May 2020

RENTAL HOUSING

As More Households Rent, the Poorest Face Affordability and Housing Quality Challenges

Accessible Version

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Why GAO Did This Study

Since the 2007–2009 financial crisis, growth in the share of renter households has reversed a decades-long trend toward homeownership. This change has underscored concerns about the availability, affordability, and condition of rental housing, especially for low-income households. The federal government subsidizes rents for around 4.4 million households per year, but more households qualify for assistance than receive it.

GAO was asked to provide a comprehensive assessment of the housing market. This report examines trends in the housing market prior to the COVID-19 pandemic and does not account for the profound impact it will likely have on renter households. This report, one of several GAO plans to issue, focuses on rental housing from 2001 through 2017 and analyzes (1) the share of households that rent, (2) the affordability of rental housing, and (3) rental housing conditions.

GAO analyzed American Community Survey and American Housing Survey data from 2001 through 2017 (the most recent data available at the time of this review) at the national level and for different types of localities. GAO also reviewed recent reports by the Department of Housing and Urban Development (HUD), research organizations, and academic researchers on rental housing and obtained views from a variety of stakeholders selected for their knowledge of these issues, including federal agency officials, academic experts, research organizations, and industry groups.

View GAO-20-427. For more information, contact Daniel Garcia-Diaz at (202) 512-4529 or garciadiazd@gao.gov.
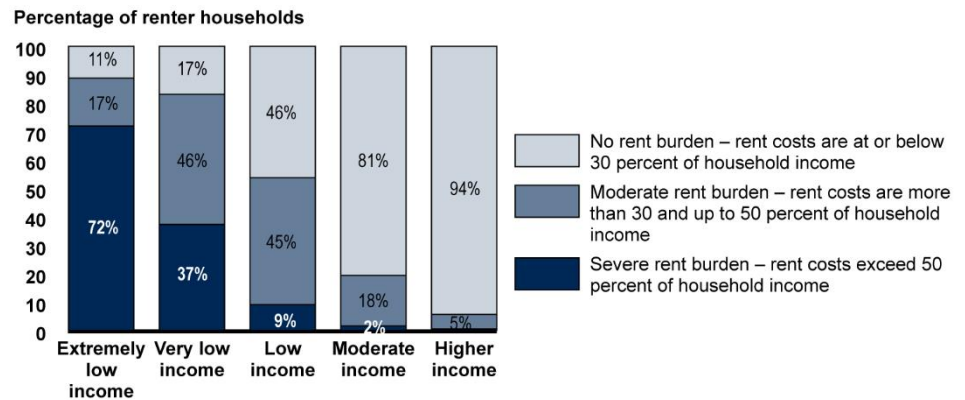
What GAO Found

In 2017, almost 7 million more households rented their homes than in 2001, which brought the share of households that rent from an estimated 34 percent to 36 percent. Renting became more common after the 2007–2009 financial crisis as foreclosures and changes in household characteristics reduced the proportion of homeowners. Renting was more prevalent across most age and race/ethnicity groups in 2017 than in 2001, with notable increases among higher-income households.

Rental affordability declined from 2001 to 2017. In 2017, 48 percent of renter households were rent burdened—that is, they paid over 30 percent of income for rent—which is 6 percentage points higher than in 2001. Rent burden was most common and most severe among lower-income households (80 percent or less than area median income), with almost three-quarters of extremely low-income households (30 percent or less than area median income) paying over half of their income in rent (see figure). Affordability declined because of a range of factors, including more households competing for rental units and the supply of low-cost rental units not keeping up with demand.

Estimated Percentage of Renter Households with Rent Burdens by Income in 2017

Percentage of renter households

Income	No rent burden	Moderate rent burden	Severe rent burden
Extremely low income	11%	17%	72%
Very low income	17%	46%	37%
Low income	46%	45%	9%
Moderate income	81%	18%	2%
Higher income	94%	5%	

No rent burden – rent costs are at or below 30 percent of household income

Moderate rent burden – rent costs are more than 30 and up to 50 percent of household income

Severe rent burden – rent costs exceed 50 percent of household income

Source: GAO analysis of American Community Survey data from the Department of Housing and Urban Development. | GAO-20-427

Note: Estimates in this figure have a margin of error of ±2 percentage points or fewer, at the 95 percent confidence level.

An estimated 15 percent of rental units in 2017—more than 5 million—had substantial quality issues (such as cracked walls and the presence of rodents) or lacked essential components of a dwelling (such as heating equipment or hot and cold running water), according to GAO's analysis of American Housing Survey data. The share of units with deficiencies was relatively stable from 2001 to 2017. Serious deficiencies more often affected households with extremely low incomes or rent burdens. In addition, lower-income households rented approximately two-thirds of the units with substantial quality issues and nearly 80 percent of units lacking essential components.

United States Government Accountability Office

Contents

Figures

Abbreviations

AHS	American Housing Survey
HAMFI	Department of Housing and Urban Development area median family income
HUD	Department of Housing and Urban Development
RUCA	rural-urban commuting area

U.S. GOVERNMENT ACCOUNTABILITY OFFICE

May 27, 2020

Congressional Requesters

Since the 2007–2009 financial crisis, growth in rentership—that is, the share of households that rent—has reversed a decades-long trend toward homeownership. Although a majority of U.S. households still own their homes, the larger number of renters has led to increased competition for rental housing. These changes have given rise to concerns about the availability and affordability of rental housing, especially for households with low incomes. While the federal government subsidizes rents for around 4.4 million households per year, housing assistance is not an entitlement, and more households qualify for assistance than receive it.[1]

You requested that we conduct a comprehensive assessment of the U.S. housing market, including whether the housing market is meeting the needs of the American people. This report examines trends in the housing market prior to the Coronavirus Disease 2019 pandemic and does not account for the profound impact it will likely have on renter households. We have ongoing work that will examine implementation of foreclosure and eviction protections authorized in recent legislation. This report, one of several we plan to issue, focuses on rental housing from 2001 through 2017, the most recent year for which data were available at the time of our review. Specifically, this report analyzes trends in (1) the share of households that rent and their characteristics, (2) the affordability of rental housing, and (3) rental housing conditions.

To describe trends in the share of households that rent, their characteristics, and the affordability of rental housing, we analyzed the Census Bureau's American Community Survey data from 2001 through 2017, reviewed recent reports on rental housing, and obtained views from a variety of stakeholders, including federal agency officials, academic experts, research organizations, and industry groups. For renter household characteristics, we analyzed data on renter household age, race/ethnicity, and income at the national level and by locality type (that

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[1]See GAO, *Rental Housing Assistance: HUD Should Strengthen Physical Inspection of Properties and Oversight of Lead Paint Hazards,* GAO-20-277T (Washington, D.C.: Nov. 20, 2019) and *Housing Choice Vouchers: Options Exist to Increase Program Efficiencies*, GAO-12-300 (Washington, D.C.: Mar. 19, 2012).

is, areas we grouped by population density and growth rate).[2] For affordability, we analyzed data on household rent costs and household incomes. Appendix I provides more detail on the data used in our analysis. Consistent with other research and Department of Housing and Urban Development (HUD) policies, we defined rent burden as spending more than 30 percent of household income on rent and severe rent burden as spending more than 50 percent of household income on rent.[3]

To describe trends in rental housing conditions, we analyzed American Community Survey data and American Housing Survey data from HUD and Census, reviewed recent reports by federal agencies and research organizations on rental housing conditions, and obtained views from federal agency officials, academic experts, and research organizations. We created two indexes to analyze American Housing Survey variables related to housing conditions and identified trends at the national level and for different types of localities.[4] HUD and others have analyzed aspects of housing quality from American Housing Survey data. Their research helped inform our methodology for developing two indexes to more specifically define the range of rental housing conditions. Appendix II provides more information about our indexes.

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[2]We defined four head-of-household age categories as younger (20–34 years old), early middle age (35–49 years old), late middle age (50–64 years old), and older (65 and older). The Census Bureau defines race as a person's self-identification with one or more social groups. An individual can report as White, Black or African American, Asian, American Indian and Alaska Native, Native Hawaiian and Other Pacific Islander, or some other race. Survey respondents may report multiple races. Ethnicity determines whether a person is of Hispanic origin or not and is broken out in two categories, Hispanic or Latino and Not Hispanic or Latino. Hispanics may report as any race. For ease of analysis, we combined some Census categories and reported on five race/ethnicity categories: White; Black; Hispanic (an ethnicity that applies to individuals of any racial background); Asian (includes Asian, Native Hawaiian, and Other Pacific Islander); and Other (includes American Indian, Alaska Native, two or more races, and some other race). We defined five income categories: extremely low income (up to 30 percent of HUD area median family income (HAMFI)); very low income (more than 30, up to 50 percent of HAMFI); low income (more than 50, up to 80 percent of HAMFI); moderate income (more than 80, up to 120 percent of HAMFI) and higher income (greater than 120 percent of HAMFI).

[3]Rent burden is the share of household income used to pay gross rent, which includes rent and utility costs.

[4]We determined that two indexes were needed to describe rental housing unit conditions based on American Housing Survey data, as relevant variables fell into two categories that required different statistical treatment and interpretation. We developed a quality index based on a factor analysis of 13 quality-related variables and a completeness index based on the presence of nine variables we identified as essential components of a dwelling.

We assessed the reliability of the American Community Survey data and American Housing Survey data by reviewing technical information for each survey and interviewing HUD and Census Bureau officials. We determined the data were sufficiently reliable for purposes of reporting at the national level on some renter household characteristics and rental housing conditions for 2001 through 2017, but we identified limitations to reporting for smaller geographies. To address this limitation, we obtained aggregated Census Bureau data from HUD's Office of Policy Development and Research. To assess the reliability of the data, we analyzed the underlying programming code and related documentation from agency officials and reviewed the data for missing elements, outliers, and errors. We determined that the data were sufficiently reliable for purposes of analyzing renter household characteristics, rent burden, and rental housing conditions from 2001 through 2017 at the national level and for different types of localities.

To describe common trends across similar types of localities for all of our objectives, we developed metro area groupings based on population change over our review period and population density, as of 2017. We identified three growth categories (high, moderate, and negative) and further categorized the moderate growth group by density (high and moderate). We also identified a group of nonmetro areas consisting of all counties in selected states that are outside the boundaries of any metro area.[5] See table 1 for a summary of the different types of areas we used for our analysis. Appendix I contains more information on our approach for grouping metro areas.

Table 1: Types of Localities by Population Growth 2000–2017 and Density, as of 2017

Locality type	Definition	Description
High-growth metro areas	Metro areas that grew in population by more than 35 percent between 2000 and 2017	Fast-growing, moderate-density metro areas where new housing has been comparatively less costly to build than in other areas.

[5]We analyzed American Community Survey data for core-based statistical areas by population in 2000 and 2017 and by population density as of 2017. To identify the nonmetro group, we analyzed 2017 American Community Survey data by county and calculated nonmetro county population information for each state.

Locality type	Definition	Description
Moderate-growth/high-density metro areas	Metro areas with population growth of up to 35 percent between 2000 and 2017, with more than 950 people per square mile	Growing, older, and dense cities where new housing has generally been costly to develop.
Moderate-growth/ moderate-density metro areas	Metro areas with population growth of up to 35 percent between 2000 and 2017, with fewer than 950 people per square mile	A diverse group of growing metro areas with a wide range of housing types, availability, and cost.
Negative-growth metro areas	Metro areas that lost population or had no population growth between 2000 and 2017	Generally older cities that may have a surplus of existing, older housing.
Nonmetro areas	Counties within each state that are outside the boundaries of any metro area	Micropolitan areas, rural areas, and small towns.

Source: GAO analysis of American Community Survey data. | GAO-20-427

We conducted this performance audit from February 2018 to May 2020 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

Federal policy for rental housing has traditionally focused on assisting low-income households through rental assistance and incentives for the development of housing with below-market rents. In fiscal year 2020, Congress appropriated about $43.9 billion for HUD's three largest federal rental assistance programs: public housing, Housing Choice Vouchers, and Project-Based Rental Assistance. These programs make rents affordable to eligible households, generally by paying the difference between the unit's rent and 30 percent of a household's adjusted income.

Unlike certain other means-tested programs, federal rental assistance programs are not entitlements. The number of households that the programs can assist is limited by the amount of budget authority that HUD requests and Congress provides through the annual appropriations

process.[6] Historically, appropriations for rental assistance programs have not been sufficient to assist all households that HUD has identified as having worst case housing needs—that is, renter households that (1) have very low incomes; (2) do not receive housing assistance; and (3) use more than one-half of their income to pay for rent, live in severely inadequate conditions, or both.[7] In 2017, HUD reported that 8.3 million households had worst case needs in 2015, an increase from 7.7 million in 2013. HUD reported that among very low-income renters in 2015, 25 percent of them received rental assistance, and an additional 43 percent had worst case needs.

To determine program eligibility and identify populations in need of assistance, many federal rental assistance programs have specific income eligibility requirements. HUD sets income limits that determine eligibility for its assistance programs based on median family income and market rent estimates. These income limits can vary across different types of localities.

Renting Became More Common after the 2007–2009 Financial Crisis but Varied by Demographic Group and Location

Renting Expanded after the Financial Crisis

The national rentership rate increased from 2001 through 2017 (see fig. 1). In 2004, the estimated rentership rate fell below 33 percent, the lowest in U.S. history, then climbed to 37 percent in 2013, a rate not seen since the 1960s. By 2017, almost 7 million more households rented their homes than in 2001, which brought the rentership rate to an estimated 36 percent.

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[6]Budget authority is the authority federal law provides to enter into financial obligations that will result in immediate or future outlays involving federal government funds.

[7]These households have incomes no more than 50 percent of the area median income. Department of Housing and Urban Development, *Worst Case Housing Needs: 2017 Report to Congress* (Washington, D.C.: August 2017).

Figure 1: Estimated Percentage of Households That Rent, 2001–2017
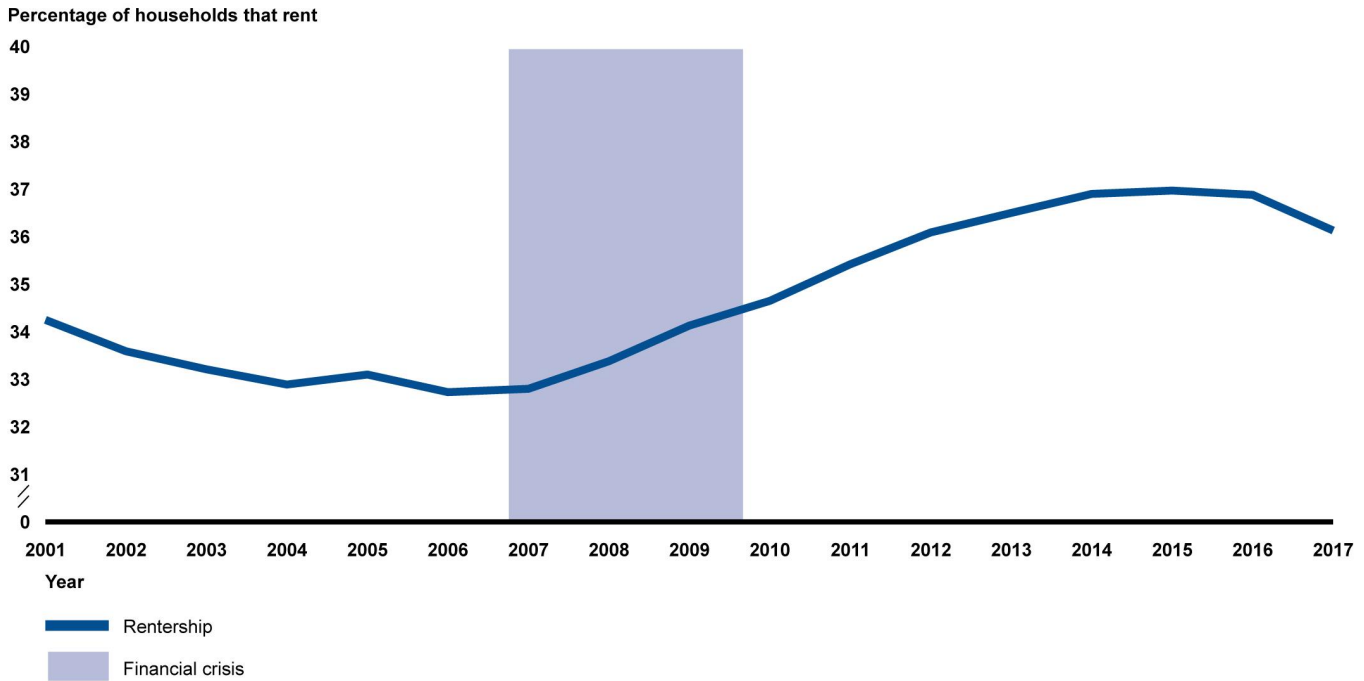
Percentage of households that rent

Rentership

Financial crisis

Source: GAO analysis of American Community Survey data from the Department of Housing and Urban Development. | GAO-20-427

Note: Estimates in this figure have a margin of error of ±1 percentage point or less, at the 95 percent confidence level.

This increase of 7 million households reflects both overall growth in the population as well as the net shift from owning to renting. Many households experienced lasting financial effects of the financial crisis, such as impaired credit or loss of income, which hampered their ability to enter into or transition back into homeownership. Although the national foreclosure rate has slowed significantly in recent years, past research has shown that most households struggle to return to homeownership after foreclosure.[8] Further, median home prices have risen faster than

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[8]According to one study, from 2007 through 2017, only one-quarter of foreclosed households were able to become homeowners again, taking an average of 4 years to do so. See T. Piskorski and A. Seru, "Debt Relief and Slow Recovery: A Decade After Lehman," National Bureau of Economic Research Working Paper No. 25403 (2018). In addition, the National Association of Realtors forecasted that less than one-third of households who lost homes to foreclosure between 2006 and 2014 would return to homeownership. See Ken Fears, "Return Buyers: Many Already Here, Many More to Come," *Economists' Outlook* (National Association of Realtors: Apr. 17, 2015).

median incomes nationally, which makes achieving homeownership more challenging. Specifically, the gap between rising home prices and wage growth has likely contributed to increases in rentership in many metro areas.[9]

Renting Became More Prevalent among Most Age Groups, with Notable Increases among Middle-Aged Households

Nationally, the rentership rate increased from 2001 through 2017 across all age categories we analyzed, except for older households (65 years or older), as shown in figure 2. The greatest increase was among early middle-aged households (35–49 years old), an estimated increase of nearly 8 percentage points. In addition, rentership for late middle-aged (50–64 years old) and younger (20–34 years old) households increased by 5 percentage points.

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[9]For example, according to one study, renting a three-bedroom property was less expensive than purchasing a median-priced home in 59 percent of U.S. metro areas studied. See ATTOM Data Solutions. "Renting a Home More Affordable Than Buying in 59 Percent of U.S. Housing Markets." January 8, 2019. Accessed October 4, 2019. https://www.attomdata.com/news/most-recent/attom-data-solutions-2019-rental-affordability-report/.
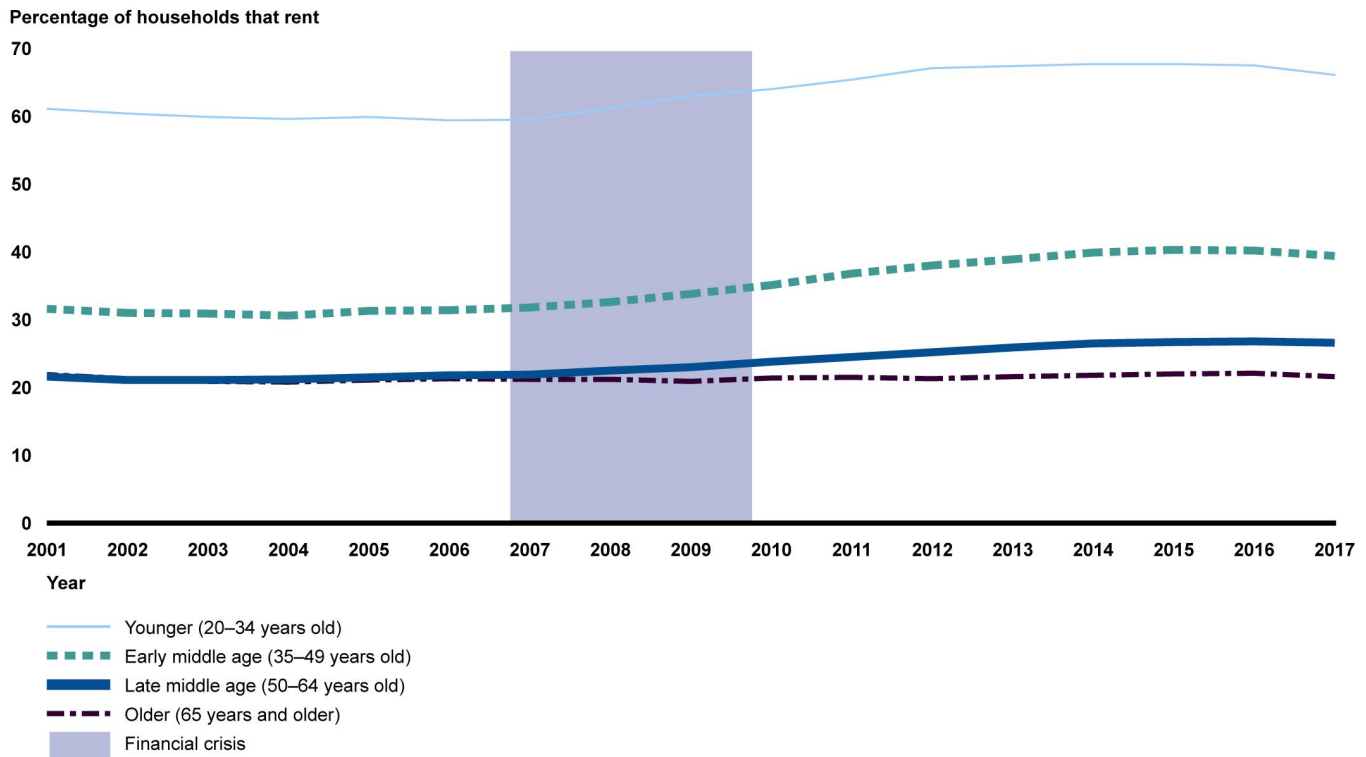
Figure 2: Estimated Rentership Rates by Age Group, 2001–2017

Percentage of households that rent

Source: GAO analysis of American Community Survey data from the Department of Housing and Urban Development. | GAO-20-427

Note: Estimates in this figure have a margin of error of ±1 percentage point or less, at the 95 percent confidence level.

Renters are, on average, older than they previously were. The late middle-aged group (50–64 years) experienced the largest estimated increase in the number of renter households—an increase of 4 million households—and accounted for more than half of the total increase in renter households from 2001 through 2017 (see fig. 3). Many of these households have not recovered from the financial crisis, and this group has lower incomes and higher rentership rates than in previous generations, Harvard's Joint Center for Housing Studies has reported. We previously reported that the homeownership rate for the poorest older

households was significantly lower after the financial crisis than before it.[10]

Figure 3: Estimated Number of Renter Households by Age Group, 2001 and 2017

Number of renter households (in millions)

Source: GAO analysis of American Community Survey data from the Department of Housing and Urban Development. | GAO-20-427

Note: Estimates in this figure have relative margins of error of ±2 percentage points or fewer, at the 95 percent confidence level.

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[10]Specifically, we analyzed the estimated percentage of older households (those in which the household head or any spouses or partners were aged 55 or older) that owned a home from 1989 through 2016. The homeownership rate for households in the bottom quintile in each year of our analysis was consistently much lower than for the other quintiles—ranging between 18 and 32 percent. Further, the homeownership rate for households in the bottom 20 percent was significantly lower in 2016 (19 percent) than in 2007 (28 percent). Differences in the percentage of households that owned a home from 2007 through 2016 were statistically significant at the 95 percent confidence level for the bottom two quintiles of our analysis. See GAO, *Retirement Security: Income and Wealth Disparities Continue through Old Age*, GAO-19-587 (Washington, D.C.: Aug. 9, 2019).

Renting Became More Common among Black Households and Declined for Hispanic and Asian Households

Black households had higher estimated rentership rates than White, Hispanic, and Asian households, and rentership among Black households increased from 54 percent in 2001 to 58 percent in 2017 (fig. 4). In contrast, rentership among White households was lowest among the race/ethnicity groups and remained generally stable during our analysis period (ranging from 26 to 29 percent from 2001 through 2017). While rentership among Hispanic and Asian households increased slightly in the aftermath of the financial crisis, as of 2017, their rentership rates had returned to levels below those of 2001, although these rates were still higher than those of White households.[11]

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[11]The estimated rentership rates for Black, Hispanic, and Asian households in 2017 were all significantly higher than the rate for White households at the 95 percent confidence level.

Figure 4: Estimated Rentership Rates by Race and Ethnicity, 2001–2017
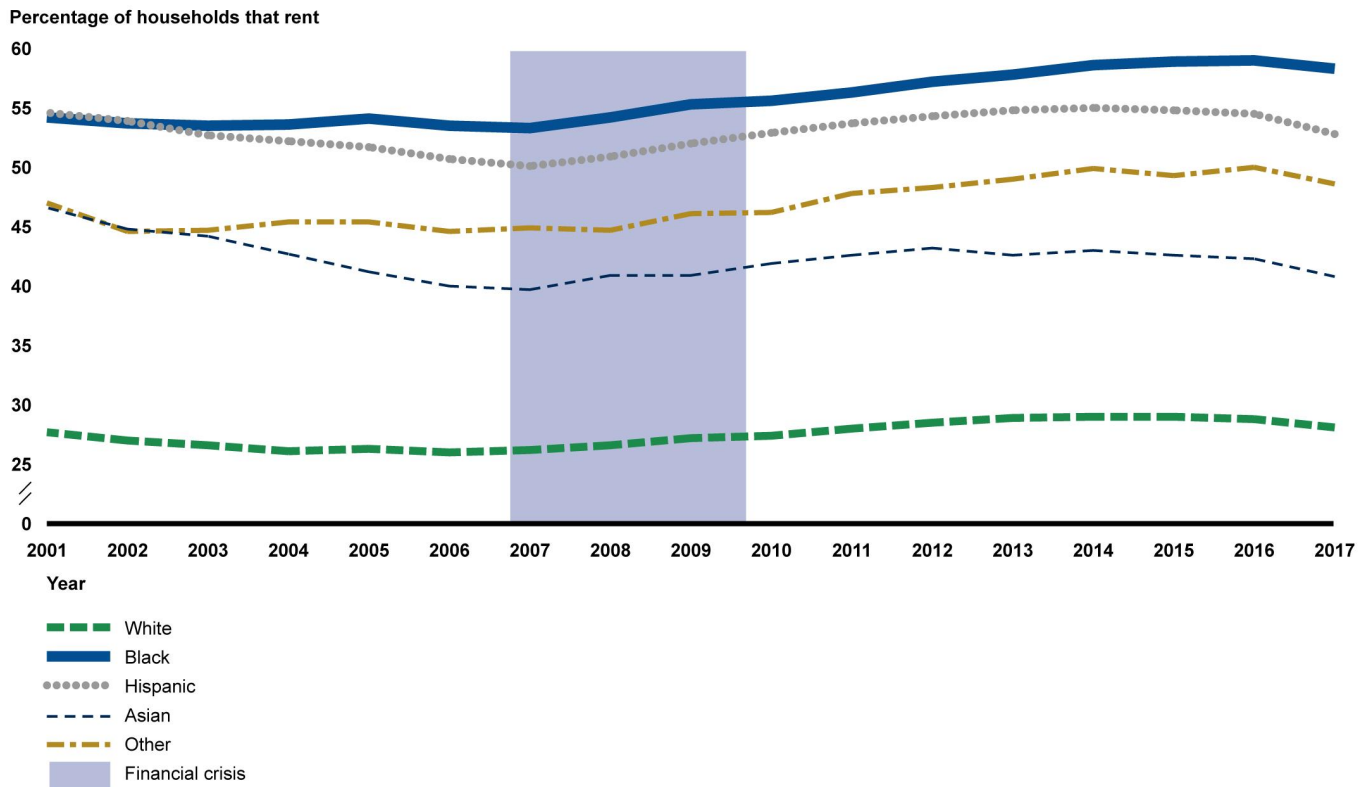
Source: GAO analysis of American Community Survey data from the Department of Housing and Urban Development. | GAO-20-427

Note: Estimates in this figure have a margin of error of ±3 percentage points or fewer, at the 95 percent confidence level.

As of 2017, high-growth and moderate-growth/high-density metro areas we analyzed tended to have more racially diverse renter populations than other areas, and renters in these metro areas were mostly from minority groups. For example, in Dallas, Texas, which is high-growth, an estimated 59 percent of renter households were minority households, and in Miami, Florida, which is moderate-growth/high-density, an estimated 75 percent of renter households were minority households.[12]

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[12]According to the Census Bureau, these estimates have a margin of error of ±0.7 percentage points, at the 90 percent confidence level.

Higher-Income Renter Households Increased Substantially after 2010

The most significant change in rentership from 2001 through 2017 by income group was for higher-income households (more than 120 percent of area median income), with the greatest change between 2010 and 2017. Nationally, higher-income households were the second smallest renter group in 2001, with an estimated 6.6 million households, or 17 percent of renter households. In 2017, higher-income households were the second largest renter group, with approximately 10.3 million households, approximately 20 percent of renter households (see fig. 5).

Figure 5: Estimated Number of Renter Households by Household Income, 2001–2017
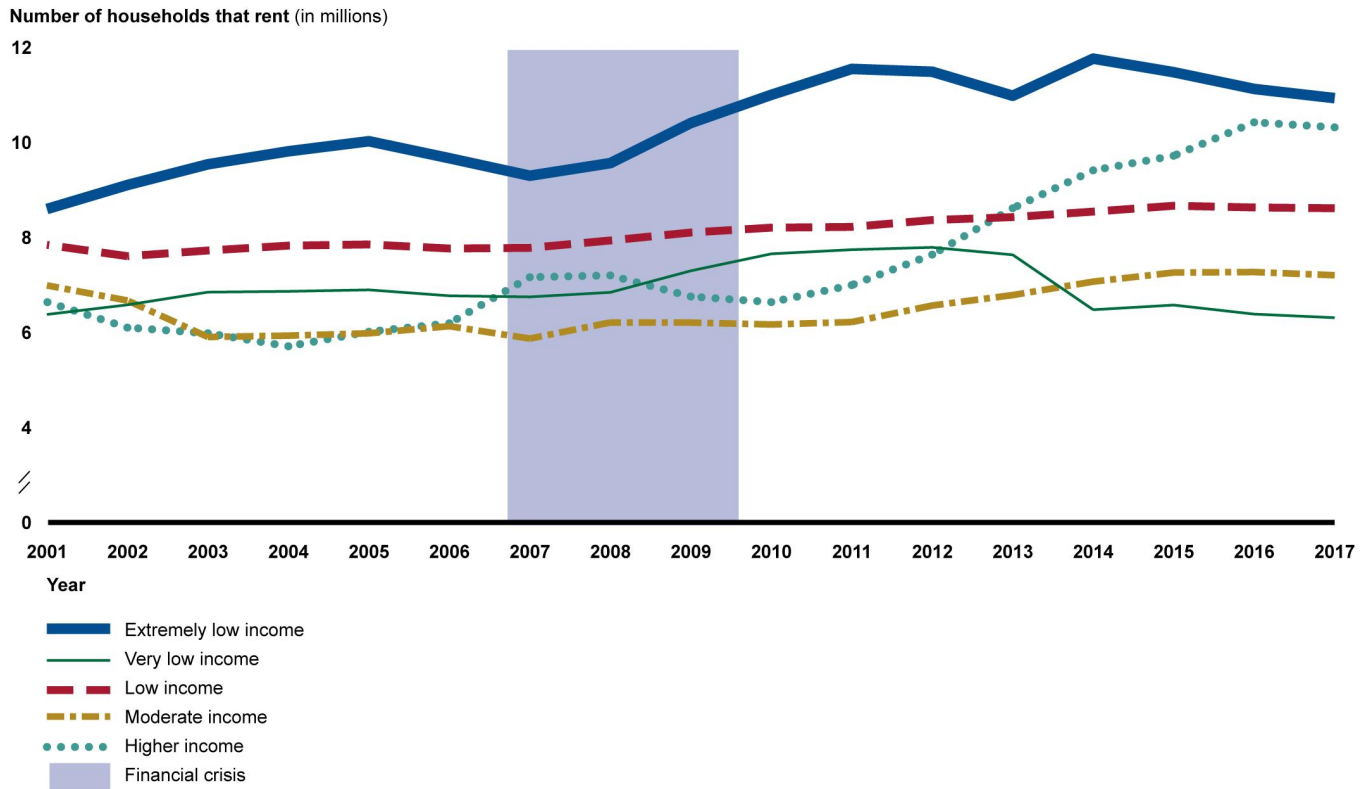
Number of households that rent (in millions)

Legend:
- Extremely low income
- Very low income
- Low income
- Moderate income
- Higher income
- Financial crisis

Source: GAO analysis of American Community Survey data from the Department of Housing and Urban Development (HUD). | GAO-20-427

Notes: Estimates in this figure have a relative margin of error of ±2 percentage points or fewer, at the 95 percent confidence level.

Extremely low income is defined as up to 30 percent of HUD area median family income (HAMFI); very low income as more than 30, up to 50 percent of HAMFI; low income as more than 50, up to 80

percent of HAMFI; moderate income as more than 80, up to 120 percent of HAMFI, and higher income as greater than 120 percent of HAMFI.

HUD revised the extremely low-income definition in 2014 to include all households below the federal poverty threshold. This classified some very low-income households as extremely low-income.

Consistent with national trends, in all locality types—that is, those with higher and lower population density or rates of growth—the estimated number and proportion of higher-income renter households increased from 2001 through 2017 (see fig. 6). The greatest increase occurred in high- and moderate-growth metro areas. This trend could reflect (1) a change in income, (2) relocation from moderate-growth/high-density metro areas, and (3) consolidation of households—such as having multiple roommates, extended families occupying one housing unit, or households doubling up with relatives or others to make ends meet.[13]

There were modest changes in the number and proportion of low-income households during the same period. Rural areas and metro areas with shrinking populations had the highest proportion of renter households with low incomes as of 2017—for example, an estimated 63 percent of renters in negative-growth metro areas had low to extremely low incomes.

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[13]We were unable to identify changes in income or relocation information at the household level from the aggregated Census Bureau data we analyzed.

Figure 6: Estimated Change in Renter Households by Income and Locality Type, 2001–2017
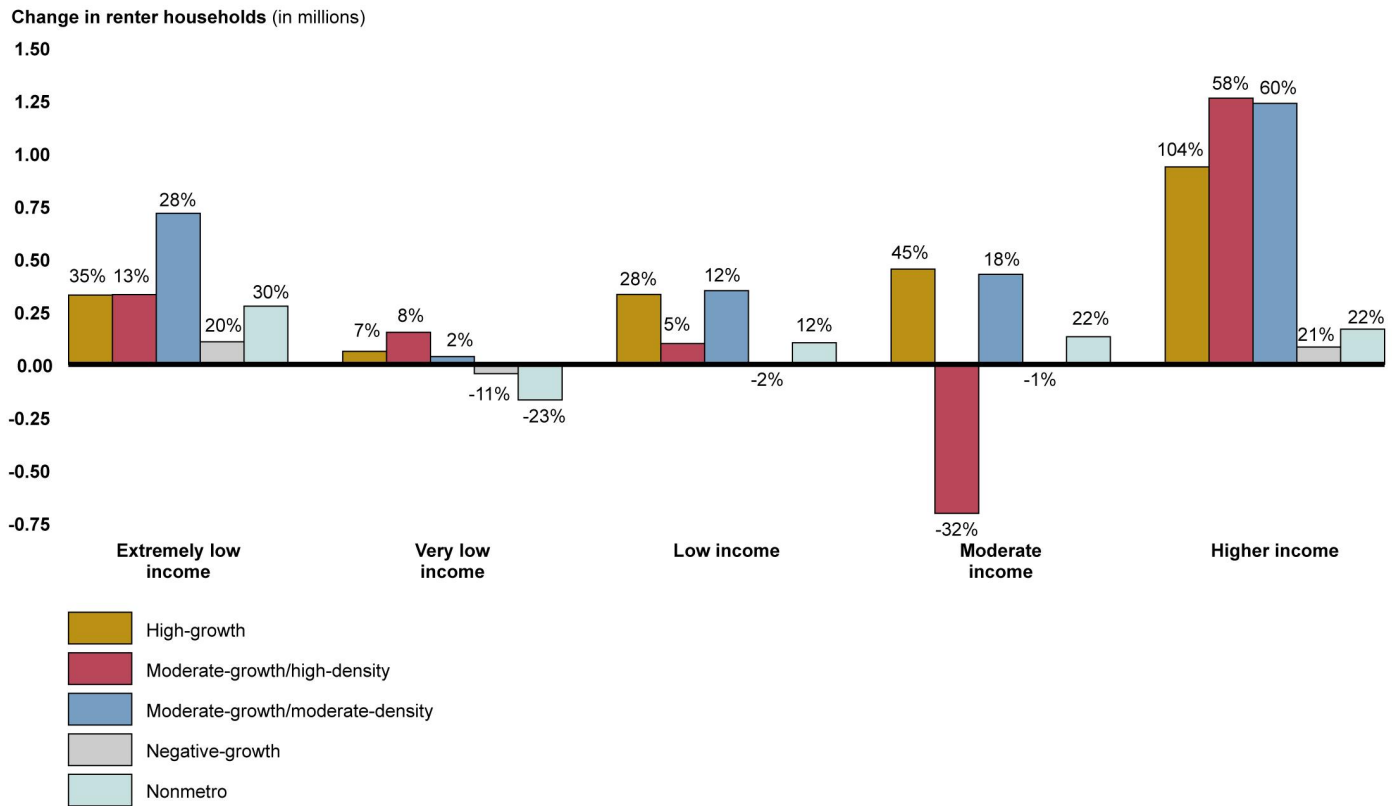
Source: GAO analysis of American Community Survey data from the Department of Housing and Urban Development (HUD). | GAO-20-427

Notes: We categorized locality types based on population growth and density. Estimates of the percent change in renter households in this figure have a margin of error of ±11 percentage points or fewer at the 95 percent confidence level. The largest margins of error occur in the higher income and nonmetro categories.

Bar height denotes the absolute change in renter households 2001–2017; data point at the end of each bar denotes percent change in that group of renter households 2001–2017.

Extremely low income is defined as up to 30 percent of HUD area median family income (HAMFI); very low income as more than 30, up to 50 percent of HAMFI; low income as more than 50, up to 80 percent of HAMFI; moderate income as more than 80, up to 120 percent of HAMFI, and higher income as greater than 120 percent of HAMFI.

HUD revised the extremely low-income definition in 2014 to include all households below the federal poverty threshold. This classified some very low-income households as extremely low-income.

Population growth and two other factors appear to have contributed to the growth in higher-income renter households. First, many homeowners who experienced foreclosure during the financial crisis became renters. Second, with rising housing costs, there has been a trend toward

consolidated households.[14] The share of households with three or more adults was higher in 2017 than in 2001.[15] Some of these households may have chosen to combine as an alternative to eviction or homelessness, and they may have overcrowded or unstable living arrangements.[16]

Rent as Share of Income Increased from 2001 through 2017, with Serious Consequences for the Poorest

The Percentage of Rent-Burdened Households Increased from 2001 through 2017

Most renter households paid a larger share of their income in rent in 2017 than in 2001. Federal housing policy generally considers rents at or below 30 percent of household income to be affordable, and households that pay more than 30 percent of income in rent are considered to be rent burdened. We found that by 2017, an estimated 48 percent of renter households were rent burdened, 6 percentage points higher than in 2001. Severe rent burden, where more than 50 percent of household income is paid in rent, also became more common. Of the households that were rent burdened in 2017, about half were severely rent burdened. These households represented 24 percent of all renter households—an increase of 4 percentage points from 2001 (see fig. 7).

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[14]For example, Harvard's Joint Center for Housing Studies reported that the number of shared renter households doubled from 4.6 million to 9.2 million between 1987 and 2017, based on an analysis of Current Population Survey data. See Joint Center for Housing Studies of Harvard University, *The State of the Nation's Housing* (Cambridge, Mass.: Joint Center for Housing Studies of Harvard University, 2018).

[15]Household income is determined by combining the incomes of all adults in a rental unit. For example, a group of low-income adults living together could have a combined household income in the higher-income category.

[16]For example, see Giselle Routhier, "Beyond Worst Case Needs: Measuring the Breadth and Severity of Housing Insecurity Among Urban Renters," *Housing Policy Debate*, vol. 29, no. 2 (2019): 235-249.

Figure 7: Estimated Percentage of Renter Households by Rent Burden in 2001 and 2017
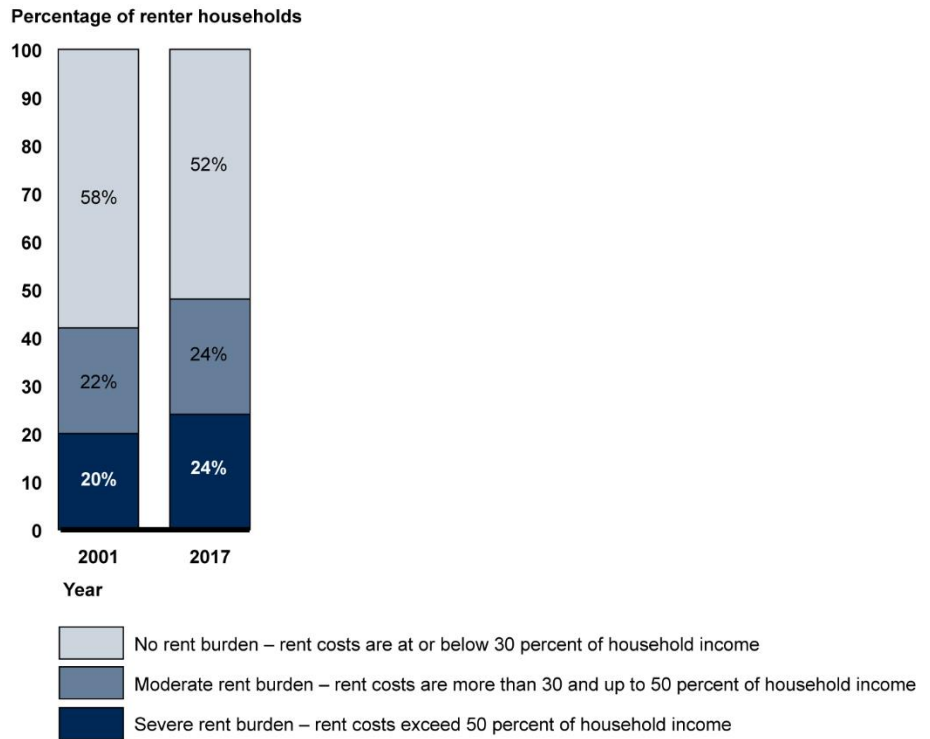
Percentage of renter households

No rent burden – rent costs are at or below 30 percent of household income

Moderate rent burden – rent costs are more than 30 and up to 50 percent of household income
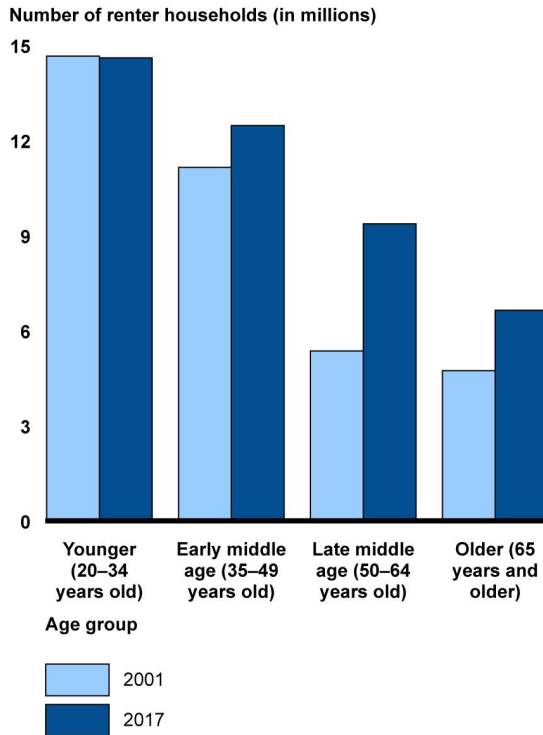
Severe rent burden – rent costs exceed 50 percent of household income

Source: GAO analysis of American Community Survey data from the Department of Housing and Urban Development. | GAO-20-427

Note: Estimates in this figure have a margin of error of ±2 percentage points or fewer, at the 95 percent confidence level.

The rising rent burden is part of a long-term trend in rental unaffordability, as supply has not kept pace with demand for rental units. With fewer affordable apartments available, rent burdens increased among lower-income households, who were forced to spend a greater proportion of income on rent. Government, academic, and industry research has identified several factors that contribute to this trend:

- Local regulation and geography have long constrained where and how much rental housing can be built. Cities have adopted zoning and land use regulations that can prohibit or increase costs for new rental units. Metro areas, particularly those in coastal or mountainous regions, have limited available land for new housing.

- Construction of new rental units has been limited since the 2007–2009 financial crisis, in part because developers struggled to rebuild

workforce capacity after layoffs of skilled construction workers. As a result, since 2009, the construction industry has focused on building luxury apartments, which have higher profit margins, and produce few units affordable to lower-income households. Conversion of lower-rent units to higher-rent units through renovation also reduced the number and share of rental units affordable to lower-income households.

- Demographic changes, particularly the aging of the millennial and baby boomer generations, have increased demand for rental units. As previously discussed, we found that renters were, on average, older in 2017 than in 2001. In addition, Harvard's Joint Center for Housing Studies has reported that late middle-age renters (50–64 years) have lower incomes and higher rentership rates than previous generations. Populations with higher rentership rates—including minority households—are forecasted to continue growing through 2030.[17]

- The spike in foreclosures during the financial crisis resulted in millions of households entering the rental market, increasing competition for available units. Tighter credit standards after the financial crisis have kept many of those who lost their home due to foreclosure from qualifying for a new mortgage.

In the United States, rent burden has been most common among minorities and older adults and in dense metropolitan areas (see fig. 8):

- Rent burden was about 10 percentage points more common among Black and Hispanic households than White households in 2017. This disparity was due to sizable differences in median income. In 2017, estimated median income was $63,704 for White households, $49,793 for Hispanic households, and $40,232 for Black households.

- Rent burden was more than 10 percentage points more common among older adult (65 and over) households than working-age (20–64) households in 2017. This disparity was also due to sizable differences in median income, as older adults were less likely to be in the workforce. In 2017, median income was $69,459 for households age 25–64 and $43,735 for households age 65 and over.[18]

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[17]Laurie Goodman, "The Demographics of Demand," *Mortgage Banking* (October 2015).

[18]According to the Census Bureau, household income includes not just earnings for each household member but also income from Social Security, interest, dividends, and many other sources.

- Rent burden was nearly 10 percentage points more common among renters in high-density metro areas than in nonmetro areas in 2017. According to the Urban Institute, the shortage of affordable rental housing was more acute in urban areas than rural areas in 2014.[19]

See appendixes III and IV for more detailed information on rent burden by age, race/ethnicity, and locality type.

Figure 8: Rent Burden among Selected Demographic Groups and Locality Types in 2017
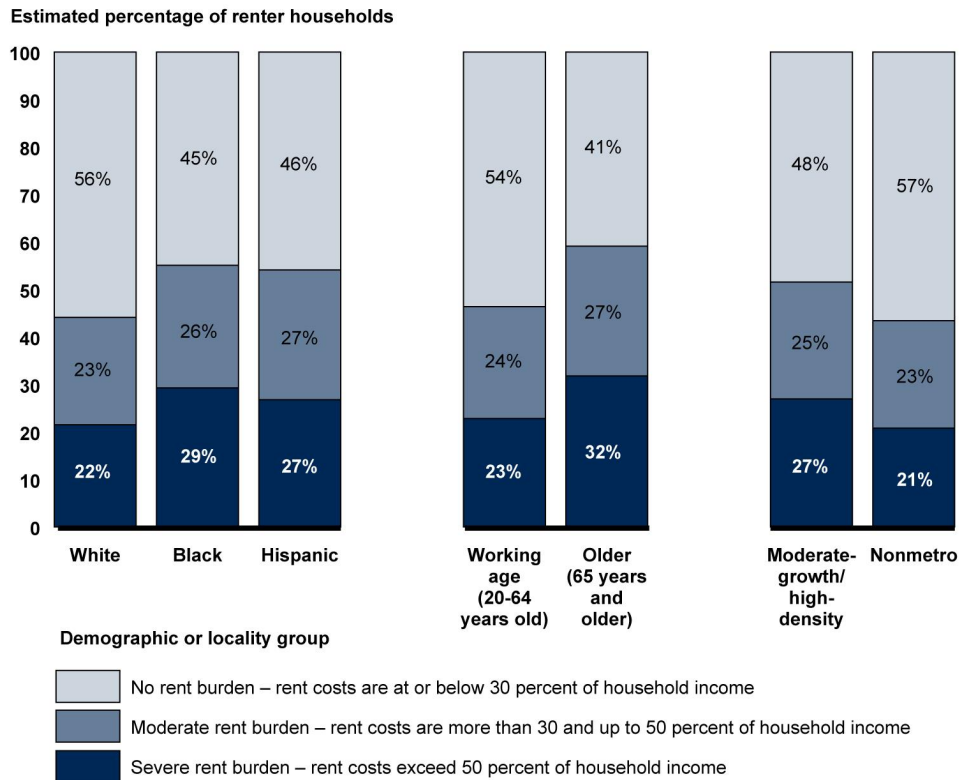
Estimated percentage of renter households

No rent burden – rent costs are at or below 30 percent of household income

Moderate rent burden – rent costs are more than 30 and up to 50 percent of household income

Severe rent burden – rent costs exceed 50 percent of household income

Source: GAO analysis of American Community Survey data from the Department of Housing and Urban Development. | GAO-20-427

Note: Estimates in this figure have a margin of error of ±2 percentage points or fewer, at the 95 percent confidence level.

[19]In 2014, rural counties had 69 adequate and affordable units available for every 100 extremely low-income renters, compared with 42 units in metropolitan counties. See Liza Getsinger, Lily Posey, Graham MacDonald, Josh Leopold, and Katya Abazajian, *The Housing Affordability Gap for Extremely Low-Income Renters in 2014* (Urban Institute, April 2017).

Lower-Income Households Commonly Experienced High Rent Burdens from 2001 through 2017

In 2017, moderate and severe rent burdens were common among low- to extremely-low income households and relatively rare among moderate- to higher-income households (see fig. 9).

Figure 9: Estimated Percentage of Renter Households with Rent Burdens by Income in 2017

Percentage of renter households

	Extremely low income	Very low income	Low income	Moderate income	Higher income
No rent burden	11%	17%	46%	81%	94%
Moderate rent burden	17%	46%	45%	18%	5%
Severe rent burden	72%	37%	9%	2%	

No rent burden – rent costs are at or below 30 percent of household income

Moderate rent burden – rent costs are more than 30 and up to 50 percent of household income

Severe rent burden – rent costs exceed 50 percent of household income

Source: GAO analysis of American Community Survey data from the Department of Housing and Urban Development. | GAO-20-427

Note: Estimates in this figure have a margin of error of ±2 percentage points or fewer, at the 95 percent confidence level.

From 2001 through 2017, the estimated number of renters with moderate or severe rent burdens increased across all income levels, but the increase was more pronounced among lower-income groups (see fig. 10). Specifically, we found the following:

- The estimated number of higher-income renters increased by more than 3.6 million households from 2001 through 2017, but relatively few of these households experienced rent burden. In contrast, the numbers of low-income, very low-income, and extremely-low income renters also

increased over this period, and these groups saw significant increases in rent burden.

- In more recent years, the estimated number of extremely low-income renter households with severe burden actually decreased—from 7.4 million in 2011 to 6.6 million in 2017. This decrease, however, does not necessarily indicate improved conditions for these households because it was not accompanied by a corresponding increase in either (1) the number of extremely low-income households that were less burdened or (2) the number of very low-income households (the next highest income group). An increase in either of these groups could indicate that the poorest, most burdened households experienced either an increase in income or a decrease in rent burden. However, because these other groups did not increase, it is possible that some of these extremely low-income, severely burdened households moved in with other households or experienced some other form of homelessness.

Figure 10: Estimated Number of Renter Households by Rent Burden and Household Income, 2001–2017
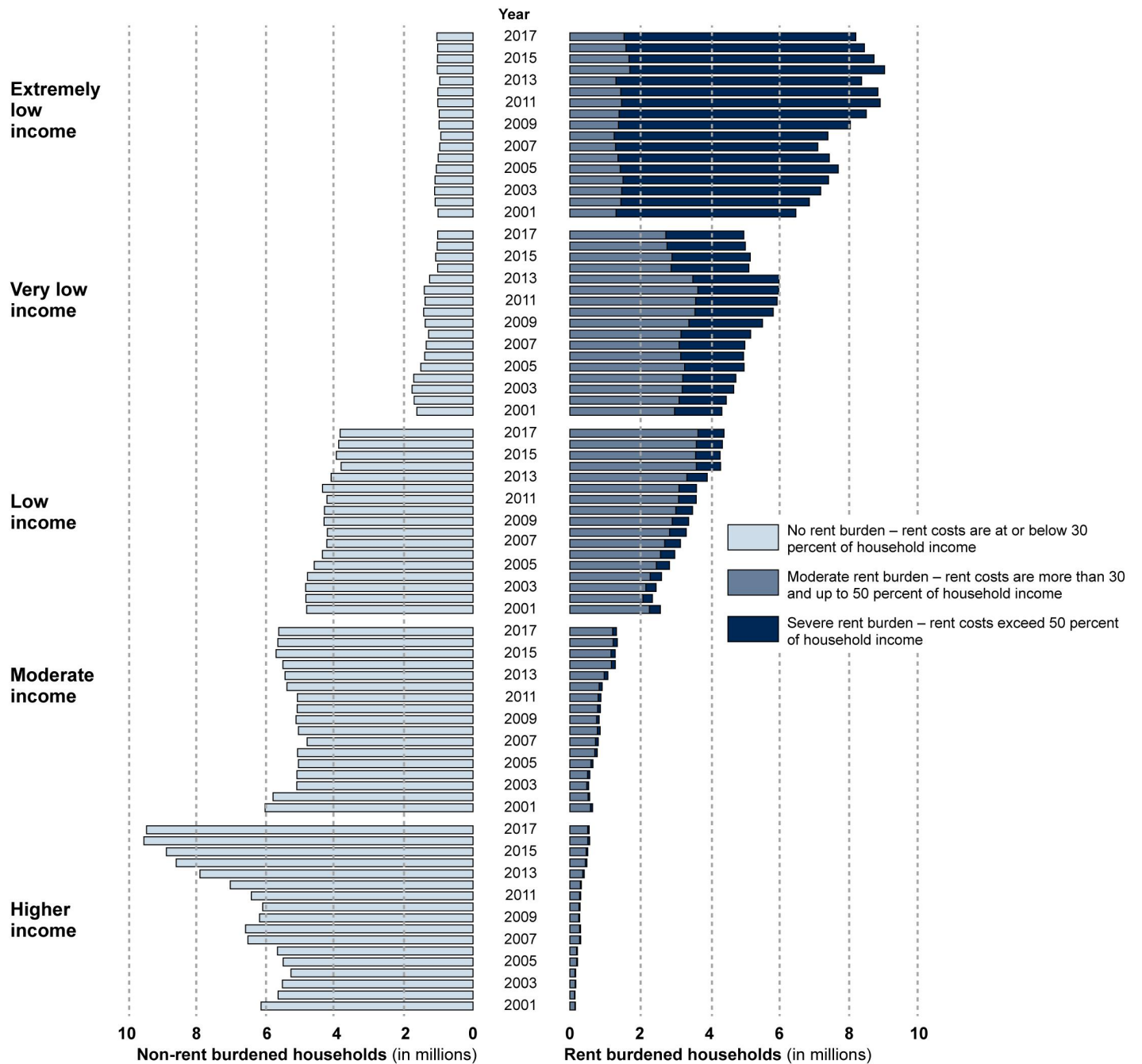
Source: GAO analysis of American Community Survey data from the Department of Housing and Urban Development. | GAO-20-427

Note: Estimated numbers of rental households in this figure include estimates for each year from 2001 through 2017. The estimates have a relative margin of error of ±16 percent or less, at the 95

percent confidence level, with the exception of higher-income rent-burdened households, which have a relative margin of error of ±32 percent or less due to small sample size.

Rent burdens affect households differently depending on their income. Households with lower incomes may pay the same percentage of income in rent as moderate- or higher-income households but have less income left over for other necessities. Even relatively inexpensive units may not leave enough money for lower-income households to cover other necessities like food, clothing, transportation, or medical care. These households may also be sensitive to shocks, such as job loss and health emergencies, and may be at heightened risk of eviction and homelessness.

Challenges that lower-income households face can vary across cities and regions due to differences in local market rents and incomes. For example, as figure 11 shows, in the San Francisco area in 2017 a very low-income family of four would experience a severe rent burden if it paid the fair market rent for a two-bedroom apartment ($3,018 per month).[20] Such a family would struggle to pay the rent and afford other necessities even with two or three full-time minimum wage jobs.[21] In contrast, a very low-income family of four in the St. Louis area in 2017 would experience a moderate or no rent burden if it paid the fair market rent for a two-bedroom apartment ($896). Such a family with at least two full-time minimum wage jobs would have relatively more money left over for other necessities.[22] See appendixes III and IV for more detailed information on rent burden by household income.

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[20]Fair market rents are calculated annually by HUD and generally defined as the 40th percentile gross rent in a local area—typically a metropolitan area or smaller area defined by HUD. Gross rent includes the cost of rent and utilities.

[21]We defined the 2017 hourly minimum wage in San Francisco as the city-level minimum wage for San Francisco. We calculated annual income for a minimum wage job assuming a 40-hour work week for 52 weeks per year.

[22]We defined the 2017 hourly minimum wage in St. Louis as the state-level minimum wage for Missouri. We calculated annual income for a minimum wage job assuming a 40 hour work week for 52 weeks per year.

Figure 11: Rent Burden for Families of Four Who Paid Fair Market Rent in the St. Louis and San Francisco Areas, 2017
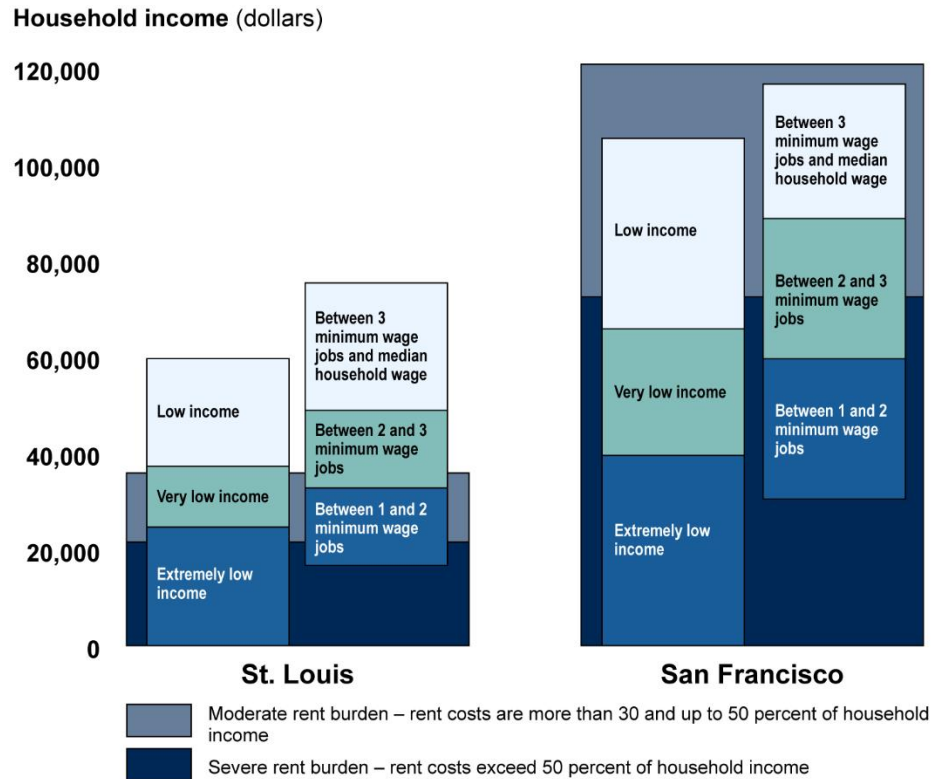
Source: GAO analysis of Census and Department of Housing and Urban Development (HUD) data. | GAO-20-427

Notes: We define median household wage for St. Louis and San Francisco as the HUD fiscal year 2017 estimated median family income for those metro areas, which are calculated based on 2014 American Community Survey 5-year estimates. Fair market rents are calculated annually by HUD and generally defined as the 40th percentile gross rent in a local area—typically a metro area or smaller area defined by HUD. Gross rent includes the cost of rent and utilities. We defined the 2017 hourly minimum wage in St. Louis as the state-level minimum wage for Missouri and the hourly minimum wage in San Francisco as the city-level minimum wage for San Francisco. We calculated annual income for a minimum wage job assuming a 40-hour work week for 52 weeks per year.

For moderate-income households, the consequences of rent burden are less dire than for lower-income households, but they are still significant. For example, a family of four earning the median income in San Francisco that paid fair market rent for a two-bedroom apartment would be rent burdened. A housing unit that would be considered affordable to them would cost at least $135 per month below fair market rent (or approximately $2,882 or less). Money that a family could save on a unit below fair market rate could help reduce household debt, add to retirement savings, or pay for necessities like child care. Rent burden

among moderate-income households tends to be more common in large cities with strong economies and significant geographic and regulatory constraints on new housing, such as San Francisco and New York.

The lowest-income households face challenges securing affordable rental units. There are not enough rental units that are affordable to the lowest-income households without rental assistance. Specifically, according to HUD, lower-income households face competition from moderate- or high-income households to rent affordable units.[23] HUD's analysis showed that although there were enough affordable units nationwide to house 66 percent of extremely-low income renters in 2015, 43 percent of those units were occupied by renters with higher incomes.

We also found that for all income groups, rents rose faster than incomes and therefore became less affordable to varying degrees. Specifically, estimated median rent-to-income ratios, which indicate the median proportion of income devoted to rent, generally increased from 2001 through 2017, according to our analysis (see fig. 12). For the lowest-income households, even small declines in affordability have a big impact because these households face the highest rent burdens and have the fewest options in the housing market. See appendix III for more detailed information on rent-to-income ratios.

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[23]See Department of Housing and Urban Development, *Worst Case Housing Needs 2017 Report to Congress*.

Figure 12: Estimated Median Rent-to-Income Ratio in 2001 and 2017
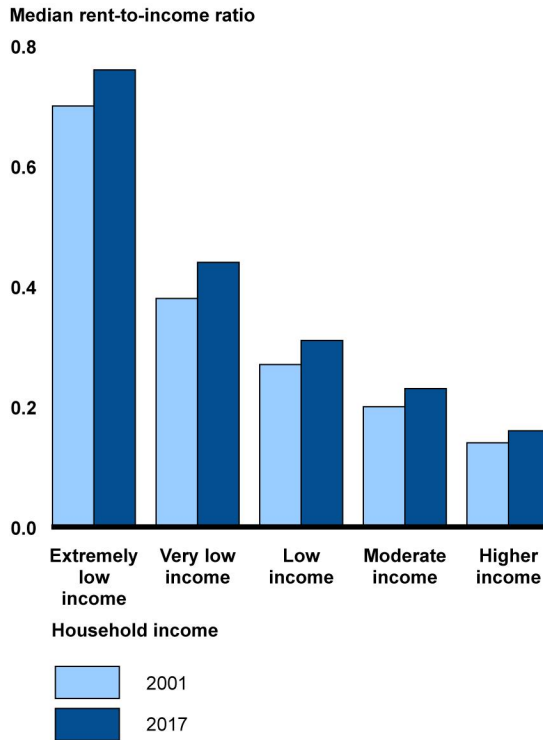
Median rent-to-income ratio

Source: : GAO analysis of American Community Survey data from the Department of Housing and Urban Development (HUD). | GAO-20-427
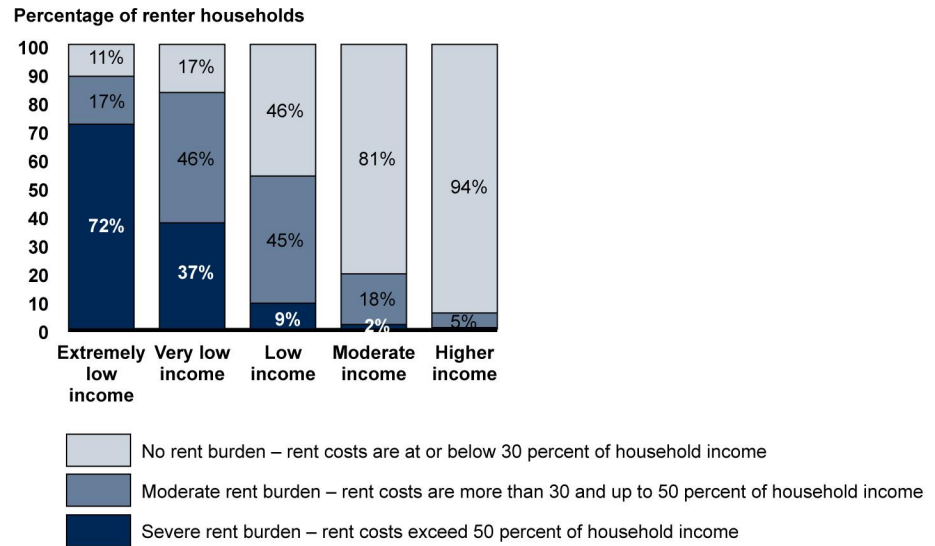
Notes: Estimates in this figure have a margin of error of ±1 percentage point or less, at the 95 percent confidence level.

Extremely low income is defined as up to 30 percent of HUD area median family income (HAMFI); very low income as more than 30, up to 50 percent of HAMFI; low income as more than 50, up to 80 percent of HAMFI; moderate income as more than 80, up to 120 percent of HAMFI, and higher income as greater than 120 percent of HAMFI.

About 15 Percent of Rental Units Had Serious Deficiencies in 2017

Based on two indexes we created to analyze rental housing conditions using American Housing Survey data, we found that an estimated 15 percent of renter households—more than 5 million—lived in units with

serious deficiencies in 2017.[24] Specifically, an estimated 12 percent of renter households (more than 4 million households) lived in units with substantial quality issues. These units typically had a combination of issues, such as cracked walls and the presence of rodents, or multiple heating problems and the presence of rodents.[25] An additional 3 percent of renter households (more than 1 million households) lived in incomplete units—that is, units lacking essential components of a dwelling (such as heating equipment or hot and cold running water). Further, an estimated 28 percent of households—nearly 10 million—rented units with less substantial quality issues. Table 2 presents these findings and how our indexes described different types of rental housing conditions.

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[24]We determined that two indexes were needed to describe rental housing unit conditions based on American Housing Survey data, as relevant variables fell into two categories that required different statistical treatment and interpretation. We developed a quality index based on a factor analysis of 13 quality-related variables, and we developed a completeness index based on the presence of nine variables we identified as essential attributes of a rental unit. App. II includes more detailed information on index variables and our methodology. In addition, app. V describes how our indexes compare to an index that HUD uses to measure housing adequacy.

[25]To avoid double-counting, we excluded incomplete units from our analysis of units in 2017 with substantial quality issues. HUD has noted that a portion of severe physical inadequacies reported in the survey likely result from or reflect maintenance or upgrade activity occurring in occupied housing units. App. II includes more detailed information on index variables and our methodology.

Table 2: Condition of Rental Housing Units Based on GAO's Quality Indexes, 2017

Category	Description	Estimated rental units: Number (in millions)	Estimated rental units: Percentage
Incomplete units	Rental units that lacked one or more essential components of a dwelling: electricity; heating equipment; bathroom sink; toilet; tub or shower; kitchen sink; refrigerator; cooking appliance; or hot and cold running water.	1.06	3
Substantial quality issues	Rental units that were complete but had at least one deficiency among 13 quality-related variables and scored above our modeled statistical threshold for substantial quality issues. The most common profiles were the presence of (1) cracked walls and rodents, (2) uncomfortably cold periods, heating equipment breakdowns, and rodents, or (3) cracked walls and water leaks.	4.34	12
Less substantial quality issues	Rental units that were complete but had one or several deficiencies among the quality-related variables and scored below our modeled statistical threshold for substantial quality issues. The most common profiles were (1) the presence of rodents, (2) the presence of water leaks, or (3) instances of blown fuses or tripped circuit breakers in the last 3 months.	9.88	28
No quality issues	Rental units that were complete and without any deficiencies among the 13 quality-related variables we identified.	20.41	57

Source: GAO analysis of American Housing Survey data. | GAO-20-427

Notes: Estimates of the number of housing units in this table have a relative margin of error of ±6 percent of the estimated number. Estimates of the percentage of housing units in this table have a margin of error of ±2 percentage points or fewer, at the 95 percent confidence level.

We refer to the combination of issues affecting units with substantial or less substantial quality issues as profiles.

The proportion of rental units with the three types of deficiencies— substantial quality issues, less substantial quality issues, and absence of essential components of a dwelling—generally remained stable from 2001 through 2017 (see fig. 13). The proportion of rental units that had at least one of these deficiencies ranged from an estimated 39 to 47 percent from 2001 through 2017.

Figure 13: GAO Quality and Completeness Indexes, Estimated Percentage of Rental Units by Housing Condition, 2001–2017

Estimated percentage of rental units
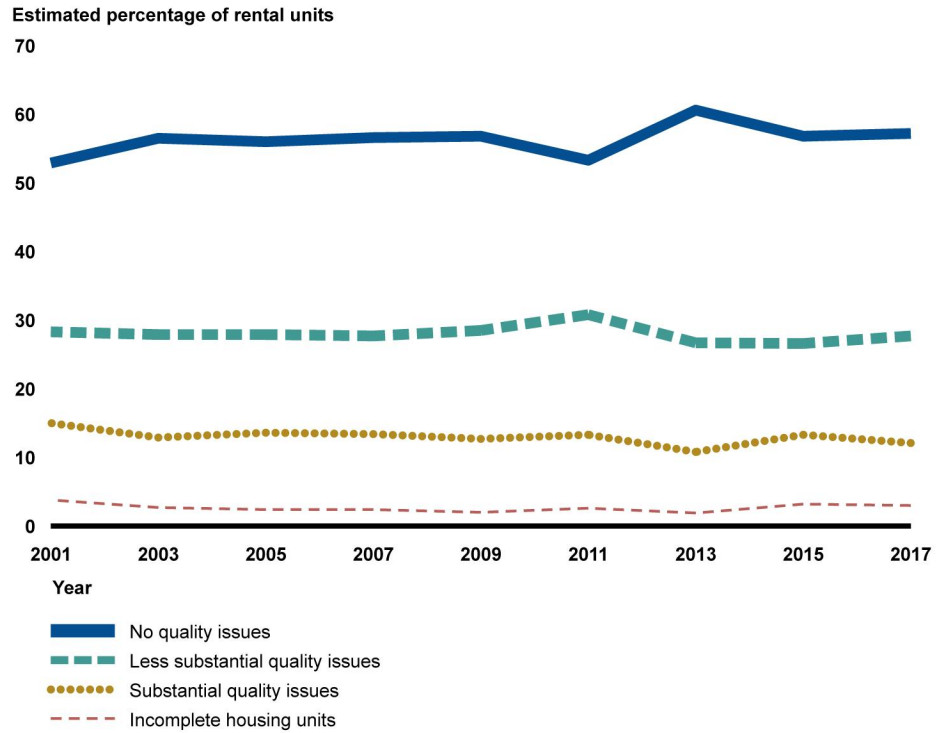
Source: GAO analysis of American Housing Survey data. | GAO-20-427

Notes: We developed two indexes to describe the range of housing conditions based on American Housing Survey data. The quality index, based on 13 quality-related variables, identified units as having no quality issues, less substantial quality issues, and substantial quality issues. The completeness index, based on nine variables we identified as essential components of a dwelling, identified units as being incomplete or complete.

Estimates in this figure have a margin of error of ±3 percentage points or fewer, at the 95 percent confidence level.

Serious Deficiencies More Often Affected Lower-Income and Rent-Burdened Households

We analyzed rental housing conditions by renter household and rental unit characteristics.[26] Households with low incomes (those with low, very low, or extremely low incomes) or with rent burdens comprised half or more of renters living in units with substantial quality issues and incomplete housing units (those lacking essential components of a dwelling). Although incomplete housing units represented a small percentage of rental units overall (about 3 percent), there were more than an estimated 1 million such units in 2017.

Low-income renters have fewer affordable options and, as a result, may end up in units with deficiencies out of necessity. Households with low, very low, or extremely low incomes represented an estimated 62 percent of renters overall in 2017. These households occupied an estimated 67 percent of units that had substantial quality issues and nearly 80 percent of incomplete units. Similarly, rent-burdened households represented an estimated 50 percent of renters overall in 2017 and occupied an estimated 53 percent of units with substantial quality issues and 60 percent of incomplete units.

There were some notable differences in housing conditions by age and race/ethnicity. Older households (65 and older) were the most likely age group to live in rental units with no deficiencies in 2017.[27] About half of renting households were White in 2017, and White households comprised the largest share of renters in each quality or completeness category we analyzed. The proportions of Hispanic and Asian households that rented incomplete units (estimated at 31 percent and 11 percent, respectively) were higher than the overall proportions of Hispanic and Asian renter households (estimated at 20 percent and 6 percent, respectively). In addition, the proportion of Black households that rented units with substantial quality issues (estimated at 24 percent) was slightly higher

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[26]With our indexes, we analyzed the following renter household characteristics: household income and affordability (rent burden), age, and race/ethnicity. In addition, based on an analysis of American Community Survey data, we analyzed household crowding, another renter household characteristic. With our indexes, we analyzed the following rental unit characteristics: unit age and location (locality type) and type of unit—that is, multifamily (2 –9 unit buildings and buildings with 10 or more units), single-family (detached and attached), or mobile home.

[27]We did not include accessibility features (such as grab bars in showers and wheelchair-accessible entrances) in our analysis, as available data were limited.

than the overall proportion of Black renter households (estimated at 21 percent).

Older and Single-Family Rental Units Were More Likely to Have Deficiencies

Rental housing conditions by unit age or type were generally consistent from 2001 through 2017. As expected, units built after 2000 had fewer deficiencies than those built before. Older rental housing—units built prior to 1980—were more likely to have substantial quality issues than those built after. An estimated 63 percent of units in high-growth metro areas had no quality issues as of 2017, compared to an estimated 55 to 57 percent of units in other types of localities. There was little other variation in housing conditions by locality type.

We also found that detached single-family homes and mobile homes were somewhat more likely to have serious deficiencies than multifamily units.[28] The proportion of units with these deficiencies remained relatively steady from 2001 through 2017. One reason for this is single-family units lack on-site building managers and other benefits of shared maintenance that multifamily units may provide. Some researchers and industry participants have noted possible maintenance challenges for a growing number of investor-owners of single-family rentals that manage thousands of properties of varying size, age, and condition.[29] From 2001 through 2017, the proportion of single-family units with serious deficiencies (rental units lacking essential components of a dwelling or units with substantial quality issues) ranged from around 13 to 20 percent (see fig. 14).[30] During the same period, the proportion of single-family

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[28]In 2017, single-family rental units represented an estimated 37 percent of all rental units (more than 13 million units), while multifamily units represented an estimated 60 percent of all units (more than 21 million units). Mobile homes represented an estimated 4 percent (fewer than 1.3 million units). Some differences in quality may be overstated due to American Housing Survey sampling error.

[29]See Emily Badger, "Would You Rather Pay Your Rent to a Bum Landlord or a Wall Street Investor?" CityLab, accessed September 23, 2013, https://www.citylab.com/life/2013/09/would-you-rather-pay-your-rent-bum-landlord-or-wall-street-investor/6985/; William Cohan, "Why Wall Street Loves Houses Again," *The Atlantic* (October 2013); Alana Semuels, "When Wall Street Is Your Landlord," *The Atlantic* (February 2019).

[30]As previously mentioned, we excluded incomplete units from our analysis of units with substantial quality issues to avoid double-counting.

units with less substantial quality issues ranged from an estimated 28 to 34 percent.

Figure 14: GAO Quality and Completeness Indexes, Estimated Percentage of Rental Units with Serious Deficiencies by Housing Type, 2001–2017

Source: GAO analysis of American Housing Survey data. | GAO-20-427

Notes: We developed two indexes to define the range of housing conditions based on American Housing Survey data. The quality index, based on 13 quality-related variables, identified units as having no quality issues, less substantial quality issues, and substantial quality issues. The completeness index, based on nine variables we identified as essential components of a dwelling, identified units as being incomplete or complete. Units with serious deficiencies lacked essential components or had substantial quality issues.

Estimates in this figure have a margin of error of ±4 percentage points or fewer, at the 95 percent confidence level.

We also analyzed household crowding trends based on American Community Survey data. We defined crowded households as those having more than two people per bedroom.[31] From 2001 through 2017, the incidence of renter household crowding decreased, with the greatest percentage point declines for Hispanic households prior to the housing crisis. Generally, households that were younger, Hispanic or Asian, or had lower incomes were more likely to experience crowding. In addition,

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[31]A studio apartment occupied by two people did not meet our crowding definition.

crowded households were more common in high-density and high-growth metro areas. Appendix VI includes information on household crowding by race/ethnicity, age, household income, and locality type.

Agency Comments

We provided a draft of this report to HUD for review and comment. HUD officials told us that they had no comments on the draft report.

As agreed with your offices, unless you publicly announce the contents of this report earlier, we plan no further distribution until 30 days from the report date. At that time, we will send copies of this report to the appropriate congressional committees, the Secretary of Housing and Urban Development, and other interested parties. In addition, the report will be available at no charge on the GAO website at http://www.gao.gov.

If you or your staff have any questions about this report, please contact me at (202) 512-4529 or garciadiazd@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report are listed in appendix VII.

Daniel Garcia-Diaz
Managing Director, Financial Markets and Community Investment

List of Requesters

The Honorable Susan M. Collins
Chairman
Subcommittee on Transportation, Housing and Urban Development, and
Related Agencies
Committee on Appropriations
United States Senate

The Honorable Michael F. Bennet
United States Senate

The Honorable Christopher A. Coons
United States Senate

The Honorable Lindsey O. Graham
United States Senate

The Honorable Tim Scott
United States Senate

Appendix I: Objectives, Scope, and Methodology

The objectives of this report were to analyze trends in (1) the share of
households that rent and their characteristics, (2) the affordability of rental
housing, and (3) rental housing conditions.

Data Used in Our Analysis

We analyzed 2001–2017 data from the American Community Survey and
American Housing Survey to describe renter household characteristics,
rent affordability, rental housing conditions, and trends at the national
level and across different types of localities.

- The American Community Survey is an ongoing survey administered by
the Census Bureau of around 3.5 million households across the United
States; the data we used in our analysis were current as of 2017, the
most recently available data at the time of our review.[32]

- The survey collects data on the economic, social, housing, and
demographic characteristics of communities at various geographic levels,
including metropolitan areas, states, and counties.

- The American Housing Survey is a biennial survey sponsored by the
Department of Housing and Urban Development (HUD) and administered
by the Census Bureau that collects a range of housing information,
including the size and composition of the U.S. housing inventory, physical
condition of housing units, characteristics of occupants, and other
information.

Findings from each survey are subject to sampling errors. To assess the
reliability of the data, we reviewed technical information for each survey.
In addition, we interviewed HUD and Census Bureau officials to identify

[32]The American Community Survey uses a series of monthly samples to produce annually
updated estimates for census tracts across the United States. The survey sample initially
included 800,000 addresses during a demonstration phase starting in 2000 and expanded
to nearly 3 million addresses after being fully implemented in 2005, and it had increased to
more than 3.5 million addresses as of 2017. In recent years, the Census Bureau has
interviewed around 2.2 million people for the survey annually through four different
methods: internet, mail, telephone, and personal visit.

differences across survey years and understand geographic limitations of
publicly available data. We determined that the surveys were sufficiently
reliable for purposes of reporting at the national level on renter household
characteristics. However, we determined that additional, nonpublic data
were needed from each survey to analyze renter household
characteristics, rent burden, and rental housing conditions for smaller
geographic units.

To address this limitation, staff from HUD's Office of Policy Development
and Research provided us with aggregated Census Bureau data. To
assess the reliability of these data, we analyzed the underlying
programming code and related documentation from agency officials and
reviewed for missing data, outliers, and errors. We determined that the
data were sufficiently reliable for purposes of analyzing renter household
characteristics, rent burden, and rental housing conditions from 2001
through 2017 at the national level and for different types of localities.

Locality Types

For all objectives, to describe common trends and differences across
localities—that is, localities with different population growth rates and
densities—we developed metro area groupings. The groupings provide a
general framework for describing metro areas that experienced varying
degrees of population growth from 2000 through 2017 and how trends in
renter household characteristics, rent affordability, and rental housing
conditions compared to trends in other types of areas.

To identify the locality types, we analyzed core-based statistical areas by
population growth from 2000 through 2017 and population density as of
2017.[33] We identified three growth categories (high, moderate, and
negative) and further categorized the moderate growth group by density
(high and moderate). We also identified a group of nonmetro areas
consisting of all counties in each state that are outside the boundaries of

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[33]Core-based statistical area refers collectively to metropolitan statistical areas and
micropolitan statistical areas, which are geographic entities that the Office of Management
and Budget defines for use by federal statistical agencies. A core-based statistical area
consists of the county or counties (or equivalent entities) associated with at least one core
(urbanized area or urban cluster) with a population of at least 10,000, plus adjacent
counties having a high degree of social and economic integration with the core as
measured through commuting ties.

any metro area.[34] These areas included micropolitan areas, small towns, and low-density rural areas.[35] The five locality types were high-growth metro areas, moderate-growth/high-density metro areas, moderate-growth/moderate-density metro areas, negative-growth metro areas, and nonmetro areas.

Renter Household Characteristics

To describe trends in the share of households that rent and their characteristics, we analyzed American Community Survey data from 2001 through 2017 at the national level and across different types of localities, with a focus on renter household age, race/ethnicity, and income.

We defined four head-of-household age categories: younger (20–34 years old), early middle age (35–49 years old), late middle age (50–64 years old), and older (65 years and older).[36] We reported on five race/ethnicity categories, combining some Census categories for our analysis: White, Black, Hispanic (an ethnicity that applies to individuals of any racial background), Asian (includes Asian, Native Hawaiian, and Other Pacific Islander), and Other (includes American Indian, Alaska Native, two or more races, and some other race).[37] We defined five income categories based on income ranges that HUD uses for determining rental assistance eligibility or reporting to Congress on worst case needs: extremely low income (up to 30 percent of HUD area median family income (HAMFI)); very low income (more than 30, up to 50 percent

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[34]To identify the nonmetro group, we analyzed 2017 American Community Survey data by county and calculated nonmetro county population information for each state.

[35]Micropolitan areas consist of the county or counties (or equivalent entities) associated with at least one urban cluster with a population of at least 10,000 but less than 50,000, plus adjacent counties having a high degree of social and economic integration with the core as measured through commuting ties.

[36]Our national-level analyses of renter household characteristics, rent affordability, and rental housing conditions include renter households age 19 or younger in the total number of renter households, but we did not analyze trends specific to that age group.

[37]The Census Bureau defines race as a person's self-identification with one or more social groups. An individual can report as White, Black or African American, Asian, American Indian and Alaska Native, Native Hawaiian and Other Pacific Islander, or some other race. Survey respondents may report multiple races. Ethnicity determines whether a person is of Hispanic origin or not and is broken out in two categories, Hispanic or Latino and Not Hispanic or Latino. Hispanics may report as any race.

of HAMFI); low income (more than 50, up to 80 percent of HAMFI);
moderate income (more than 80, up to 120 percent of HAMFI) and higher
income (greater than 120 percent of HAMFI).[38]

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[38]HUD sets income limits that determine eligibility for various rental assistance programs
(extremely low income, very low income, and low income). The agency develops income
limits based on median family income estimates and fair market rent area definitions for
each metropolitan area, parts of some metropolitan areas, and each nonmetropolitan
county. Since 2014, as a result of a legislative change, HUD has used for several of its
housing programs a definition of "extremely low income" that does not exceed the higher
of Department of Health and Human Services poverty guidelines or 30 percent of area
median income.

Rent Affordability

To describe trends in the affordability of rental housing, we analyzed
American Community Survey data on gross rent as a percentage of
household income from 2001 through 2017 at the national level and
across different types of localities. Consistent with other housing research
and HUD policies, we defined rent burden as spending more than 30
percent of household income on rent, moderate rent burden as spending
more than 30 and up to 50 percent of household income on rent, and
severe rent burden as spending more than 50 percent of household
income on rent.[39] Further, as described in appendix IV, we developed a
supplementary analysis of rental housing affordability for rural areas by
state.[40]

Rental Housing Conditions

To describe trends in rental housing conditions, we analyzed data from
the American Community Survey and American Housing Survey from
2001 through 2017 at the national level and across different types of
localities.[41] HUD designed the American Housing Survey to include
indicators of housing quality. HUD analyzes and reports periodically on a
housing adequacy measure as part of its worst case housing needs
assessments for Congress.[42] HUD's adequacy measure and related
research informed our methodology for developing two indexes to

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[39]Rent burden is the share of household income used to pay gross rent, which includes
rent and utility costs.

[40]There is no single agreed-upon definition of rural areas and, for purposes of this report,
we defined rural areas based on the Department of Agriculture's 2010 rural-urban
commuting area codes 7, 8, 9, 10, and 10.3 (as revised July 3, 2019). We obtained renter
household data for these areas from the American Community Survey's 5-year estimates
for 2013–2017.

[41]HUD revised some American Housing Survey variables and expanded the survey
sample in 2015.

[42]HUD's adequacy index categorizes housing units as severely inadequate, moderately
inadequate, or adequate based on whether a surveyed housing unit meets certain
conditions or criteria. The conditions and criteria are related to the presence of bathroom
and kitchen facilities, whether a unit has heat in the winter, and the presence of other
hazards to health and well-being, such as water leaks, wall cracks, and rodents.

analyze rental housing conditions.[43] We developed the indexes to more
specifically define the range of housing conditions. The two indexes
include 13 quality-related variables and nine variables we identified as
essential components of a dwelling from the American Housing Survey,
described in table 3.[44] Appendix II includes more detailed information
about our methodology. Appendix V includes information on the
similarities and differences between HUD's adequacy index and the
indexes we developed for this report.

Table 3: GAO Rental Housing Conditions Indexes

Category	Description
Incomplete units	Rental units that lacked one or more essential components of a dwelling: electricity; heating equipment; bathroom sink; toilet; tub or shower; kitchen sink; refrigerator; cooking appliance; or hot and cold running water.
Substantial quality issues	Rental units that were complete but had at least one deficiency among 13 quality-related variables and scored above our modeled statistical threshold for substantial quality issues. The most common profiles were the presence of (1) cracked walls and rodents, (2) uncomfortably cold periods, heating equipment breakdowns, and rodents, or (3) cracked walls and water leaks.
Less substantial quality issues	Rental units that were complete but had one or several deficiencies among the quality-related variables and scored below our modeled statistical threshold for substantial quality issues. The most common profiles were (1) the presence of rodents, (2) the presence of water leaks, or (3) instances of blown fuses or tripped circuit breakers in the last 3 months.
No quality issues	Rental units that were complete and were without any deficiencies among the 13 quality-related variables we identified.

Source: GAO analysis of American Housing Survey data. | GAO-20-427

Note: We refer to the combination of issues affecting units with substantial or less substantial quality
issues as profiles.

With our indexes, we analyzed trends in rental housing conditions by
renter household characteristics and rental unit characteristics. The renter

[43]Researchers have analyzed HUD's adequacy index and tested several other indexes for
measuring housing quality. For example, see F.J. Eggers and F. Moumen, *American
Housing Survey: A Measure of (Poor) Housing Quality*, (Bethesda, MD: Econometrica,
Inc., 2013); F.J. Eggers and F. Moumen, *American Housing Survey: Housing Adequacy
and Quality As Measured by the AHS* (Bethesda, MD: Econometrica, Inc., 2013); and
Sandra Newman and C. Scott Holupka, *The Quality of America's Assisted Housing Stock:
Analysis of the 2011 and 2013 American Housing Surveys*, a report prepared for the
Department of Housing and Urban Development (Falls Church, VA: Economic Systems
Inc., 2017). There is no agreed-upon definition of housing quality. Based on limitations of
other types of housing quality indexes, such as challenges reporting trends over time and
subjective scoring techniques, we developed our own statistical analysis of American
Housing Survey variables to analyze rental housing conditions.

[44]We determined that two indexes were needed to describe rental housing unit conditions
based on American Housing Survey data, as relevant variables fell into two categories
that required different statistical treatment and interpretation.

household characteristics we analyzed included household income and affordability, race/ethnicity, and age. The rental unit characteristics we analyzed included location, age, and structure type. In addition, from American Community Survey data, we analyzed household crowding as another aspect of housing conditions. Further, we reviewed reports and studies on housing conditions and interviewed stakeholders including federal agency officials, academic experts, and research organizations.

To further describe trends in renter household characteristics, rent affordability, and rental housing conditions during our review period, we reviewed reports and studies by federal agencies and research organizations and interviewed a variety of stakeholders selected for their knowledge of these issues, including federal agency officials from HUD, the Census Bureau, Congressional Research Service, the Department of Agriculture, the Federal Housing Finance Agency, and the Department of the Treasury; academic experts, including researchers from Harvard's Joint Center for Housing Studies and others; research organizations that included the Bipartisan Policy Center, various researchers associated with the Board of Governors of the Federal Reserve System, Brookings Institute, Center on Budget and Policy Priorities, Housing Assistance Council, National League of Cities, National Rural Housing Coalition, Urban Land Institute, and Urban Institute; and industry groups that included the National Association of Home Builders, National Association of Realtors, and the National Housing Conference.

We conducted this performance audit from February 2018 to May 2020 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objective.

Appendix II: Statistical Analysis of Rental Housing Conditions

This appendix provides additional details on our analysis of the conditions of the national rental housing stock between 2001 and 2017.

Data

To assess rental housing conditions, we used data from the national American Housing Survey (AHS), which is administered by the Census Bureau and conducted every odd year. Specifically, we considered two concepts, unit completeness and unit quality, and relied on questions which were consistently asked over the 2001 to 2017 period to define nine completeness and 13 quality variables.[45]

These are described in table 4.

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[45]See Department of Housing and Urban Development and Census Bureau, American Housing Survey Codebook, accessed February 4, 2020, https://www.census.gov/data-tools/demo/codebook/ahs/ahsdict.html.

Table 4: GAO Rental Housing Conditions Index Variables

GAO index	Variable
Completeness	Electricity
Completeness	Hot and cold running water
Completeness	Heating equipment
Completeness	A bathroom sink
Completeness	A bathroom toilet
Completeness	A bathroom tub or shower
Completeness	A kitchen sink
Completeness	A kitchen refrigerator
Completeness	Any kitchen cooking appliance (a stove or range with oven, burners, or a microwave)
Quality	Any 24 hour or longer period during which the unit was uncomfortably cold in the past winter
Quality	The number of times the main heating equipment broke down for 6 hours or more in the past winter
Quality	The number of times the unit was completely without running water for 6 hours or more in the past 3 months
Quality	The number of toilet breakdowns lasting 6 hours or more in the past 3 months
Quality	The number of sewer breakdowns lasting 6 hours or more in the past 3 months
Quality	Any water leaks from outside the unit in the past 12 months
Quality	Any water leaks from inside the unit in the past 12 months
Quality	Any open holes or cracks wider than the edge of a dime in the inside walls or ceilings
Quality	Any holes in the floors big enough for someone to catch their foot on
Quality	Any areas of peeling paint or broken plaster larger than 8 inches by 11 inches
Quality	Evidence of rodents inside the unit in the past 12 months
Quality	The number of times fuses blew or circuit breakers tripped in the past 3 months
Quality	Any electrical wiring in the finished areas neither concealed inside walls nor under protective metal or plastic coverings

Source: GAO analysis of American Housing Survey data. | GAO-20-427

The survey questions underlying uncomfortably cold periods and heating equipment breakdowns were only asked of respondents who occupied their unit in the winter prior to the survey year, so our main analysis of rental unit quality only considered cash-rent housing units occupied by households since the prior winter, while the analysis of unit completeness considered all cash-rent units.[46] See table 5 for the distributions of the completeness and quality variables in 2017.

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[46]Renter-occupied units include those that are rented for cash and those with no cash rent, such as a life tenancy or units that come free with a job. We included only cash-rent units in our analysis.

Table 5: Renter Household Responses to AHS Questions about Rental Unit Conditions, 2017

GAO index	Estimated percentage of renter households with:	Number of issues: 0 (No)	Number of issues: 1 (Yes)	Number of issues: 2	Number of issues: 3	Number of issues: 4	No response	Number of observations in analysis	Number of interviews
Completeness	Missing electricity	99.9	0.1	na	na	na	na	22,701	22,701
Completeness	Missing hot and cold running water	99.5	0.5	na	na	na	na	22,701	22,701
Completeness	Missing heating equipment	99.0	1.0	na	na	na	na	22,701	22,701
Completeness	Missing bathroom sink, toilet, or tub/shower	99.7	0.0	0.0	0.2	na	na	22,701	22,701
Completeness	Missing kitchen sink, fridge, or cooking appliance	98.9	0.7	0.2	0.2	na	na	22,701	22,701
Quality	Uncomfortably cold winter periods	90.2	8.8	na	na	na	1.0	19,613	19,613
Quality	Heating equipment breakdowns	96.7	1.6	0.7	0.3	0.7	na	19,613	19,613
Quality	Running water breakdowns	95.8	2.1	0.6	0.3	0.5	0.7	19,613	22,701
Quality	Toilet breakdowns	97.6	1.3	0.5	0.1	0.4	na	19,613	22,701
Quality	Sewer breakdowns	98.4	0.9	0.4	0.1	0.2	na	19,613	22,701
Quality	Outside leaks	90.0	10.0	na	na	na	na	19,613	22,701
Quality	Inside leaks	88.7	11.3	na	na	na	na	19,613	22,701
Quality	Floor holes	98.2	1.8	na	na	na	na	19,613	22,701
Quality	Wall cracks	92.7	7.3	na	na	na	na	19,613	22,701
Quality	Peeling paint	96.9	3.1	na	na	na	na	19,613	22,701
Quality	Rodents inside	87.2	12.8	na	na	na	na	19,613	22,701
Quality	Blown fuses	91.9	4.0	1.9	0.8	1.4	na	19,613	22,701
Quality	Exposed electrical wiring	96.8	3.2	na	na	na	na	19,613	22,701

Legend: — = not applicable.

Source: GAO analysis of American Housing Survey (AHS) data. | GAO-20-427

Note: All estimates in this table have a margin of error of less than 1 percentage point. The heating equipment, running water, and toilet breakdown variables all allowed respondents answers of up to 8 or more breakdowns. Survey responses of 5, 6, 7, and 8 or more breakdowns were pooled together with responses of only 4 breakdowns for reporting simplicity, so that the percentage of responses in this category always corresponds to 4 or more issues. However, all other analysis used the original responses.

Methodology and Results

We used each set of variables to construct two indexes, one of unit completeness (an indicator) and one of unit quality (a continuous measure). We collapsed the continuous quality index into three categories (no quality issues, less substantial quality issues, and substantial quality issues) to facilitate a summary of rental housing quality trends.

Completeness

To determine rental unit completeness, we first summed the number of missing components contained in the nine completeness components for each rental unit in the surveys. We obtained an estimate of Cronbach's alpha associated with this sum of 0.40, which was low enough to suggest that a simple indicator would be a more appropriate summary measure.[47] We therefore determined that each of the nine completeness components was essential for us to consider a unit livable, and assigned a completeness score to each rental unit based on the absence of any of them. The resulting index therefore measured incompleteness, where a score of 1 indicated that a unit was missing one or more of the essential components. See table 6 for the distribution of the completeness index in the survey years between 2001 and 2017.

Table 6: Distribution of Completeness Index by AHS Year, 2001–2017

Year	Estimated percentage of complete rental units	Estimated percentage of incomplete rental units	Number of observations in analysis
2001	97.2	2.8	12,954
2003	97.8	2.2	14,821
2005	98.0	2.0	13,034
2007	98.0	2.0	11,715
2009	98.3	1.7	14,133
2011	98.0	2.0	20,544
2013	98.3	1.7	23,358
2015	97.2	2.8	24,223
2017	97.5	2.5	22,701

Source: GAO analysis of American Housing Survey (AHS) data. | GAO-20-427

Note: All 2001 to 2007 estimates in this table have a margin of error of less than 3 percentage points, and all 2009 to 2017 estimates have a margin of error of less than 1 percentage point. The essential components we used to determine whether a rental unit was complete are electricity; hot and cold running water; heating equipment; a bathroom sink, toilet, and tub or shower; and a kitchen sink, refrigerator, and cooking appliance.

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[47]The 95 percent confidence interval for this estimate is [0.39, 0.40].

Quality

To determine rental unit quality, we conducted a factor analysis, a statistical method that exploits correlations among variables related to unobserved factors to obtain estimates for these factors. Given our selection of variables, we interpreted the unobserved factor as rental unit quality, and we specified the following measurement models:

$y_i^* = \lambda_i \eta + \varepsilon_i$ for $i = 1,\ldots,13$

where ε_i is an error term satisfying $E[\varepsilon_i] = 0$ $\forall i$ and $cov(\varepsilon_i, \eta) = cov(\varepsilon_i, \varepsilon_j) = 0$ $\forall I \neq j$, and λ_i are factor loadings capturing the linear effect of unobserved quality η on y_i^*. Each of the 13 observed categorical variables, y_i, has a latent continuous variable, y_i^*, that determines the values realized in the data, such that:

$y_i = \{0, -\infty < y_i^* \leq a_1$
$1, a_1 < y_i^* \leq a_2$
$c_i, a_{ci} < y_i^* < \infty$

where $c_i + 1$ is the number of categories each y_i can take, and $a_1, a_2, \ldots, a_{ci}$ are thresholds determining the mapping between each unobserved latent continuous indicator y_i^* and its observed categorical counterpart y_i.[48] This model was estimated in two steps. We first estimated the thresholds and polychoric correlations between the 13 unobserved continuous variables by maximum likelihood.[49] Then, given the vector of the 91 unique polychoric correlation coefficients and the identification assumption, $\lambda_1 = 1$ we obtained estimates of the model's parameters (the factor loadings and the variances of the latent quality and error terms) via diagonally-weighted least squares.[50] We used this estimator (in conjunction with the full weights matrix in estimating standard errors and

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[48]c_i+1 can be either four or eight (depending on AHS variable topcoding) for variables counting a number of occurrences, such as the number of heating equipment or toilet breakdowns, or two for variables that are just indicators of an issue, such as the water leaks or evidence of rodents. Note that for these latter indicators, $c_i = 1$ and $a_2 = \infty$. . See table 5 for more details.

[49]For details, see U. Olsson, "Maximum Likelihood Estimation of the Polychoric Correlation Coefficient," *Psychometrika*, vol. 44 (1979): pp. 443–460.

[50]In particular, the factor loading set to one was that from the equation in which the endogenous variable is the continuous counterpart to the indicator for whether a unit was ever uncomfortably cold for a period of 24 hours or more in the previous winter.

fit statistics) to allow for inference that is robust to non-normal distributions of the latent continuous variables. Finally, we obtained quality score estimates by empirical Bayes, which selects the mode of the posterior distribution $p(\eta | y_i)$ evaluated at the estimates of the model's parameters. Note that because all quality variables increased in the presence or number of issues, the quality index correspondingly increased in poor quality.[51]

We first estimated two variants of the factor model, one accounting for the sample weights assigned to units in each survey (our preferred specification), and one that did not account for these weights. The robust root mean square error of approximation from the latter of 0.020 suggested that our single factor model provided an appropriate representation of the AHS data.[52] Estimates of the polychoric correlation matrix and of the factor loadings are reported in tables 7 and 8 respectively. We assessed stability by estimating the model on each AHS year separately and broadly found that factor loadings estimates varied little over time. Given the estimates from our preferred specification, which accounts for the survey design, we then relied on empirical Bayes estimation to assign a quality score to each unit for which responses to all 13 quality variables were observed. The full distributions of the resulting quality index in the survey years between 2001 and 2017 are reported in figure 15.

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[51]This is similar to an index previous researchers constructed by factor analysis. These researchers showed that their index was very highly correlated with indexes using similar underlying variables constructed by unweighted addition, ad hoc weighting, or with weights derived from a consumer rating model. See Sandra Newman and C. Scott Holupka, *The Quality of America's Assisted Housing Stock: Analysis of the 2011 and 2013 American Housing Surveys*, a report prepared for the Department of Housing and Urban Development (Falls Church, VA: Economic Systems Inc., 2017).

[52]The 90 percent confidence interval for the root mean square error is [0.019, 0.021]. The statistical package ("lavaan" in R) we used to perform the factor analysis could not directly estimate our preferred specification accounting for sampling weights. We obtained this specification's factor loadings estimates by approximating the survey design, but our method did not allow us to obtain consistent estimates of standard errors or model fit statistics, which is why we relied on the estimates from the unweighted specification to assess model fit.

Figure 15: Distribution of Continuous Quality Index, 2001, 2005, 2009, 2013, and 2017
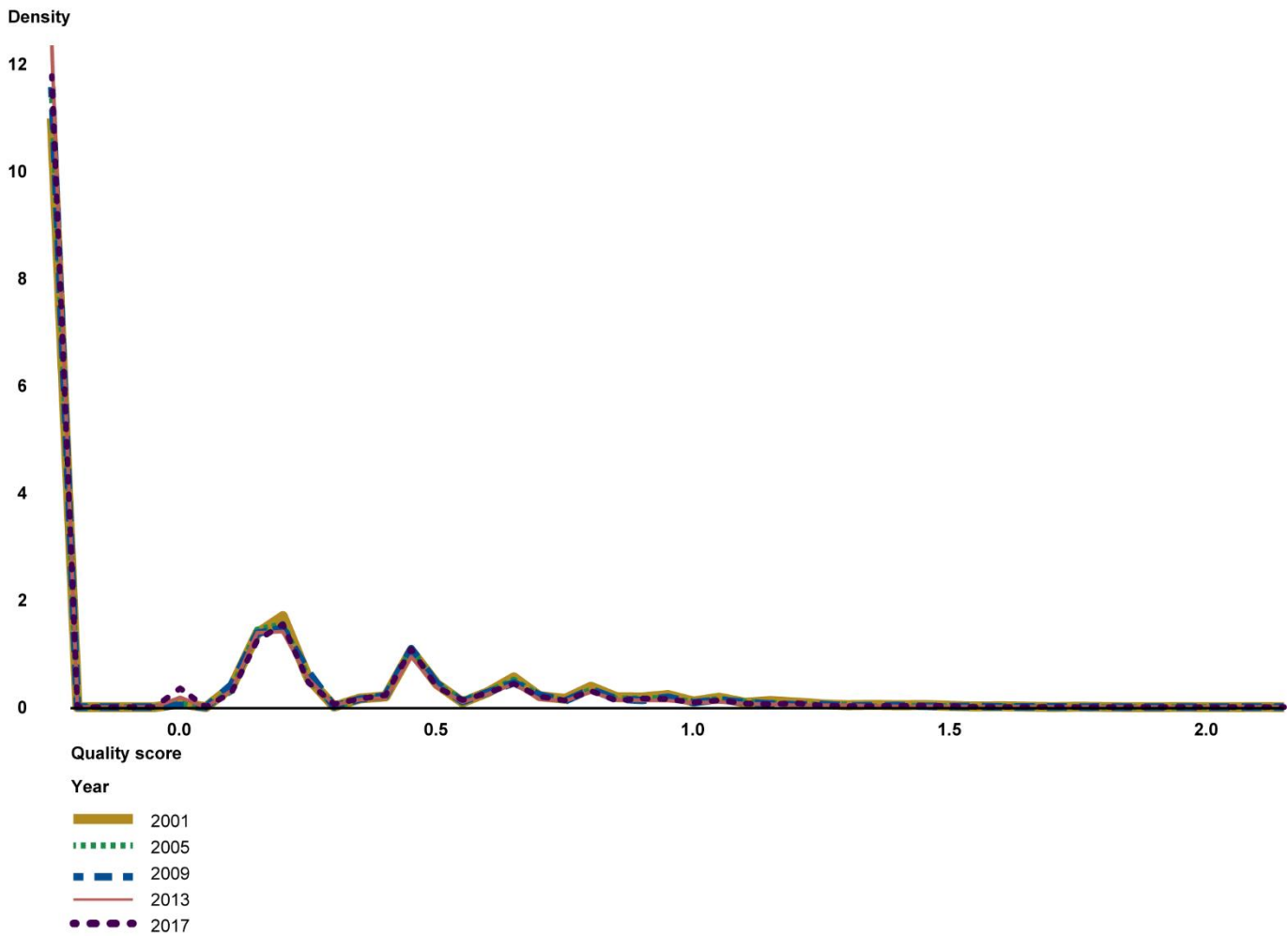
Source: GAO analysis of American Housing Survey data. | GAO-20-427

Note: This relative frequency polygon has an interval width of 0.05. The quality index is constructed by factor analysis and is increasing in quality issues. The quality score associated with no quality issues is approximately -0.23. Quality variables include: whether there was any 24 hour or longer period during which the unit was uncomfortably cold in the past winter and, if so, the number of times the main heating equipment broke down for 6 hours or more; the number of times the unit was completely without running water for 6 hours or more in the past 3 months; the number of toilet and sewer breakdowns lasting 6 hours or more in the past 3 months; whether there were any outside or inside water leaks in the past 12 months; whether there were any holes in the floors large enough to catch someone's foot, any open holes or cracks wider than the edge of a dime in the inside walls or ceilings, or any areas of peeling paint or broken plaster larger than 8 inches by 11 inches; whether there was evidence of rodents inside the unit in the past 12 months; the number of times fuses blew or circuit breakers tripped in the past 3 months; and whether any electrical wiring in the finished areas was neither concealed inside walls nor under protective metal or plastic coverings.

Table 7: Polychoric Correlations between Variables in Quality Factor Model, 2001–2017

Category	Uncomfortably cold winter periods	Heating equipment breakdowns	Running water breakdowns	Toilet breakdowns	Sewer breakdowns	Outside leaks	Inside leaks	Floor holes	Wall cracks	Peeling paint	Rodents inside	Blown fuses	Exposed electrical wiring
Uncomfortably cold winter periods	1.00	na	na	na	na	na	na	na	na	na	na	na	na
Heating equipment breakdowns	0.31	1.00	na	na	na	na	na	na	na	na	na	na	na
Running water breakdowns	0.27	0.24	1.00	na	na	na	na	na	na	na	na	na	na
Toilet breakdowns	0.37	0.32	0.29	1.00	na	na	na	na	na	na	na	na	na
Sewer breakdowns	0.38	0.33	0.29	0.40	1.00	na	na	na	na	na	na	na	na
Outside leaks	0.32	0.28	0.25	0.33	0.34	1.00	na	na	na	na	na	na	na
Inside leaks	0.33	0.29	0.26	0.34	0.35	0.30	1.00	na	na	na	na	na	na
Floor holes	0.43	0.37	0.33	0.45	0.46	0.38	0.40	1.00	na	na	na	na	na
Wall cracks	0.45	0.40	0.35	0.47	0.48	0.41	0.42	0.54	1.00	na	na	na	na
Peeling paint	0.43	0.37	0.33	0.45	0.46	0.38	0.40	0.52	0.55	1.00	na	na	na
Rodents inside	0.30	0.26	0.23	0.32	0.32	0.27	0.28	0.36	0.39	0.36	1.00	na	na
Blown fuses	0.29	0.25	0.22	0.30	0.31	0.26	0.27	0.35	0.37	0.35	0.25	1.00	na
Exposed electrical wiring	0.15	0.13	0.11	0.15	0.16	0.13	0.14	0.18	0.19	0.18	0.13	0.12	1.00

Legend: — = not applicable.

Source: GAO analysis of American Housing Survey data. | GAO-20-427

Note: The renter household universe in this table is that of cash-rent households that occupied their units since at least the winter prior to the survey interview. In 2017, an estimated 14.8 percent of cash-rent households did not occupy their units in the winter prior to the interview, and we excluded them because they were not asked about having uncomfortably cold winter periods or heating equipment breakdowns. We then selected thresholds in the distribution of the continuous quality index to

distinguish between units without any quality issues, units with a quality score indicating the presence of less substantial issues, and units with a score denoting more substantial issues (those with either a combination of some of the most severe issues as determined by the model, or a large number of issues of varying severities).

Table 8: Factor Loadings Model Estimates

Variable	Factor loading estimate, model with sample design	Factor loading estimate, model without sample design	Standard error, model without sample design	95 percent confidence interval lower bound, model without sample design	95 percent confidence interval upper bound, model without sample design
Uncomfortably cold winter periods	1.00	1.00	na	na	na
Heating equipment breakdowns	0.88	0.89	0.01	0.87	0.91
Running water breakdowns	0.78	0.78	0.02	0.75	0.81
Toilet breakdowns	1.05	1.05	0.02	1.02	1.08
Sewer breakdowns	1.07	1.07	0.02	1.04	1.11
Outside leaks	0.90	0.91	0.01	0.89	0.94
Inside leaks	0.93	0.95	0.01	0.93	0.98
Floor holes	1.21	1.21	0.02	1.18	1.24
Wall cracks	1.28	1.28	0.01	1.25	1.31
Peeling paint	1.21	1.21	0.01	1.18	1.24
Rodents inside	0.85	0.86	0.01	0.84	0.88
Blown fuses	0.82	0.82	0.01	0.80	0.85
Exposed electrical wiring	0.42	0.41	0.02	0.37	0.45

Legend: — = not applicable.

Source: GAO analysis of American Housing Survey data. | GAO-20-427

Note: The renter household universe in this table is that of cash-rent households that occupied their units since at least the winter prior to the survey interview. In 2017, an estimated 14.8 percent of cash-rent households did not occupy their units in the winter prior to the interview, and we excluded them because they were not asked about having uncomfortably cold winter periods or heating equipment breakdowns. The factor loading on the uncomfortably cold winter periods variable is set to 1 for model identification. We used the R package "lavaan" to perform the factor analysis. Because this package cannot estimate our preferred specification accounting for sampling weights, we obtained this specification's factor loadings estimates by approximating the sample design, but we did not estimate associated standard errors.

We then selected thresholds in the distribution of the continuous quality
index to distinguish between units without any quality issues, units with a
quality score indicating the presence of less substantial issues, and units
with a score denoting more substantial issues (those with either a
combination of some of the most severe issues as determined by the
model, or a large number of issues of varying severities).

The first threshold between units with no quality issues and units with at
least one issue occurred at a score of -0.2280. Units with no issues
represented between 54 and 62 percent of the rental units to which we
were able to assign quality scores. To further separate units experiencing
any issues into two groups, we inspected the quality score distribution for
local minima in its density to find a score around which small
perturbations in threshold choice would have little effect on the share of
units falling into each of the two groups. We examined all quality issue
profiles experienced in units with scores in the region around two
candidates where the density nearly reached 0, and selected a score of
0.5240 as the second threshold, immediately above which were units with
one or more holes in the floor large enough to catch someone's foot. All
units with a quality score of 0.5240 or higher were therefore considered to
have substantial issues.[53]

Table 9 reports the share of cash-rent, previous-winter-occupied units for
each quality level in the survey years between 2001 and 2017, and table
10 reports the most common quality issue profiles in 2017.

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[53]Recall that the index is increasing in quality issues.

Table 9: Distribution of Quality Index by AHS Year, 2001–2017

Year	Estimated percentage of rental units with no quality issues	Estimated percentage of rental units with less substantial quality issues	Estimated percentage of rental units with substantial quality issues	Estimated percentage of rental units without a quality score	Less substantial issues, first quartile continuous quality score estimate	Less substantial issues, third quartile continuous quality score estimate	Substantial issues, first quartile continuous quality score estimate	Substantial issues, third quartile continuous quality score estimate	Number of observations in analysis
2001	52.8	28.1	15.3	3.8	0.15	0.41	0.65	1.01	9,817
2003	55.8	27.5	12.8	4.0	0.15	0.41	0.65	1.01	12,105
2005	55.8	27.7	13.5	2.9	0.15	0.44	0.65	0.96	10,687
2007	55.6	27.2	13.3	3.9	0.15	0.44	0.65	0.96	10,400
2009	56.0	28.2	12.7	3.1	0.15	0.44	0.65	0.96	12,604
2011	52.4	30.4	13.3	3.9	0.15	0.41	0.65	0.99	16,841
2013	59.5	26.2	10.7	3.6	0.15	0.41	0.65	0.94	21,245
2015	57.0	26.6	13.5	2.9	0.15	0.44	0.65	0.97	21,922
2017	57.8	28.0	12.4	1.7	0.15	0.41	0.65	0.95	19,613

Source: GAO analysis of American Housing Survey (AHS) data. | GAO-20-427

Note: All 2001 to 2007 estimated percentages in this table have a margin of error of less than 3 percentage points, and all 2009 to 2017 estimated percentages have a margin of error of 1 percentage point or less. The renter household universe in this table is that of cash-rent households that occupied their unit since at least the winter prior to the survey interview. In 2017, an estimated 14.8 percent of cash-rent households did not occupy their unit in the winter prior to the interview, and we excluded them because they were not asked about having uncomfortably cold winter periods or heating equipment breakdowns. The quality index is constructed by factor analysis, and scores are then mapped to one of the three quality levels. The quality score associated with no quality issues is approximately -0.23. Quality variables include: whether there was any 24 hour or longer period during which the unit was uncomfortably cold in the past winter and, if so, the number of times the main heating equipment broke down for 6 hours or more, the number of times the unit was completely without running water for 6 hours or more in the past 3 months; the number of toilet and sewer breakdowns lasting 6 hours or more in the past 3 months; whether there were any outside or inside water leaks in the past 12 months; whether there were any holes in the floors large enough to catch someone's foot, any open holes or cracks wider than the edge of a dime in the inside walls or ceilings, or any areas of peeling paint or broken plaster larger than 8 inches by 11 inches; whether there was evidence of rodents inside the unit in the past 12 months; the number of times fuses blew or circuit breakers tripped in the past 3 months; and whether any electrical wiring in the finished areas was neither concealed inside walls nor under protective metal or plastic coverings

Table 10: Most Frequent Profiles of Quality Issues by Quality Level, 2017

Quality level	Quality issues profile	Estimated number of rental units, 2017 (in thousands)	95 percent confidence level margin of error (in thousands of units)
Less substantial quality issues	Evidence of rodents inside the unit in the past 12 months	1,740	153
Less substantial quality issues	Inside water leaks in the past 12 months	1,328	128
Less substantial quality issues	Outside water leaks in the past 12 months	1,247	130
Less substantial quality issues	One or more instances of fuses blowing or circuit breakers tripping in the past 3 months	881	103
Less substantial quality issues	Any 24 hour or longer period during which unit was uncomfortably cold in the past winter	638	82
Less substantial quality issues	Electrical wiring in the finished areas neither concealed inside walls nor under protective metal or plastic coverings	617	77
Substantial quality issues	Open holes or cracks wider than the edge of a dime in the inside walls or ceilings, and evidence of rodents inside the unit in the past 12 months	130	36
Substantial quality issues	Any 24 hour or longer period during which unit was uncomfortably cold, one or more main heating equipment breakdowns lasting 6 hours or more in the past winter, and evidence of rodents inside the unit in the past 12 months	117	39
Substantial quality issues	Outside water leaks in the past 12 months, and open holes or cracks wider than the edge of a dime in the inside walls or ceilings	111	34
Substantial quality issues	Inside water leaks in the past 12 months, and open holes or cracks wider than the edge of a dime in the inside walls or ceilings	93	30

Quality level	Quality issues profile	Estimated number of rental units, 2017 (in thousands)	95 percent confidence level margin of error (in thousands of units)
Substantial quality issues	Holes in the floors large enough to catch someone's foot	87	33
Substantial quality issues	Any 24 hour or longer period during which unit was uncomfortably cold, and three or more main heating equipment breakdowns lasting 6 hours or more in the past winter	73	28

Source: GAO analysis of American Housing Survey data. | GAO-20-427

Note: The renter household universe in this table is that of cash-rent households which occupied their unit since at least the winter prior to the survey interview. In 2017, an estimated 14.8 percent of cash-rent households did not occupy their unit in the winter prior to interview, and we excluded them because they were not asked about having uncomfortably cold winter periods or heating equipment breakdowns. The quality index is constructed by factor analysis, and scores are then mapped to one of three quality levels (no quality issues, less substantial quality issues, or substantial quality issues).

Limitations

Our analysis is subject to several limitations. In determining both unit completeness and quality, we were limited to the variables consistently available across all survey years. Therefore, we could not include features not observed in the AHS which could be deemed to be important components of either unit completeness (such as a unit's access to an internet service provider) or quality (such as the presence of major defects in the structure of the unit's building).

In the quality factor model, we assumed that quality was uncorrelated with the error term from each measurement equation and that the error terms were uncorrelated with each other to obtain estimates of the model's parameters, and ultimately the quality scores. A violation of these assumptions would bias the estimates. For example, if rental units located in regions with harsh weather were of systematically worse quality than units in fairer weather regions, the estimated effect of poor quality on a variable like the number of outdoor leaks could be overstated, which would in turn overweight the importance of outdoor leaks in the estimation of the quality scores, resulting in overly poor quality score estimates for units experiencing outdoor leaks. Conversely, if units in harsh weather regions were of systematically better quality than those in fairer weather regions (e.g. as a measure of resilience) the estimated effect of poor quality on outdoor leaks would be understated, biasing down the importance of outdoor leaks in the estimation of quality scores. In general, any systematic linear relationship between latent quality (η) and the unobserved factors (ε_i) affecting one of the 13 unobserved latent continuous variables, or between the unobserved factors themselves, would be a violation of the model's assumptions.

Since the two quality variables recording uncomfortably cold periods and heating equipment breakdowns were only asked of respondents who occupied their unit in the winter prior to the survey year, we could not assign quality scores to the 10 to 25 percent of rental units across years which were occupied by recent movers. To assess potential biases on the quality distribution of the full cash-rent-occupied rental housing stock introduced by excluding this group, we therefore compared both groups along the remaining 11 dimensions

Of the 11 observable quality variables, three exhibited an incidence of issues that differed meaningfully across the two groups. These differences were persistent throughout survey years and consistent in

their direction: units whose respondents moved in later than the winter prior to the interview were between 5 to 10 percentage points less likely to experience any outside leaks, inside leaks, and to report evidence of rodents. The differences were meaningful in that they corresponded to over a halving of the incidence of the evidence of rodents, and up to a halving of the incidence of both types of leaks in the recent-mover units relative to the units for which all quality variables were available.

To evaluate the effect of these differences on the quality distribution of the full universe of cash-rent units, we estimated a modified quality factor model in which we dropped the uncomfortably cold periods and heating equipment breakdowns variables. This allowed us to obtain quality scores for both the units with the original scores and the recent-mover units. The distributions of the modified quality indices in the two groups reached their largest difference at the share of units without any of the set of 11 quality issues, and we estimated that across all survey years, 1.3 to 2.4 percentage points more units would likely have no measured quality issues in the full cash-rent universe than we found in that which excludes the recent movers.[54]

Furthermore, the distributions of the modified indices truncated to exclude the respective units without any of the 11 quality issues were largely comparable. In the full universe of cash-rent units, we would therefore expect decreases in each of the shares of less substantial issues and substantial issues units proportional to their respective shares in the partial universe, and in sum corresponding to the magnitude of the increase in units with no issues each year.[55] The alternative of including recent movers in our main model at the expense of the uncomfortably cold periods and heating equipment breakdowns variables would have yielded a share of units without any other quality issues that we estimated to be 3 to 4 percentage points higher than the share calculated using the original index in the partial universe. Because we believed that these variables should ultimately be included in the quality index, and because we considered the biases we estimated to be relatively small, we retained the original index.

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[54]This approach assumes there would be no differences in the incidences of the omitted uncomfortably cold periods and heating breakdowns variables if these were observable in both groups. The estimated bias for units without quality issues in the 2017 survey was +1.5 percentage points.

[55]The approximate biases for units with less substantial quality issues and substantial quality issues in the 2017 survey were respectively -1 and -0.5 percentage points.

GAO-20-427 Rental Housing

Appendix III: Additional Information on Rentership and Affordability Trends

In this appendix we present our analysis of rentership and housing affordability by age, race/ethnicity, locality type, and income from 2001 through 2017. The data on renter households are from the American Community Survey's 1-year estimates.

Table 11: Estimated Percentage of Households That Rent by Age, Race/Ethnicity, Locality Type, and Income, 2001–2017

Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
All households[a]	34	34	33	33	33	33	33	33	34	35	35	36	37	37	37	37	36
20–34 years	61	60	60	60	60	59	60	61	63	64	65	67	67	68	68	67	66
35–49 years	32	31	31	31	31	31	32	33	34	35	37	38	39	40	40	40	39
50–64 years	22	21	21	21	21	22	22	23	23	24	25	25	26	27	27	27	27
65 years and older	22	21	21	21	21	21	21	21	21	21	21	21	22	22	22	22	22
White	28	27	27	26	26	26	26	27	27	27	28	29	29	29	29	29	28
Black	54	54	53	54	54	53	53	54	55	56	56	57	58	59	59	59	58
Hispanic	55	54	53	52	52	51	50	51	52	53	54	54	55	55	55	55	53
Asian	47	45	44	43	41	40	40	41	41	42	43	43	43	43	43	42	41
Other	47	45	45	45	45	45	45	45	46	46	48	48	49	50	49	50	49
High-growth metro areas	34	33	33	32	34	33	33	33	34	35	36	37	37	38	38	38	37
Moderate-growth/high-density metro areas	41	40	39	39	39	38	38	39	40	41	42	42	42	43	43	43	42

Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Moderate-growth/moderate-density metro areas	34	33	33	32	32	32	32	33	34	34	35	35	36	36	36	36	35
Negative-growth metro areas	30	30	29	29	29	29	29	30	30	31	32	32	32	33	33	33	32
Nonmetro areas	27	27	27	28	27	27	27	28	28	28	28	29	29	29	29	29	29
Extremely low income	64	64	63	63	64	64	65	66	66	67	67	67	67	67	67	66	65
Very low income	50	50	49	49	49	49	51	51	51	51	51	52	54	54	54	55	54
Low income	41	40	39	39	40	40	41	41	41	41	41	42	44	45	45	46	45
Moderate income	31	29	28	27	28	28	29	30	29	29	30	31	32	34	34	35	35
Higher income	17	16	16	15	15	15	16	16	16	16	17	18	19	20	20	21	20

Source: GAO analysis of American Community Survey data. | GAO-20-427

Notes: Estimates in this table have a margin of error of ±3 percentage points or fewer, at the 95 percent confidence level.

We defined four head-of-household age categories as younger (20–34 years old), early middle age (35–49 years old), late middle age (50–64 years old), and older (65 and older). We reported on five race/ethnicity categories, combining some Census categories for ease of analysis: White, Black, Hispanic (an ethnicity that applies to individuals of any racial background), Asian (includes Asian, Native Hawaiian, and Other Pacific Islander), and Other (includes American Indian, Alaska Native, two or more races, and some other race). We identified five locality types based on population growth and density: high-growth metro areas, moderate-growth/high-density metro areas, moderate-growth/moderate-density metro areas, negative-growth metro areas, and nonmetro areas. We defined extremely low income as up to 30 percent of Department of Housing and Urban Development area median family income (HAMFI); very low income as more than 30, up to 50 percent of HAMFI; low income as more than 50, up to 80 percent of HAMFI; moderate income as more than 80, up to 120 percent of HAMFI; and higher income as greater than 120 percent of HAMFI.

[a]While "all households" includes households age 19 or younger, that category is not broken out in this table.

Table 12: Estimated Number of Renter Households by Age, Race/Ethnicity, Locality Type, and Income, 2001–2017

Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
All households	36,453,560	36,064,820	36,000,845	36,147,915	36,771,635	36,530,915	36,862,875	37,755,695	38,773,225	39,694,045	40,727,290	41,850,285	42,447,170	43,267,430	43,701,740	43,837,495	43,378,800
20–34 years	14,657,365	14,495,425	14,422,510	14,310,735	14,277,800	13,600,650	13,565,570	13,899,025	14,422,705	14,279,560	14,409,675	14,807,250	14,816,305	14,871,815	14,882,110	14,830,305	14,602,505
35–49 years	11,150,435	10,983,960	10,900,750	10,843,670	11,076,265	11,183,085	11,259,065	11,366,900	11,508,735	11,772,120	12,142,535	12,388,120	12,474,905	12,678,540	12,757,705	12,674,285	12,467,695
50–64 years	5,357,955	5,402,595	5,601,200	5,883,990	6,177,070	6,495,005	6,732,390	7,078,020	7,372,380	7,960,730	8,386,745	8,704,015	8,977,470	9,279,500	9,386,980	9,433,840	9,371,005
65 years and older	4,740,145	4,634,445	4,579,125	4,610,005	4,757,415	4,831,400	4,884,300	5,004,570	5,056,245	5,327,920	5,461,905	5,658,030	5,877,705	6,145,700	6,391,090	6,607,015	6,642,105
White	21,795,050	21,273,010	21,103,110	20,839,170	21,095,330	20,967,000	21,113,195	21,531,865	22,018,000	22,172,740	22,615,485	23,093,880	23,285,870	23,402,345	23,457,255	23,280,720	22,810,395
Black	6,566,880	6,592,640	6,685,325	6,846,025	7,007,590	6,901,125	6,963,515	7,103,920	7,337,000	7,481,070	7,656,885	7,850,680	7,982,555	8,222,335	8,367,410	8,434,815	8,437,030
Hispanic	5,480,165	5,625,590	5,686,495	5,881,150	6,059,140	6,092,460	6,169,660	6,416,875	6,620,870	7,014,140	7,318,550	7,609,895	7,792,590	8,080,700	8,254,445	8,372,530	8,360,830
Asian	1,627,145	1,639,790	1,696,015	1,721,070	1,700,310	1,683,495	1,687,215	1,766,005	1,794,030	1,956,240	2,013,955	2,125,560	2,159,205	2,283,580	2,319,610	2,362,125	2,374,115
Other	984,315	933,790	829,895	860,505	909,265	886,840	929,285	937,030	1,003,325	1,069,855	1,122,415	1,170,265	1,226,960	1,278,470	1,303,015	1,387,305	1,396,430
High-growth metro areas	5,214,910	5,217,735	5,256,040	5,366,465	5,553,815	5,560,495	5,681,165	5,852,375	6,019,640	6,303,795	6,602,285	6,871,950	7,035,710	7,315,665	7,445,710	7,542,830	7,413,225
Moderate-growth/high-density metro areas	11,298,355	11,045,075	10,948,685	10,756,010	10,972,075	10,809,300	10,847,845	11,094,375	11,320,730	11,705,920	11,958,210	12,187,135	12,331,215	12,529,265	12,644,620	12,703,825	12,542,745
Moderate-growth/moderate-density metro areas	12,949,480	12,801,005	12,773,895	12,856,615	13,186,965	13,187,875	13,351,910	13,610,795	14,095,025	14,393,820	14,720,790	15,193,830	15,449,550	15,694,125	15,856,305	15,900,780	15,780,605
Negative-growth metro areas	2,392,345	2,354,310	2,317,785	2,320,585	2,312,505	2,227,490	2,237,425	2,300,425	2,384,910	2,379,970	2,465,980	2,517,380	2,522,170	2,560,545	2,577,675	2,573,505	2,553,070
Nonmetro areas	4,598,470	4,646,695	4,704,440	4,848,245	4,746,275	4,745,755	4,744,525	4,897,725	4,952,920	4,910,540	4,980,025	5,079,990	5,108,530	5,167,830	5,177,430	5,116,555	5,089,160
Extremely low income	8,598,680	9,103,535	9,539,315	9,813,355	10,025,070	9,667,425	9,298,735	9,564,285	10,408,310	11,001,665	11,546,810	11,487,555	10,982,505	11,763,215	11,477,735	11,125,320	10,932,075
Very low income	6,379,230	6,581,020	6,848,550	6,865,060	6,896,590	6,771,495	6,748,655	6,843,985	7,297,655	7,654,605	7,742,675	7,790,465	7,634,500	6,478,500	6,576,705	6,386,005	6,310,255
Low income	7,844,370	7,605,610	7,724,880	7,827,590	7,852,615	7,767,175	7,780,390	7,936,26	8,103,550	8,205,795	8,221,850	8,366,205	8,427,900	8,543,420	8,666,710	8,631,125	8,614,585
Moderate income	6,990,285	6,672,220	5,905,215	5,932,885	5,981,835	6,131,805	5,871,135	6,210,385	6,207,730	6,168,115	6,219,235	6,566,910	6,786,580	7,069,865	7,261,360	7,271,340	7,204,190
Higher income	6,640,995	6,102,435	5,982,890	5,709,030	6,015,530	6,193,015	7,163,955	7,200,785	6,755,980	6,663,865	6,996,720	7,639,155	8,615,685	9,412,430	9,719,230	10,423,700	10,317,700

Source: GAO analysis of American Community Survey data. | GAO-20-427

Notes: Estimates in this table have a relative margin of error of ±8 percent or less of the estimated number of renter households, at the 95 percent confidence level.

We defined four head-of-household age categories as younger (20-34 years old), early middle age (35-49 years old), late middle age (50-64 years old), and older (65 and older). We reported on five race/ethnicity categories, combining some Census categories for ease of analysis: White, Black, Hispanic (an ethnicity that applies to individuals of any racial background), Asian (includes Asian, Native Hawaiian, and Other Pacific Islander), and Other (includes American Indian, Alaska Native, two or more races, and some other race). We identified five locality types based on population growth and density: high-growth metro areas, moderate-growth/high-density metro areas, moderate-growth/moderate-density metro areas, negative-growth metro areas, and nonmetro areas. We defined extremely low income as up to 30 percent of Department of Housing and Urban Development area median family income (HAMFI); very low income as more than 30, up to 50 percent of HAMFI; low income as more than 50, up to 80 percent of HAMFI; moderate income as more than 80, up to 120 percent of HAMFI; and higher income as greater than 120 percent of HAMFI.

Table 13: Estimated Number of Households with Rent Burdens by Age, Race/Ethnicity, and Locality Type, 2001–2017

Category	Rent burden	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
All households	Not rent burdened	19,400,475	18,870,075	18,146,700	17,784,480	17,537,620	17,320,230	17,680,275	17,919,035	17,792,375	17,663,230	17,945,020	18,997,220	19,467,475	19,762,080	20,430,350	20,904,835	20,764,470
All households	Moderately rent burdened	7,338,405	7,337,550	7,518,725	7,710,960	8,005,730	8,056,150	8,165,655	8,375,775	8,754,050	9,089,335	9,285,405	,388,680	9,550,435	9,878,400	9,862,900	9,766,450	9,703,580
All households	Severely rent burdened	6,891,520	7,080,315	7,537,355	7,813,230	8,408,115	8,358,460	8,238,905	8,704,340	9,323,565	9,909,010	10,359,780	10,300,910	10,230,495	10,368,230	10,125,975	9,990,055	9,774,080
20–34 years	Not rent burdened	8,112,310	7,792,420	7,449,415	7,260,090	6,99,275	6,573,820	6,657,720	6,761,870	6,786,950	6,483,225	6,498,520	6,901,155	7,017,675	7,059,590	7,261,860	7,436,665	7,363,115
20–34 years	Moderately rent burdened	2,941,875	2,924,85	3,029,830	3,026,705	3,150,320	3,059,545	3,036,805	3,125,275	3,273,350	3,269,320	3,316,430	3,334,965	3,331,990	3,420,195	3,375,065	3,306,805	3,270,255
20–34 years	Severely rent burdened	2,691,555	2,823,565	2,950,820	3,089800	3,295,195	3,094,105	3,029,070	3,188,265	3,492,900	3,630,165	3,676,670	3,635,125	3,551,960	3,486,485	3,352,810	3,238,780	3,129,700
35–49 years	Not rent burdened	6,439,600	6,215,265	5,926,220	5,684,020	5,706,640	5,750,550	5,803,045	5,840,950	5,650,040	5,618,480	5,758,175	6,091,875	6,200,560	6,281,730	6,491,075	6,577,790	6,486,185
35–49 years	Moderately rent burdened	2,078,000	2,114,340	2,177,030	2,290,790	2,332,385	2,369,630	2,442,460	2,458,875	2,546,205	2,654,745	2,706,965	2,705,455	2,735,190	2,815,205	2,786,110	2,739,750	2,726,755
35–49 years	Severely rent burdened	1,819,825	1,905,960	2,041,315	2,079,695	2,269,780	2,313,615	2,262,640	2,366,160	2,566,335	2,719,225	2,866,690	2,798,690	2,738,450	2,768,655	2,666,970	2,589,675	2,498,155
50–64 years	Not rent burdened	2,854,455	2,910,765	2,907,010	2,974,900	3,069,060	3,171,740	3,325,855	3,443,925	3,453,875	3,616,760	3,739,685	3,937,630	4,104,150	4,195,595	4,312,475	4,422,360	4,406,110
50–64 years	Moderately rent burdened	1,050,140	1,070,535	1,106,965	1,189,375	1,275,810	1,372,090	1,403,790	1,495,760	1,617,590	1,766,715	1,839,030	1,890,470	1,964,185	2,047,140	2,071,395	2,036,680	2,023,265
50–64 years	Severely rent burdened	973,085	958,640	1,103,265	1,201,530	1,296,670	1,395,025	1,427,890	1,555,755	1,667,495	1,890,450	2,079,935	2,121,335	2,129,750	2,217,825	2,179,220	2,174,820	2,141,190
65 years and older	Not rent burdened	1,813,600	1,771,340	1,710,150	1,717,810	1,726,320	1,713,945	1,776,295	1,765,775	1,797,455	1,867,835	1,883,455	1,999,250	2,076,905	2,154,505	2,290,215	2,395,085	2,429,145
65 years and older	Moderately rent burdened	1,151,515	1,126,400	1,095,230	1,104,935	1,143,100	1,170,050	1,200,485	1,212,980	1,236,760	1,331,145	1,359,630	1,406,160	1,459,130	1,541,180	1,576,005	1,623,245	1,622,225
65 years and older	Severely rent burdened	1,222,255	1,182,465	1,256,535	1,247,475	1,339,980	1,379,540	1,342,615	1,419,420	1,412,010	1,505,455	1,579,375	1,611,445	1,677,325	1,770,030	1,811,545	1,866,030	1,890,195
White	Not rent burdened	12,123,525	11,708,190	11,215,675	10,870,315	10,728,040	10,529,830	10,759,335	10,894,870	10,778,000	10,487,045	10,707,240	11,281,475	11,451,860	11,532,585	11,790,315	11,898,610	11,708,240
White	Moderately rent burdened	4,130,000	4,036,415	4,161,040	4,149,805	4,276,650	4,358,605	4,356,230	4,450,270	4,668,810	4,822,930	4,848,430	4,883,705	4,903,560	5,012,485	4,937,830	4829,895	4,741,485

Category	Rent burden	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
White	Severely rent burdened	3,642,520	3,683,360	3,934,405	4,008,765	4,276,640	4,260,770	4,195,915	4,409,450	4,719,345	4,965,950	5,123,370	4,996,915	4,980,715	4,913,475	4,784,980	4,690,370	4,509,790
Black	Not rent burdened	3,131,950	3,048,580	2,954,260	2,937,675	2,903,745	2,832,640	2,893,190	2,914,780	2,895,950	2,861,815	2,852,820	3,047,550	3,133,360	3,188,165	3,360,250	3,543,715	3,532,930
Black	Moderately rent burdened	1,427,640	1,478,900	1,498,205	1,575,175	1,622,100	1,625,585	1,655,905	1,704,890	1,771,120	1,827,420	1,852,870	1,847,245	1,919,130	2,014,645	2,020,610	2,016,220	2,032,435
Black	Severely rent burdened	1,577,805	1,637,890	1,745,850	1,847,790	1,999,500	1,965,325	1,945,515	2,020,440	2,167,720	2,268,885	2,387,100	2,382,670	2,350,180	2,431,195	2,378,810	2,297,470	2,303,375
Hispanic	Not rent burdened	2,740,035	2,764,195	2,702,150	2,716,310	2,642,175	2,692,900	2,725,780	2,771,130	2,746,665	2,869,415	2,903,300	3,090,740	3,233,285	3,333,725	3,491,345	3,612,320	3,638,935
Hispanic	Moderately rent burdened	1,294,750	1,351,985	1,372,135	1,472,000	1,575,690	1,546,445	1,605,260	1,655,205	1,724,355	1,819,865	1,928,285	1,983,410	2,040,545	2,121,310	2,163,520	2,150,840	2,167,810
Hispanic	Severely rent burdened	1,144,020	1,214,275	1,313,200	1,371,355	1,533,300	1,552,020	1,532,420	1,676,225	1,817,875	1,957,320	2,108,035	2,140,170	2,117,530	2,195,695	2,156,770	2,164,945	2,125,625
Asian	Not rent burdened	883,980	869,515	875,955	873,660	846,070	859,895	869,255	906,330	921,125	983,910	1,011,620	1,078,285	1,107,795	1,147,250	1,190,820	1,214,080	1,233,285
Asian	Moderately rent burdened	306,515	299,610	307,385	327,050	342,805	336,490	340,685	360,645	367,515	385,520	398,735	413,045	415,950	446,525	452,210	456,040	454,055
Asian	Severely rent burdened	320,005	339,865	368,680	373,140	370,870	362,970	354,230	371,055	371,190	431,575	439,000	463,620	465,855	494,185	490,205	501,520	503,435
Other	Not rent burdened	520,980	479,590	398,660	386,525	417,595	404,960	432,715	431,925	450,630	461,050	470,040	499,165	541,180	560,350	597,615	636,115	651,080
Other	Moderately rent burdened	179,490	170,640	179,965	186,920	188,490	189,030	207,580	24,765	222,250	233,595	257,080	261,270	271,235	283,435	288,730	313,450	307,805
Other	Severely rent burdened	207,175	204,930	175,215	212,185	227,800	217,375	210,825	227,170	247,435	285,280	302,280	317,540	316,220	333,680	315,205	335,755	331,850
High-growth metro areas	Not rent burdened	2,828,930	2,734,215	2,632,935	2,630,020	2,659,945	2,678,345	2,776,780	2,821,560	2,766,675	2,824,620	2,960,225	3,193,695	3,337,770	3,442,030	3,603,085	3,679,940	3,648,740
High-growth metro areas	Moderately rent burdened	1,113,880	1,151,230	1,201,975	1,252,300	1,298,455	1,302,430	1,345,540	1,366,100	1,441,875	1,513,560	1,566,930	1,594,895	1,657,735	1,743,645	1,725,575	1,751,480	1,713,340
High-growth metro areas	Severely rent burdened	926,680	995,035	1,076,200	1,121,240	1,238,345	1,229,320	1,208,195	1,304,920	1,436,360	1,563,290	1,629,555	1,646,325	1,591,490	1,677,965	1,649,685	1,641,355	1,607,715
Moderate-growth/high-density metro areas	Not rent burdened	6,033,905	5,737,950	5,469,875	5,201,235	5,111,225	5,043,550	5,084,360	5,150,540	5,163,765	5,138,015	5,158,140	5,381,595	5,450,100	5,496,935	5,644,685	5,797,675	5,738,405

Category	Rent burden	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Moderate-growth/high-density metro areas	Moderately rent burdened	2,343,065	2,359,330	2,401,870	2,387,820	2,535,740	2,486,705	2,539,690	2,583,915	2,643,230	2,788,525	2,822,600	2,832,430	2,889,260	2,976,685	2,963,035	2,924,575	2,915,715
Moderate-growth/high-density metro areas	Severely rent burdened	2,339,770	2,391,805	2,519,985	2,592,460	2,751,115	2,734,010	2,685,665	2,818,325	2,943,755	3,152,750	3,333,405	3,317,055	3,321,230	3,356,460	3,313,110	3,290,520	3,191,465
Moderate–growth/moderate-density metro areas	Not rent burdened	6,909,090	6,766,240	6,515,025	6,412,780	6,368,465	6,308,095	6,474,340	6,547,980	6,550,450	6,488,285	6,571,905	6,960,105	7,190,200	7,275,155	7,548,080	7,734,955	7,659,105
Moderate–growth/moderate-density metro areas	Moderately rent burdened	2,617,885	2,609,080	2,626,200	2,756,780	2,850,010	2,917,735	2,929,810	3,022,660	3,190,140	3,286,635	3,367,425	3,437,685	3,486,815	3,594,950	3,623,405	3,558,635	3,566,185
Moderate–growth/moderate-density metro areas	Severely rent burdened	2,435,430	2,490,730	2,658,935	2,717,695	2,988,060	2,966,820	2,960,220	3,088,835	3,325,925	3,554,290	3,697,790	3,698,440	3,651,560	3,694,540	3,576,485	3,523,135	3,493,680
Negative-growth metro areas	Not rent burdened	1,317,855	1,264,030	1,210,075	1,158,165	1,096,295	1,048,830	1,055,780	1,073,655	1,078,810	1,059,900	1,078,255	1,147,725	1,160,280	1,181,380	1,212,050	1,249,675	1,246,935
Negative-growth metro areas	Moderately rent burdened	451,885	441,895	463,210	458,930	465,855	457,775	467,010	478,430	494,570	504,880	515,930	517,115	523,185	535,530	539,595	533,335	519,900
Negative-growth metro areas	Severely rent burdened	443,565	454,460	461,815	517,200	557,270	536,015	526,880	557,315	609,405	612,200	651,625	628,730	623,870	615,105	599,980	587,070	572,345
Nonmetro areas	Not rent burdened	2,310,695	2,367,635	2,318,790	2,382,280	2,301,690	2,241,405	2,289,010	2,325,295	2,232,675	2,152,405	2,176,490	2,314,095	2,329,130	2,366,580	2,422,450	2,442,590	2,471,280
Nonmetro areas	Moderately rent burdened	811,685	776,020	825,470	855,125	855,680	891,500	883,605	924,680	984,235	995,735	1,012,515	1,006,545	993,445	1,027,595	1,011,295	998,420	988,450
Nonmetro areas	Severely rent burdened	746,075	748,285	820,415	864,640	873,320	892,295	857,945	934,940	1,008,120	1,026,480	1,047,410	1,010,370	1,042,345	1,024,160	986,715	947,980	908,865

Source: GAO analysis of American Community Survey data. | GAO-20-427

Notes: Estimates in this table have a relative margin of error of ±32 percent or less of the estimated number of renter households, at the 95 percent confidence level.

We defined four head-of-household age categories as younger (20–34 years old), early middle age (35–49 years old), late middle age (50–64 years old), and older (65 and older). We reported on five race/ethnicity categories, combining some Census categories for ease of analysis: White, Black, Hispanic (an ethnicity that applies to individuals of any racial background), Asian (includes Asian, Native Hawaiian, and Other Pacific Islander), and Other (includes American Indian, Alaska Native, two or more races, and some other race). We identified five locality types based on population growth and density: high-growth metro areas, moderate-growth/high-density metro areas, moderate-growth/moderate-density metro areas, negative-growth metro areas, and nonmetro areas. Rent burden is the share of household income used to pay gross rent, which includes rent and utility costs. We defined rent burden as spending more than 30 percent of household income on rent, moderate rent burden as spending more than 30 and up to 50 percent of household income on rent, and severe rent burden as spending more than 50 percent of household income on rent.

Table 14: Estimated Percentage of Households with Rent Burdens by Age, Race/Ethnicity, and Locality Type, 2001–2017

Category	Rent burden	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
All households	Not rent burdened	58	57	55	53	52	51	52	51	50	48	48	49	50	49	51	51	52
All households	Moderately rent burdened	22	22	23	23	24	24	24	24	24	25	25	24	24	25	24	24	24
All households	Severely rent burdened	20	21	23	23	25	25	24	25	26	27	28	27	26	26	25	25	24
20–34 years	Not rent burdened	59	58	55	54	52	52	52	52	50	48	48	50	50	51	52	53	53
20–34 years	Moderately rent burdened	21	22	23	23	24	24	24	24	24	24	25	24	24	24	24	24	24
20–34 years	Severely rent burdened	20	21	22	23	25	24	24	24	26	27	27	26	26	25	24	23	23
35–49 years	Not rent burdened	62	61	58	57	55	55	55	55	52	51	51	53	53	53	54	55	55
35–49 years	Moderately rent burdened	20	21	21	23	23	23	23	23	24	24	24	23	23	24	23	23	23
35–49 years	Severely rent burdened	18	19	20	21	22	22	22	22	24	25	25	24	23	23	22	22	21
50–64 years	Not rent burdened	59	59	57	55	54	53	54	53	51	50	49	50	50	50	50	51	51
50–64 years	Moderately rent burdened	22	22	22	22	23	23	23	23	24	24	24	24	24	24	24	24	24
50–64 years	Severely rent burdened	20	19	22	22	23	23	23	24	25	26	27	27	26	26	25	25	25
65 years and older	Not rent burdened	43	43	42	42	41	40	41	40	40	40	39	40	40	39	40	41	41
65 years and older	Moderately rent burdened	27	28	27	27	27	27	28	28	28	28	28	28	28	28	28	28	27
65 years and older	Severely rent burdened	29	29	31	31	32	32	31	32	32	32	33	32	32	32	32	32	32
White	Not rent burdened	61	60	58	57	56	55	56	55	53	52	52	53	54	54	55	56	56
White	Moderately rent burdened	21	21	22	22	22	23	23	23	23	24	23	23	23	23	23	23	23
White	Severely rent burdened	18	19	20	21	22	22	22	22	23	24	25	24	23	23	22	22	22
Black	Not rent burdened	51	49	48	46	44	44	45	44	42	41	40	42	42	42	43	45	45
Black	Moderately rent burdened	23	24	24	25	25	25	25	26	26	26	26	25	26	26	26	26	26
Black	Severely rent burdened	26	27	28	29	31	31	30	30	32	33	34	33	32	32	31	29	29
Hispanic	Not rent burdened	53	52	50	49	46	46	46	45	44	43	42	43	44	44	45	46	46
Hispanic	Moderately rent burdened	25	25	25	26	27	27	27	27	27	27	28	27	28	28	28	27	27
Hispanic	Severely rent burdened	22	23	24	25	27	27	26	27	29	29	30	30	29	29	28	27	27
Asian	Not rent burdened	59	58	56	56	54	55	56	55	55	55	55	55	56	55	56	56	56

Category	Rent burden	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Asian	Moderately rent burdened	20	20	20	21	22	22	22	22	22	21	22	21	21	21	21	21	21
Asian	Severely rent burdened	21	23	24	24	24	23	23	23	22	24	24	24	23	24	23	23	23
Other	Not rent burdened	57	56	53	49	50	50	51	50	49	47	46	46	48	48	50	49	50
Other	Moderately rent burdened	20	20	24	24	23	23	24	24	24	24	25	24	24	24	24	24	24
Other	Severely rent burdened	23	24	23	27	27	27	25	26	27	29	29	29	28	28	26	26	26
High-growth metro areas	Not Rent Burdened	58	56	54	53	51	51	52	51	49	48	48	50	51	50	52	52	52
High-growth metro areas	Moderately rent burdened	23	24	24	25	25	25	25	25	26	26	25	25	25	25	25	25	25
High-growth metro areas	Severely rent burdened	19	20	22	22	24	24	23	24	25	26	26	26	24	24	24	23	23
Moderate-growth/high-density metro areas	Not rent Burdened	56	55	53	51	49	49	49	49	48	46	46	47	47	46	47	48	48
Moderate-growth/high-density metro areas	Moderately rent burdened	22	22	23	23	24	24	25	24	25	25	25	25	25	25	25	24	25
Moderate-growth/high-density metro areas	Severely rent burdened	22	23	24	25	26	27	26	27	27	28	29	29	28	28	28	27	27
Moderate-growth/moderate-density metro areas	Not rent burdened	58	57	55	54	52	52	52	52	50	49	48	49	50	50	51	52	52
Moderate-growth/moderate-density metro areas	Moderately rent burdened	22	22	22	23	23	24	24	24	24	25	25	24	24	25	25	24	24
Moderate-growth/moderate-density metro areas	Severely rent burdened	20	21	23	23	24	24	24	24	25	27	27	26	25	25	24	24	24
Negative-growth metro areas	Not rent burdened	60	59	57	54	52	51	52	51	49	49	48	50	50	51	52	53	53
Negative-growth metro areas	Moderately rent burdened	20	20	22	22	22	22	23	23	23	23	23	23	23	23	23	23	22
Negative-growth metro areas	Severely rent burdened	20	21	22	24	26	26	26	26	28	28	29	27	27	26	26	25	24
Nonmetro areas	Not rent burdened	60	61	58	58	57	56	57	56	53	52	51	53	53	54	55	56	57
Nonmetro areas	Moderately rent burdened	21	20	21	21	21	22	22	22	23	24	24	23	23	23	23	23	23

Category	Rent burden	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Nonmetro areas	Severely rent burdened	19	19	21	21	22	22	21	22	24	25	25	23	24	23	22	22	21

Source: GAO analysis of American Community Survey data. | GAO-20-427

Notes: Estimates in this table have a margin of error of ±7 percentage points or fewer, at the 95 percent confidence level.

We defined four head-of-household age categories as younger (20–34 years old), early middle age (35–49 years old), late middle age (50–64 years old), and older (65 and older). We reported on five race/ethnicity categories, combining some Census categories for ease of analysis: White, Black, Hispanic (an ethnicity that applies to individuals of any racial background), Asian (includes Asian, Native Hawaiian, and Other Pacific Islander), and Other (includes American Indian, Alaska Native, two or more races, and some other race). We identified five locality types based on population growth and density: high-growth metro areas, moderate-growth/high-density metro areas, moderate-growth/moderate-density metro areas, negative-growth metro areas, and nonmetro areas. Rent burden is the share of household income used to pay gross rent, which includes rent and utility costs. We defined rent burden as spending more than 30 percent of household income on rent, moderate rent burden as spending more than 30 and up to 50 percent of household income on rent, and severe rent burden as spending more than 50 percent of household income on rent.

Table 15: Estimated Number of Households with Rent Burdens by Income, 2001–2017

Household income	Rent burden	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
All households	Not rent burdened	19,400,475	18,870,075	18,146,700	17,784,480	17,537,620	17,320,230	17,680,275	17,919,035	17,792,375	17,663,230	17,945,020	18,997,220	19,467,475	19,762,080	20,430,350	20,904,835	20,764,470
All households	Moderately rent burdened	7,338,405	7,337,550	7,518,725	7,710,960	8,005,730	8,056,150	8,165,655	8,375,775	8,754,050	9,089,335	9,285,405	9,388,680	9,550,435	9,878,400	9,862,900	9,766,450	9,703,580
All households	Severely rent burdened	6,891,520	7,080,315	7,537,355	7,813,230	8,408,115	8,358,460	8,238,905	8,704,340	9,323,565	9,909,010	10,359,780	10,300,910	10,230,495	10,368,230	10,125,975	9,990,055	9,774,080
Extremely low income	Not rent burdened	1,001,900	1,085,755	1,101,705	1,089,645	1,054,340	997,190	956,810	921,355	974,645	970,340	1,009,245	1,009,450	956,215	1,025,970	1,020,965	1,011,590	1,034,635
Extremely low income	Moderately rent burdened	1,325,055	1,460,040	1,483,880	1,524,645	1,442,470	1,378,645	1,311,330	1,269,870	1,392,400	1,412,150	1,479,210	1,459,625	1,320,990	1,718,485	1,692,080	1,605,005	1,551,190
Extremely low income	Severely rent burdened	5,145,530	5,396,200	5,697,495	5,882,210	6,242,240	6,049,730	5,788,275	6,119,045	6,639,640	7,076,880	7,407,895	7,362,050	7,032,985	7,293,040	7,016,505	6,828,000	6,636,100
Very low income	Not rent burdened	1,610,435	1,687,395	1,745,790	1,698,635	1,498,870	1,386,235	1,340,895	1,275,210	1,369,525	1,413,925	1,373,845	1,394,975	1,245,330	1,012,040	1,070,480	1,029,265	1,012,340
Very low income	Moderately rent burdened	2,998,565	3,129,125	3,219,630	3,233,085	3,287,865	3,173,585	3,126,000	3,180,810	3,408,005	3,584,365	3,600,420	3,665,240	3,522,905	2,900,150	2,923,710	2,783,870	2,747,545
Very low income	Severely rent burdened	1,355,770	1,350,340	1,472,735	1,521,950	1,699,625	1,801,990	1,884,570	1,997,660	2,110,645	2,241,245	2,336,920	2,317,010	2,467,970	2,226,365	2,243,560	2,242,510	2,236,160
Low income	Not rent burdened	4,764,700	4,788,070	4,793,225	4,738,290	4,547,865	4,312,220	4,186,280	4,172,395	4,265,735	4,254,930	4,184,015	4,311,265	4,063,455	3,779,715	3,916,155	3,847,985	3,806,345
Low income	Moderately rent burdened	2,279,320	2,092,580	2,176,500	2,301,640	2,476,640	2,596,670	2,713,945	2,857,355	2,933,585	3,035,445	3,113,240	3,125,150	3,352,110	3,624,275	3,603,005	3,624,205	3,670,005
Low income	Severely rent burdened	312,710	271,600	295,020	323,410	378,200	408,805	453,745	477,255	470,315	480,070	504,450	502,430	581,610	693,725	698,010	743,725	745,840
Moderate income	Not rent burdened	5,954,840	5,725,065	5,045,615	5,044,295	4,999,840	5,025,585	4,750,395	5,035,430	5,067,695	4,999,560	5,029,370	5,328,910	5,383,140	5,444,110	5,640,250	5,590,200	5,564,180
Moderate income	Moderately rent burdened	589,440	520,205	484,955	505,785	603,125	712,810	734,265	788,710	766,955	795,885	812,685	838,810	984,605	1,190,280	1,178,305	1,240,660	1,225,170
Moderate income	Severely rent burdened	62,080	49,665	54,210	65,035	61,195	74,540	78,880	81,575	74,135	79,560	78,295	89,335	104,610	110,965	119,765	119,110	109,925
Higher income	Not rent burdened	6,068,595	5,583,790	5,460,365	5,213,615	5,436,700	5,599,000	6,445,895	6,514,650	6,114,775	6,024,475	6,348,540	6,952,625	7,819,335	8,500,245	8,782,500	9,425,795	9,346,970
Higher income	Moderately rent burdened	146,020	135,595	153,765	145,800	195,625	194,440	280,120	279,035	253,110	261,485	279,840	299,855	369,820	445,210	465,800	512,715	509,680
Higher income	Severely rent burdened	15,430	12,510	17,890	20,625	26,860	23,395	33,435	28,805	28,825	31,255	32,230	30,090	43,325	44,135	48,135	56,710	46,050

Source: GAO analysis of American Community Survey data. | GAO-20-427

Notes: Estimated numbers of renter households in this table have a relative margin of error of about ±16 percent of the estimated number, at the 95 percent confidence level unless otherwise noted. Estimated numbers of renter households in the higher income category have a relative margin of error of ±32 percent of the estimated number, at the 95 percent confidence level due to small sample size.

We defined extremely low income as up to 30 percent of Department of Housing and Urban Development area median family income (HAMFI); very low income as more than 30, up to 50 percent of HAMFI; low income as more than 50, up to 80 percent of HAMFI; moderate income as more than 80, up to 120 percent of HAMFI; and higher income as greater than 120 percent of HAMFI. Rent burden is the share of household income used to pay gross rent, which includes rent and utility costs. We defined rent burden as spending more than 30 percent of household income on rent, moderate rent burden as spending more than 30 and up to 50 percent of household income on rent, and severe rent burden as spending more than 50 percent of household income on rent.

Table 16: Estimated Percentage of Households with Rent Burdens by Income, 2001–2017

Household income	Rent burden	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
All households	Not rent burdened	58	57	55	53	52	51	52	51	50	48	48	49	50	49	51	51	52
All households	Moderately rent burdened	22	22	23	23	24	24	24	24	24	25	25	24	24	25	24	24	24
All households	Severely rent burdened	20	21	23	23	25	25	24	25	26	27	28	27	26	26	25	25	24
Extremely low income	Not rent burdened	13	14	13	13	12	12	12	11	11	10	10	10	10	10	10	11	11
Extremely low income	Moderately rent burdened	18	18	18	18	17	16	16	15	15	15	15	15	14	17	17	17	17
Extremely low income	Severely rent burdened	69	68	69	69	71	72	72	74	74	75	75	75	76	73	72	72	72
Very low income	Not rent burdened	27	27	27	26	23	22	21	20	20	20	19	19	17	16	17	17	17
Very low income	Moderately rent burdened	50	51	50	50	51	50	49	49	49	50	49	50	49	47	47	46	46
Very low income	Severely rent burdened	23	22	23	24	26	28	30	31	31	31	32	31	34	36	36	37	37
Low income	Not rent burdened	65	67	66	64	61	59	57	56	56	55	54	54	51	47	48	47	46
Low income	Moderately rent burdened	31	29	30	31	33	35	37	38	38	39	40	39	42	45	44	44	45
Low income	Severely rent burdened	4	4	4	4	5	6	6	6	6	6	6	6	7	9	8	9	9
Moderate income	Not rent burdened	90	91	90	90	88	86	85	85	86	85	85	85	83	81	81	80	81
Moderate income	Moderately rent burdened	9	8	9	9	11	12	13	13	13	14	14	13	15	18	17	18	18
Moderate income	Severely rent burdened	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2
Higher income	Not rent burdened	97	97	97	97	96	96	95	95	96	95	95	95	95	95	94	94	94
Higher income	Moderately rent burdened	2	2	3	3	3	3	4	4	4	4	4	4	4	5	5	5	5
Higher income	Severely rent burdened	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0

Source: GAO analysis of American Community Survey data. | GAO-20-427

Notes: Estimates in this table have a margin of error of ±3 percentage points or fewer, at the 95 percent confidence level.

We defined extremely low income as up to 30 percent of Department of Housing and Urban Development area median family income (HAMFI); very low income as more than 30, up to 50 percent of HAMFI; low income as more than 50, up to 80 percent of HAMFI; moderate income as more than 80, up to 120 percent of HAMFI; and higher income as greater than 120 percent of HAMFI. Rent burden is the share of household income used to pay gross rent, which includes rent and utility costs. We defined rent burden as spending more than 30 percent of household income on rent, moderate rent burden as spending more than 30 and up to 50 percent of household income on rent, and severe rent burden as spending more than 50 percent of household income on rent.

Table 17: Estimated Rent-to-Income Ratio by Demographic Group and Locality Type, 2001–2017

Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
20–34 years	0.26	0.26	0.28	0.28	0.29	0.29	0.29	0.29	0.30	0.31	0.31	0.30	0.30	0.30	0.29	0.29	0.28
35–49 years	0.25	0.25	0.26	0.27	0.27	0.28	0.28	0.28	0.29	0.29	0.30	0.29	0.29	0.29	0.28	0.28	0.28
50–64 years	0.26	0.26	0.27	0.28	0.28	0.28	0.28	0.29	0.29	0.30	0.31	0.30	0.30	0.30	0.30	0.29	0.29
65+ years	0.33	0.33	0.34	0.34	0.34	0.35	0.34	0.35	0.35	0.35	0.36	0.35	0.35	0.35	0.35	0.35	0.35
White	0.25	0.25	0.26	0.27	0.28	0.28	0.28	0.28	0.28	0.29	0.29	0.28	0.28	0.28	0.28	0.28	0.27
Black	0.30	0.30	0.31	0.32	0.33	0.33	0.33	0.33	0.34	0.35	0.36	0.35	0.34	0.34	0.34	0.33	0.33
Hispanic	0.29	0.29	0.30	0.31	0.32	0.32	0.32	0.32	0.33	0.34	0.34	0.34	0.33	0.33	0.33	0.32	0.32
Asian	0.26	0.26	0.27	0.27	0.28	0.28	0.28	0.28	0.27	0.28	0.28	0.28	0.27	0.28	0.27	0.27	0.27
Other	0.27	0.27	0.29	0.30	0.30	0.30	0.30	0.30	0.30	0.32	0.32	0.32	0.31	0.31	0.30	0.30	0.30
High-growth metro areas	0.26	0.27	0.29	0.29	0.29	0.29	0.29	0.29	0.31	0.31	0.31	0.30	0.30	0.30	0.29	0.29	0.29
Moderate-growth/high-density metro areas	0.27	0.28	0.29	0.30	0.30	0.30	0.30	0.31	0.31	0.32	0.32	0.32	0.32	0.32	0.31	0.31	0.31
Moderate-growth/moderate-density metro areas	0.27	0.27	0.28	0.28	0.29	0.29	0.29	0.29	0.30	0.31	0.31	0.30	0.30	0.30	0.29	0.29	0.29
Negative-growth metro areas	0.26	0.26	0.27	0.28	0.29	0.29	0.29	0.30	0.30	0.31	0.31	0.30	0.30	0.30	0.29	0.29	0.29
Nonmetro areas	0.26	0.25	0.26	0.26	0.27	0.27	0.27	0.28	0.29	0.29	0.29	0.28	0.29	0.28	0.28	0.28	0.27
Extremely low income	0.70	0.70	0.70	0.72	0.74	0.75	0.75	0.78	0.77	0.78	0.79	0.79	0.80	0.76	0.75	0.76	0.76
Very low income	0.38	0.38	0.38	0.38	0.39	0.40	0.41	0.42	0.41	0.42	0.42	0.42	0.43	0.44	0.44	0.44	0.44
Low income	0.27	0.26	0.26	0.27	0.27	0.28	0.28	0.29	0.29	0.29	0.29	0.29	0.30	0.31	0.31	0.31	0.31
Moderate income	0.20	0.19	0.19	0.20	0.20	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.22	0.23	0.22	0.23	0.23
Higher income	0.14	0.13	0.14	0.14	0.14	0.14	0.15	0.15	0.15	0.15	0.15	0.15	0.16	0.16	0.16	0.16	0.16

Source: GAO analysis of American Community Survey data. | GAO-20-427

Notes: Estimates in this table have a margin of error of ±2 percentage points or fewer, at the 95 percent confidence level.

We defined four head-of-household age categories as younger (20–34 years old), early middle age (35–49 years old), late middle age (50–64 years old), and older (65 and older). We reported on five race/ethnicity categories, combining some Census categories for ease of analysis: White, Black, Hispanic (an ethnicity that applies to individuals of any racial background), Asian (includes Asian, Native Hawaiian, and Other Pacific Islander), and Other (includes American Indian, Alaska Native, two or more races, and some other race). We identified five locality types based on population growth and density: high-growth metro areas, moderate-growth/high-density metro areas, moderate-growth/moderate-density metro areas, negative-growth metro areas, and nonmetro areas. Rent burden is the share of household income used to pay gross rent, which includes rent and utility costs. We defined rent burden as spending more than 30 percent of household income on rent, moderate rent burden as spending more than 30 and up to 50 percent of household income on rent, and severe rent burden as spending more than 50 percent of household income on rent

Appendix IV: Estimated Rent Burden in Statewide Rural Areas

In this appendix we present state-level analysis of housing affordability for rural renter households. While rental affordability is a challenge in both rural and urban areas, differences in demographics, economies, housing stock, and federal rental assistance programs make rural rental affordability issues unique[56]

We defined rural areas using the U.S. Department of Agriculture's 2010 rural-urban commuting area (RUCA) codes.[57] The data on renter households living in these areas are from the American Community Survey's 5-year estimates for 2013 through 2017.

While renter households lived in rural areas of all 50 states, generally the most populous states had the largest populations of renter households in rural areas (fig. 16). From 2013 through 2017, more than an estimated 2.2 million renter households lived in rural areas. The states with the largest estimated populations of renter households in rural areas were Texas (119,000), Missouri (96,000), Wisconsin (96,000), and Kentucky (93,000).

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[56]Rural-specific federal rental housing assistance includes the Section 515 Rural Rental Housing Direct Loan program, Section 538 Rural Rental Housing Guaranteed Loan program, Section 521 Rental Assistance program, and Section 514/516 Farm Labor Housing programs. Other federal programs, while not rural-specific, also assist renters in rural areas, including the low-income housing tax credit and Section 8 project-based and housing choice vouchers.

[57]There is no single agreed-upon definition of rural areas used by the U.S. government. While our nonmetro group could be considered rural, it includes urban clusters with populations up to 50,000. Further, the other four locality types may include areas of low population densities that could be considered rural. For these reasons, we developed a supplementary rural analysis that captures low population density areas based on census tracts. The definition of rural areas for purposes of this report combines census tracts with secondary RUCA codes 7, 8, 9, 10, and 10.3 from the 2010 RUCA codes revised as of July 3, 2019.

Figure 16: Estimated Number of Renter Households in Rural Areas by State, 2013–2017
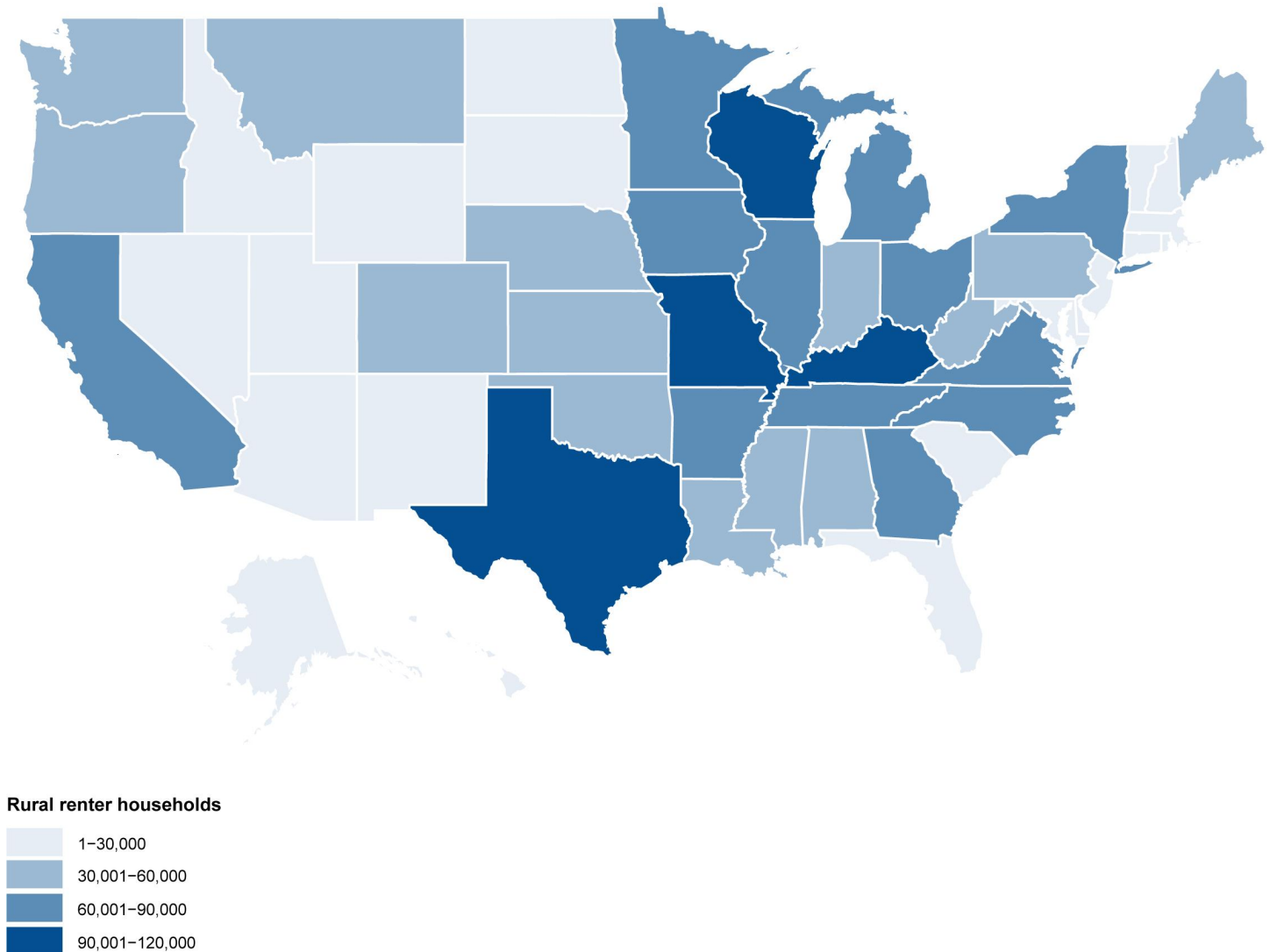
Rural renter households

	1–30,000
	30,001–60,000
	60,001–90,000
	90,001–120,000

Source: GAO analysis of Department of Agriculture and American Community Survey data. | GAO-20-427

Note: Estimates in this figure have a margin of error of ±13 percentage points or fewer, at the 95 percent confidence level with the exception of two states, which have a relative margin of error of ±51 percent (Rhode Island) and ±34 percent (New Jersey) of the estimate due to small sample size.

The prevalence of rural renter households varied significantly by state. While only about 5 percent of renter households lived in rural areas from 2013 through 2017, some states had significantly larger proportions of renters in rural areas. States with higher estimated proportions of rural renter households generally had small populations and were in northern New England or along the Missouri, Mississippi, or Ohio Rivers (fig. 17).

The states with the largest estimated proportions of renter households in rural areas were Vermont (39 percent) and Montana (32 percent).

Figure 17: Estimated Percentage of Renter Households in Rural Areas by State, 2013–2017

Renter households: percent rural

- 0−9%
- 10−19%
- 20−29%
- 30−39%

Source: GAO analysis of Department of Agriculture and American Community Survey data. | GAO-20-427

Note: Estimates in this figure have a margin of error of ±1 percentage point or less, at the 95 percent confidence level.

Renter households in rural areas generally had lower incomes than other renter households. From 2013 through 2017, while the median income for renter households overall was an estimated $36,653, nearly three in five

rural renter households had incomes lower than $35,000. For context, a household with two full-time jobs earning the federal minimum wage in 2017 would earn approximately $30,160.[58] In general, Southern states had the highest estimated proportion of rural renter households with incomes less than $35,000 (fig. 18). The states with the smallest proportion of rural renter households with incomes lower than $35,000 were New Jersey (25 percent), Rhode Island (32 percent), Alaska (35 percent), Hawaii (39 percent), and Connecticut (39 percent).

[58]The federal minimum wage in 2017 was $7.25 per hour. We calculate full-time jobs as working 40 hours per week for 52 weeks per year.

Figure 18: Estimated Percentage of Rural Renter Households with Income Less than $35,000 by State, 2013–2017
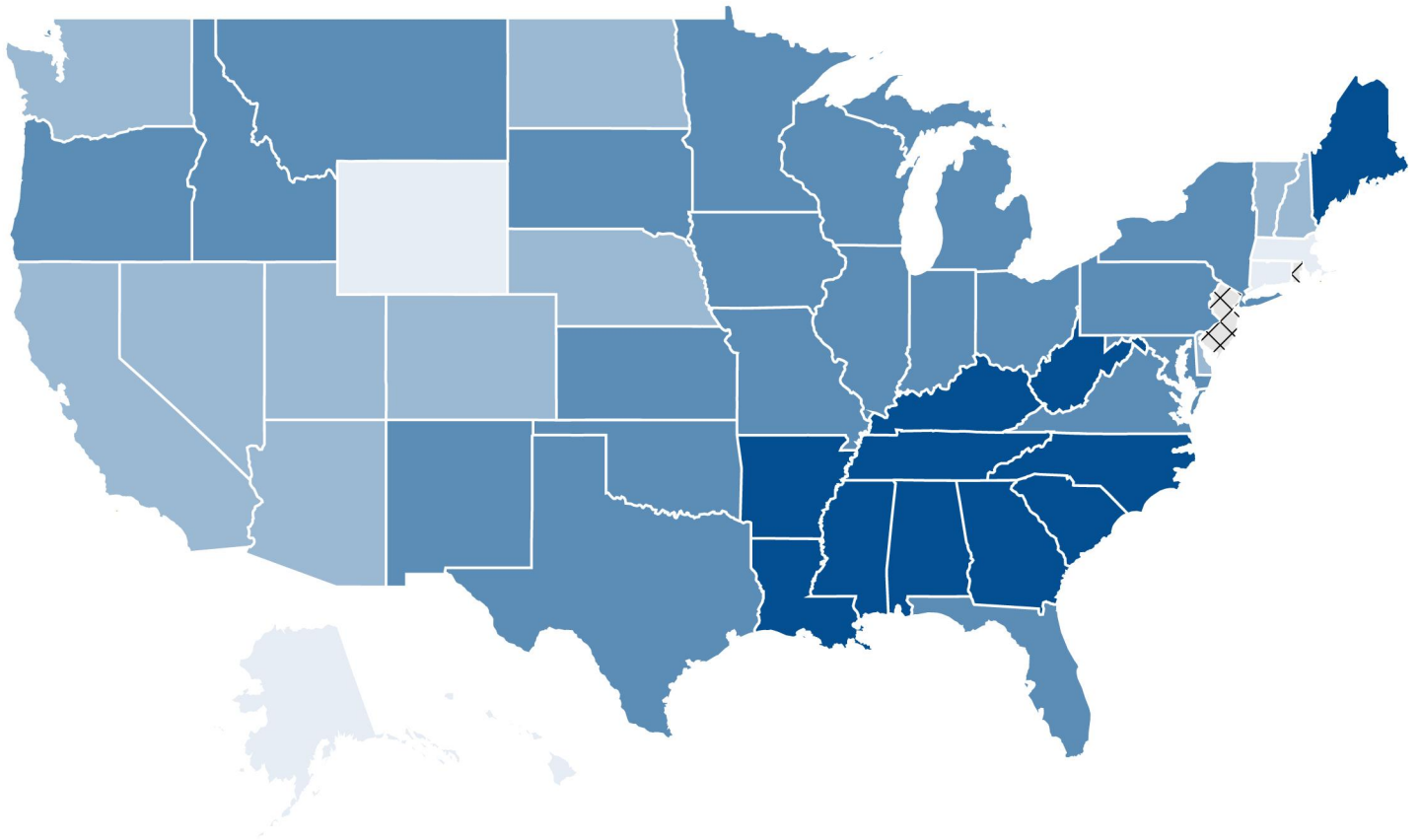
Rural renter households: percent with income <$35,000
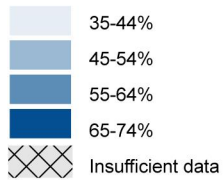
	35-44%
	45-54%
	55-64%
	65-74%
	Insufficient data

Source: GAO analysis of Department of Agriculture and American Community Survey data. | GAO-20-427
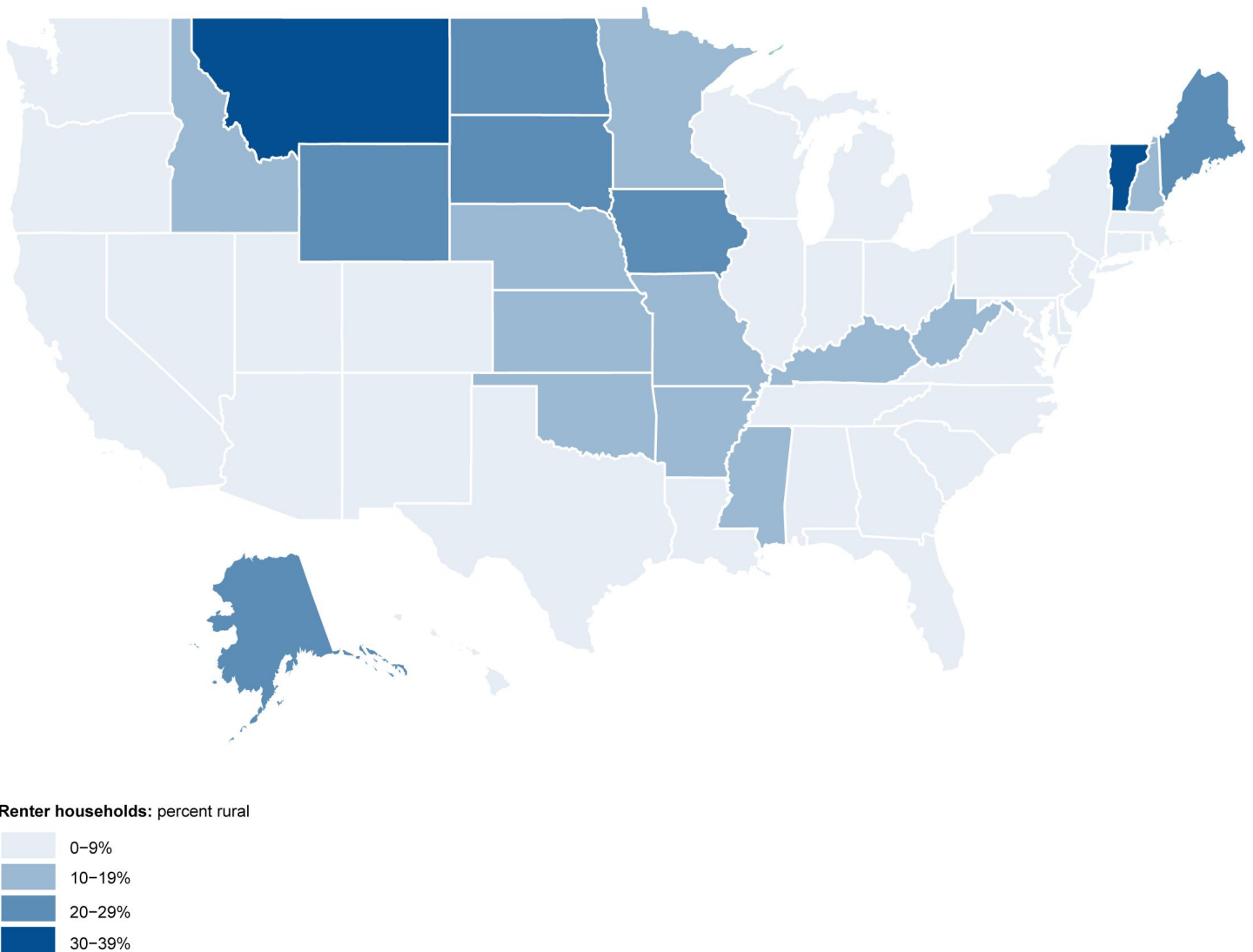
Note: Estimates in this figure have a margin of error of ±9 percentage points or fewer, at the 95 percent confidence level.

Rent burden was common among renter households in rural areas, but prevalence varied by state.[59] Rent burden was slightly less common among rural renter households from 2013 through 2017 (45 percent) than renter households in general in 2017 (48 percent). In eight of 48 states, at least 50 percent of rural renter households were rent burdened (fig. 19). In general, rural rent burden was most common in the Northeast, South, and West Coast, and least common in the U.S. interior. Louisiana had the highest estimated rate of rent burden among rural renter households (55 percent) and Wyoming had the lowest (33 percent).

[59]In the publicly available Census data we used for our analysis of rent burden in rural areas, households were aggregated into groups based on the percentage of income they spent on rent. For this analysis, we defined the group of households spending 30 percent or more of household income on rent as rent burdened. This definition differs slightly from the rent burden definition we used for the larger analysis of rent burden in this report. For the larger analysis, we defined rent burden as spending more than 30 percent of household income on rent, moderate rent burden as spending more than 30 and up to 50 percent of household income on rent, and severe rent burden as spending more than 50 percent of household income on rent. These definitions are consistent with other housing research and Department of Housing and Urban Development policies.

Figure 19: Estimated Percentage of Rural Renter Households with Rent Burdens by State, 2013–2017

Rural renter households: percent rent burdened

- 30-39%
- 40-49%
- 50-59%
- Insufficient data

Source: GAO analysis of Department of Agriculture and American Community Survey data. | GAO-20-427

Note: Estimates in this figure have a margin of error of ±7 percentage points or fewer, at the 95 percent confidence level.

Rent burdens were more common among rural households with incomes below $35,000. From 2013 through 2017, an estimated 70 percent of these households were rent burdened, and in no individual state were less than 50 percent of these households rent burdened (fig. 20). The five states with the highest proportion of lower-income rural renter households that were rent burdened were Alaska (81 percent), Massachusetts (83

percent), Hawaii (83 percent), California (83 percent), and Delaware (85 percent). As discussed previously in this report, lower-income households with rent burdens may struggle to pay for essential needs like food, transportation, health care, and clothing.

Figure 20: Estimated Percentage of Rural Renter Households with Income Less than $35,000 That Were Rent Burdened by State, 2013–2017

Rural renter households with income <$35,000: percent rent burdened

- 51-60%
- 61-70%
- 71-80%
- 81-90%
- Insufficient data

Source: GAO analysis of Department of Agriculture and American Community Survey data. | GAO-20-427

Note: Estimates in this figure have a margin of error of ±9 percentage points or fewer, at the 95 percent confidence level.
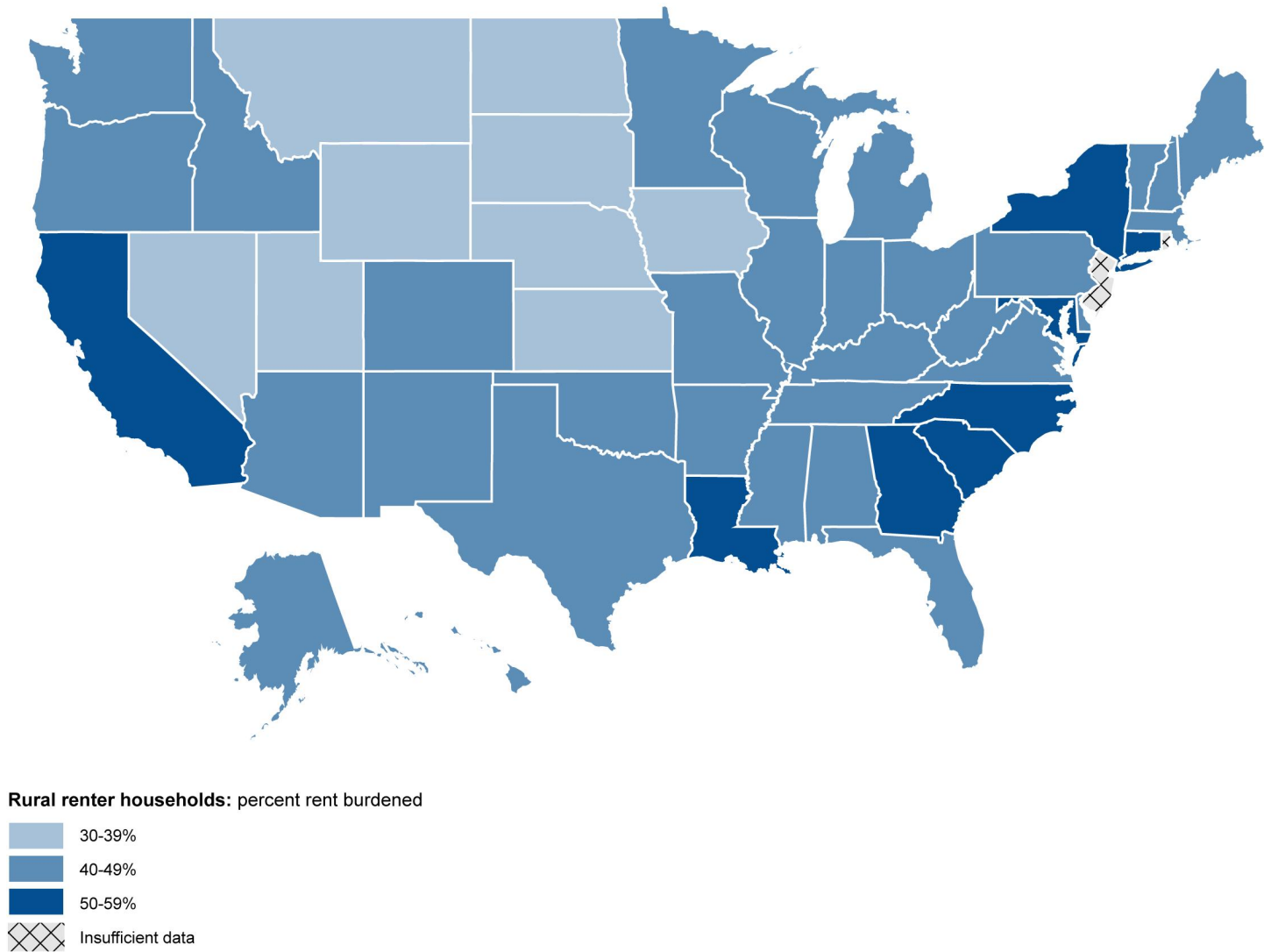
Rent burdens were uncommon among rural households with incomes of $35,000 or greater. From 2013 through 2017, only an estimated 9 percent of these households were rent burdened, and in no state were more than 30 percent of these households rent burdened (fig. 21). In 40 of 48 states, less than an estimated 15 percent of rural renter households with incomes of $35,000 or greater were rent burdened. The four states with the highest proportion of rural renter households with income $35,000 or greater that were rent burdened were Connecticut (28 percent), Hawaii (26 percent), California (24 percent), and Massachusetts (22 percent).

Figure 21: Estimated Percentage of Rural Renter Households with Income $35,000 or Greater That Were Rent Burdened by State, 2013–2017

Rural renter households with income >$35,000: percent rent burdened

- 1-10%
- 11-20%
- 21-30%
- Insufficient data
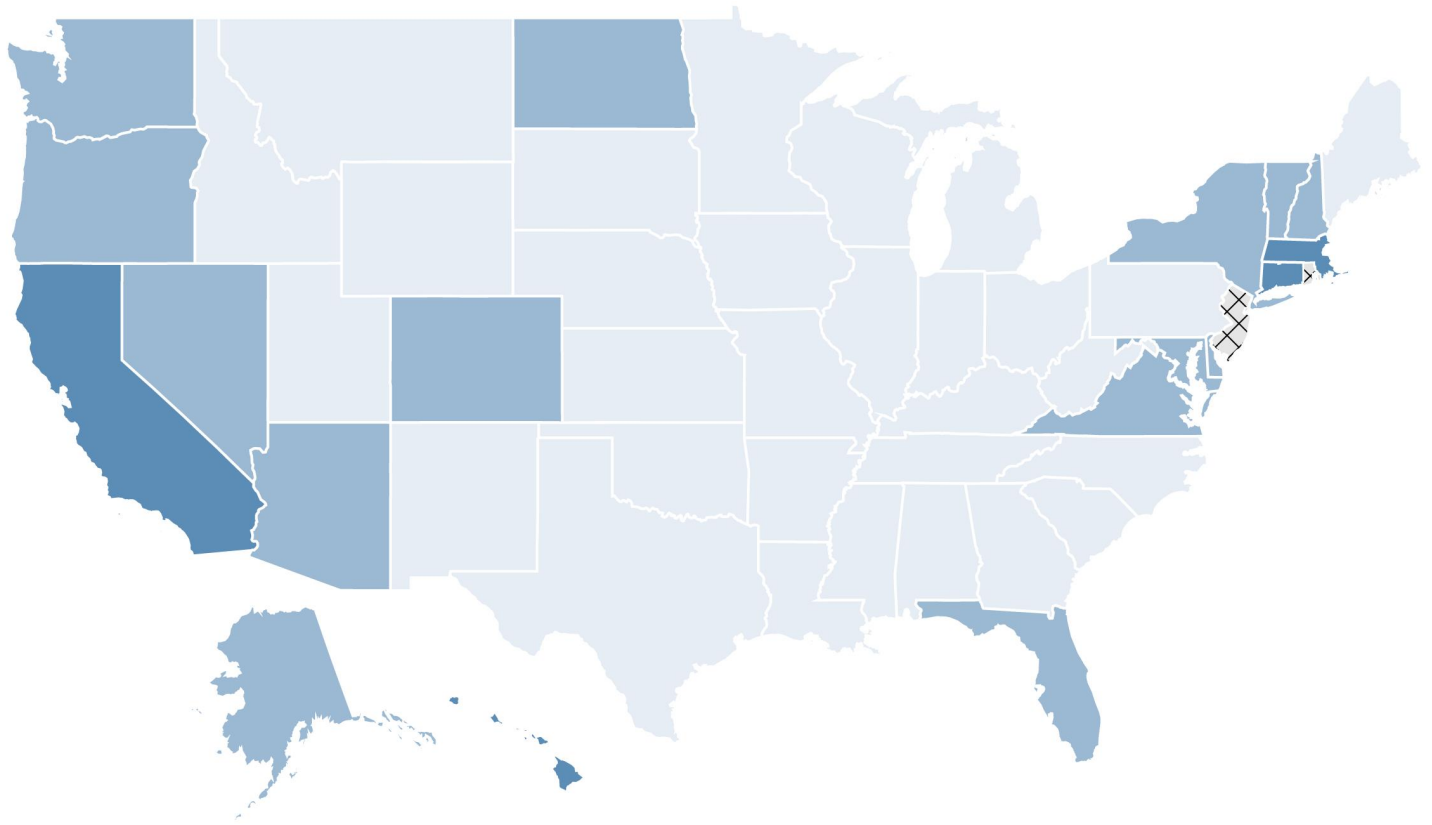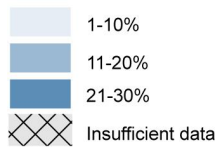
Source: GAO analysis of Department of Agriculture and American Community Survey data. | GAO-20-427
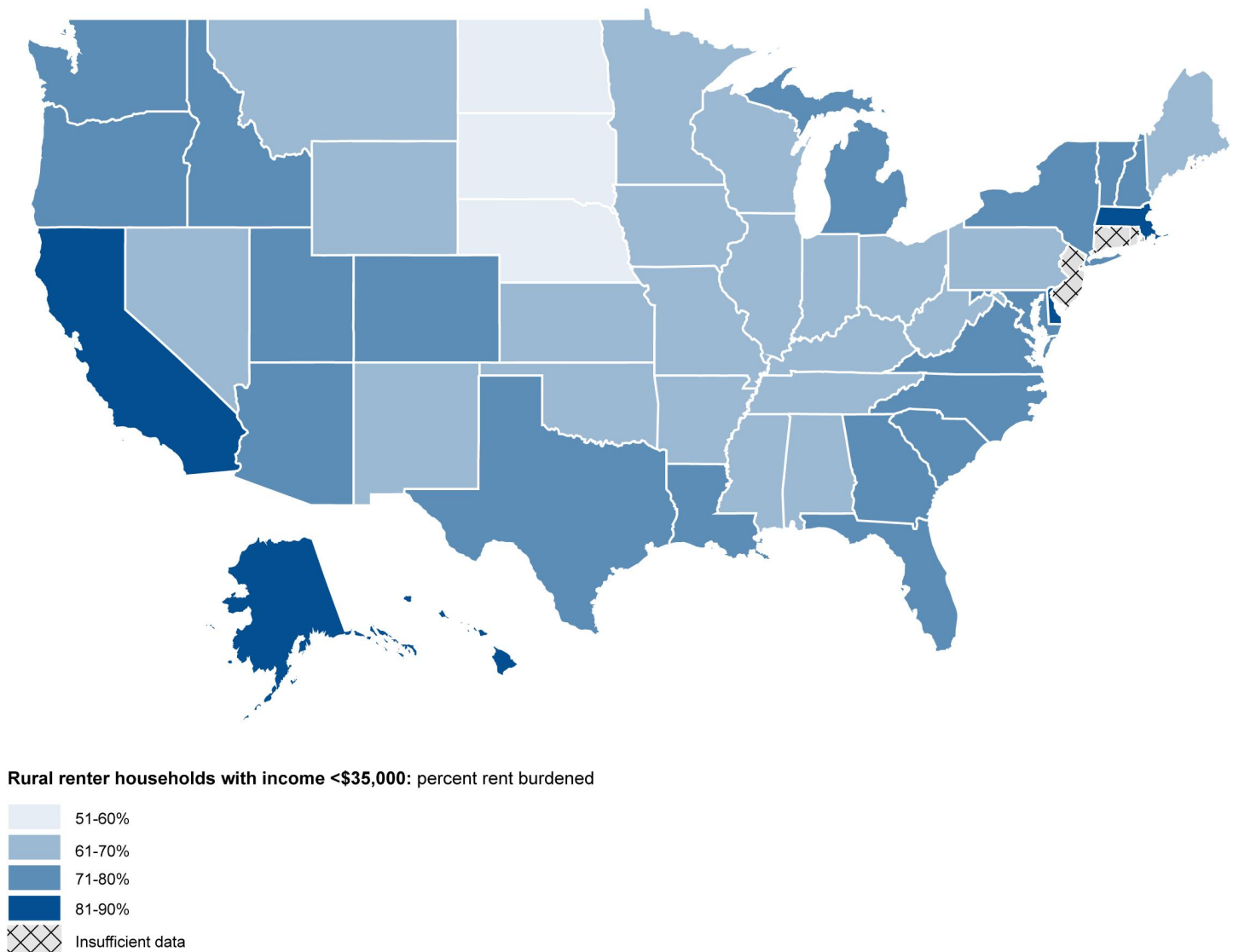
Note: Estimates in this figure have a margin of error of ±11 percentage points or fewer, at the 95 percent confidence level.

Appendix V: Comparison of GAO Housing Conditions Indexes and HUD Adequacy Index

This appendix describes how the indexes we developed to analyze rental housing conditions compare to an index the Department of Housing and Urban Development (HUD) uses to measure housing adequacy. Although our index uses many of the same American Housing Survey variables as HUD's adequacy index, differences in our analytic methods allowed us to produce more detailed results on housing conditions.

HUD measures housing adequacy as part of its ongoing efforts to analyze and report on worst case housing needs[60]

The adequacy index is a measure that is based on 19 variables in the American Housing Survey. It categorizes housing units as severely inadequate, moderately inadequate, or adequate based on whether a surveyed housing unit meets certain conditions or criteria.[61] Severely

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[60]HUD defines worst case needs as renter households that have very low incomes, and do not receive housing assistance, and pay more than one-half their income for rent, live in severely inadequate conditions, or both.

[61]The conditions and criteria for a severely inadequate score are based on a combination of variables, including the presence of bathroom and kitchen facilities, whether a unit has heat in the winter, and the presence of other hazards to health and well-being such as water leaks, wall cracks, and rodents. The conditions and criteria for a moderately inadequate score are based on a combination of 12 variables related to the same set of hazards to health and well-being in addition to other factors such as lacking a source of heat or having a kitchen lacking a sink, refrigerator, or cooking appliance. Any unit that does not satisfy the conditions and criteria of a severely or moderately inadequate score is scored as adequate.

inadequate housing units represented 2 to 3 percent of all rental units from 2001 through 2017.[62]

We developed two indexes based on a factor analysis of 13 quality-related variables and nine variables we identified as essential components of a dwelling. We determined that two indexes were needed to describe rental housing unit conditions based on American Housing Survey data, as relevant variables fell into two categories that required different statistical treatment and interpretation. Figure 22 provides a detailed comparison between the variables and scoring techniques of our indexes and HUD's adequacy index.

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[62]HUD has attributed the consistency in housing adequacy to more stringent building codes over time and ongoing demolition of obsolete units. Department of Housing and Urban Development, *Worst Case Housing Needs: 2017 Report to Congress* (Washington, D.C.: August 2017).

Figure 22: Comparison of the Department of Housing and Urban Development's (HUD) Adequacy Index and GAO's Housing Conditions Indexes
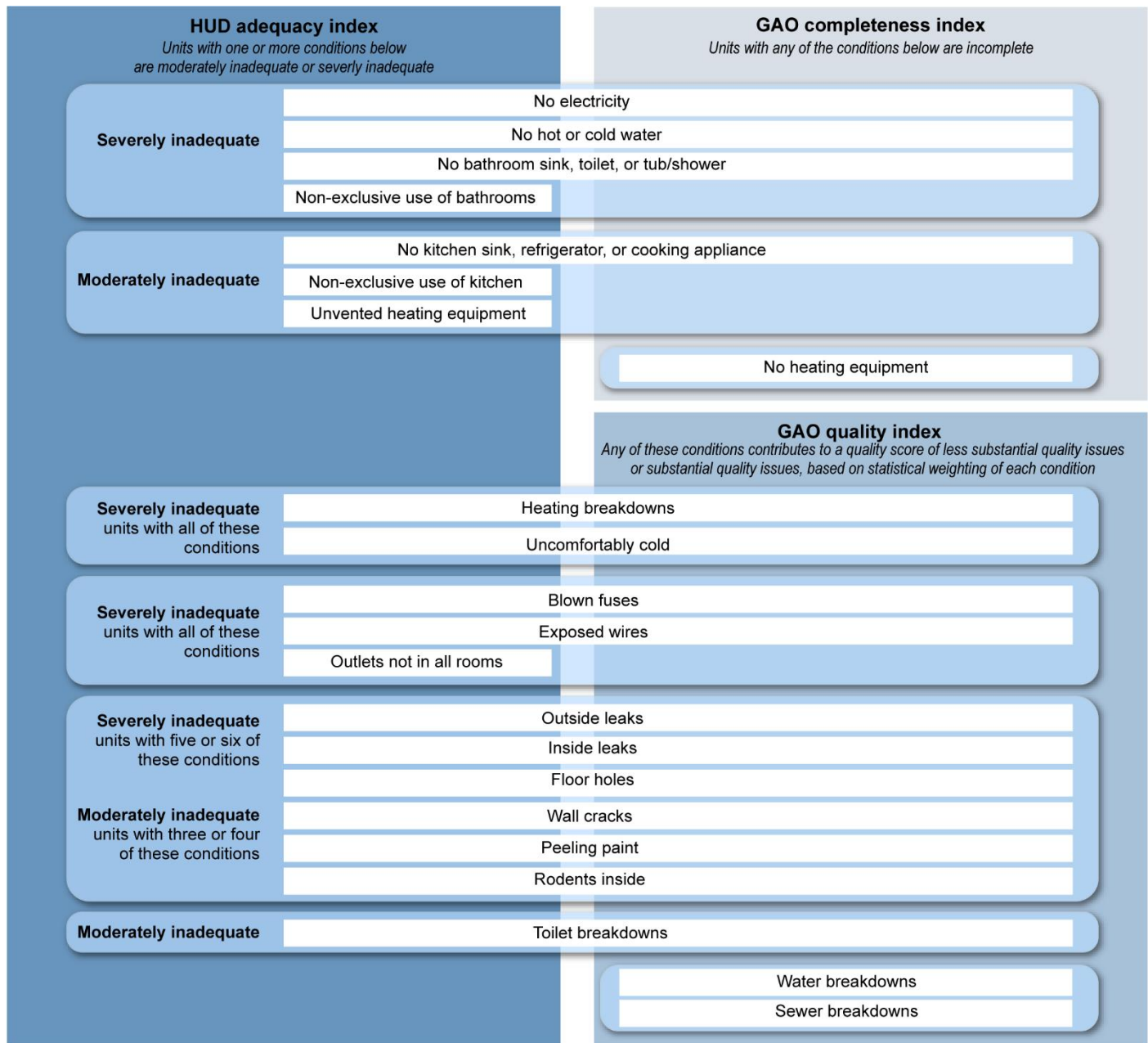
Source: GAO analysis of Department of Housing and Urban Development (HUD) information. | GAO-20-427

Note: We developed two indexes to define the range of housing conditions based on American Housing Survey data. The quality index, based on 13 quality-related variables, identified units as having no quality issues, less substantial quality issues, and substantial quality issues. The

completeness index, based on nine variables we identified as essential components of a dwelling, identified units as being incomplete or complete.

We compared HUD's 2017 housing adequacy findings to the results of our indexes and identified some notable differences. Among rental units that HUD considered adequate in 2017, an estimated 8 percent had substantial quality issues as measured by our quality index—affecting 2.7 million households. In addition, another estimated 9.7 million units had less substantial quality issues. These units did not satisfy HUD's scoring criteria for inadequate or moderately inadequate units, but they had a combination of issues that exceeded our statistical thresholds for substantial and less substantial quality issues.[63] Figure 23 provides a detailed comparison of how our results compare to HUD's.

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[63]We assigned a weight to each variable based on its estimated correlation with all other quality-related variables, whereas HUD's index is based on whether a given combination of variables is present.

Figure 23: Comparison of Findings from the Department of Housing and Urban Development's (HUD) Adequacy Index and GAO's Housing Conditions Indexes, 2017

Overall (rental housing units in millions)

GAO

HUD 35.69

Overlap by GAO quality and completeness indexes

No quality issues (GAO) 20.41
Adequate (HUD) 20.07
Moderately inadequate (HUD) 0.34
Severely inadequate (HUD) 0.00

Less substantial quality issues (GAO) 9.88
Adequate (HUD) 9.66
Moderately inadequate (HUD) 0.22
Severely inadequate (HUD) 0.00

Substantial quality issues (GAO) 4.34
Adequate (HUD) 2.71
Moderately inadequate (HUD) 1.18
Severely inadequate (HUD) 0.45

Incomplete (GAO) 1.06
Adequate (HUD) 0.34
Moderately inadequate (HUD) 0.40
Severely inadequate (HUD) 0.32

HUD adequacy index

Adequate
Moderately inadequate
Severely inadequate

GAO quality index

○ No quality issues
⊕ Less substantial quality issues
⊗ Substantial quality issues

GAO completeness index

◇ Incomplete

Source: GAO analysis of American Housing Survey data from Department of Housing and Urban Development (HUD). | GAO-20-427

Appendix VI: Additional Information on Rental Housing Conditions

This appendix provides additional information on rental housing conditions by household income, affordability (rent burden), race/ethnicity, age, rental unit age, and structure type, based on two indexes we developed to analyze American Housing Survey data[64]

The appendix also includes information on household crowding based on our analysis of American Community Survey data by household income, rent burden, race/ethnicity, and age.

Table 18: GAO Quality and Completeness Indexes, Rental Units by Housing Condition and Income, 2017

na	Index category: Incomplete housing units	Index category: Incomplete housing units	Index category: Substantial quality issues	Index category: Substantial quality issues	Index category: Less substantial quality issues	Index category: Less substantial quality issues	Index category: No quality issues	Index category: No quality issues	Index category: All rental units	Index category: All rental units
Renter households by housing condition and income	Estimated number (in millions)	Estimated percentage	Estimated number (in millions)	Estimated percentage	Estimated number (in millions)	Estimated percentage	Estimated number (in millions)	Estimated percentage	Estimated number (in millions)	Estimated percentage
All households	1.06	3	4.34	12	9.88	28	20.41	57	35.69	100
Extremely low income	0.47	5	1.41	14	2.56	26	5.34	55	9.77	100

[64]App. II includes more detailed information about the indexes we developed.

na	Index category: Incomplete housing units	Index category: Incomplete housing units	Index category: Substantial quality issues	Index category: Substantial quality issues	Index category: Less substantial quality issues	Index category: Less substantial quality issues	Index category: No quality issues	Index category: No quality issues	Index category: All rental units	Index category: All rental units
Renter households by housing condition and income	Estimated number (in millions)	Estimated percentage	Estimated number (in millions)	Estimated percentage	Estimated number (in millions)	Estimated percentage	Estimated number (in millions)	Estimated percentage	Estimated number (in millions)	Estimated percentage
Very low income	0.17	3	0.68	13	1.41	26	3.09	58	5.34	100
Low income	0.20	3	0.83	12	2.05	29	3.93	56	7.01	100
Moderate and higher income	0.23	2	1.42	10	3.87	28	8.05	59	13.57	100

Source: GAO analysis of American Housing Survey data. | GAO-20-427

Notes: We developed two indexes to define the range of housing conditions based on American Housing Survey data. The quality index, based on 13 quality-related variables, identified units as having no quality issues, less sub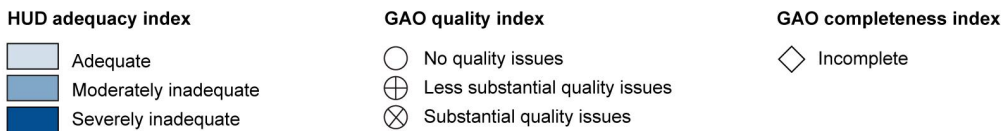stantial quality issues, and substantial quality issues. The completeness index, based on nine variables we identified as essential components of a dwelling, identified units as being incomplete or complete.

Estimates of the number of housing units in this table have a relative margin of error of ±25 percent or less of the estimated number. Estimates of the percent of housing units in this table have a margin of error of ±7 percentage points or fewer, at the 95 percent confidence level.

Extremely low income is defined as up to 30 percent of HUD area median family income (HAMFI); very low income as more than 30, up to 50 percent of HAMFI; low income as more than 50, up to 80 percent of HAMFI; moderate income as more than 80, up to 120 percent of HAMFI, and higher income as greater than 120 percent of HAMFI.

Table 19: GAO Quality and Completeness Indexes, Rental Units by Housing Conditions and Rent Burden, 2017

na	Incomplete housing units (index category)		Substantial quality issues (index category)		Less substantial quality issues (index category)		No quality issues (index category)		All rental units (index category)	
Renter households by rent burden	**Estimated number (in millions)**	**Estimated percentage**	**Estimated number (in millions)**	**Estimated percentage**	**Estimated number (in millions)**	**Estimated percentage**	**Estimated number (in millions)**	**Estimated percentage**	**Estimated number (in millions)**	**Estimated percentage**
All households	1.06	3	4.34	12	9.88	28	20.41	57	35.69	100
Not rent burdened	0.42	2	2.03	11	5.10	28	10.37	58	17.92	100
Rent burdened	0.64	4	2.31	13	4.78	27	10.04	57	17.77	100
Moderate burden	0.29	3	1.07	12	2.42	27	5.08	57	8.85	100
Severe burden	0.35	4	1.24	14	2.36	26	4.97	56	8.92	100

Source: GAO analysis of American Housing Survey data. | GAO-20-427

Notes: We developed two indexes to define the range of housing conditions based on American Housing Survey data. The quality index, based on 13 quality-related variables, identified units as having no quality issues, less substantial quality issues, and substantial quality issues. The completeness index, based on nine variables we identified as essential components of a dwelling, identified units as being incomplete or complete.

Estimates of the number of housing units in this table have a relative margin of error of ±23 percent or less of the estimated number. Estimates of the percent of housing units in this table have a margin of error of ±5 percentage points or fewer, at the 95 percent confidence level.

Households that were not rent burdened had rent costs that were 30 percent or less of household income. Rent-burdened households had rent costs more than 30 percent of household income. Of those, moderate burden households had rent costs of more than 30 and up to 50 percent of household income, and severe burden households had rent costs that exceeded 50 percent of household income.

Table 20: GAO Quality and Completeness Indexes, Rental Units by Condition and Race/Ethnicity, 2017

na	Incomplete housing units (index category)		Substantial quality issues (index category)		Less substantial quality issues (index category)		No quality issues (index category)		All rental units (index category)	
Renter households by race/ethnicity	Estimated number (in millions)	Estimated percentage	Estimated number (in millions)	Estimated percentage	Estimated number (in millions)	Estimated percentage	Estimated number (in millions)	Estimated percentage	Estimated number (in millions)	Estimated percentage
All households	1.06	3	4.34	12	9.88	28	20.41	57	35.69	100
White	0.43	2	2.04	11	5.09	29	10.24	58	17.81	100
Black	0.14	2t	1.03	14	2.09	28	4.20	56	7.47	100
Hispanic	0.33	4	0.92	13	1.87	26	4.19	57	7.31	100
Asian	0.11	6	0.16	8	0.47	23	1.29	63	2.03	100
Other	0.05	4	0.18	17	0.35	33	0.49	46	1.07	100

Source: GAO analysis of American Housing Survey data. | GAO-20-427

Notes: We developed two indexes to define the range of housing conditions based on American Housing Survey data. The quality index, based on 13 quality-related variables, identified units as having no quality issues, less substantial quality issues, and substantial quality issues. The completeness index, based on nine variables we identified as essential components of a dwelling, identified units as being incomplete or complete.

Estimates of the number of housing units in this table have a relative margin of error of ±30 percent or less of the estimated number. Estimates of the percent of housing units in this table have a margin of error of ±9 percentage points or fewer, at the 95 percent confidence level.

We reported on five race/ethnicity categories, combining some Census categories for ease of analysis: White, Black, Hispanic (an ethnicity that applies to individuals of any racial background), Asian (includes Asian, Native Hawaiian, and Other Pacific Islander), and Other (includes American Indian, Alaska Native, two or more races, and some other race).

Table 21: GAO Quality and Completeness Indexes, Rental Units by Condition and Age, 2017

na	Incomplete housing units (index category)	Incomplete housing units (index category)	Substantial quality issues (index category)	Substantial quality issues (index category)	Less substantial quality issues (index category)	Less substantial quality issues (index category)	No quality issues (index category)	No quality issues (index category)	All rental units (index category	All rental units (index category
Renter households by age	Estimated number (in millions)	Estimated percentage	Estimated number (in millions)	Estimated percentage	Estimated number (in millions)	Estimated percentage	Estimated number (in millions)	Estimated percentage	Estimated number (in millions)	Estimated percentage
All households	1.06	3	4.34	12	9.88	28	20.41	57	35.69	100
Younger	0.28	3	1.39	13	3.19	30	5.76	54	10.62	100
Early middle age	0.30	3	1.43	13	2.99	28	5.97	56	10.69	100
Late middle age	0.25	3	1.14	13	2.30	27	4.85	57	8.54	100
Older	0.24	4	0.36	6	1.36	24	3.73	66	5.68	100

Source: GAO analysis of American Housing Survey data. | GAO-20-427

Notes: We developed two indexes to define the range of housing conditions based on American Housing Survey data. The quality index, based on 13 quality-related variables, identified units as having no quality issues, less substantial quality issues, and substantial quality issues. The completeness index, based on nine variables we identified as essential components of a dwelling, identified units as being incomplete or complete.

Estimates of the number of housing units in this table have a relative margin of error of ±13 percent or less of the estimated number. Estimates of the percent of housing units in this table have a margin of error of ±3 percentage points or fewer, at the 95 percent confidence level.

We defined four head-of-household age categories as younger (20–34 years old), early middle age (35–49 years old), late middle age (50–64 years old), and older (65 and older).

Table 22: GAO Quality and Completeness Indexes, Rental Units by Condition and Structure Age, 2017

na	Incomplete housing units (index category)		Substantial quality issues (index category)		Less substantial quality issues (index category)		No quality issues (index category)		All rental units (index category)	
Year built	Estimated number (in millions)	Estimated percentage	Estimated number (in millions)	Estimated percentage	Estimated number (in millions)	Estimated percentage	Estimated number (in millions)	Estimated percentage	Estimated number (in millions)	Estimated percentage
2000–2017	0.11	2	0.33	5	1.46	24	4.27	69	6.17	100
1980–1999	0.26	3	0.87	10	2.28	27	5.04	60	8.44	100
1960–1979	0.28	3	1.10	12	2.65	28	5.28	57	9.32	100
1940–1959	0.17	3	0.88	16	1.53	28	2.81	52	5.39	100
1920–1939	0.12	4	0.51	16	0.98	31	1.57	49	3.17	100
Before 1920	0.13	4	0.63	2	0.99	31	1.45	45	3.20	100

Source: GAO analysis of American Housing Survey data. | GAO-20-427

Note: We developed two indexes to define the range of housing conditions based on American Housing Survey data. The quality index, based on 13 quality-related variables, identified units as having no quality issues, less substantial quality issues, and substantial quality issues. The completeness index, based on nine variables we identified as essential components of a dwelling, identified units as being incomplete or complete.

Estimates of the number of housing units in this table have a relative margin of error of ±18 percent or less of the estimated number. Estimates of the percent of housing units in this table have a margin of error of ±5 percentage points or fewer, at the 95 percent confidence level.

Table 23: GAO Quality and Completeness Indexes, Rental Units by Condition and Unit Type, 2017

na	Incomplete housing units (index category)		Substantial quality issues (index category)		Less substantial quality issues (index category)		No quality issues (index category)		All rental units (index category)	
Structure Type	**Estimated number (in millions)**	**Estimated percentage**	**Estimated number (in millions)**	**Estimated percentage**	**Estimated number (in millions)**	**Estimated percentage**	**Estimated number (in millions)**	**Estimated percentage**	**Estimated number (in millions)**	**Estimated percentage**
Multifamily	0.67	3	2.42	11	5.46	26	12.76	60	21.31	100
Multifamily: Small (2–9 units)	0.28	3	1.21	12	2.83	2	6.11	59	10.43	100
Multifamily: Large (10 or more units)	0.39	4	1.20	11	2.63	24	6.65	61	10.87	100
Single family	0.33	3	1.71	13	4.00	31	7.05	54	13.10	100
Single family: Detached	0.25	3	1.33	14	3.05	32	4.97	52	9.61	100
Single family: Attached	0.08	2	0.38	11	0.95	27	2.08	60	3.49	100
Mobile home	0.05	4	0.21	16	0.42	33	0.60	47	1.29	100

Source: GAO analysis of American Housing Survey data. | GAO-20-427

Notes: We developed two indexes to define the range of housing conditions based on American Housing Survey data. The quality index, based on 13 quality-related variables, identified units as having no quality issues, less substantial quality issues, and substantial quality issues. The completeness index, based on nine variables we identified as essential components of a dwelling, identified units as being incomplete or complete.

Estimates of the number of housing units in this table have a relative margin of error of ±21 percent or less of the estimated number. Estimates of the percent of housing units in this table have a margin of error of ±8 percentage points or fewer, at the 95 percent confidence level.

Figure 24: Estimated Percentage of Crowded Renter Households by Race/Ethnicity, 2001–2017
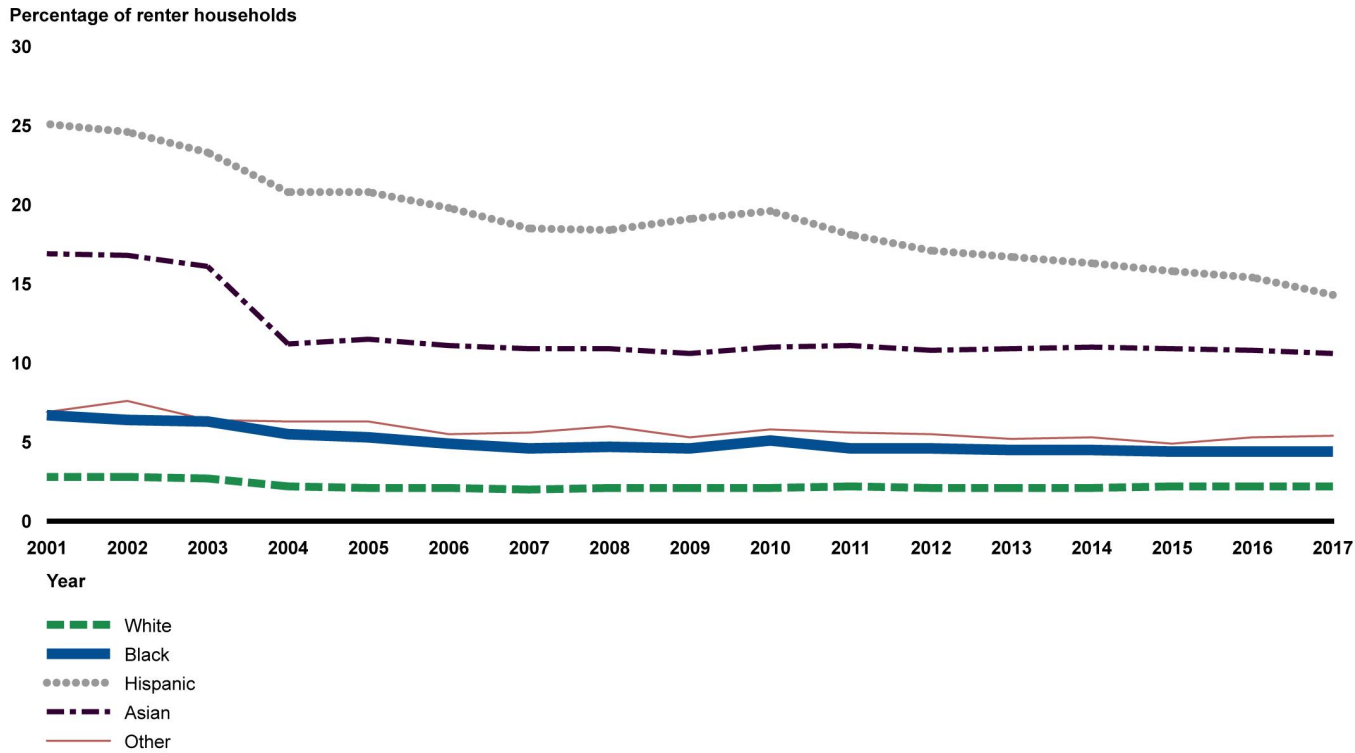
Percentage of renter households

Source: GAO analysis of American Community Survey data. | GAO-20-427

Notes: We defined a crowded household as having more than two people per bedroom. A studio apartment occupied by two people did not meet our crowding definition.

Estimates in this figure have a margin of error of ±2 percentage points or fewer, at the 95 percent confidence level.

Figure 25: Estimated Percentage of Crowded Renter Households by Age, 2001–2017
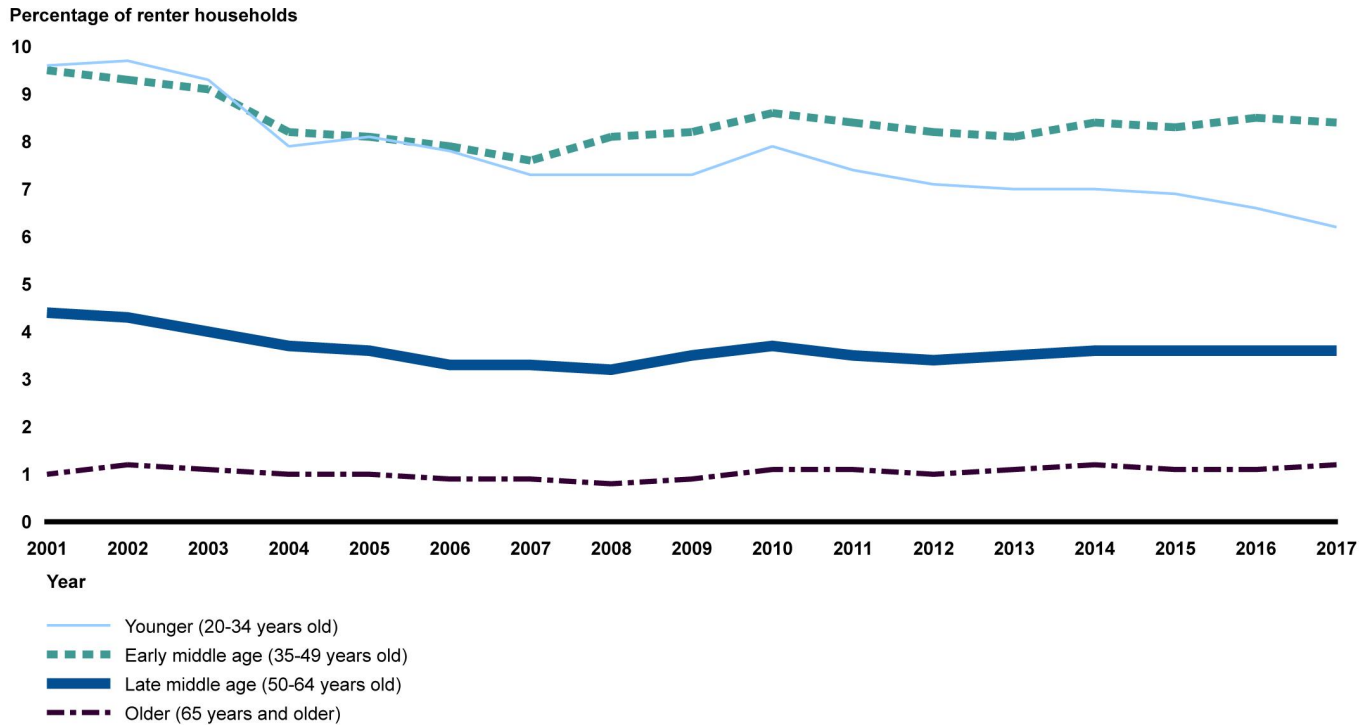
Percentage of renter households

Source: GAO analysis of American Community Survey data. | GAO-20-427

Notes: We defined a crowded household as having more than two people per bedroom. A studio apartment occupied by two people did not meet our crowding definition.

Estimates in this figure have a margin of error of ±1 percentage point or less, at the 95 percent confidence level.

Figure 26: Estimated Percentage of Crowded Renter Households by Income, 2001–2017
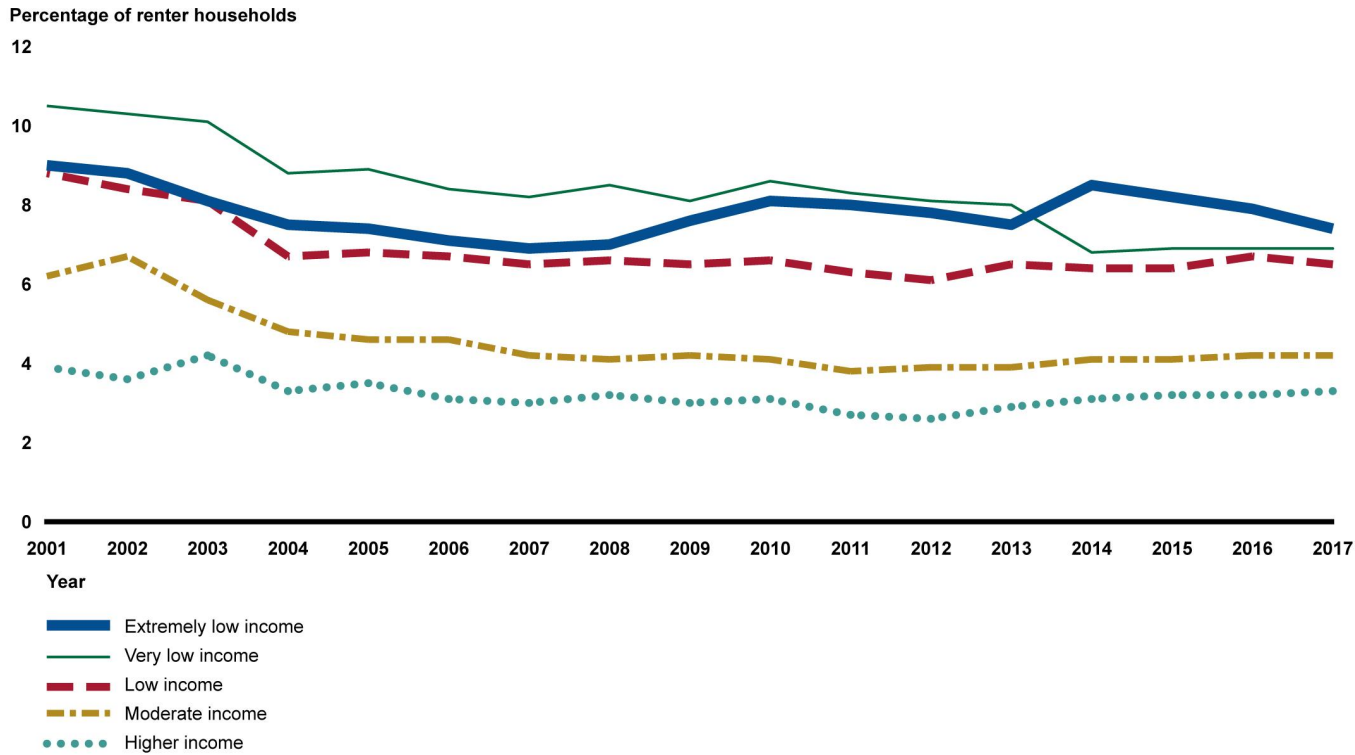
Percentage of renter households

Extremely low income

Very low income

Low income

Moderate income

Higher income

Source: GAO analysis of American Community Survey data. | GAO-20-427

Notes: We defined a crowded household as having more than two people per bedroom. A studio apartment occupied by two people did not meet our crowding definition.

Estimates in this figure have a margin of error of ±1 percentage point or less, at the 95 percent confidence level.

Figure 27: Estimated Percentage of Crowded Renter Households by Locality Type, 2001–2017
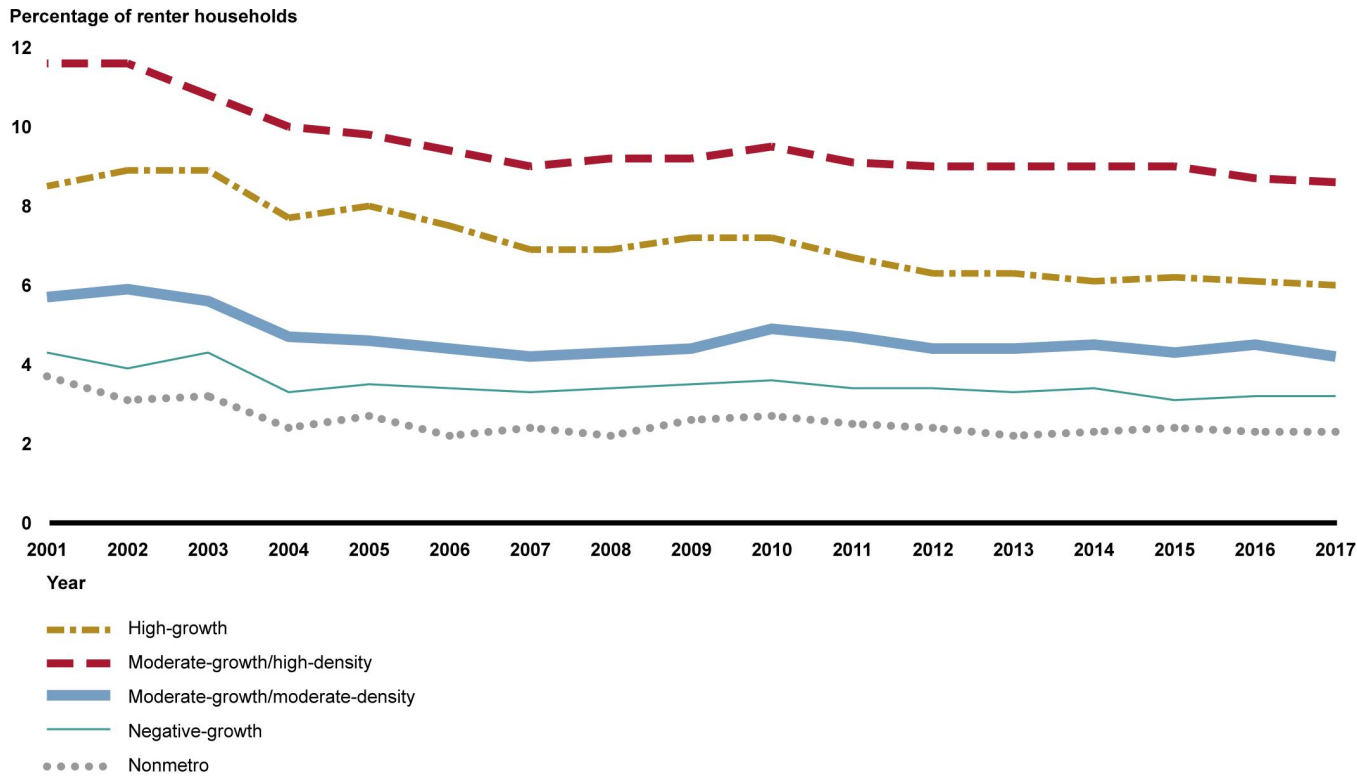
Percentage of renter households

High-growth

Moderate-growth/high-density

Moderate-growth/moderate-density

Negative-growth

Nonmetro

Source: GAO analysis of American Community Survey data. | GAO-20-427

Notes: We defined a crowded household as having more than two people per bedroom. A studio apartment occupied by two people did not meet our crowding definition.

Estimates in this figure have a margin of error of ±1 percentage point or less, at the 95 percent confidence level.

Appendix VII: GAO Contact and Staff Acknowledgments

GAO Contact

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Staff Acknowledgments

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Appendix VIII: Accessible Data

Data Tables

Accessible Data for Estimated Percentage of Renter Households with Rent Burdens by Income in 2017

Category	Severe rent burden – rent costs exceed 50 percent of household income	Moderate rent burden – rent costs are more than 30 and up to 50 percent of household income	No rent burden – rent costs are at or below 30 percent of household income
Extremely|low|income	71.96	16.82	11.22
Very low|income	37.29	45.82	16.88
Low|income	9.07	44.64	46.29
Moderate|income	1.59	17.76	80.65
Higher|income	0.47	5.15	94.39

Accessible Data for Figure 1: Estimated Percentage of Households That Rent, 2001–2017

Year	Percentage of households that rent
2001	34.25
2002	33.59
2003	33.21
2004	32.89
2005	33.1
2006	32.73
2007	32.8
2008	33.38
2009	34.13
2010	34.65
2011	35.42
2012	36.09

Year	Percentage of households that rent
2013	36.5
2014	36.9
2015	36.97
2016	36.88
2017	36.13

Accessible Data for Figure 2: Estimated Rentership Rates by Age Group, 2001–2017

Year	Younger (20–34 years old)	Early middle age (35–49 years old)	Late middle age (50–64 years old)	Older (65 years and older)
2001	61.1	31.6	21.6	21.9
2002	60.4	31	21.1	21.3
2003	59.9	30.9	21.1	20.9
2004	59.6	30.6	21.2	20.8
2005	59.9	31.3	21.5	21.1
2006	59.4	31.4	21.8	21.3
2007	59.5	31.8	21.9	21.2
2008	61.2	32.6	22.5	21.2
2009	63	33.8	23	20.9
2010	64	35.1	23.8	21.4
2011	65.4	36.8	24.5	21.5
2012	67.1	38	25.2	21.3
2013	67.4	38.9	25.9	21.6
2014	67.7	39.9	26.5	21.8
2015	67.7	40.3	26.7	22
2016	67.5	40.2	26.8	22.1
2017	66.1	39.4	26.6	21.6

Accessible Data for Figure 3: Estimated Number of Renter Households by Age Group, 2001 and 2017

Category	2001"	2017"
Younger|(20 - 34|years old)	14.6574	14.6025
Early middle|age (35 - 49|years old)	11.1504	12.4677
Late middle|age (50 - 64|years old)	5.35795	9.37101
Older (65|years and|older)	4.74015	6.64211

Accessible Data for Figure 4: Estimated Rentership Rates by Race and Ethnicity, 2001–2017

Year	Hispanic	White	Black	Asian	Other
2001	54.6	27.7	54.2	46.6	47
2002	53.9	27	53.7	44.8	44.6
2003	52.7	26.6	53.5	44.2	44.7
2004	52.2	26.1	53.6	42.7	45.4
2005	51.7	26.3	54.1	41.2	45.4
2006	50.7	26	53.5	40	44.6
2007	50.1	26.2	53.3	39.7	44.9
2008	50.9	26.6	54.2	40.9	44.7
2009	52	27.2	55.3	40.9	46.1
2010	52.9	27.4	55.6	41.9	46.2
2011	53.7	28	56.3	42.6	47.8
2012	54.3	28.5	57.2	43.2	48.3
2013	54.8	28.9	57.8	42.6	49
2014	55	29	58.6	43	49.9
2015	54.8	29	58.9	42.6	49.3
2016	54.5	28.8	59	42.3	50
2017	52.8	28.1	58.3	40.8	48.6

Accessible Data for Figure 5: Estimated Number of Renter Households by Household Income, 2001–2017

Year	Extremely Low Income	Very Low Income	Low Income	Moderate Income	Higher Income
2001	8.59868	6.37923	7.84437	6.99029	6.641
2002	9.10354	6.58102	7.60561	6.67222	6.10243
2003	9.53932	6.84855	7.72488	5.90522	5.98289
2004	9.81335	6.86506	7.82759	5.93288	5.70903
2005	10.0251	6.89659	7.85262	5.98184	6.01553
2006	9.66742	6.77149	7.76717	6.1318	6.19301
2007	9.29874	6.74866	7.78039	5.87113	7.16395
2008	9.56428	6.84399	7.93626	6.21038	7.20078
2009	10.4083	7.29765	8.10355	6.20773	6.75598
2010	11.0017	7.65461	8.2058	6.16812	6.63865

Year	Extremely Low Income	Very Low Income	Low Income	Moderate Income	Higher Income
2011	11.5468	7.74268	8.22185	6.21924	6.99672
2012	11.4876	7.79047	8.36621	6.56691	7.63915
2013	10.9825	7.6345	8.4279	6.78658	8.61568
2014	11.7632	6.4785	8.54342	7.06987	9.41243
2015	11.4777	6.5767	8.66671	7.26136	9.71923
2016	11.1253	6.386	8.63113	7.27134	10.4237
2017	10.9321	6.31025	8.61458	7.20419	10.3177

Accessible Data for Figure 6: Estimated Change in Renter Households by Income and Locality Type, 2001–2017

Category	High-growth	Moderate-growth/ high-density	Moderate-growth/ moderate-|density	Negative-growth	Nonmetro
Extremely low|income	0.326955	0.32892	0.714055	0.105245	0.274265
Very low|income	0.060325	0.15066	0.03551	-0.045435	-0.16979
Low income	0.32962	0.097475	0.34797	-0.010785	0.101175
Moderate|income	0.44956	-0.707	0.42479	-0.003675	0.129235
Higher income	0.933845	1.25879	1.23424	0.080525	0.16526

Accessible Data for Figure 7: Estimated Percentage of Renter Households by Rent Burden in 2001 and 2017

Year	Severe rent burden – rent costs exceed 50 percent of household income	Moderate rent burden – rent costs are more than 30 and up to 50 percent of household income	No rent burden – rent costs are at or below 30 percent of household income
2001	20	22	58
2017	24	24	52

Accessible Data for Figure 8: Rent Burden among Selected Demographic Groups and Locality Types in 2017

Category	Severe rent burden – rent costs exceed 50 percent of household income	Moderate rent burden – rent costs are more than 30 and up to 50 percent of household income	No rent burden – rent costs are at or below 30 percent of household income
White	21.52	22.62	55.86
Black	29.27	25.83	44.9
Hispanic	26.8	27.33	45.87
Working|age|(20-64|years old)	22.82	23.56	53.62
Older|(65 years|and|older)	31.81	27.3	40.88
Moderate-|growth/|high-|density	26.94	24.61	48.44
Nonmetro	20.8	22.63	56.57

Accessible Data for Figure 9: Estimated Percentage of Renter Households with Rent Burdens by Income in 2017

Category	Severe rent burden – rent costs exceed 50 percent of household income	Moderate rent burden – rent costs are more than 30 and up to 50 percent of household income	No rent burden – rent costs are at or below 30 percent of household income
Extremely|low|income	71.96	16.82	11.22
Very low|income	37.29	45.82	16.88
Low|income	9.07	44.64	46.29
Moderate|income	1.59	17.76	80.65
Higher|income	0.47	5.15	94.39

Accessible Data for Figure 10: Estimated Number of Renter Households by Rent Burden and Household Income, 2001–2017

Year	Category	Severely Rent Burdened (in millions)	Rent Burdened, Not Severely (in millions)	Not Rent Burdened (in millions)
2017	Extremely low income	6.6361	1.55119	1.03464
	Extremely low income	6.828	1.60501	1.01159

Year	Category	Severely Rent Burdened (in millions)	Rent Burdened, Not Severely (in millions)	Not Rent Burdened (in millions)
2015	Extremely low income	7.01651	1.69208	1.02096
	Extremely low income	7.29304	1.71849	1.02597
2013	Extremely low income	7.03299	1.32099	0.956215
	Extremely low income	7.36205	1.45963	1.00945
2011	Extremely low income	7.40789	1.47921	1.00924
	Extremely low income	7.07688	1.41215	0.97034
2009	Extremely low income	6.63964	1.3924	0.974645
	Extremely low income	6.11904	1.26987	0.921355
2007	Extremely low income	5.78827	1.31133	0.95681
	Extremely low income	6.04973	1.37864	0.99719
2005	Extremely low income	6.24224	1.44247	1.05434
	Extremely low income	5.88221	1.52465	1.08965
2003	Extremely low income	5.6975	1.48388	1.1017
	Extremely low income	5.3962	1.46004	1.08576
2001	Extremely low income	5.14553	1.32506	1.0019
2017	Very low income	2.23616	2.74755	1.01234
	Very low income	2.24251	2.78387	1.02927
2015	Very low income	2.24356	2.92371	1.07048
	Very low income	2.22636	2.90015	1.01204
2013	Very low income	2.46797	3.52291	1.24533
	Very low income	2.31701	3.66524	1.39498
2011	Very low income	2.33692	3.60042	1.37385
	Very low income	2.24125	3.58437	1.41393
2009	Very low income	2.11064	3.40801	1.36953
	Very low income	1.99766	3.18081	1.27521
2007	Very low income	1.88457	3.126	1.34089
	Very low income	1.80199	3.17359	1.38624
2005	Very low income	1.69962	3.28787	1.49887
	Very low income	1.52195	3.23309	1.69863
2003	Very low income	1.47273	3.21963	1.74579
	Very low income	1.35034	3.12913	1.6874
2001	Very low income	1.35577	2.99857	1.61044
2017	Low income	0.74584	3.67001	3.80634
	Low income	0.743725	3.6242	3.84799
2015	Low income	0.69801	3.60301	3.91615
	Low income	0.693725	3.62427	3.77971

Year	Category	Severely Rent Burdened (in millions)	Rent Burdened, Not Severely (in millions)	Not Rent Burdened (in millions)
2013	Low income	0.58161	3.35211	4.06346
	Low income	0.50243	3.12515	4.31126
2011	Low income	0.50445	3.11324	4.18401
	Low income	0.48007	3.03545	4.25493
2009	Low income	0.470315	2.93358	4.26574
	Low income	0.477255	2.85736	4.17239
2007	Low income	0.453745	2.71394	4.18628
	Low income	0.408805	2.59667	4.31222
2005	Low income	0.3782	2.47665	4.54786
	Low income	0.32341	2.30164	4.73829
2003	Low income	0.29502	2.1765	4.79322
	Low income	0.2716	2.09258	4.78807
2001	Low income	0.31271	2.27932	4.7647
2017	Moderate income	0.109925	1.22517	5.56418
	Moderate income	0.11911	1.24066	5.5902
2015	Moderate income	0.119765	1.1783	5.64025
	Moderate income	0.110965	1.19028	5.44411
2013	Moderate income	0.10461	0.984605	5.38314
	Moderate income	0.089335	0.83881	5.32891
2011	Moderate income	0.078295	0.812685	5.02937
	Moderate income	0.07956	0.795885	5.03543
2009	Moderate income	0.074135	0.766955	5.06769
	Moderate income	0.081575	0.78871	4.99956
2007	Moderate income	0.07888	0.734265	4.7504
	Moderate income	0.07454	0.71281	5.02559
2005	Moderate income	0.061195	0.603125	4.99984
	Moderate income	0.065035	0.505785	5.0443
2003	Moderate income	0.05421	0.484955	5.04561
	Moderate income	0.049665	0.520205	5.72506
2001	Moderate income	0.06208	0.58944	5.95484
2017	Higher income	0.04605	0.50968	9.34697
	Higher income	0.05671	0.512715	9.4258
2015	Higher income	0.048135	0.4658	8.7825
	Higher income	0.044135	0.44521	8.50024
2013	Higher income	0.043325	0.36982	7.81933
	Higher income	0.03009	0.299855	6.95263

Year	Category	Severely Rent Burdened (in millions)	Rent Burdened, Not Severely (in millions)	Not Rent Burdened (in millions)
2011	Higher income	0.03223	0.27984	6.34854
	Higher income	0.031255	0.261485	6.02447
2009	Higher income	0.028825	0.25311	6.11477
	Higher income	0.028805	0.279035	6.51465
2007	Higher income	0.033435	0.28012	6.4459
	Higher income	0.023395	0.19444	5.599
2005	Higher income	0.02686	0.195625	5.4367
	Higher income	0.020625	0.1458	5.21361
2003	Higher income	0.01789	0.153765	5.46037
	Higher income	0.01251	0.135595	5.58379
2001	Higher income	0.01543	0.14602	6.0686

Accessible Data for Figure 12: Estimated Median Rent-to-Income Ratio in 2001 and 2017

Category	2001	2017
Extremely|low|income	0.7	0.76
Very low|income	0.38	0.44
Low|income	0.27	0.31
Moderate|income	0.2	0.23
Higher|income	0.14	0.16

Accessible Data for Figure 13: GAO Quality and Completeness Indexes, Estimated Percentage of Rental Units by Housing Condition, 2001–2017

Year	No quality issues	Less substantial quality issues	Substantial quality issues	Incomplete housing units
2001	52.9	28.3	15	3.8
2003	56.5	27.9	12.9	2.7
2005	56	27.9	13.6	2.4
2007	56.6	27.7	13.4	2.4
2009	56.8	28.5	12.7	2
2011	53.3	30.8	13.3	2.6
2013	60.6	26.7	10.8	1.9
2015	56.8	26.6	13.3	3.2
2017	57.2	27.7	12.1	3

Accessible Data for Figure 14: GAO Quality and Completeness Indexes, Estimated Percentage of Rental Units with Serious Deficiencies by Housing Type, 2001–2017

Year	Single-family rental units	Multifamily rental units
2001	20.11	18.17
2003	17.05	14.51
2005	17.82	15.13
2007	17.16	14.82
2009	16.54	13.72
2011	16.54	15.44
2013	12.74	12.57
2015	16.86	15.84
2017	15.6	14.51

Accessible Data for Figure 24: Estimated Percentage of Crowded Renter Households by Race/Ethnicity, 2001–2017

Year	Hispanic	White	Black	Asian	Other
2001	25.1	2.8	6.7	16.9	6.9
2002	24.6	2.8	6.4	16.8	7.6
2003	23.3	2.7	6.3	16.1	6.4
2004	20.8	2.2	5.5	11.2	6.3
2005	20.8	2.1	5.3	11.5	6.3
2006	19.8	2.1	4.9	11.1	5.5
2007	18.5	2	4.6	10.9	5.6
2008	18.4	2.1	4.7	10.9	6
2009	19.1	2.1	4.6	10.6	5.3
2010	19.6	2.1	5.1	11	5.8
2011	18.1	2.2	4.6	11.1	5.6
2012	17.1	2.1	4.6	10.8	5.5
2013	16.7	2.1	4.5	10.9	5.2
2014	16.3	2.1	4.5	11	5.3
2015	15.8	2.2	4.4	10.9	4.9
2016	15.4	2.2	4.4	10.8	5.3
2017	14.3	2.2	4.4	10.6	5.4

Accessible Data for Figure 25: Estimated Percentage of Crowded Renter Households by Age, 2001–2017

Year	Younger 20 - 34 years old	Early middle age 35 - 49 year olds	Late middle age 50 - 64 years old	Older 65 years and older
2001	9.6	9.5	4.4	1
2002	9.7	9.3	4.3	1.2
2003	9.3	9.1	4	1.1
2004	7.9	8.2	3.7	1
2005	8.1	8.1	3.6	1
2006	7.8	7.9	3.3	0.9
2007	7.3	7.6	3.3	0.9
2008	7.3	8.1	3.2	0.8
2009	7.3	8.2	3.5	0.9
2010	7.9	8.6	3.7	1.1
2011	7.4	8.4	3.5	1.1
2012	7.1	8.2	3.4	1
2013	7	8.1	3.5	1.1
2014	7	8.4	3.6	1.2
2015	6.9	8.3	3.6	1.1
2016	6.6	8.5	3.6	1.1
2017	6.2	8.4	3.6	1.2

Accessible Data for Figure 26: Estimated Percentage of Crowded Renter Households by Income, 2001–2017

Year	Extremely Low Income	Very Low Income	Low Income	Moderate Income	Higher Income
2001	9	10.5	8.8	6.2	3.9
2002	8.8	10.3	8.4	6.7	3.6
2003	8.1	10.1	8.1	5.6	4.2
2004	7.5	8.8	6.7	4.8	3.3
2005	7.4	8.9	6.8	4.6	3.5
2006	7.1	8.4	6.7	4.6	3.1
2007	6.9	8.2	6.5	4.2	3
2008	7	8.5	6.6	4.1	3.2
2009	7.6	8.1	6.5	4.2	3
2010	8.1	8.6	6.6	4.1	3.1

Year	Extremely Low Income	Very Low Income	Low Income	Moderate Income	Higher Income
2011	8	8.3	6.3	3.8	2.7
2012	7.8	8.1	6.1	3.9	2.6
2013	7.5	8	6.5	3.9	2.9
2014	8.5	6.8	6.4	4.1	3.1
2015	8.2	6.9	6.4	4.1	3.2
2016	7.9	6.9	6.7	4.2	3.2
2017	7.4	6.9	6.5	4.2	3.3

Accessible Data for Figure 27: Estimated Percentage of Crowded Renter Households by Locality Type, 2001–2017

Year	Negative-growth	Moderate-growth/ moderate-density	Moderate-growth/ high-density	High-growth	Nonmetro
2001	3.7	5.7	11.6	8.5	4.3
2002	3.1	5.9	11.6	8.9	3.9
2003	3.2	5.6	10.8	8.9	4.3
2004	2.4	4.7	10	7.7	3.3
2005	2.7	4.6	9.8	8	3.5
2006	2.2	4.4	9.4	7.5	3.4
2007	2.4	4.2	9	6.9	3.3
2008	2.2	4.3	9.2	6.9	3.4
2009	2.6	4.4	9.2	7.2	3.5
2010	2.7	4.9	9.5	7.2	3.6
2011	2.5	4.7	9.1	6.7	3.4
2012	2.4	4.4	9	6.3	3.4
2013	2.2	4.4	9	6.3	3.3
2014	2.3	4.5	9	6.1	3.4
2015	2.4	4.3	9	6.2	3.1
2016	2.3	4.5	8.7	6.1	3.2
2017	2.3	4.2	8.6	6	3.2

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