People may choose to spend more on housing to access better quality housing or neighborhoods with better schools, which could offset the reduced funds available for child enrichment.

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The potential of homeownership to contribute to social and community development outcomes

The literature broadly supports the link between homeownership and political and social participation, though methodological concerns temper the degree of direct linkages. In light of Habitat's investment in neighborhood revitalization efforts, we review research exploring the effects of homeownership on neighborhood impacts.

Homeownership has long been associated with a range of social benefits. In 2013, Rohe and Lindbland prepared a comprehensive reexamination of the social benefits of homeownership in light of the foreclosure crisis, which they categorized in five broad areas:

1. Social and political involvement;
2. Neighborhood perceptions and social capital;
3. Psychological health (covered in Health and Residential Stability);
4. Physical health (covered in Health and Residential Stability); and
5. Parenting and children's behavior (covered in Educational Outcomes) (Rohe and Lindbland, 2013).

This section focuses on the first two topics along with the potential of concentrated investments to strengthen neighborhoods. Topics 3-5 above are addressed in other sections of the literature review as noted.

Social and Political Participation

The measures often used to gauge social and political participation include voting in national, state, and local elections, supporting specific candidates (either volunteering or through donations), and calling or writing elected officials. In addition, an individual might demonstrate social participation through joining volunteer organizations (Rohe and Lindbland, 2013). After reviewing and analyzing the available research, Rohe and Lindbland conclude that **there's reason to believe that homeownership may lead to increases in both voting and participating in civic organizations**.

Rohe and Lindblad (2013) offer two potential explanations for the higher rates of social and political participation among homeowners:

- Compared to renters, homeowners have greater economic investment in their homes, thus it is reasonable to expect that they will be more likely to participate in both political and social activities to protect and, ideally, improve their investment (Cox, 1982); and
- Compared to renters, homeowners become more emotionally attached to their homes and neighborhoods (Logan and Molotch, 1987).

While both explanations are plausible, Dietz and Huarin (2003) observe that there are issues related to the direction of causality that make it difficult to assess these hypotheses. For example, it could be the case that people who are predisposed toward civic engagement may be more likely to want to buy homes and establish themselves within a community.

Recent efforts to investigate the link between homeownership and political and social participation have attempted to address this limitation through controlling for selection bias. For example, DiPasquele and Glaeser (1999), using data from the U.S. General Social Survey, addressed selection bias using an instrumental variable approach and also controlled for length of tenure. They found that, compared to renters in the sample, **homeowners were 16% more likely to vote in local elections**. More recently, researchers Manturuk, Lindbland, and Quercia (2009), analyzed data collected for the Community Advantage Program (CAP[31]) and also found that homeowners were more likely to have voted in recent local elections. They also found that homeowners in disadvantaged neighborhoods were more likely to vote than owners in other areas. The authors address selection bias through a bivariate probit model to account for an overlapping set of variables that predict both the probability of homeownership and the probability of voting. They then use the predicted probability of homeownership (the dependent variable) from the first model as an independent variable in the second model that predicts voting.

McCabe (2013) looks beyond voting patterns to investigate whether homeowners are more likely to be involved in neighborhood groups and civic associations. The author analyzes data from the November supplement of the Current Population Survey and finds that, after controlling for residential tenure, **homeowners are 1.28 times more likely to become involved in a neighborhood group and 1.32 times more likely to join a civic association**. In addition, McCabe finds that there is a 65% chance that a homeowner will vote in a local election compared to 54% for renters. The author addresses selection bias through performing robustness checks that compare the homeownership effect to a set of placebo measures.

Not all studies, though, find a positive association between homeownership and social and political participation. In an attempt to capture additional measures of social and political participation while also controlling for selection bias, Englehardt et al. (2010) examined a program designed to subsidize savings for home purchases for low-income renters through Individual Development Accounts[32]. The authors are able to estimate the social benefits of

[31] CAP is a secondary mortgage market program developed out of a partnership between the Ford Foundation, Fannie Mae, and Self-Help, a leading community development financial institution located in Durham, NC. To qualify for the program, participants had to meet one of the following criteria: 1) have an annual income of no more than 80% of the Area Median Income (AMI), 2) be a minority with an income not in excess of 115 percent of AMI, or 3) purchase a home in a high-minority (over 30% minority residents) or low-income (below 80% of AMI) census tract and have an income not in excess of 115% of AMI (Manturuk, Lindbland, and Quercia, 2009).

[32] The field experiment was conducted in Tulsa, Oklahoma from 1993 to 2003.

homeownership in a probit regression analysis because low-income renters were randomly chosen to receive the subsidy. Contrary to the studies mentioned above, the authors found those who bought homes were no more likely to vote in local elections or to engage in other political activities, including writing a letter or supporting a candidate with time or money. It should be noted, though, that the study sample was relatively small (437 renters who were in non-subsidized housing at baseline) and geographically limited to Tulsa, Oklahoma.

Neighborhood Perceptions and Social Capital

In general, the available research associates homeownership with "higher levels of neighborhood satisfaction, friendship formation, attachment, cohesion, trust, and social capital." (Rohe and Lindbland, 2013). These perceptions may well have consequences. Sampson, Raudenbush and Earls (1997), for example, demonstrated that positive perceptions of neighbors lead to reductions in violent crime.

While studies find an association between homeownership and positive neighborhood perceptions, no studies have explored empirically whether homeowners' higher satisfaction with their neighborhood is simply a rationalization made to justify their large financial purchase. They also do not control for selection bias that would arise if homeowners choose their neighborhoods in a selective way that influences neighborhood outcomes (Rohe and Lindbland, 2013). For example, a homeowner might select a neighborhood of peers with similar political beliefs, which might also influence their neighborhood satisfaction.

In addition to selection bias, measurement error and level of analysis are particular concerns in studies that link homeownership to neighborhood perceptions because survey questions no longer focus on the individual respondent. Rather, study participants must shift their attention to their neighbors and neighborhood by, for example, both rating their general trust of neighbors and gauging the likelihood that neighbors would return lost money (Rohe and Lindbland, 2013). Grinstein-Weiss et al. (2011) adjust for this measurement error by utilizing multi-level modeling to capture multiple respondents within particular neighborhoods. They asked lower-income households to rate their neighborhood as a place to raise children to measure neighborhood satisfaction. Those in the sample that were homeowners responded more positively, after controlling for neighborhood characteristics such as stability and disadvantage.

While social capital is defined in a variety of ways throughout the research, authors Manturuk, Lindblad, and Quercia (2010) use a measure which they call a resource generator to measure overall and neighborhood-specific social capital. They define social capital as social resources a person can access through contacts with others in his or her social networks, and neighborhood-specific social capital as the number of contacts that live in their neighborhood. The authors find that **homeowners have more total social capital resources and more neighborhood social capital resources than renters**.

Impacts of Concentrated Investments in Homeownership

To explore the effects of homeownership on neighborhood impacts, research has looked at neighborhood revitalization efforts that employ housing-based strategies. To study whether such efforts produce positive impacts on neighborhood outcomes, HUD launched the Homeownership Zone demonstration in 11 cities: Baltimore, Maryland; Buffalo, New York; Cleveland, Ohio; Louisville, Kentucky; Philadelphia, Pennsylvania; Sacramento, California; Flint, Michigan; Indianapolis, Indiana; New York City, New York; San Juan, Puerto Rico; and Trenton, New Jersey. Applicants were required to concentrate homeownership investments in particular neighborhoods and sell at least 51 percent of the homes to low- or moderate-income households.

An interim report of the Homeownership Zone evaluation found that before the initiative, the demonstration cities were characterized by low rates of homeownership, large tracts of vacant or abandoned property, high crime rates, and poor reputations. At the time of data collection for the interim report, published in 2007, most sites were several years from completion yet still demonstrated positive outcomes, including waiting lists for new homes to be built, visible improvement in housing conditions, increased local public-private partnerships, and $273 million in additional funds invested in Homeownership Zone sites (Exceed Corporation et al., 2007).

To the best of our knowledge, the Homeownership Zone evaluation was never completed, perhaps because the 2008 foreclosure crisis and Great Recession intervened. It is possible that some of the efforts have been evaluated locally but not widely reported. There have been a number of other research studies that explore the effects of housing on neighborhood outcomes, including HOPE VI[33], Healthy Neighborhoods[34], and Living Cities[35] (Turnham and Bonjorni, 2004), but none of these involved the same intensity of homeownership development as the Homeownership Zone demonstration. Another challenge is that research on these initiatives has struggled with developing appropriate outcome and impact measurements of neighborhood improvement and instead have focused primarily on measuring outputs such as housing production figures (Turnham and Bonjorni, 2004). This is evident in the interim evaluation of HUD's Homeownership Zone Initiative, which reports only on housing units

[33] Goal: Revitalization of distressed housing and surrounding neighborhoods through a focus on public housing revitalization with expected spillover effect on the neighborhood. This includes 193 grants with funding from 1993-2002, totalling $5 billion (Turnham and Bonjorni, 2004)

[34] Housing-based strategy focused on resident (rather than CDC) leadership and asset-based approach; main tools are incentives for homeownership and small scale physical improvements to attract people to the neighborhood (Turnham and Bonjorni, 2004).

[35] Goal: CDC capacity-building to effect neighborhood change through funds to support real estate development by CDCs, human capital development programs through CDC/community partnerships, and CDC capacity building (Turnham and Bonjorni, 2004).

constructed, number of units sold to low- and moderate-income buyers, and the racial and ethnic makeup of homebuyers (Exceed Corporation et al., 2007).

In addition to the Homeownership Zone demonstration, an equally ambitious homeownership development program occurred in East Brooklyn. In the 1980s, the East Brooklyn Congregations undertook a major investment in the construction of affordable owner-occupied homes. Dubbed the "Nehemiah plan," the effort ultimately produced over 4,500 homes over 30 years and is widely viewed to have led to a positive transformation of the neighborhoods in which the homes are located, including increased housing values by 23.6 percent relative to the wider district (Deslippe, 2019).

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The environmental benefits of homeownership and home repairs

Residential energy efficiency offers numerous advantages to families, particularly low-income families who often have to choose between paying an energy bill or paying for essentials such as food or medicine. Evidence cited below shows the potential economic and environmental impacts of housing, with a focus on low-income families. Specifically, the literature focuses on the energy efficiency of newly constructed homes, the return on investment of energy-efficient home repairs, the need for investments in residential energy-efficiency, and the implications of location for energy use.

Energy-Efficiency of Newly Constructed Homes

As shown in **Figure 6.1**, **the per-household energy use associated with single-family homes constructed in the 2000s is substantially lower than that of homes constructed before 1960**. The data show a steady reduction in energy use by decade of construction from pre-1950s construction up through the 1980s, followed by increases in the 1990s and 2000s, and then a drop again in the 2010s. The reduced energy consumption may be due to improvements in building codes and energy-efficiency standards, as well as improved energy efficiency of major appliances and lighting. At the same time, larger homes require more energy to heat and cool, which may explain the higher energy use of homes built in the 1990s and 2000s, relative to the 1970s and 1980s. These data come from the Residential Energy Consumption Survey (RECS), a survey fielded by the U.S. Energy Information Administration to a representative sample of households (La Jeunesse, 2017).

Figure 6.1: Household Energy Consumption and Expenditures by Year of Construction, 2015

Year of construction	US energy consumption per household in 2015 (million Btu)	US energy expenditures per household in 2015
Before 1950	88.7	$1,901
1950 – 1959	84.4	$1,861
1960 – 1969	75.0	$1,756
1970 – 1979	70.3	$1,765
1980 – 1989	65.7	$1,747

1990 – 1999	78.3	$1,937
2000 – 2009	78.2	$2,013
2010 – 2015	67.0	$1,755

Source: Table CE1.1, 2015 RECS (available here)

A number of policy implications flow from these data:

- All else being equal, the construction of new homes is a way to reduce per-household energy consumption and utility costs.
- To the extent that newly built homes are larger than earlier homes, however, the increased energy use associated with the larger buildings could offset improvements resulting from energy-efficient construction.
- **Households living in older homes (built before 1960) have substantially higher energy use than households living in more recently constructed homes, which could lead to hardship affording utility costs**.

Return on Investment of Energy-Efficient Home Repairs

Energy-efficiency home repairs can lead to reductions in energy use, greenhouse gases and utility costs, as well as improvements in comfort. A report prepared by the Oak Ridge National Laboratory in 2014 provides one of the most rigorous efforts to measure the economic return on energy-efficiency investments through an impact assessment of the U.S. Department of Energy's Weatherization Assistance Program during program years 2007, 2008, and 2009 (Blasnik, et al., 2014). The Weatherization Assistance Program was created to increase the energy efficiency of dwellings owned or occupied by low-income individuals and families to reduce their total residential energy expenditures and improve their health and safety. The program specifically targets vulnerable populations, including the elderly, those with disabilities, families with children, high residential energy users, and households with high energy burden.

The impact assessment conducted by Blasnik and co-authors identified a representative sample of clients served by the program using data from the Department of Energy, grantees, and subgrantees. These data allowed the authors to characterize program participants in terms of housing unit type, geography, households demographics, housing unit characteristics, and program services. The authors also collected energy usage information from energy suppliers and through direct metering in clients' homes. The study compared pre- and post-repair energy usage to develop statistical estimates of net energy impacts associated with the specific repair, while also projecting measures of lifetime and energy costs to estimate the cost savings for households served and the cost effectiveness of the program.

Broadly speaking, the Weatherization Assistance Program includes two steps:

1. Extensive testing of a client's home to identify cost-effective energy saving opportunities; and
2. Home repair installation matched to the needs of each home, including specifically:
    a. Bypass Air Sealing (79% Installation Rate)
    b. Attic Insulation (70%)
    c. Wall Insulation (29%)
    d. Furnace Replacement (22%)
    e. Refrigerator (13%)
    f. Water Heater Replacement (9%)

The study reports information on energy cost savings and cost effectiveness under two scenarios:

1. Impact on program year 2008 clients; and
2. Projected impact of a program implemented in program year 2013 using energy price projections (because the study focused on program years 2007-2009).

Figures 6.2 and 6.3 present the findings for each scenario, disaggregated by the type of Heating Fuel used in a home that received a repair. Each scenario presents variations on the same theme: that **home repairs provided through the program reduce energy costs significantly, leading to significant annual savings as a percentage of annual energy-related costs**. Moreover, the cost effectiveness of the program (calculated through comparing the net present value of lifetime energy cost savings to the energy measure costs) are high, estimated to be **$1.47 of lifetime savings to a household for every $1 invested for the overall program**. Importantly, these savings are projected to be sustained in future years (**Figure 6.3**).

Figure 6.2: Program Year 2008 WAP Energy Impacts for Single Family Homes by Main Heating Fuel

	Annual Energy Costs			Annual Savings (first year)			
Heating Fuel	**Fuel**	**Electric**	**Total$**	**Fuel**	**Electric**	**Total$**	**% Savings**
Natural Gas	$996	$952	$1,948	$178	$61	$239	12.3%
Electricity	-	$1,796	$1796	-	$187	$187	10.4%
Fuel Oil	$2,402	$1,106	$3,510	$396	$65	$461	13.1%
Propane	$2,457	$996	$3,453	$407	$69	$476	13.9%
Other	$850	$917	$1,767	$141	$61	$201	11.4%
All Clients	**$1,155**	**$1,124**	**$2,279**	**$198**	**$84**	**$283**	**12.4%**

Other heating fuels include wood, kerosene, and coal.

Figure 6.3: Projected Program Year 2013 Energy Impacts for Single-Family Homes by Main Heating Fuel

	Annual Energy Costs			Annual Savings (first year)			
Heating Fuel	**Fuel**	**Electric**	**Total$**	**Fuel**	**Electric**	**Total$**	**% Savings**
Natural Gas	$799	$1,102	$1,811	$142	$65	$208	11.5%
Electricity	-	$1,852	$1,852	-	$192	$192	10.3%
Fuel Oil	$2,606	$1,156	$3,762	$430	$68	$497	13.2%
Propane	$1,968	$1,062	$3,030	$326	$74	$399	13.2%
Other	$925	$967	$1,892	$153	$64	$217	11.5%
All Clients	**$1,027**	**$1,182**	**$2,209**	**$175**	**$88**	**$264**	**11.9%**

Other heating fuels include wood, kerosene, and coal.

In addition to utility cost savings, **residential energy efficiency represents the largest source of potential greenhouse gas reduction**. According to a report by NRDC and Energy + Environmental Economics (E3), the single largest source of CO2 equivalent emissions from a single intervention is residential energy efficiency (Gowrishankar & Levin, 2017). As an expert blog post concerning the report highlights, **more efficient appliances and lighting, building shells, and behavioral changes in a residential setting can account for 500 million metric tons of CO2 equivalent reductions annually by 2050, which is equal to the combined electric power emissions of California, Texas, New York, Florida, Illinois, and Virginia in 2016** (Shahyd, 2017).

The Need for Investments in Residential Energy-Efficiency

There is a significant need for energy-efficient improvements in older homes. According to findings from the Residential Energy Consumption Survey (RECS)[36], as of 2015, 17% of single-family homes built prior to 1980 were still reported to have 'poor insulation' and only 11% had received an energy audit (La Jeunesse, 2017). By contrast, a recent profile of newly constructed homes (built after 2009) showed only 1% of residents reporting 'poor insulation', and nearly 90% of new homes come with double- or triple-pane windows (La Jeunesse, 2017).

The negative consequence of energy inefficiencies in the US housing stock is evidenced by the number of households reporting some form of energy insecurity, including reducing or forgoing food or medicine to pay energy costs, receiving disconnect or delivery stop notice, or leaving the home at a reported unhealthy temperature. According to RECS data, over 31% (37 million) of all US households reported some form of energy insecurity in 2015. **The most common reported form of energy insecurity was reducing or forgoing food or medicine to pay energy costs** (25.3 million households) (Table HC11.1 Household Energy Insecurity, 2015, RECS). As Kuholski et al. highlights, health is indirectly impacted when families pay a disproportionate share of their income for energy bills, including lower general health status, high malnutrition, and more iron deficiency. For example, poor children in northern states had lower caloric intake during the winter than children in higher-income levels (Bhattacharya et al., 2002), and seniors in northern states are more likely to go hungry in late winter and early spring because of increased costs of energy (Nord & Kantor, 2006).

The Implications of Location for Energy Use

In addition to the physical features of a home, where it is built also has significant environmental and climate change implications. A 2011 report illustrating the relationship between household energy consumption and residential development patterns finds that **housing located in a walkable neighborhood near public transit, employment centers, schools, and other amenities allows residents to drive less, thereby reducing transportation costs and household energy consumption**. The report also finds that housing size and type is also a significant determinant of energy consumption, in which single-family attached homes and multifamily units that are common in urban locations are inherently more efficient due to their

[36] EIA administers the Residential Energy Consumption Survey (RECS) to a nationally representative sample of housing units. Traditionally, specially trained interviewers collect energy characteristics on the housing unit, usage patterns, and household demographics. For the 2015 survey cycle, EIA used web and mail forms, in addition to in-person interviews, to collect detailed information on household energy characteristics. This information is combined with data from energy suppliers to these homes to estimate energy costs and usage for heating, cooling, appliances and other end uses — information critical to meeting future energy demand and improving efficiency and building design. More information can be found at this website: https://www.eia.gov/consumption/residential/about.php

compact size and shared walls among units (see **Figure 6.4**) (Jonathan Rose Companies, 2011).

Figure 6.4: Location Efficiency: Household and Transportation Energy Use by Location

Source: Jonathan Rose Companies, 2011

Reducing transportation costs through providing affordable housing near transit is particularly impactful for low-income individuals and families. Nationally, **for every dollar a working family saves on housing, it spends 77 cents more on transportation as most families locate far from their place of work in search of lower cost housing** (Lipman, 2006). Moreover, a study of 28 metropolitan areas found that families with incomes between $20,000 and $50,000 spent 29.6% of their income on transportation, compared to just over 20% of all households. Thus, providing affordable housing near transit disrupts the tradeoff many low-income families face between affordable housing and high transportation costs (Lipman, 2006).

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Conclusion

In this strategic review of the literature on potential outcomes associated with affordable homeownership and home repairs, numerous themes have emerged that are particularly relevant to Habitat's work.

While home equity represents nearly 60% of the net worth of the typical Black or Hispanic homeowner, homeownership rates of Black and Hispanic households are well below that of white households, a gap that remains largely unexplained after controlling for income. The financial crisis in 2007-2008 resulted in historic levels of foreclosures that disproportionately impacted Black and Hispanic borrowers, resulting in the complete erasure between 2006 to 2015 of all homeownership gains Black families experienced from 1994 to just before the crisis. The loss of a home due to foreclosure has significant adverse effects beyond economic loss, including increased levels of depression and suicide, and that foreclosure rates were dramatically lower among borrowers with safe and affordable mortgages. Housing affordability has become more of a problem for a larger share of households in recent years, and low-income families face tradeoffs between housing and other expenses, including notably nutritious food and health care expenditures.

Housing quality has wide ranging effects on the health and well-being of homeowners, and is strongly predictive of children's emotional and behavioral functioning and lower cognitive skills, yet persistent housing conditions such as leaky roofs, peeling paint, structural problems, chronic dampness, improperly vented combustion appliances, and poor ventilation disproportionately affect families with limited incomes because of their lack of affordable housing choices. Such effects extend to educational outcomes for children, including developmental and educational deficits associated with lead paint and school absences associated with asthma. Moreover, improving housing quality has wide-reaching environmental benefits that translate into significantly lower energy costs, though low-income households still often face higher repair costs as compared to middle and upper-income households.

Beyond housing quality, the location of a home offers both environmental and economic benefits. Housing located in walkable neighborhoods near public transit reduces transportation costs and household energy consumption, yet many low-income families are priced-out of these locations and are forced to move further outside their place of work, offsetting any housing savings with increased transportation costs.

Finally, frequent residential moves are disruptive to a child's education and often lead to interruptions in instruction, extended absenteeism, and chaotic environments not conducive to studying, while moving to a low-poverty neighborhood has a positive impact on college attendance and quality for children, though only for those who moved before the age of 13. For

older children, by contrast, moves to lower-poverty areas can be detrimental to school success, possibly due to the disruption of the move.