

Rural/Urban Differences in Housing Quality and Adequacy: Findings from the American Housing Survey, 2019

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Key Findings

- Rural housing units had higher rates of several specific housing quality issues, including heating problems, utility interruptions, missing roofing or external building materials, and broken windows.
- Urban housing units had higher rates of flush toilet breakdowns, electric wiring problems, and indoor water leakage, compared to rural units.
- The prevalence of signs of mice or rats inside homes in rural areas was approximately double that observed in urban clusters and urbanized areas.

Purpose

There is ample evidence that poor housing quality and inadequate conditions (overcrowding, high-cost burden, plumbing, and kitchen facilities) can lead to negative health outcomes. However, less is known about differences in rates of specific housing quality characteristics such as pests, building conditions, and related characteristics by rurality. In this policy brief, we identify rural/urban differences in various measures of housing quality using a nationally representative survey.

Background

Extensive research has identified that poor housing quality and substandard housing conditions can have detrimental effects on individuals' health and well-being, such as increasing the risk of disability and the incidence of chronic disease.¹⁻⁵ In addition, rural residents often have worse health outcomes than urban residents, such as higher rates of mortality and lower life expectancy.⁶ The housing stock in rural areas is also, on average, older and of poorer quality,⁷⁻¹¹ which may be perpetuating rural/urban health inequities.

Housing should provide safety and shelter from the natural elements, including protection from heat, cold, precipitation, and pests. However, not all housing is created equally and some homes suffer from quality deficits in their physical structure, in the degree to which they allow in natural elements and pests, and in their vulnerability to mold and other toxic exposures.^{12,13} Altogether, these quality issues can have deleterious impacts on health.^{14,15} Maintaining a home can be expensive, however, and access to high-quality housing may be out of reach for many owners and renters alike.^{2,16} This may especially impact rural residents, who have lower incomes and higher rates of home ownership¹⁷ – meaning that home upkeep and maintenance is more likely their individual responsibility, but that they may have fewer financial resources available to help with such efforts.

Despite this attention on housing and health, more detailed information is needed on rural/urban differences in specific measures of housing quality in order to inform policy and improve rural health equity. This policy brief addresses that gap by identifying rural/urban differences in several specific housing quality measures. Results from this brief provide a more comprehensive understanding of housing challenges faced by rural residents, as well as potential areas for further policy intervention.

Approach

Data for this study come from the 2019 American Housing Survey (AHS). The AHS is a nationally representative longitudinal housing unit survey conducted biennially on the quality of housing in the U.S. since 1973.¹⁸ We used publicly available data on population size from the U.S. Census Bureau within each county to classify housing units based on the 2010 Census Rural-Urban Classification,¹⁹ with housing units located in urbanized areas (generally with populations greater than 50,000), housing units in urban clusters (with at least 2,500 but fewer than 50,000 people), and housing

units in rural areas (defined as all other populations not included in either urban area). We used cross-sectional data from 2019 responses for all housing units in this study. We limited our housing unit sample to those with housing condition measurements that were reported in both urban and rural areas (weighted sample size of N=124,136,000 housing units).

Housing conditions were first assessed by an overall adequacy composite measure, which included three distinct categories: severely inadequate, moderately inadequate, and adequate. For a detailed description of housing adequacy measures included in this study, see Table 1.

Table 1. Overall Housing Adequacy Measures from the 2019 American Housing Survey²⁰

Overall Housing Adequacy Condition	Specific Condition Measure(s)	Description
Severely inadequate	Plumbing	Lacking hot or cold piped water, lacking a full bathroom, or sharing a bathroom with non-household members
	Heating	Having been uncomfortably cold last winter for 24 hours or more because the heating equipment broke down, and it broke down at least three times for at least six hours or more
	Electricity	Having no electricity
	Wiring	Having all the following electric problems: exposed wiring, a room with no working wall outlet, and three blown fuses or tripped circuit breakers in the last three months
	Upkeep	Having at least five of the following six maintenance problems: (1) water leaks from the outside in the last 12 months; (2) leaks from inside structure in the last 12 months; (3) holes in the floors; (4) holes or open cracks (wider than a dime) in the walls or ceilings; (5) more than 8x11 inches of peeling paint or broken plaster; or (6) signs of rats in the last 12 months
Moderately inadequate	Upkeep	Having only three or four of the six problems listed under “severely inadequate - upkeep”
	Other	Having any one of the following conditions: (1) on at least three occasions during the last three months, all the flush toilets were broken down at the same time for six hours or more; (2) having unvented gas, oil, or kerosene heaters as the main heating equipment; (3) lacking a kitchen sink, lacking a working refrigerator, lacking cooking equipment (stove, burners, or microwave oven), or sharing the kitchen with non-household members
Adequate	N/A	A unit is deemed “adequate” if it does not meet the definitions of “severely inadequate” or “moderately inadequate”

Unit classified as “severely inadequate” if it meets at least one of the conditions listed, “moderately inadequate” if it does not meet the definition of “severely inadequate,” but does meet at least one of the conditions listed for “moderately inadequate,” and “adequate” if it does not meet the definition of either of the former categories

In addition to the adequacy composite measure, we also examined several individual housing conditions, including heating and electrical conditions, plumbing conditions, building conditions, and mold and pest conditions (Tables 2-6).

We used chi-square tests to determine statistically significant differences in adequacy, as well as in specific housing quality conditions between rural, urban clusters, and urbanized areas. We used SAS 9.4 software for data analysis and used Census weighted data to generate nationally representative estimates.

Results

Table 2 depicts the prevalence of housing adequacy by rurality. In our weighted sample, there were 24,905,000 housing units in rural areas, accounting for 20.1% of the total weighted data. Urban clusters comprised 11,590,000 housing units (9.3%), and 87,641,000 (70.6%) housing units were in urbanized areas.

Overall, rural residents had lower rates of adequate housing than urban residents. Rural areas, urban clusters, and urban areas had similar proportions of housing units classified as severely inadequate (1.1% vs 1.1% vs 1.2%). This equates to approximately 285,000 housing units in rural areas with severe housing quality issues. However, in the moderately inadequate category, 4.3% of rural housing units were affected, compared to 4.0% in urban clusters and 3.4% in urbanized areas ($p < 0.001$). Rural residents has statistically the lowest rate of adequate housing conditions, but all three areas had very similar rates (94.6%, 94.9%, 95.4%).

Table 3 presents specific heating and electrical conditions among housing units in rural and urban locations. Generally, rural households exhibited

fewer problems in both heating and electric conditions, although rates varied by condition. A total of 1,209,000 rural housing units did not have heating equipment the previous winter before the survey, and rural residents had a significantly, but only slightly substantively higher percentage of uncomfortably cold experiences (for 24 hours or more) compared to urban clusters and urbanized areas (6.8% vs. 6.2% vs. 5.8%, $p < 0.001$). The reasons that may lead to residents experiencing uncomfortably cold conditions captured in the survey include equipment breakdowns, utility interruptions, inadequate heating capacity, inadequate insulation, and the high cost of heating. Utility interruptions were more prevalent in rural housing units than in urban clusters and urbanized areas (2.5% vs. 1.1% vs. 0.9%, $p < 0.001$). Additionally, 114,000 rural housing units (0.5%) faced the challenge of cold due to heating costs. On the other hand, urban clusters had a higher incidence of inadequate capacity to provide heat to residents compared to rural and urbanized areas. All of these results indicate statistically significant differences between rural areas, urban clusters, and urbanized areas ($p < 0.05$), although the areas with the highest rates were not consistent across conditions.

A significantly higher proportion of housing units located in urban clusters exhibited electrical problems compared to those in rural and urban areas ($p < 0.01$). Yet, rural areas still accounted for a substantial number of housing units affected, with 23,096,000 rural units (7.3%) reporting blown fuses or breakers in the last three months. Additionally, 1,054,000 rural housing units (2.6%) had exposed wiring, and 1,182,000 rural units (2.0%) had rooms that lacked electric outlets.

Table 2. Housing Adequacy in Rural and Urban Areas

Housing Adequacy	Rural Areas Housing Units	Urban Cluster Housing Units	Urbanized Area Housing Units	P-Value
Severely inadequate	1.1%	1.1%	1.2%	0.76
Moderately inadequate	4.3%	4.0%	3.4%	<0.001
Adequate	94.6%	94.9%	95.4%	<0.001
Housing units (# in thousands)	24,905 (20.1%)	11,590 (9.3%)	87,641 (70.6%)	

Table 3. Heating and Electrical Conditions

Heating and Electrical Conditions	Description	Rural Areas Housing Units	Urban Cluster Housing Units	Urbanized Area Housing Units	P-Value
Heating Problems	No heating equipment and occupied last winter	4.9%	10.2%	8.2%	<0.001
	Uncomfortably cold for 24 hours or more	6.8%	6.2%	5.8%	<0.001
	<i>Equipment breakdowns</i>	1.8%	2.1%	2.5%	<0.001
	<i>Utility interruption</i>	2.5%	1.1%	0.9%	<0.001
	<i>Inadequate heating capacity</i>	0.6%	1.2%	0.7%	<0.001
	<i>Inadequate insulation</i>	0.7%	1.1%	0.7%	<0.001
	<i>Cost of heating</i>	0.5%	0.6%	0.4%	<0.05
	<i>Other causes</i>	5.0%	4.2%	3.3%	<0.001
Electric Fuses and Circuit Breakers	With fuses or breakers blown	7.3%	8.3%	7.5%	<0.01
	Exposed wiring	2.6%	3.2%	2.7%	<0.01
	Rooms without electric outlets	2.0%	2.6%	1.8%	<0.001

Concerning plumbing conditions (Table 4), rural residents were more likely to have water supply stoppage in the last three months. Approximately 916,000 or 3.7% of housing units in rural areas were affected, compared to 2.3% in urban clusters and 2.5% in urbanized areas ($p < 0.001$). In terms of water leakage, rural housing units reported relatively better conditions than urbanized areas and urban clusters in most categories. However, a substantial number of rural housing units still reported different types of leakage within the last three months. For instance, over 1,500,000 or 6.7% of rural housing units experienced leakage from inside the structure, while 2,500,000 rural housing units (10.3%) had leakage from outside the structure. Notably, 839,000 housing units, representing 3.4% of the total rural housing units, were more likely to be exposed to water leakage in basements compared to urban clusters (3.1%) and urbanized areas (2.6%) ($p < 0.001$). Furthermore, 324,000 rural housing units

(1.3%) reported non-functioning flush toilets in the three months preceding the survey.

Table 5 demonstrates that rural housing units exhibit a higher likelihood of poor building conditions than urban housing units. Specifically, 4.4% of rural housing units lacked roofing material, 1.8% had a hole in the roof, 3.4% lacked outside wall material, 1.6% had sloping outside walls, 1.3% had boarded-up windows, 4.5% had broken windows, and 1.5% had holes in the floors. The prevalence of these broken building conditions surpasses that of housing units in urban clusters and urbanized areas ($p < 0.001$). Further, in rural areas, an estimated 4.4% of housing units (1,100,000) experienced foundation crumbling issues, 5.7% of housing units (1,400,000) exhibited interior open cracks or holes, and 2.2% of housing units (550,000) displayed interior broken plaster or peeling paint, although the prevalence of each of those was even higher in urban cluster housing units. Housing units in urbanized areas

Table 4. Plumbing Conditions

Plumbing Conditions	Description	Rural Areas Housing Units	Urban Cluster Housing Units	Urbanized Area Housing Units	P-Value
Water Supply Shortage	Stoppage in last 3 months	3.7%	2.3%	2.5%	<0.001
Water Leakage During Last 12 Months	With leakage from inside structure	6.7%	7.8%	7.9%	<0.001
	<i>Fixtures backed up or overflowed</i>	1.4%	1.7%	1.9%	<0.001
	<i>Pipes leaked</i>	3.2%	3.2%	3.2%	0.89
	<i>Broken water heater</i>	0.7%	1.1%	0.7%	<0.001
	With leakage from outside structure	10.3%	10.7%	9.0%	<0.001
	<i>Roof</i>	5.1%	5.1%	4.2%	<0.001
	<i>Basement</i>	3.4%	3.1%	2.6%	<0.001
	<i>Walls, closed windows, or doors</i>	1.4%	1.5%	1.8%	<0.001
Flush Toilet Breakdowns	None working some time in last 3 months	1.3%	2.4%	1.7%	<0.001

Table 5. Building Conditions

Description	Rural Areas Housing Units	Urban Cluster Housing Units	Urbanized Area Housing Units	P-Value
Sagging roof	2.0%	2.7%	1.0%	<0.001
Missing roofing material	4.4%	3.9%	2.0%	<0.001
Hole in roof	1.8%	1.5%	0.8%	<0.001
Missing bricks, siding, or other outside wall material	3.4%	3.0%	1.6%	<0.001
Sloping outside walls	1.6%	1.2%	0.6%	<0.001
Boarded up windows	1.3%	1.3%	0.6%	<0.001
Broken windows	4.5%	4.0%	2.3%	<0.001
Bars on windows	0.4%	0.8%	2.2%	<0.001
Foundation crumbling or has open crack or hole	4.4%	5.1%	3.5%	<0.001
Holes in floors	1.5%	1.4%	1.1%	<0.001
Open cracks or holes (interior)	5.7%	6.6%	5.2%	<0.001
Broken plaster or peeling paint (interior)	2.2%	2.6%	2.0%	<0.001

had the lowest prevalence of each measure of building condition, with the exception of bars on windows, for which it had a higher prevalence (2.2%) than rural housing units (0.4%) and urban cluster housing units (0.8%). All of these results indicate statistically significant differences between rural areas, urban clusters, and urbanized areas ($p < 0.001$).

Table 6 presents the prevalence of mold and pest-related conditions across the three rural/urban categories. While the differences in mold conditions between rural and urban areas were not statistically significant overall, it is still worth noting that 2.9% (732,000) of housing units in rural areas reported experiencing mold within the last 12 months prior to the survey. Specifically, within rural buildings, mold was found in

0.6% (140,000) of kitchens, 1.1% (278,000) of bathrooms, 0.8% (204,000) of bedrooms, 0.3% (87,000) of living rooms, and 0.8% (189,000) of basements. Among these specific conditions, mold in basements was more common in rural housing units than urban housing units ($p < 0.001$). In terms of pests, the presence of mice or rats inside the home was more common in rural housing units compared to urban clusters and urbanized areas (21.2% vs. 11.8% vs. 9.3%, $p < 0.001$). Conversely, urbanized areas had the highest prevalence (12.5%) of cockroach infestations inside the home among the three areas, but 6.8% (1,683,000) of rural housing units still reported the presence of cockroaches ($p < 0.001$).

Table 6. Presence of Mold and Pests

Mold and Pest Conditions	Description	Rural Areas Housing Units	Urban Cluster Housing Units	Urbanized Area Housing Units	P-Value
Mold	Housing units with mold in last 12 months	2.9%	2.8%	3.0%	0.66
	<i>Kitchen</i>	0.6%	0.6%	0.5%	0.25
	<i>Bathroom(s)</i>	1.1%	1.3%	1.4%	<0.01
	<i>Bedroom(s)</i>	0.8%	0.7%	0.7%	0.09
	<i>Living room</i>	0.3%	0.4%	0.4%	0.54
	<i>Basement</i>	0.8%	0.4%	0.5%	<0.001
Pests	Signs of mice or rats inside home in last 12 months	21.2%	11.8%	9.3%	<0.001
	Signs of cockroaches in last 12 months	6.8%	11.6%	12.5%	<0.001

Discussion and Implications

Access to adequate housing is essential for promoting health and well-being, and rural residents experience poorer health outcomes than their urban counterparts.^{1,2,21,22} In this policy brief, we found that complex variations in housing conditions and adequacy across rural and urban areas. We also found poorer housing conditions among rural housing units for some specific measures, including heating conditions (especially the prevalence of utility interruptions), water supply stoppages, water leakage in basements, missing roof or external building materials, broken windows, mold

in basements, and presence of rats or mice. However, there were several other measures on which rural housing units had higher quality than urban housing units. These mixed findings emphasize the need for a nuanced and detailed approach to addressing housing quality, with the understanding that specific challenges will vary by geographic context.

These findings present several practical areas in which to intervene. First, the findings of this study reveal that rural areas experience higher rates of uncomfortably cold conditions. These adverse heating conditions can expose residents to increased risks of hypothermia, respiratory infections, and exacerbation

tion of chronic conditions. Prolonged exposure to cold environments has been associated with a higher incidence of cardiovascular diseases, respiratory ailments, and mental health challenges.^{23–26} While utility interruptions were more common among rural housing units than urban, rural residents were also more likely to endorse “other” causes of uncomfortably cold conditions (causes beyond those listed on the survey.) Further investigation into the factors contributing to those reporting being uncomfortably cold, particularly for rural residents, may help provide additional insight into potential solutions for adequately warm housing in the winter months. While utility interruptions may be unavoidable in some circumstances, this may also be an area of focus for communities that experience those interruptions frequently, emphasizing the need for sustained investment in rural infrastructure and capacity.

We also found that structural concerns such as holes, cracks, and broken windows were more common in rural areas. These may lead to greater dampness and draftiness within the home. Alongside possible water damage, such issues could also exacerbate pest issues. Indeed, more than 20% of rural housing units reported signs of mice or rats, which raises concerns about animal-borne disease and problems with food safety. Pests such as rodents and insects can carry diseases that can be transmitted to humans, leading to serious health problems.²⁷ This can be particularly concerning in areas where residents may already have chronic conditions due to other factors such as poverty or lack of access to health care.^{28,29} More pests in rural housing can also contaminate food stores and damage crops and livestock, particularly in areas where residents rely on hunting, fishing, or farming to provide food for their families.³⁰

Finally, the prevalence of electrical problems in rural housing units poses substantial safety risks. While our analysis found higher rates of electrical problems in urban areas than in rural ones, the risks exist in all geographic locations, and the associated problems may be more severe in rural communities. Such housing conditions can lead to electrical fires, electric shocks, and injuries.³¹ Moreover, inadequate electrical systems can limit access to essential medical equipment and

hinder proper lighting, potentially impacting vision and overall well-being.^{32,33} These structural issues may also lead to poorer energy efficiency, resulting in higher utility costs and undue financial strain.³⁴ In this regard, rural families, especially those who are lower income often face challenging trade-offs between paying their energy bills and affording basic necessities such as food or medicine.³⁵ This tends to impact racially marginalized groups, older adults, and renters more acutely.^{35–37}

To holistically address the health implications of rural housing quality issues, policymakers should prioritize multifaceted interventions. Initiatives should include subsidies for heating upgrades, improved electrical systems, plumbing repairs, building rehabilitation programs, and integrated pest management strategies. Initiatives should also focus on addressing issues in the availability of skilled trades workforce and businesses in rural areas, as well as disruptions with supply chains. There are existing policies in place that may help alleviate these issues, such as the USDA Section 504 Home Repair program, which offers loans and grants to very-low-income single-family homeowners for home repairs, improvements, and modernization.³⁸ Additionally, the USDA Housing Preservation Grant Program provides funding specifically for the repair and rehabilitation of rural housing units.³⁹ Recent research also shows higher rates of governmental rental assistance among rural renters,⁴⁰ emphasizing the reliance on government assistance programs in rural communities. Continued funding for these programs is essential, as well as considering expansion of eligibility criteria, ensuring residents are aware of the assistance available to them, and minimizing the administrative burden to apply for these programs. In addition, further research using qualitative methods such as in-depth interviews or focus groups could explore rural residents’ experiences with housing quality issues and perceptions of access to housing programs.

Lastly, in this study, we looked at rural and urban areas across the U.S., but the impact of some of these measures such as lack of heating equipment will vary depending on regional climate. Rural residents in cold-weather climates may face greater difficulties as they may have limited options for temporary lodging or maintenance services compared to urban areas.⁴¹ In

addition, the East South Central, New England, and Middle Atlantic Census divisions have been found to have the highest median rural energy cost burdens in the US, but the severity of these burdens remains unclear.⁴² Future work should explore regional differences in rural housing quality, including not only heating concerns but also an urgent exploration of equitable access to cooling solutions, particularly in the face of intensifying summer heatwaves. Finally, beyond climate, rural residents may also have increased barriers to completing housing repairs due to fewer workers in their area to hire for repairs, and difficulty or delays in getting the necessary supplies to their home. Policymakers should take such regional and rural-specific barriers into account when devising housing and infrastructure solutions.

Conclusion

In this study, we found poorer housing quality in rural areas, both overall and across several specific measures. Rural housing units were more likely than urban housing units to have issues with pests, leakage, and structural integrity (e.g., broken windows, cracks, and holes). Still, on other housing quality measures, rural housing units performed better than urban housing units, emphasizing the importance of a nuanced approach to understanding housing quality. Ultimately, rural housing quality is an important driver of rural health. In turn, efforts to improve and address rural housing quality are essential to addressing rural health equity.

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