Projected Housing Demand, Underproduction, and Mismatch in Tennessee

2026 Tennessee Housing Market at a Glance

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Contents

Executive Summary 2

Introduction 3

Projected Housing Demand Estimates 4

Underproduction Estimates 7

Affordability Mismatch Estimates 12

Appendix A: Methodology 19

- Estimates of projected housing demand 19
- Housing Underproduction Estimates 20
- Affordability Mismatch Estimates 22

Appendix B: Tables 25

Appendix C: Regional Figures 29

References 52

Executive Summary

The state is at a turning point: by 2035, it must add more homes than it did in the previous two decades to keep housing attainable for its residents. Tennessee's economic and population growth are strong assets, but without adequate housing, that success could stall. Tennessee's population grew to about 7.2 million in 2024 and is projected to reach 7.7 million by 2035, an increase of roughly 510,000 people in a decade. This increased population will intensify competition for housing.

Current projections indicate that Tennessee will need approximately 315,000 new homes by 2035 to meet demand. To accommodate population growth, normal vacancy and replacement of aging stock, Tennessee must add roughly 30,000 to 35,000 new homes per year until 2035. Over 160,000 new housing units are needed in the Nashville region alone. In future analysis, we anticipate that these projections will decline because of lower net migration to the U.S in 2025.

Tennessee's housing shortages and mismatches are localized and manifest unevenly across the state. The state's housing shortfall is concentrated in its fastest growing regions. We estimate that several Tennessee regions entered 2024 with sizable underproduction. In the Knoxville region, we estimate a shortfall of approximately 4,900 units and roughly 3,600 units in the Clarksville region. In stable, mid-sized metro areas like Chattanooga, Cookeville, and Fayetteville, some housing shortages exist. In slower growth, aging, metro areas like Memphis, Dyersburg, Cleveland, and Decatur, there is no evident housing shortage, but the quality and maintenance of existing housing are of concern.

Furthermore, while Tennessee has enough rental units in total, a severe affordability mismatch for low-income households persists. Memphis and Nashville face the most acute shortage of affordable and available housing for extremely low-income renters, where there are only 22 and 32 affordable and available rental homes per 100 extremely low-income households. With coordinated planning, flexible zoning, and investment in both new and existing housing stock, Tennessee can close its housing gap and build a more balanced, resilient housing market for the future.

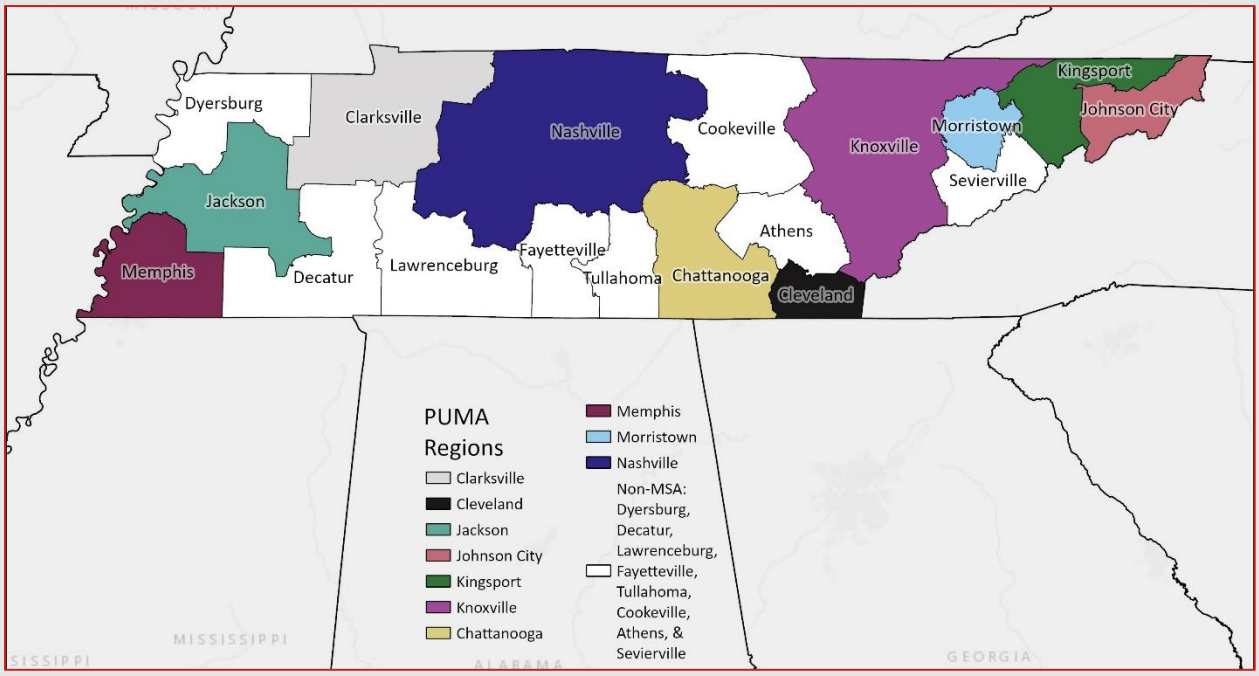
Introduction

Housing affordability is a growing challenge across Tennessee, driven by population growth, shifting demographics, and housing supply that has not kept pace with demand. Tennessee's population grew to about 7.2 million in 2024 and is projected to reach 7.7 million by 2035, an increase of roughly 510,000 people in a decade. This increased population will intensify competition for housing. After the 2008 housing downturn, new construction slowed dramatically. As a result, Tennessee entered the 2020s with a significant housing deficit. Too few homes were available for year-around occupancy to meet the housing needs of existing and newly formed households. This has contributed to rising home prices and rents statewide. As a result, many Tennessee households, especially those with low incomes, face cost burdens (spending over 30% of income on housing) or are unable to find housing they can afford. In 2024, half of renter households and about one-fifth of owner households (19%) in Tennessee were cost burdened, underscoring a significant affordable housing gap.

In this brief, we offer three specific estimates: the projected 10-year need for housing by metro area by 2035; the current housing underproduction for metro areas; and an estimate of the affordable and available rental by area median income (AMI). A detailed methodology of each is available in Appendix A.

We provide estimates at the combined public-use microdata area (PUMA) region level. Combined PUMA regions are constructed using census-designated PUMAs, which closely overlap with metropolitan statistical areas (MSAs). Figure 1 illustrates both MSA-aligned combined PUMA regions (in color) and non-MSA-aligned combined PUMA regions (in white). Given the overlap, throughout this brief we use "combined PUMA region" and "metro area" interchangeably, when discussing MSA-aligned combined PUMA regions. Details about the components of these geographies as well as their construction can be found in Appendix B.

Figure 1: Combined PUMA Regions Including MSA and Non-MSA Regions



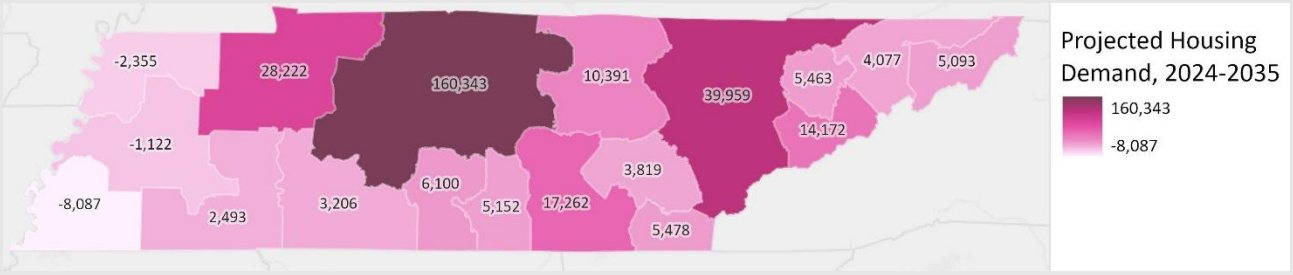
Projected Housing Demand Estimates

Tennessee will need approximately 315,000 more housing units by 2035 to meet projected demand

Tennessee's housing demand will be shaped by changing demographics. Young adults aged 25 to 34 entering the workforce will form new households and drive rental and starter-home demand, especially in metro areas. "Baby boomers" aging in place will increase demand for smaller accessible homes and senior-friendly communities. And, migration from higher cost states will continue to add pressure to urban and suburban housing markets, particularly in Middle Tennessee.

THDA estimates that Tennessee will need to add approximately 315,000 new housing units by 2035 to meet projected demand. According to projections from the Tennessee State Data Center (TNSDC), the state's population is expected to grow from 7.2 million in 2024 to 7.7 million in 2035, an increase of roughly 510,000 people. Annual production will need to be roughly 30,000-35,000 new units per year from now until 2035. For details about how we arrive at these estimates, please reference Appendix A.

Figure 2: Projected Housing Demand by Combined PUMA Region



Source: Source: THDA calculations of IPUMS USA, University of Minnesota, www.ipums.org.

This projected demand is driven by three factors:

1. **New household growth:** Population increase and rising headship rate among young adults and seniors is driving new household formation.
2. **Vacancy requirements:** Maintaining a healthy vacancy rate of around five percent allows households to move and markets to function efficiently.
3. **The replacement of aging or obsolete housing units:** In rural areas and older urban neighborhoods where much of the housing stock pre-dates 1980, the state must also build enough homes to replace aging stock and allow for mobility.

To have healthy and balanced housing markets across the state, building new housing to meet population and household demand is not enough. Tennessee must also focus on the replacement of aging stock and mobility. If labor shortages, zoning barriers, and financing constraints continue to hinder construction, Tennessee could fall short of thousands of homes, worsening price pressure and limiting economic growth. Without targeted statewide policies, the shortage will not just remain a metro area problem. Rather, it will continue to spread outward as Tennesseans move farther from job centers and communities compete for limited housing supply.

Furthermore, housing demand will not be evenly distributed across the state. More than half of Tennessee's new housing demand by 2035 will occur in just three major metro areas –Nashville, Knoxville and Clarksville – reflecting on-going job growth and economic dynamism. Rural counties in western and northeastern Tennessee, and the Memphis region may experience smaller net demand, but face ongoing challenges maintaining and upgrading older housing stock. These differences underscore the need for region-specific housing strategies, rather than

a uniform statewide response.[i] We find the following 10-year trends in both anticipated housing needed and the key reasons in the state's primary regions:

- **Nashville Area**
    - The 2024 to 2035 projected growth in housing units is estimated to be approximately 160,000 units.
    - The key drivers for this growth include population growth, regional job expansion, and continued in-migration.
- **Knoxville Area**
    - The 2024 to 2035 projected growth in housing units is estimated to be 40,000 units.
    - The key drivers for this growth include an economy driven by the University Tennessee and expanding suburban developments.
- **Clarksville Area**
    - The 2024 to 2035 projected growth in housing units is estimated to be 29,000 units.
    - The key drivers of this growth include a boom in younger individuals and families, proximity to Fort Campbell, and a stronger demand for affordable rental units.
- **Chattanooga, Johnson City, and Cookeville Areas**
    - These areas are expected to have moderate growth in housing units.
    - The key drivers of this moderate growth in these areas include steady job markets and regional connectivity.
- **Memphis and parts of West Tennessee**
    - These areas are anticipated to have little, or even negative, growth in housing units.
    - The key drivers of this little or negative growth include an aging population, slow job growth, and a need for reinvestment and rehabilitation of the existing housing stock.

Underproduction Estimates

Current housing underproduction is localized to high-growth metros.

While housing projections may not manifest for a variety of reasons, least of which include population and demographic shifts in the state and the nation over the next decade, estimating the current housing underproduction provides us with real-time estimates of how Tennessee's housing markets are struggling to keep up with population and job growth. In this section, housing underproduction is estimated by assessing Tennessee's current housing supply and demand. Housing demand is estimated by aggregating current households as well as "missing households," or households that could have formed if the housing market allowed for it, which is then adjusted by a healthy vacancy rate present in adaptive housing markets. The supply of housing is estimated by considering livable housing units, which exclude homes designated as vacation homes or homes that are uninhabitable, such that they are substandard and vacant. For more details, please reference Appendix C.

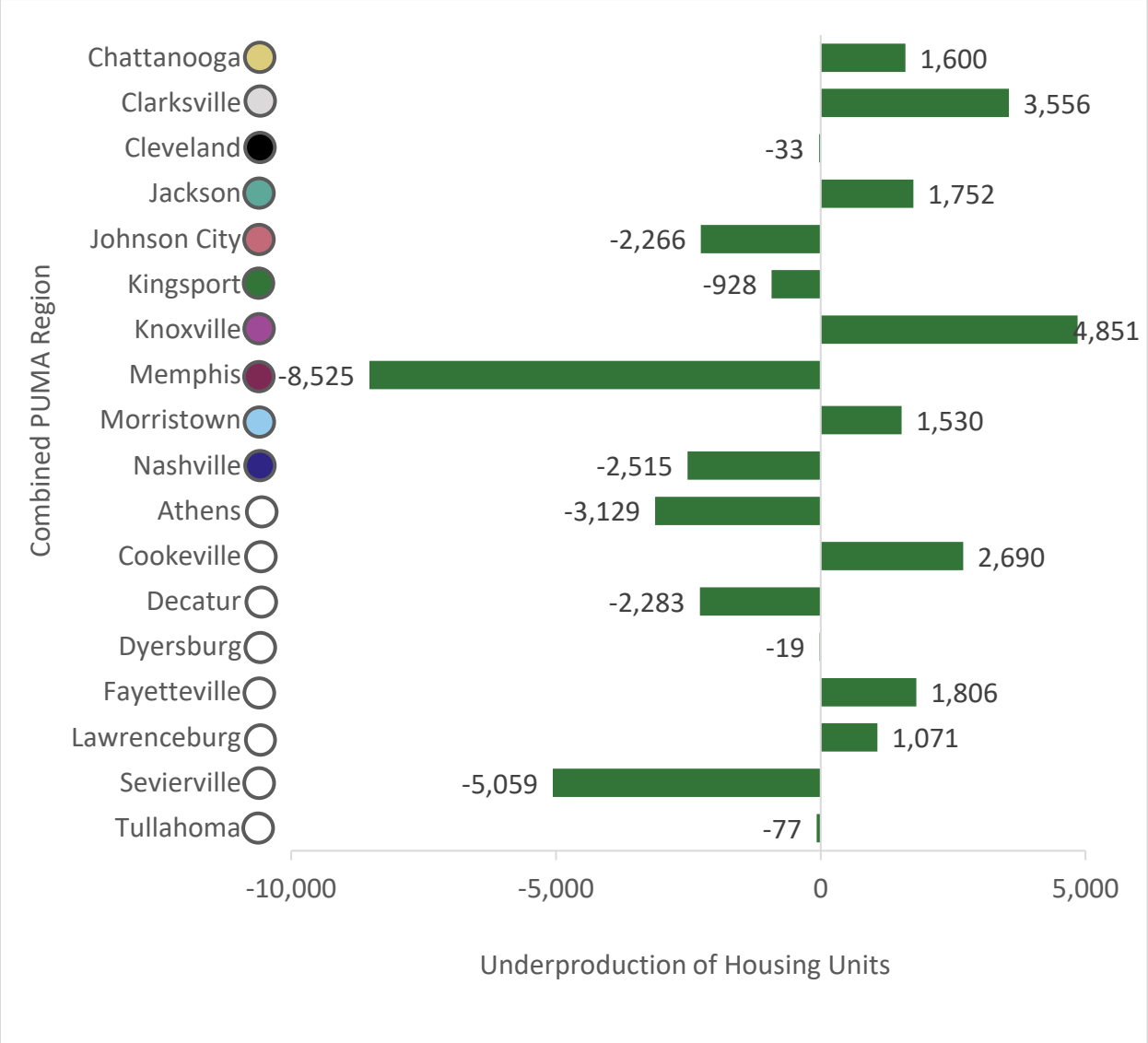
Equation 1: THDA Underproduction Formula

$$\text{Underproduction} = \underbrace{\frac{\text{Households} + \text{Missing Households}}{(1 - \text{Target Vacancy Rate})}}_{\text{Demand}} - \underbrace{\left[\text{Total Housing Units} - 2^{\text{nd}} \text{ and Vacation Units} - \text{Uninhabitable Units}\right]}_{\text{Supply}}$$

Figure 3 illustrates that housing shortfalls are highly localized and concentrated in major growth centers such as the Knoxville and Clarksville PUMA regions. Because of regional differences in household formation, population, and housing construction, some regions do not indicate housing underproduction. However, it is important to interpret these findings with respect to the context of areas. For example, in areas like the Sevierville metro area, which is known for its tourist attractions, significant portions of the housing stock are intended for short-term rentals. As such, existing populations have trouble finding affordable housing. These homes might not be represented as second or vacation homes in publicly available data. In 2024, the Knoxville region had an underproduction of 4,851 housing units, which is indicative of a growing population, but housing production that has sought to match this growth.

Most striking is the change in underproduction for the Nashville metro area over two years. Previous estimations using 2023 data indicated that the Nashville region faced an underproduction of approximately 11,000 housing units, with demand exceeding units available for year-around occupancy. Using 2024 data, however, yielded no shortage. Increased housing production in the region has likely contributed to total available housing units exceeding estimated demand, indicating that the region no longer faces a net housing underproduction. However, this aggregate balance between supply and demand does not imply that current housing needs have been met. Many low-income households continue to face significant barriers to finding affordable and available housing (Arik, 2026a). As a result, policy efforts should increasingly focus not only on overall housing supply but on the production and preservation of units affordable to lower-income households.

Figure 3: Underproduction Estimates across Tennessee PUMA Regions, 2024



Source: THDA calculations of IPUMS USA, University of Minnesota, www.ipums.org.

Several structural factors contribute to this imbalance between supply and demand.

Because of lagging construction after the Great Recession, homebuilding dropped sharply between 2008 and 2012, and despite economic recovery, production levels continue to fall behind necessary levels. Furthermore, strong population and job growth in key metros like the Nashville and Clarksville regions, have driven up demand for housing. Finally, factors that contribute to more expensive and difficult construction like rising construction costs, zoning and land use barriers, and infrastructure bottlenecks all contribute to difficulty constructing housing at a large scale.

Structural forces interact differently across regions, producing distinct local housing market dynamics.

Housing supply and demand operate in regional markets defined by commuting patterns and employment centers. These differences are critical to developing nuanced policy responses respective of the characteristics of these areas.

In high-growth metros like Nashville, despite the current balance between supply and demand, housing production has consistently trailed household formation, creating low vacancy rates and affordability challenges across income levels. And for, Nashville's lowest-income households, increased production of deeply subsidized housing is critical to offset affordability challenges. The Clarksville metro's younger population and military-adjacent workforce add additional strain on available rental housing. The Cookeville region, the Knoxville region exhibit moderate, but growing deficits tied to regional employment and higher education demand.

Conversely, the Memphis metro and parts of West Tennessee show balanced, or surplus housing supply. However, aging housing stock and disinvestment pose quality and affordability concerns rather than outright shortages. As such, new production and rehabilitation are still required despite the shortage because the quality of existing housing is lagging (Arik, 2026b).

THDA's analysis finds that the state's PUMA regions can be categorized in three ways:

- **High-growth metro areas (e.g. Clarksville and Knoxville PUMA Regions)** are areas with rapid job and population growth, significant housing shortfalls, and rising prices and rents.
- **Stable, mid-sized metro areas (Chattanooga, Cookeville, Fayetteville PUMA Regions)** are areas with balanced markets, moderate pressure from population growth, and some affordability challenges.
- **Slow-growth, aging metro areas (Memphis, Dyersburg, Cleveland, and Decatur PUMA Regions)** are areas with no underproduction, but require a focus on aging housing stock and quality maintenance.

Tennessee is an ownership state, in that owner-occupied housing units represent 67% of total occupied units. This rate is even higher in some rural areas. Table 1 shows the distribution of

underproduced units by tenure and income categories in the three regions with the highest underproduced units, assuming the distribution of households by tenure and income categories in 2024. If the current balance between renters and owners persists, for households under the 50% AMI level, a shortage of renter housing is pronounced in high-growth areas such as the Clarksville metro area. And, for households whose incomes fall above the 50% AMI level, a shortage of owner units is prevalent, indicating a need for affordable homeownership opportunities for families.

Table 1: Distribution of Total Underproduced Units by Tenure and Affordability by Select Combined PUMA Region, 2024

Region	Chattanooga		Clarksville		Knoxville	
Affordability	**Owner**	**Renter**	**Owner**	**Renter**	**Owner**	**Renter**
<30%	95	135	212	202	270	343
30-50%	88	73	185	231	312	218
50-80%	156	106	326	244	532	339
80-100%	108	59	267	159	396	149
100-120%	88	52	272	125	335	105
>120%	523	119	994	338	1,627	225
Total Underproduction	1,057	543	2,257	1,299	3,472	1,379

Source: THDA calculations of IPUMS USA, University of Minnesota, www.ipums.org.

Housing underproduction has tangible economic and social consequences. Limited supply drives faster increase in home prices and rents, outpacing wage growth and widening affordability gap. Employers face difficulty attracting and retaining workers in regions where housing costs are rising faster than wages. Workers often “drive until they qualify,” living farther from jobs to find affordable homes, straining infrastructure and family budgets. Younger adults and lower-income individuals delay household formation, contributing to the “missing household” effect. The result is a feedback loop – underproduction limits affordability, affordability constraints reduce household formation and suppressed formation hides the true scale of housing need.

Affordability Mismatch Estimates

Affordability mismatch and the cost of housing severely limit options for low-income households.

Tennessee's housing affordability challenges are not caused by a lack of physical units alone. Although the state has no shortage of rental units, overall, too few of those homes are affordable and available to families with low and moderate incomes. As of 2024, nearly one in four renter households in Tennessee earn less than 30% of area median income (AMI). Yet, fewer than 40% of those households can find an affordable and available home.

In theory, Tennessee's rental market looks balanced. As illustrated in Figure 4, there are 972,612 renter households and over one million housing units available for rent (occupied or vacant but available for rent) but this balance hides a critical disparity.[ii] Most low-income renters cannot access units they can afford because higher income households occupy a large share of lower-rent units.

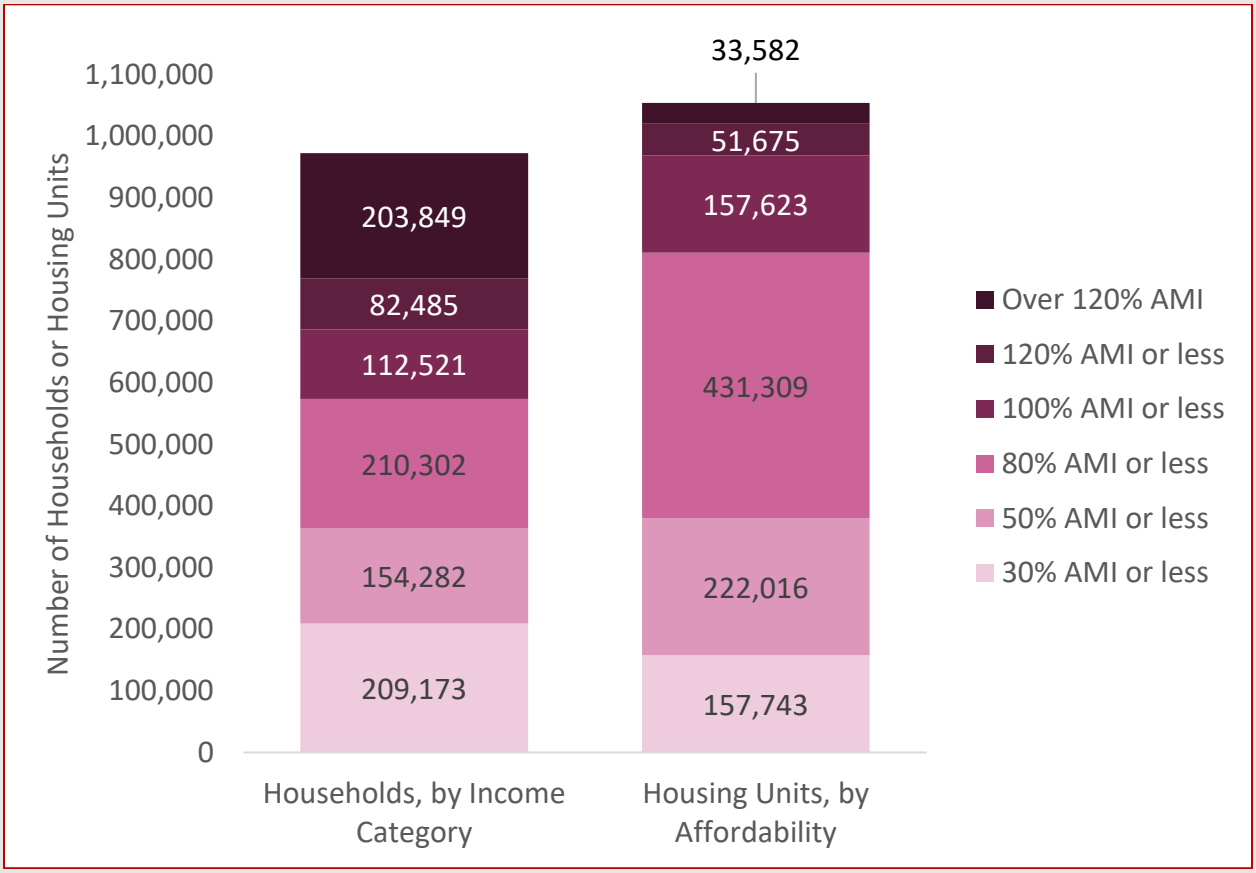
The intersection of affordability and availability provides a better picture of housing opportunity. A home is considered affordable when rent and utilities cost no more than 30% of a household's income. It is available when it is either vacant or occupied by a household within the same income range.[iii] In the private market, households choose the housing that fits best to their budget and needs. If available, households are able to occupy homes that cost less than 30% of their income, or what is considered affordable. When higher-income households occupy rental homes that are affordable to lower-income households, those homes are no longer available for lower-income households.

The shortage of affordable rental housing is most acute for the extremely low-income (ELI) renter households, or those whose incomes are 30% or less than the area median income (AMI).[iv] This group includes, but is not limited to, households earning around $25,000 a year or less for a family of four; people working fulltime in childcare, retail, food services, or other essential service jobs. In 2024, Tennessee had approximately 210,000 renter households at or below 30% AMI, representing 22% of state's total renter households. However, there were

fewer than 160,000 rental units that are affordable for households earning 30% or less of AMI. These ELI households are the households facing an absolute shortage of housing.

Very low-income (VLI) households earn between 30% and 50% of AMI. In 2024, around 155,000 VLI renter households represented 16% of total renters. They can afford housing units affordable to households within the 30%-50% AMI range as well as units affordable for ELI households. Nearly 380,000 homes are affordable for 364,000 renter households at the VLI level. As incomes increase, the number of units affordable to them also increases and any absolute shortage disappears.

Figure 4: Rental Units and Renter Households by Affordability and income, 2024, Tennessee



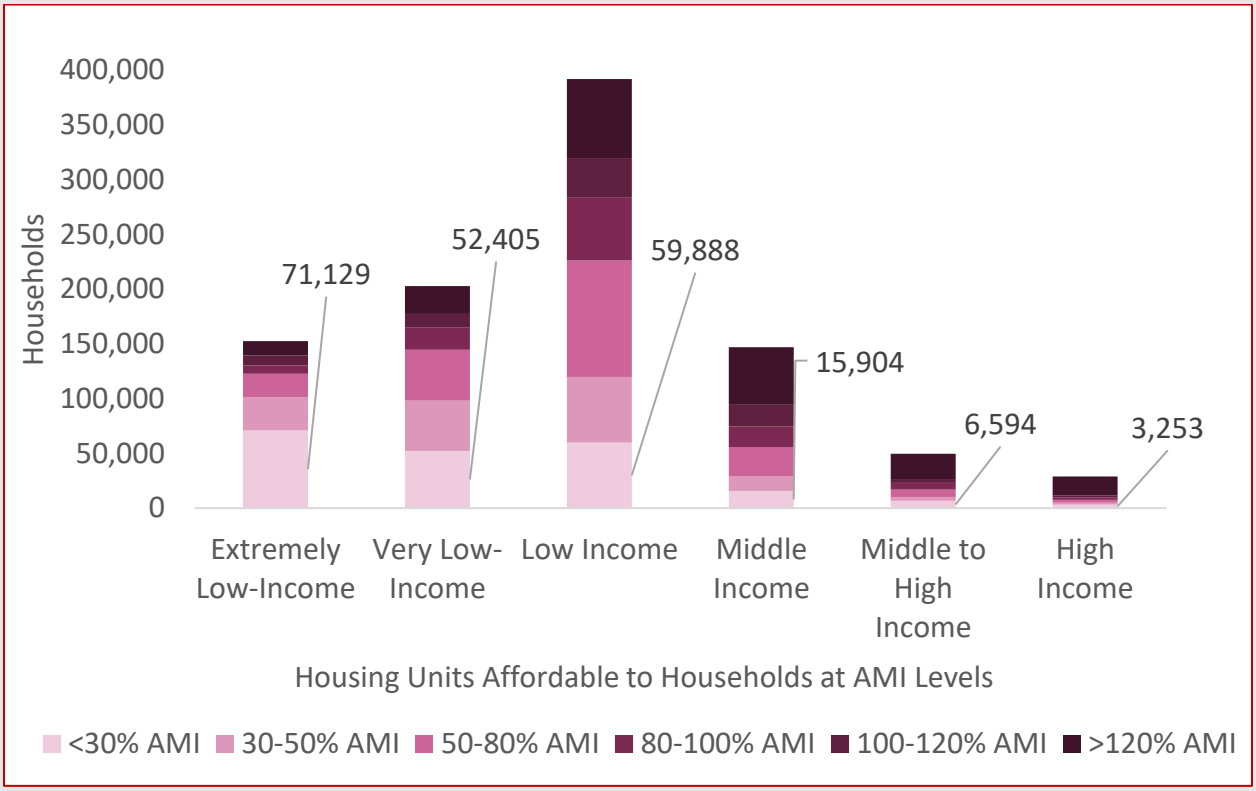
Source: THDA calculations of IPUMS USA, University of Minnesota, www.ipums.org.

The shortage of affordable housing, especially for ELI renters, becomes even more dire when we consider the availability of these homes. ELI renter households must compete with households

from all income levels to access affordable housing, which exacerbates the shortage of affordable housing for this income category.

For example, as illustrated in Figure 5, of the approximately 152,000 rental housing units that would be affordable to ELI households, only about 71,000 units (excluding vacant units) were occupied by ELI households. The remaining housing units were not "available" for ELI households because higher-income households occupied them. Therefore, for the 210,000 ELI households (as illustrated in Figure 4), there were 77,000 affordable and available units (as illustrated in Figure 5). As such, for every 100 ELI renter households, there are only 37 affordable and available units, yielding an absolute shortage of 133,000 units.

Figure 5: Availability of Rental Homes and Renter Households by Income and Affordability, 2024, Tennessee



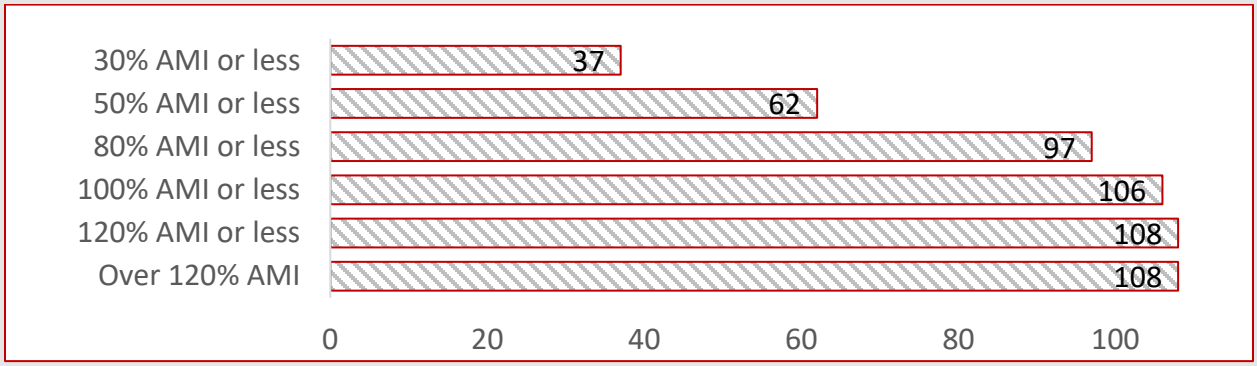
Source: THDA calculations of IPUMS USA, University of Minnesota, www.ipums.org.

As household income increases, the affordability and availability measure increases as well, as evidenced by Figure 6. For the 364,000 households below 50% AMI, there were 224,000 affordable and available rental housing. For moderate-income renters (below 80% AMI), our

analysis suggests the supply of modest-priced rentals is about equal to the number of households in this bracket, so the gap is effectively non-existant. This aligns with cumulative data showing about 97 affordable units per 100 renter households at or below 80% AMI in Tennessee, indicating balance. Many households in this range may still experience some cost burden. However, there are enough units in Tennessee's market to keep moderate-income renters housed without an absolute shortage.

For higher incomes (households with incomes greater than 80% AMI), there is technically a "surplus" of affordable units in Tennessee, meaning these households have plenty of housing options below their maximum affordable rent. Higher income renters can and often do occupy mid- or lower-priced units (for convenience, savings, or lack of luxury supply), which reduces the effective supply for lower-income groups. For example, a household earning $75k could afford a $1,875/month rent, but they might choose a $1,200/month apartment. From an affordability standpoint, that $1,200 unit could have served a household making $50k, but it is occupied by a higher-income household. This dynamic is precisely why our gap analysis is inclusive of surplus units at the top, indicating that if those higher earners were in more expensive units, moderate units would be freed up for moderate income households. Indeed, when all renters are considered, the total number of rental units in Tennessee (approximately one million) matches the number of renter households (approximately 950k), implying the overall market is in balance. But because of the mismatch in households occupying units affordable to them, the distribution is skewed with severe undersupply on the bottom end, and an excess of affordable options for those on the top end. That "excess" is not a literal oversupply of vacant units, but rather a reflection that higher-income households and likely to occupy units that would be affordable to lower-income groups.

Figure 6: Affordable and Available Rental Homes per 100 Renter Households, 2024, Tennessee



Source: THDA calculations of IPUMS USA, University of Minnesota, www.ipums.org.

A statewide analysis alone might obscure the severity of the affordability problem. In 2024, every Combined PUMA region we included in our analysis had a shortage of affordable and available rental homes for extremely low-income households. As Table 2 demonstrates, especially in large metro areas, low-income households are severely constrained by availability of affordable housing. For example, in the Memphis metro, there are only 22 affordable and available housing units per 100 extremely low-income households, while in the Lawrenceburg region, there are 73 affordable and available units per 100 ELI households.

Table 2: Affordable and Available Per 100 renter Households, 2024, Combined PUMA Regions

Region	Number of Affordable and Available Units per 100 below 30% AMI (ELI) Households	Number of Affordable and Available Units per 100 below 50% AMI (VLI) Households	Context
Memphis	22	58	Deep shortage of low-cost rentals; aging stock
Nashville	32	53	Rapid rent growth, strong in-migration
Clarksville	52	68	Young, fast-growing population; high rental demand
Cleveland/Fayetteville	<30	57-73	Deepest shortage for ELI households
Knoxville	41	67	Moderate gap, but rising costs, particularly near universities and job centers
Lawrenceburg/Kingsport	56-73	77-97	Smaller deficit; affordability aided by lower costs

Source: THDA calculations of IPUMS USA, University of Minnesota, www.ipums.org.

In summary, Tennessee's current rental affordability gap is concentrated for the lowest income households. Households earning less than 30% of the face an absolute shortage of available housing. By contrast, middle-income renters have roughly enough supply, and higher-income renters have ample choices. Urban regions (e.g., Nashville, Memphis, Knoxville, Chattanooga) have the largest absolute numbers of cost-burdened households and often the highest housing costs, and thus, the largest gaps in the quantity of affordable housing. Rural areas may have lower housing costs, but households are also more likely to have lower incomes. As such, some rural counties show high rates of cost burden because incomes are especially low, and even modest rents can be a strain. Additionally, rural areas might lack quality affordable rental options due to limited production, and aging or substandard housing stock.

Urban areas will need significant new construction of multifamily rentals to meet growth. In contrast, rural areas should focus on preserving low-cost housing and improving housing quality. Across all regions, the lowest-income households, e.g. those at or below the poverty line, stand out as needing the greatest amount of assistance, as no region in Tennessee has enough affordable and available housing for all its ELI renters.

The affordability mismatch affects more than housing. It ripples through the broader economy and communities. When workers cannot afford to live near job centers, workforce mobility declines. Increased cost burdens limit the household savings and local spending. When housing instability increases because of these issues, more families are at risk of eviction or homelessness. And finally, as growth centers attract higher-income residents, low-income households are displaced or priced out, and regional inequalities widen.

Appendix A: Methodology

Estimates of projected housing demand

To estimate housing demand over the next 10 years, we first project the number of households that might form over that period. Projected households are estimated by using the headship rate or the percentage of individuals who are the heads of their own households, which is a key measure for understanding household formation and its impact on housing demand.

Using public-use microdata area (PUMA) estimates of 1-year American Community Survey (ACS) data from IPUMS (Ruggles, 2025), we calculate headship rates between 2005 and 2023 by age (starting with 18 as 5-year cohorts). For forecasting future values of headship rate based on its past values, we use an autoregressive integrated moving average (ARIMA) model.[v]

These forecasted headship rates rely on population projections provided by the Tennessee State Data Center (Boyd Center, 2024) which offers projections until 2070.

Headship rate estimates are developed by age cohorts. Because PUMA boundaries change every 10 years with the decennial census, we cannot estimate headship rates by combined PUMA regions. Therefore historical (2005-2023) headship rates are calculated at the state level, excluding people in group quarters (GQs) from the total population.

Forecasted headship rates are then used to project the number of households to 2035. The total number of projected households is the projected headship rate multiplied by projected population. Although headship rate projections and projected households are developed for the entire state, we develop regional population projections. Using county-level Tennessee population projections provided by the TNSDC (Boyd Center, 2024), we develop Combined PUMA region-level projections.

Because we exclude people living in GQs when calculating headship rates, we also remove them from the total projected population for the years 2024 to 2035. To do that, we first calculate the share of population living in GQs for the most recent year the data are available, 2024. We used 2024 IPUMS data to determine the share of people in GQs by region and age (breakdowns similar to headship rates). Then, we multiply the 2024 GQ share for each PUMA region and age

cohort each year until 2035 to determine the projected number of people living in GQs. Then, we subtract that amount from the total number of people to get population excluding GQs.

We calculate the projected housing unit needs using "target vacancy rate," "replacement rate" and "seasonal vacancy rate."

Housing Underproduction Estimates

To estimate current housing needs, we modify a methodology described in Oregon Housing Need Analysis (2024) which was first used in a methodology developed by Up for Growth (2025). First, we estimate housing demand, which we measure as the sum of the current number of households and "missing households" divided by the target occupancy rate. Missing households are households that would have formed if sufficient affordable housing were available to them. When homes are scarce or unaffordable, some individuals delay or postpone forming their own households, live with others (relatives or friends), or become homeless due to economic hardship.

We use 1-year American Community Survey (ACS) public use microdata sample (PUMS) estimates from IPUMS (2025) to estimate the current number of households. To estimate missing households, we compare the current year's headship rates (e.g. the share of adults heading a household) by age cohorts to headship rates of the same age cohorts in a "normal" or baseline year. For this analysis, we compared headship rates from 2023 for 5-year age cohorts for ages 18 to 65 to headship rates for the same age cohorts in the year 2000. If a cohort has a lower headship rate than in the baseline year, then fewer households have formed for that age cohort. After determining the baseline headship rates for each age cohort, we multiply them by the current year's population. The result is a potential counterfactual for the number of households that might have formed had there been no cost constraints in the housing market. The difference between this counterfactual and the actual number of households that did form is the number of "missing households" for each age cohort. Total "missing households" are the sum of reduced household formation from cohorts aged 64 years and younger. If the value for missing households is negative such that more households formed in the current year compared to the baseline year, it is netted out to zero.

Because public-use microdata area (PUMA) boundaries change every 10 years based on the decennial census, “missing households” cannot be calculated for the same regions we used for this analysis. Therefore, we calculate the missing households by state and distribute state-level missing household numbers to regions based on the current household-age composition of the regions. The total number of households is the sum of total existing households and missing households.

Then, we determine the target number of housing units needed to accommodate these households’ needs and natural vacancy in an unconstrained market. We use a target vacancy rate of five percent, the reasoning for which is explained in detail by Up for Growth (2025). A target vacancy rate represents the share of housing stock that must remain unoccupied at any given time for a housing market to function efficiently. A target vacancy rate ensures that households have the option of moving to another home that may be more suitable for them; and that landlords can turn units over. The target vacancy rate does not measure observed vacancy. Rather, it aims to capture the “healthy” level of vacancy that the market should move towards when supply and demand are in equilibrium. A current vacancy rate below this threshold indicates a “tight” market, which may yield rapid rent and home price increases. And a rate that is higher than this threshold indicates that there is an imbalance between supply and demand.

To measure the existing supply of housing, we measure the housing units that are available for year-around occupancy, which is calculated as the total housing units less second and vacation homes and uninhabitable units. Second homes and vacation homes are easily identifiable from IPUMS data by region. A housing unit is “uninhabitable” if the unit does not have complete kitchen and indoor plumbing, and the unit is vacant for one year or more. We use a more stringent definition to determine “uninhabitable” units then what is typically used for determining “substandard” housing. Some housing units might lack complete kitchen or indoor plumbing and while rehabilitating them will improve the living conditions of households, if they have not been vacant for more than a year, then we include them as still available for year-around occupancy and part of available supply, by our definition. In doing so, we attempt a more conservative estimate of available supply of housing than other variations of this model.

“Current housing underproduction” refers to the number of homes available for occupancy falling short of what would be needed to accommodate existing households (missing and in housing units). We do not report a statewide underproduction number as aggregating the housing underproduction to the state level would obscure crucial differences among various regions. We provide current housing underproduction rates for regions across the state, which are defined as combinations of PUMAs. Housing supply and demand operate in regional markets, typically defined by commuting patterns and labor markets. People usually live and work within the same metro area; they do not shop for housing across the entire state. Home prices, rents, and residential construction respond to local conditions such as zoning, land costs, developer capacity, and employment patterns. The state is a composite of multiple distinct housing markets such as Nashville with rapid growth, Knoxville with moderate growth and Memphis with its older housing stock and slowing demand. A statewide average can mask severe local imbalances where one region’s excess supply coexists with another region’s acute shortage. Therefore, underproduction needs to be measured where these forces interact.

Affordability Mismatch Estimates

We consider the “mismatch” of housing to be a measure of the types of rental units that households occupy compared to what is affordable to them. While cost-burden is driven by several factors, one is the “mismatch” in housing that is available to the households that need them. For example, some extremely low-income (ELI) renter households, or households that are below the 30% area median income (AMI), are forced to live in housing units that are unaffordable to them, because the existing affordable units in the area are occupied by households of higher income levels.

To estimate this level of mismatch, we first estimate the number of affordable homes for renter households at various income levels. Affordability is determined by considering to which income levels the gross rents of units are affordable, e.g., housing costs do not exceed 30% of a household’s income. Availability is determined by meeting two provisions: whether the unit is affordable to a household and whether the unit is currently occupied by a household below or equal to the appropriate income level or is vacant.

Renter households are placed into categories based on how their incomes compare to the AMI. We follow the approach utilized by the U.S. Department of Housing and Urban Development (HUD), which compares household size-adjusted income and bedroom size-adjusted rent to determine affordability as households not paying more than 30% of their income on housing.

To better conceptualize affordability at a regional level, we use a methodology developed by the Atlanta Federal Reserve Bank for its Southeastern Rental Affordability Tracker (SERAT, 2024). We combine PUMAs to create, "Combined PUMA Regions," similar to core-based statistical areas (CBSAs) and cities. Our combined PUMA regions closely align with Atlanta Federal Reserve Bank's SERAT but exclude PUMAs outside of Tennessee. Regions are built from Census Public Use Microdata Areas (PUMA) using data from the 2022 vintage of data. The U.S. Census Bureau updates PUMAs every 10 years following the decennial census. As such, future changes to PUMA boundaries may affect the Tennessee's Combined PUMA regions in the future.

Then, we calculate the AMI for these combined PUMA regions for family households only, which are defined as two or more people residing together and related by birth, marriage, or adoption. Using reported household income and the reported number of people in the household from the IPUMS data, we placed renter households in the appropriate income category by dividing their reported income by the household size-appropriate AMI levels[vi]:

- Extremely low income (ELI) includes households whose income is less than or equal to 30% of AMI.
- Very low income (VLI) includes households whose income is between 30.1 and 50% AMI.
- Low income (LI) includes households whose income is between 50.01 to 80% AMI.
- Middle income includes households whose income is between 80.01 to 100% AMI.
- Upper income includes households whose income is both between 100 to 120% percent AMI and over 120%.[vii]

Then, we calculate each household's reported rent costs as a percentage of total reported household income to determine whether a household was moderately cost burdened (e.g. paying more than 30% of household income on rent) or severely cost burdened (e.g. paying

more than 50% of household income on rent). Households with zero or negative income are excluded from cost burden determination. [viii]

Using IPUMS housing-level data, we determine the affordability level of each rental unit. We first calculate the gross rent by adding the cost of electricity, fuel, gas and water to the monthly rent.[ix] Then, we find the bedroom-weighted income needed[x] to rent a unit without being cost burdened. If this gross rent is not more than 30% of bedroom adjusted AMI, then the unit is considered affordable. We calculate this measure for each income level.

We designate units as available if the unit is affordable to a renter household equal to or below each income level and if the unit is vacant or currently occupied by a household below that income level. Units that are rented, but not occupied, are identified as “vacant,” and are included “available” units depending on the asking rent.[xi]

Finally, we compared the number of renter households to the number of rental units to determine the surplus / shortage of affordable units at each income level. Units occupied by households with the necessary income to pay no more than 30% towards housing costs are considered available.

Appendix B: Tables

Table B1: Tennessee Combined PUMA Regions Used for Analysis

State	Combined PUMA Region Name	Tennessee Counties in Region
TN	Athens, TN µSA + Bledsoe & Rhea Counties, TN Bledsoe, McMinn, Meigs, Rhea	Bledsoe, McMinn, Meigs, Rhea
TN/GA	Chattanooga, TN-GA MSA; McMinnville, TN µSA; & Summerville, GA µSA + Grundy & Van Buren Counties, TN	Grundy, Hamilton, Marion, Sequatchie, Van Buren, Warren, TN
TN/ KY	Clarksville, TN-KY MSA & Paris, TN µSA + Benton, Carroll, Houston, & Humphreys County, TN & Lyon & Todd Counties, KY	Benton, Carroll, Henry, Houston, Humphreys, Montgomery, Stewart
TN	Cleveland, TN MSA	Bradley, Polk
TN	Cookeville, TN µSA (minus Jackson County, TN) & Crossville, TN µSA + Clay, Fentress, & Pickett Counties, TN	Clay, Cumberland, Fentress, Overton, Pickett, Putnam, White
TN	Decatur, Hardeman, Hardin, Henderson, & McNairy Counties, TN	Decatur, Hardeman, Hardin, Henderson, McNairy
TN	Dyersburg, TN µSA; Martin, TN µSA; & Union City, TN µSA + Lake County, TN	Dyer, Lake, Obion, Weakley
TN	Fayetteville, TN µSA; Lewisburg, TN µSA; & Shelbyville, TN µSA	Bedford, Lincoln, Marshall
TN	Jackson, TN MSA + Haywood & Lauderdale Counties, TN	Chester, Crockett, Gibson, Haywood, Lauderdale, Madison

State	Combined PUMA Region Name	Tennessee Counties in Region
TN	Johnson City, TN MSA + Johnson County, TN	Carter, Johnson, Unicoi, Washington
TN	Kingsport-Bristol-Bristol, TN-VA MSA (minus Scott & Washington Counties, VA) & Greenville, TN µSA	Greene, Hawkins, Sullivan
TN	Knoxville, TN MSA (minus Grainger County, TN) + Claiborne, Hancock, Monroe, & Scott Counties, TN	Anderson, Blount, Campbell, Claiborne, Hancock, Knox, Loudon, Monroe, Morgan, Roane, Scott, Union
TN	Lawrenceburg, TN µSA + Giles, Lewis, Perry, & Wayne Counties, TN	Giles, Lawrence, Lewis, Perry, Wayne
TN	Memphis, TN-MS-AR MSA (minus Benton, Marshall, Tate, & Tunica Counties, MS & Crittenden County, AR)	Fayette, Shelby, Tipton, TN
TN	Morristown, TN MSA + Grainger County, TN	Grainger, Hamblen, Jefferson
TN	Nashville-Davidson--Murfreesboro--Franklin, TN MSA + DeKalb & Jackson Counties, TN	Cannon, Cheatham, Davidson, DeKalb, Dickson, Hickman, Jackson, Macon, Maury, Robertson, Rutherford, Smith, Sumner, Trousdale, Williamson, Wilson
TN	Sevierville, TN µSA & Newport, TN µSA	Cocke, Sevier
TN	Tullahoma-Manchester, TN µSA & Winchester, TN µSA	Coffee, Franklin, Moore

Source: Southeastern Rental Affordability Tracker, Federal Reserve Bank of Atlanta.

Table B2: Housing Demand, Supply and Underproduction, 2024, Combined PUMA Regions

PUMA Region	Target Households	Demand	Supply	Housing Underproduction
Athens	44,446	47,873	51,002	3,129
Chattanooga	205,355	221,278	219,678	-1,600
Clarksville	146,852	158,553	154,997	-3,556
Cleveland	49,994	53,765	53,798	33
Cookeville	100,309	107,649	104,959	-2,690
Decatur	46,603	50,209	52,492	2,283
Dyersburg	44,442	47,722	47,741	19
Fayetteville	50,581	54,361	52,555	-1,806
Jackson	92,627	100,124	98,372	-1,752
Johnson City	97,500	104,793	107,059	2,266
Kingsport	124,603	133,707	134,635	928
Knoxville	431,217	463,940	459,089	-4,851
Lawrenceburg	46,857	50,322	49,251	-1,071
Memphis	400,187	434,764	443,289	8,525
Morristown	60,356	65,005	63,475	-1,530
Nashville	881,914	951,781	954,296	2,515
Sevierville	58,270	62,548	67,607	5,059
Tullahoma	44,033	47,296	47,373	77

Source: THDA calculations of IPUMS USA, University of Minnesota, www.ipums.org.

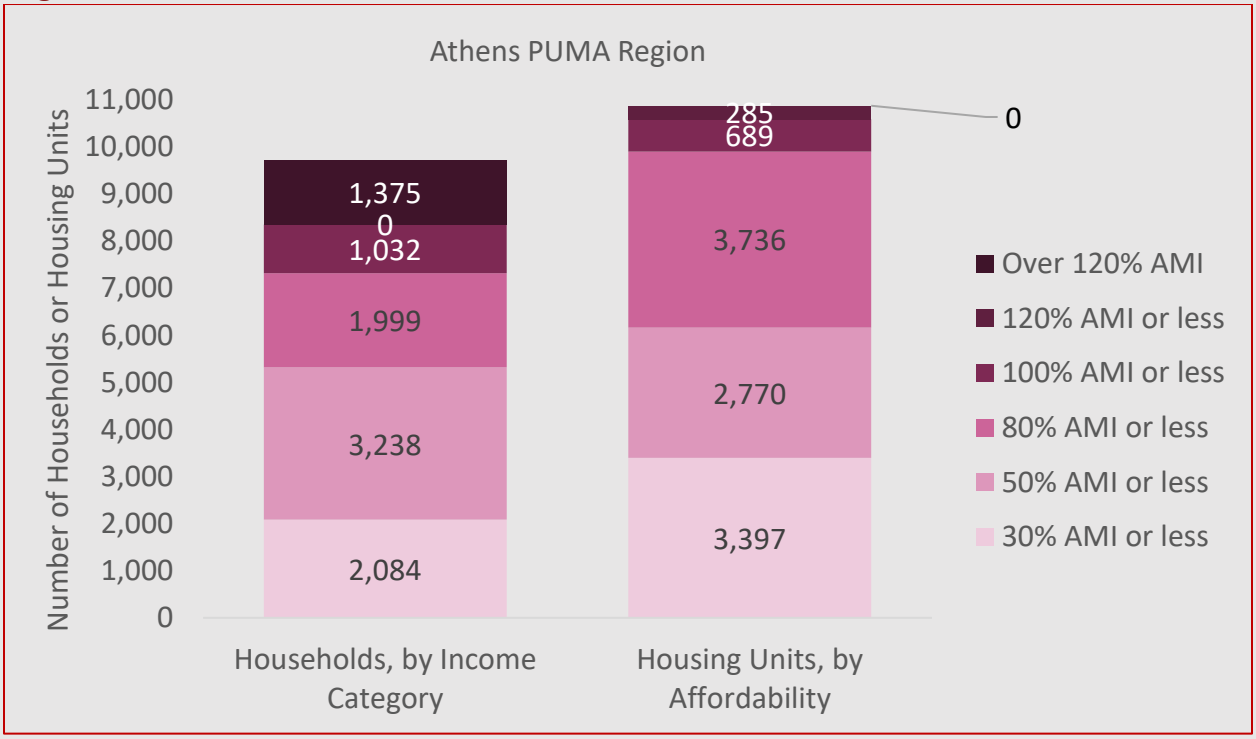
Table B3: Projected Housing Demand, Change in Households and Housing Units by 2035

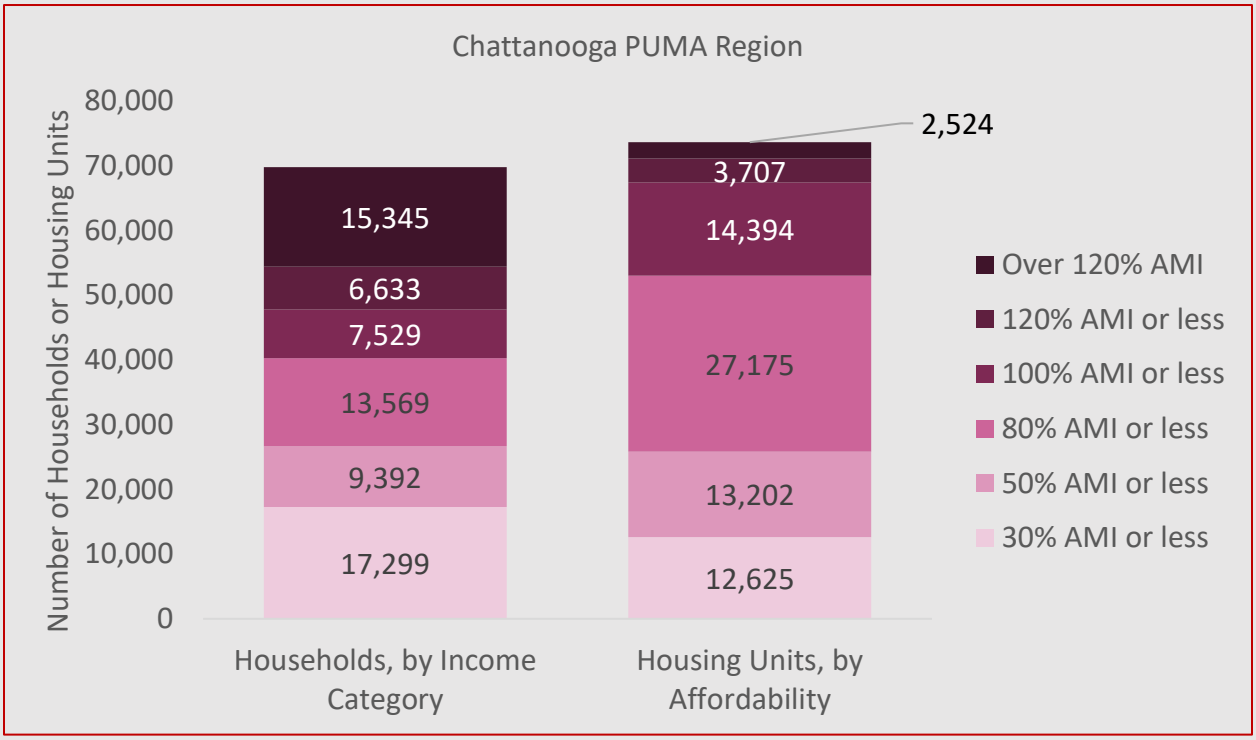
Combined PUMA Region	2024 Households	2024 Housing Units	2035 Households	2035 Housing Units	Change in Households	Change in Housing Units
Athens	48,674	51,236	50,578	55,055	1,904	3,819
Chattanooga	204,225	214,974	217,228	232,235	13,003	17,262
Clarksville	140,088	147,461	161,250	175,684	21,162	28,222
Cleveland	53,767	56,596	57,975	62,074	4,208	5,478
Cookeville	98,979	104,188	104,817	114,579	5,838	10,391
Decatur	47,953	50,477	47,008	52,970	-945	2,493
Dyersburg	41,551	43,738	38,695	41,383	-2,857	-2,355
Fayetteville	50,959	53,641	55,876	59,742	4,917	6,100
Jackson	89,600	94,316	87,510	93,195	-2,090	-1,122
Johnson City	97,360	102,484	99,756	107,577	2,396	5,093
Kingsport	126,671	133,338	128,543	137,416	1,871	4,077
Knoxville	429,515	452,121	456,801	492,080	27,286	39,959
Lawrenceburg	46,533	48,982	47,805	52,188	1,273	3,206
Memphis	414,461	436,275	403,621	428,188	-10,840	-8,087
Morristown	62,435	65,721	65,063	71,184	2,628	5,463
Nashville	873,053	919,004	1,011,616	1,079,346	138,563	160,343
Sevierville	59,105	62,215	61,852	76,387	2,747	14,172
Tullahoma	45,628	48,029	48,700	53,181	3,072	5,152
Tennessee	3,001,957	3,159,955	3,224,494	3,473,435	222,537	313,480

Source: THDA calculations of IPUMS USA, University of Minnesota, www.ipums.org.

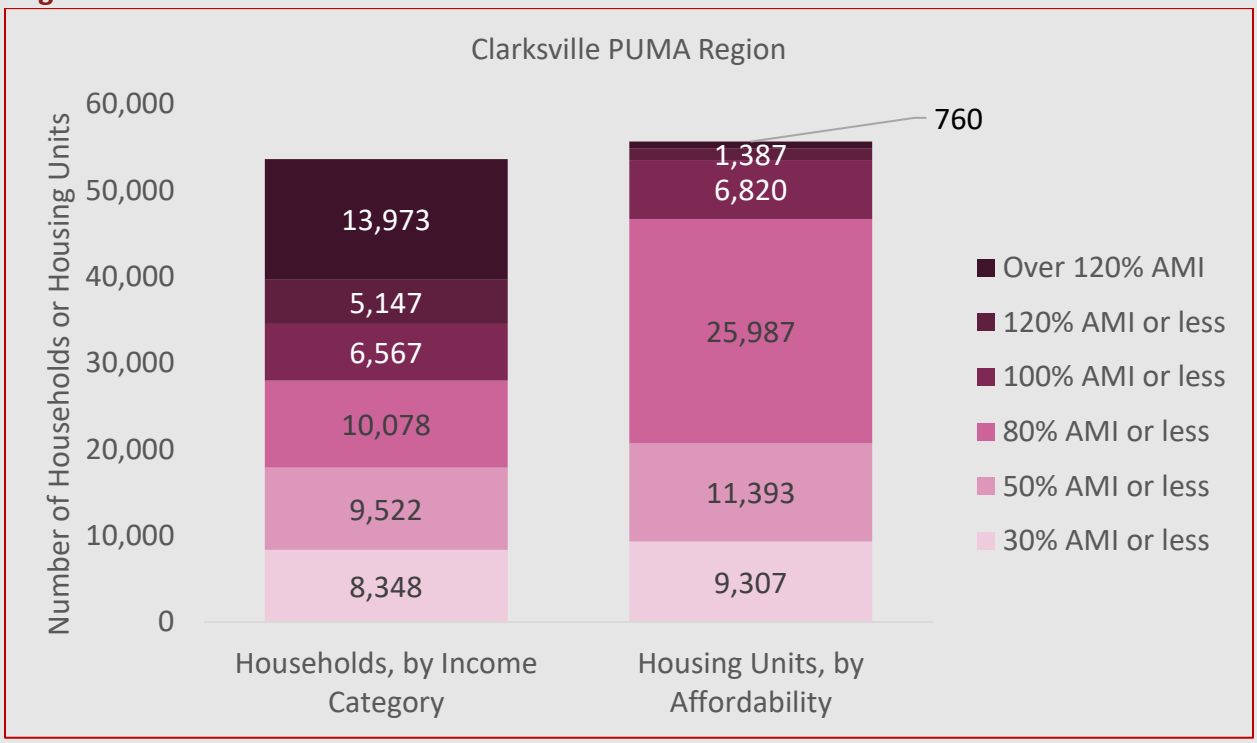
Appendix C: Regional Figures

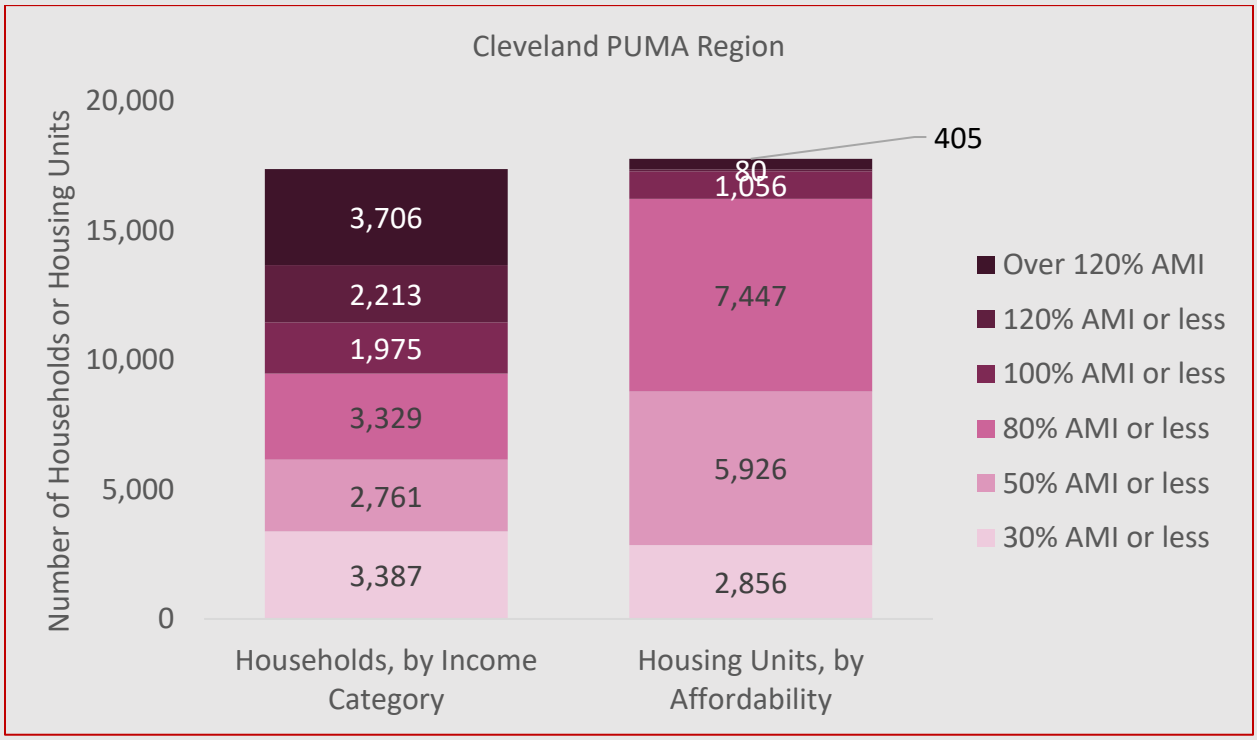
Figures C1A-C1B: Number of Affordable Units and Households by AMI for all Combined PUMA Regions



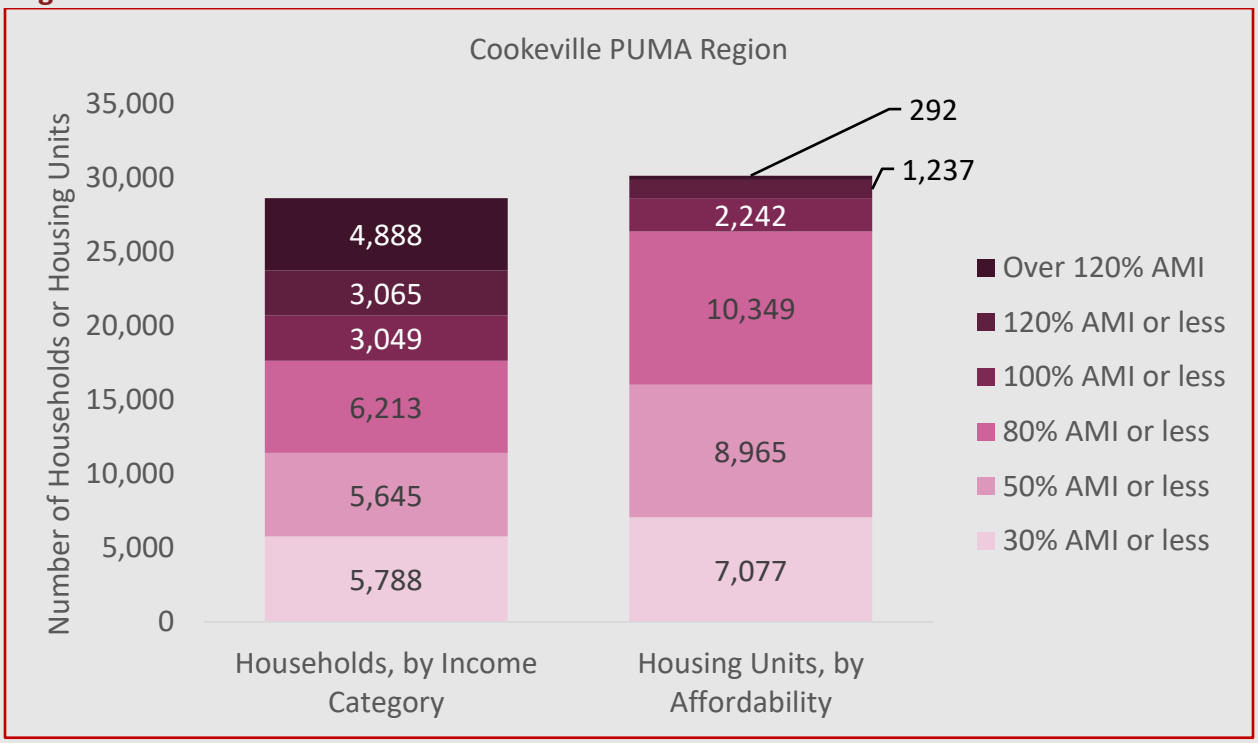


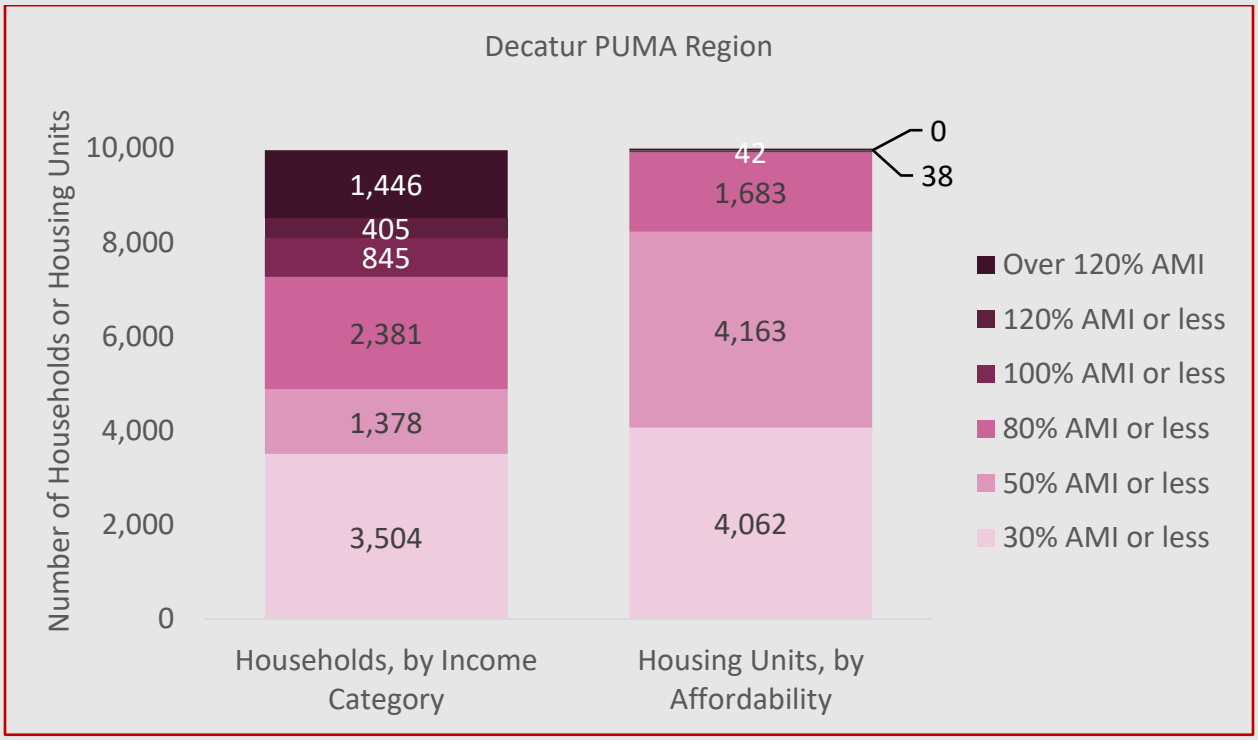
Figures C1C-C1D: Number of Affordable Units and Households by AMI for all Combined PUMA Regions



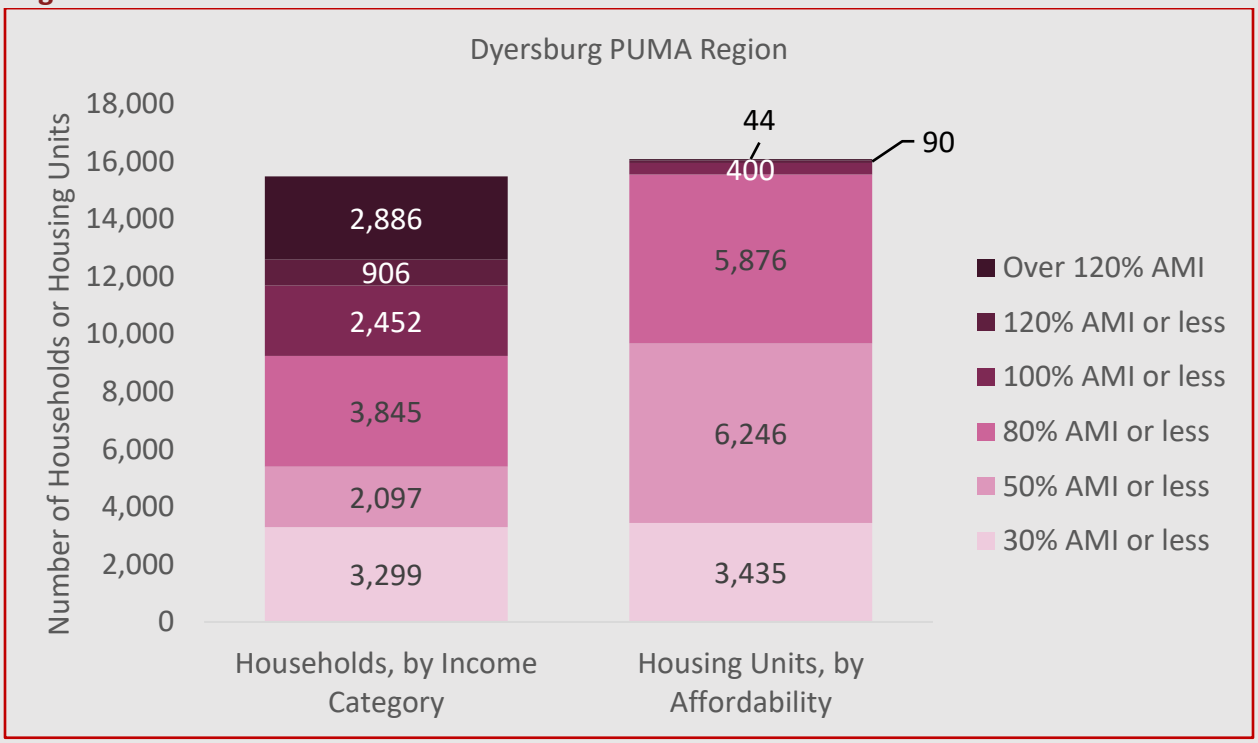


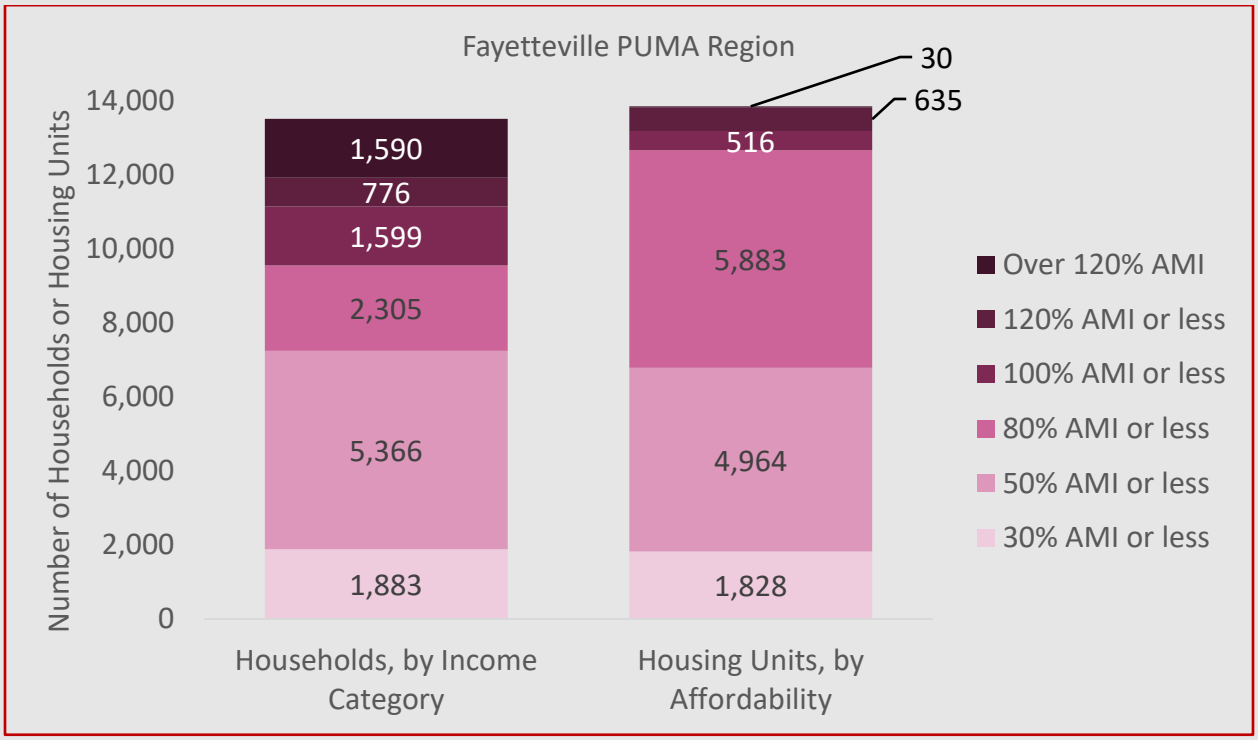
Figures C1E-C1F: Number of Affordable Units and Households by AMI for all Combined PUMA Regions



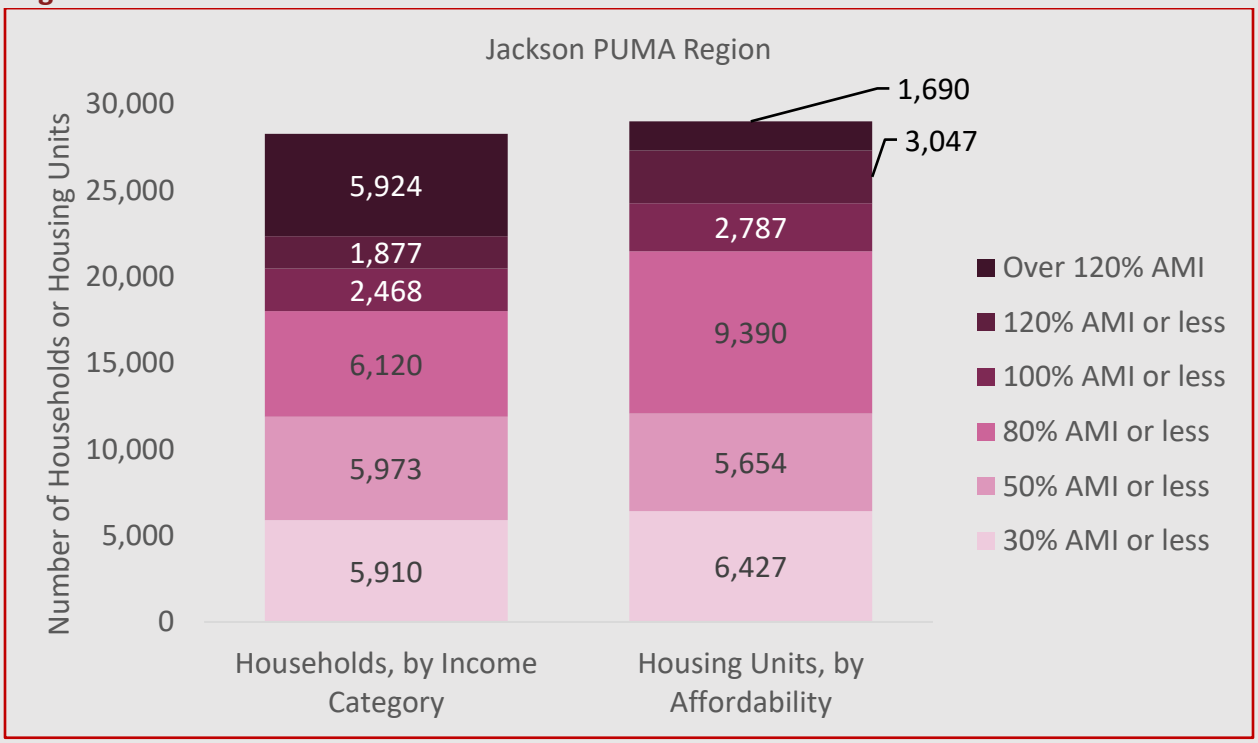


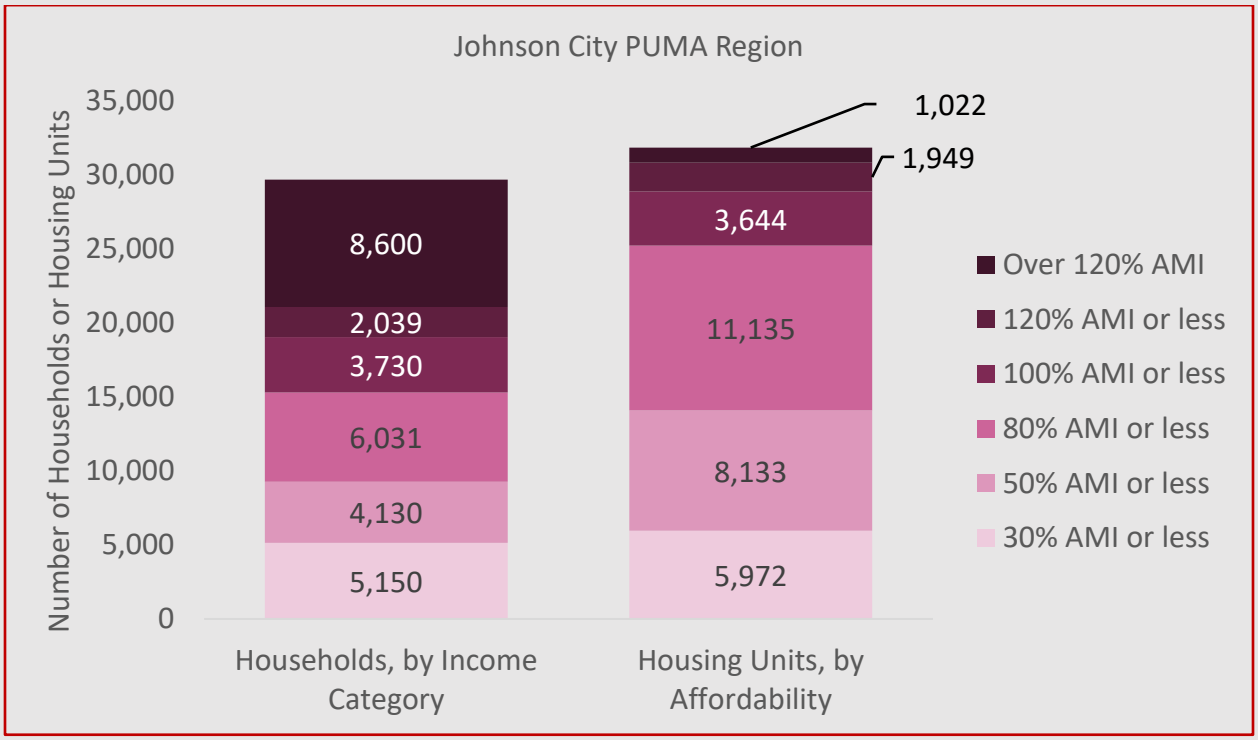
Figures C1G-C1H: Number of Affordable Units and Households by AMI for all Combined PUMA Regions



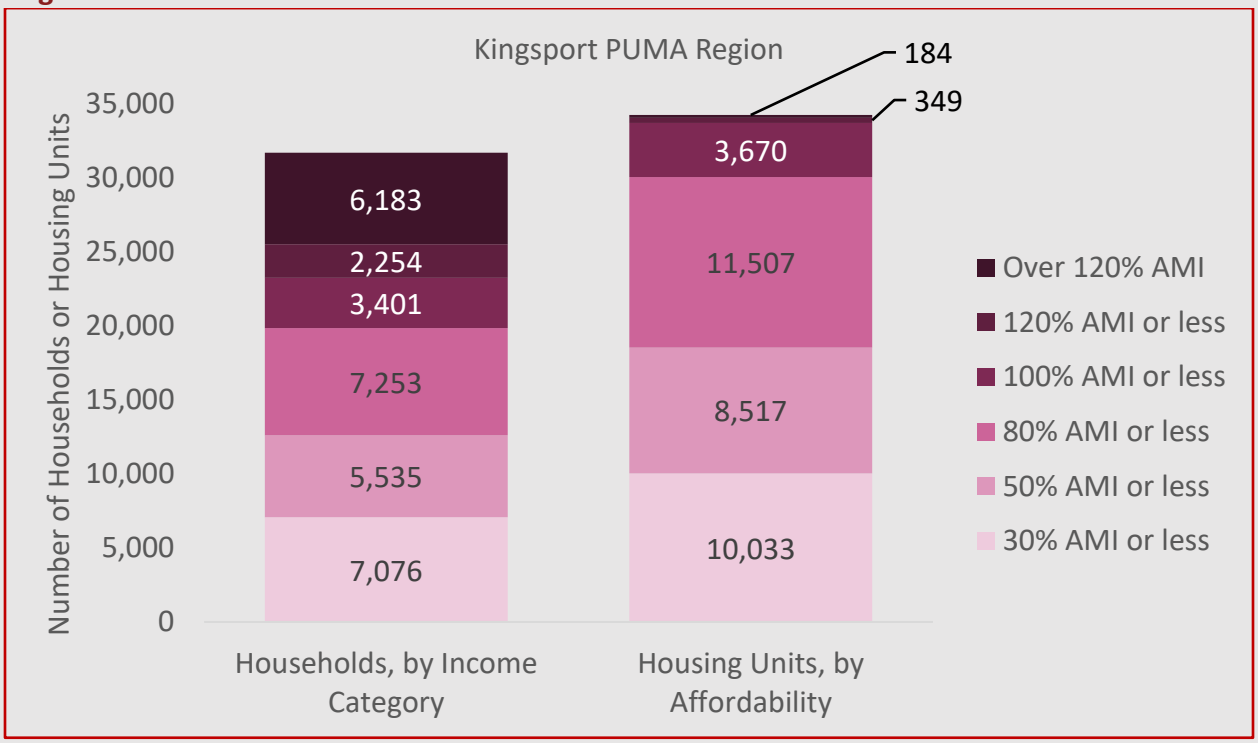


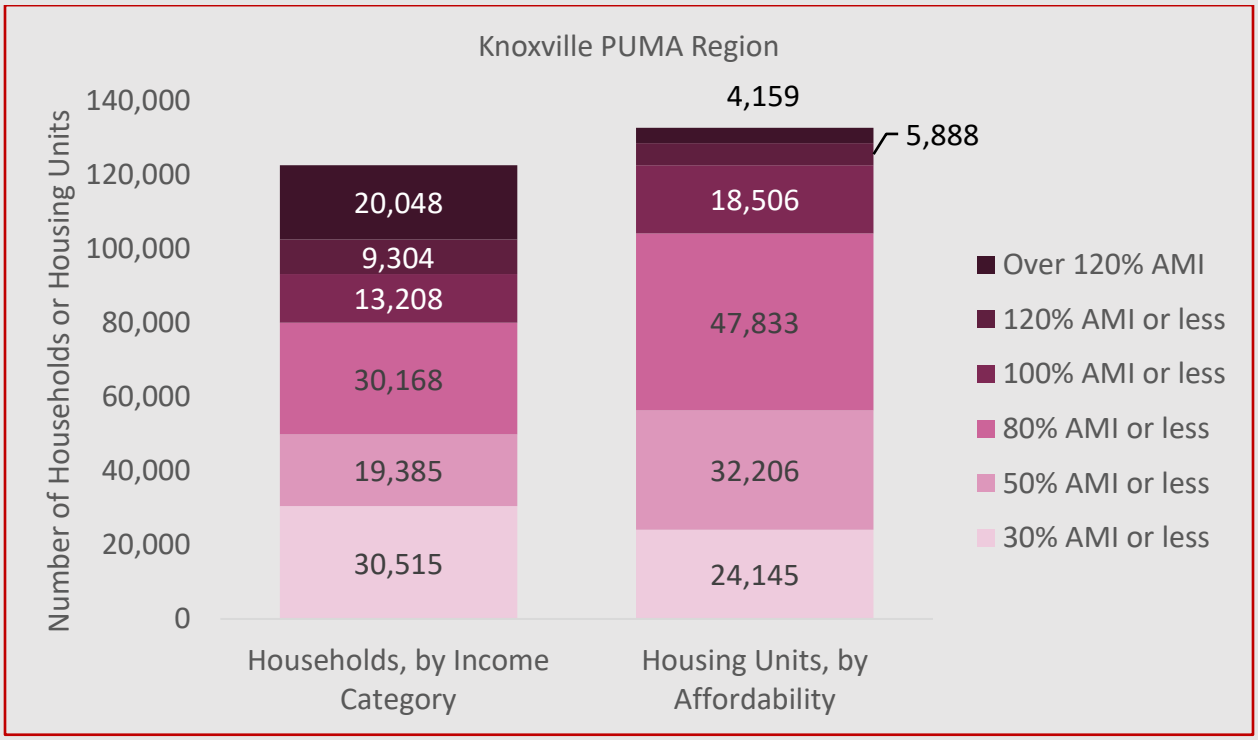
Figures C1I-C1J: Number of Affordable Units and Households by AMI for all Combined PUMA Regions



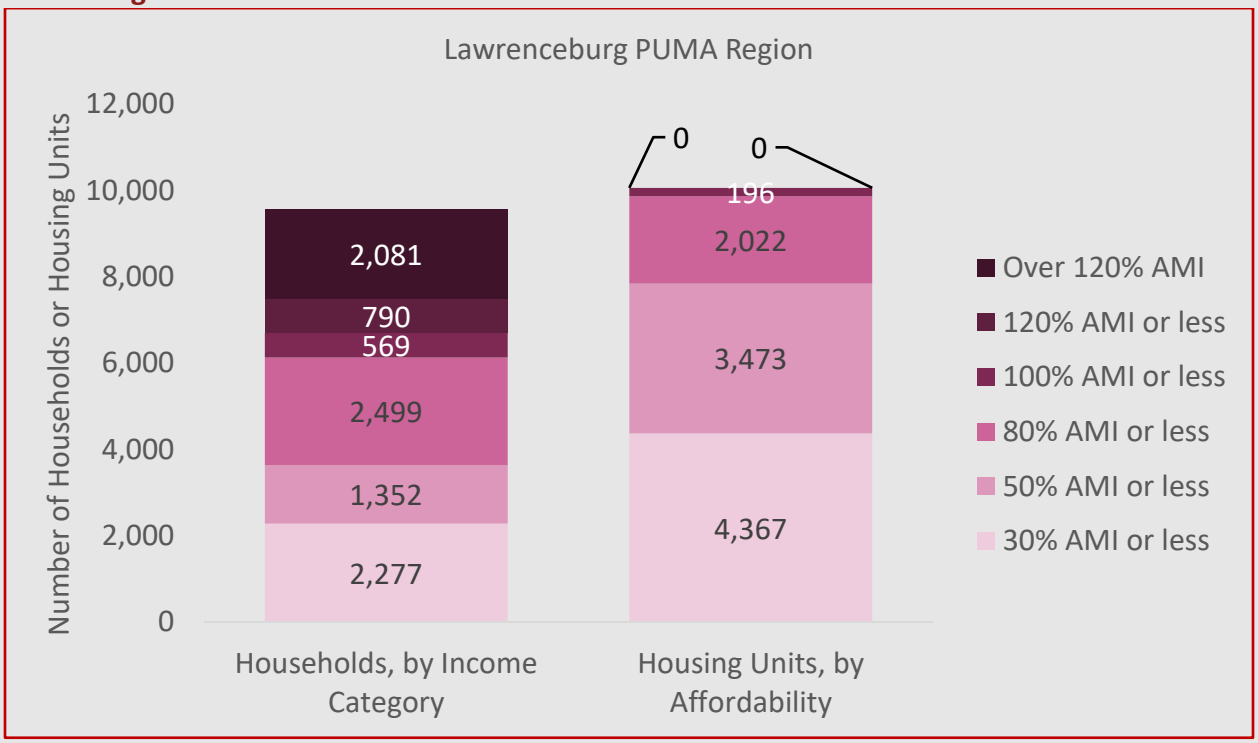


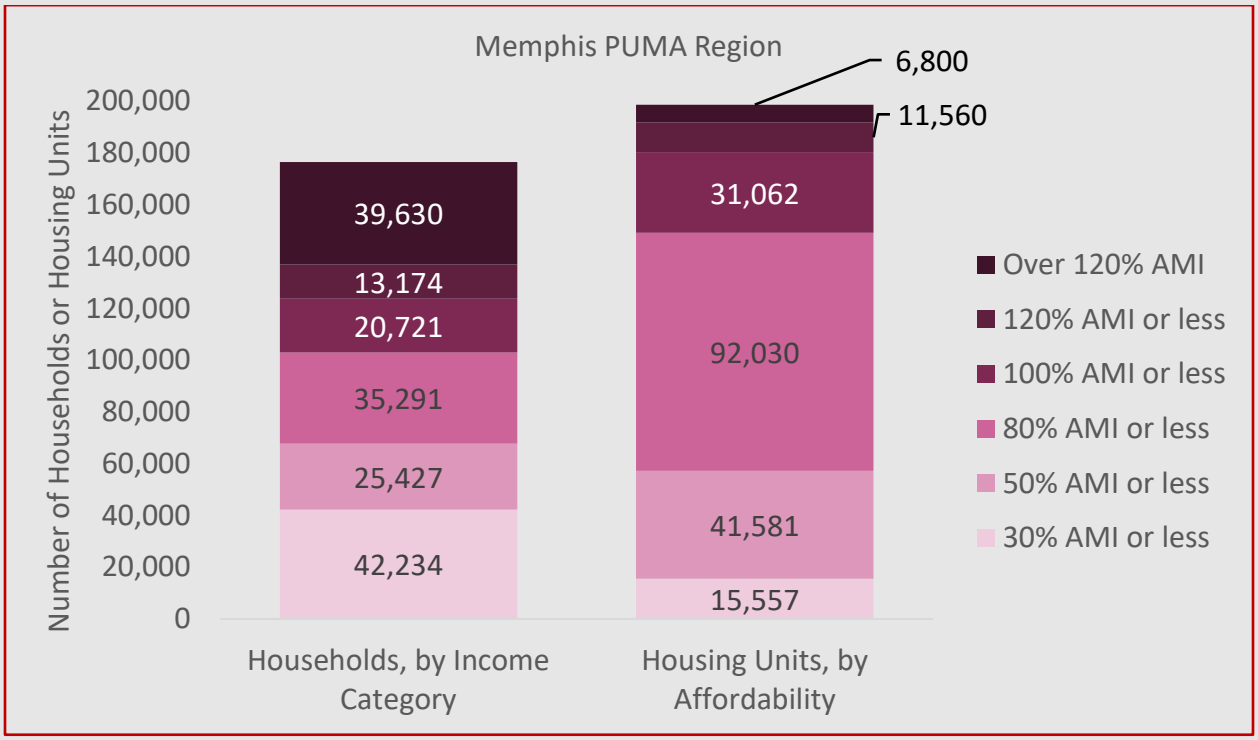
Figures C1K-C1L: Number of Affordable Units and Households by AMI for all Combined PUMA Regions



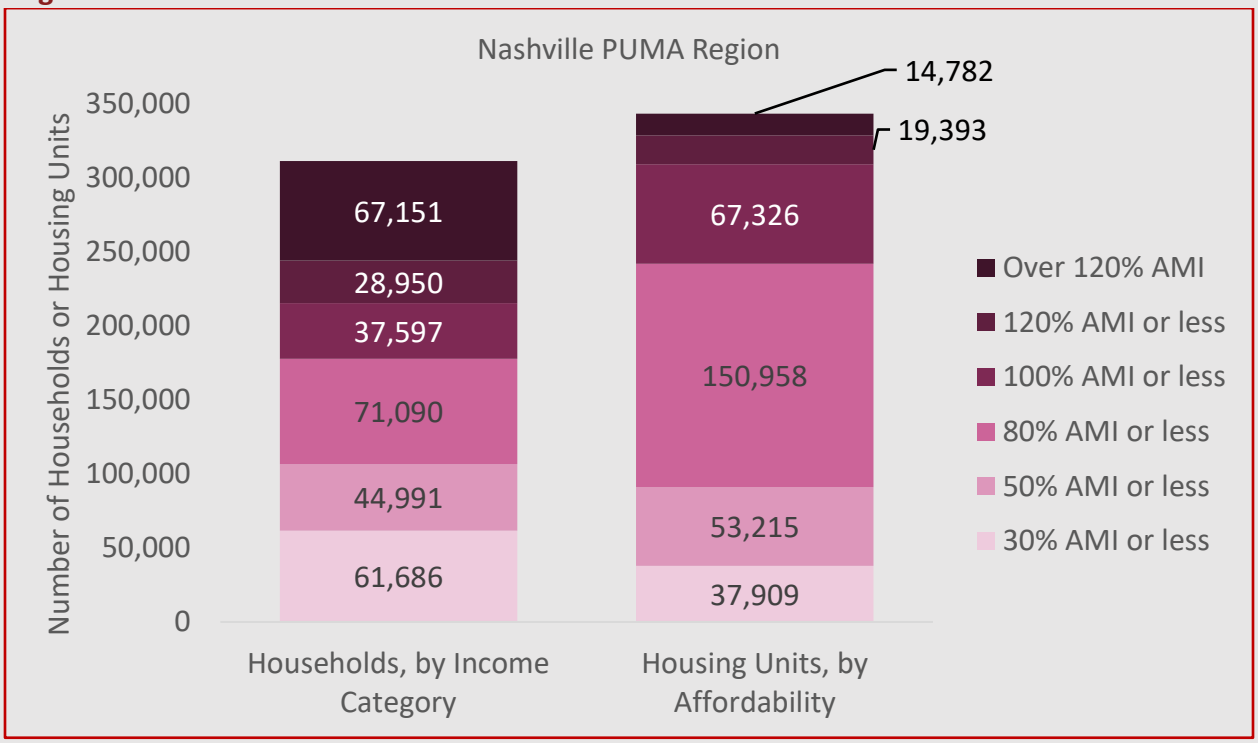


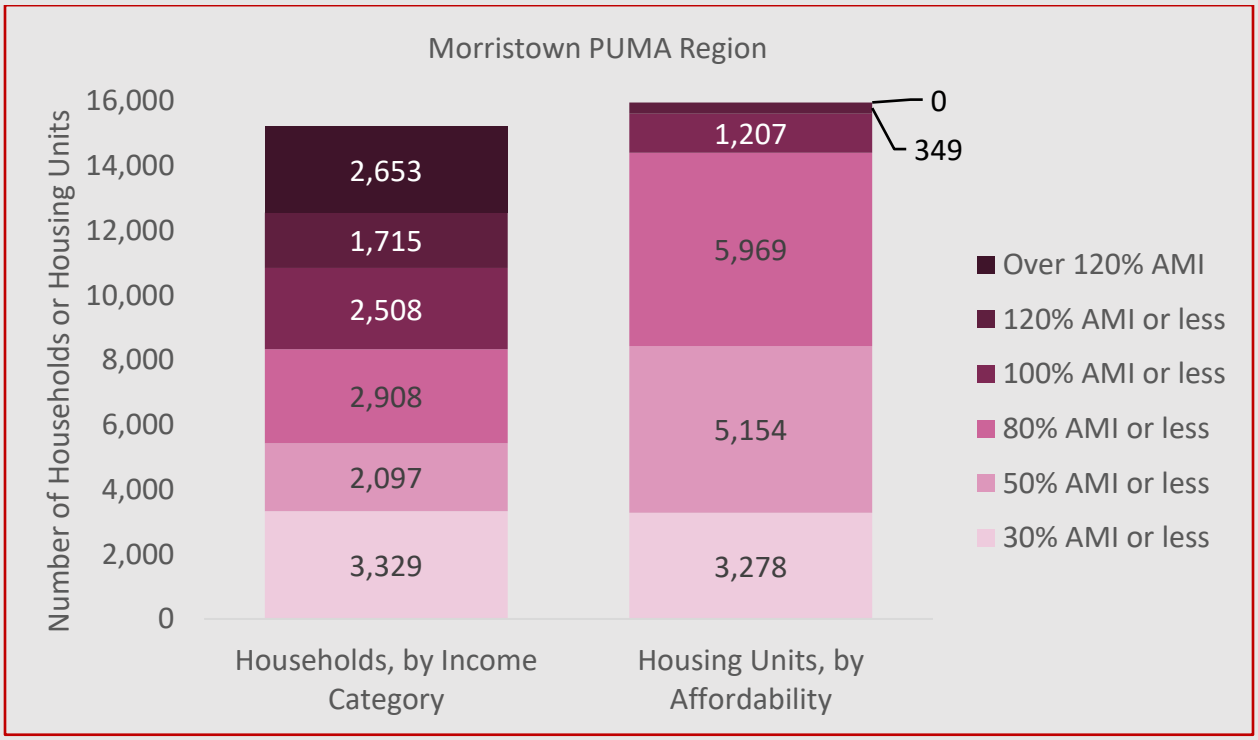
Figures C1M-C1N: Number of Affordable Units and Households by AMI for all Combined PUMA Regions



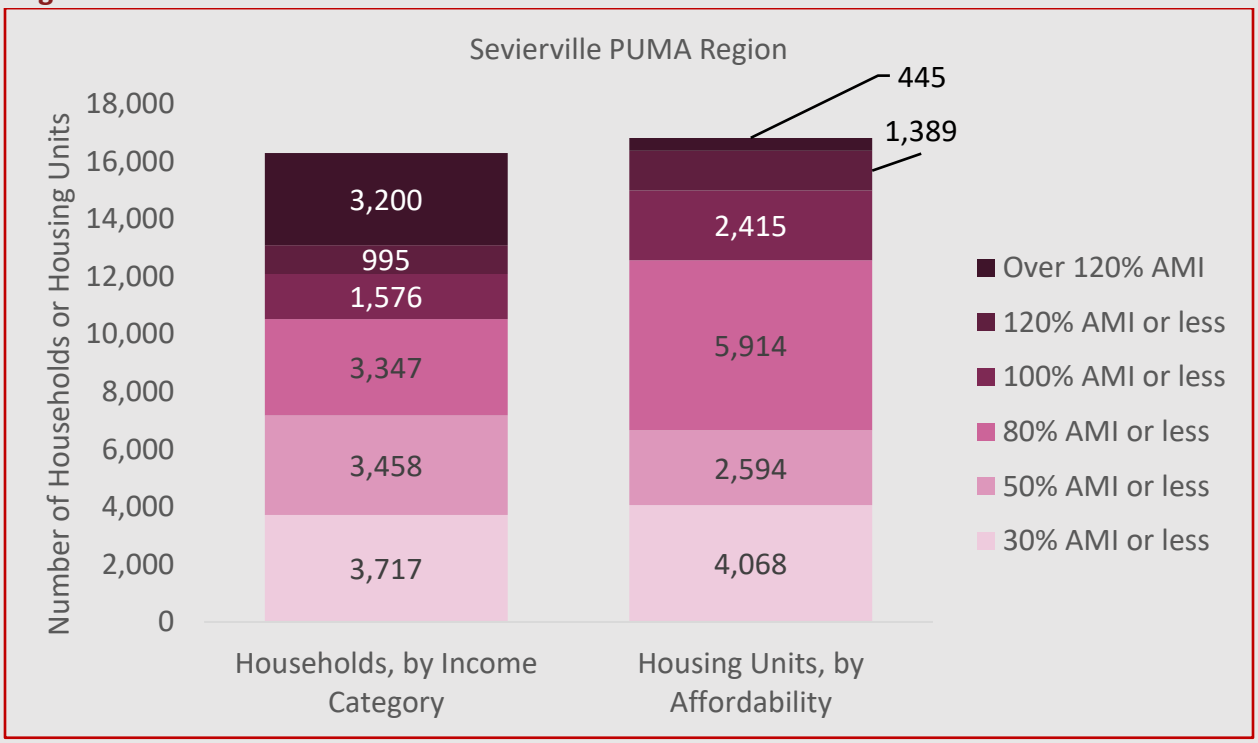


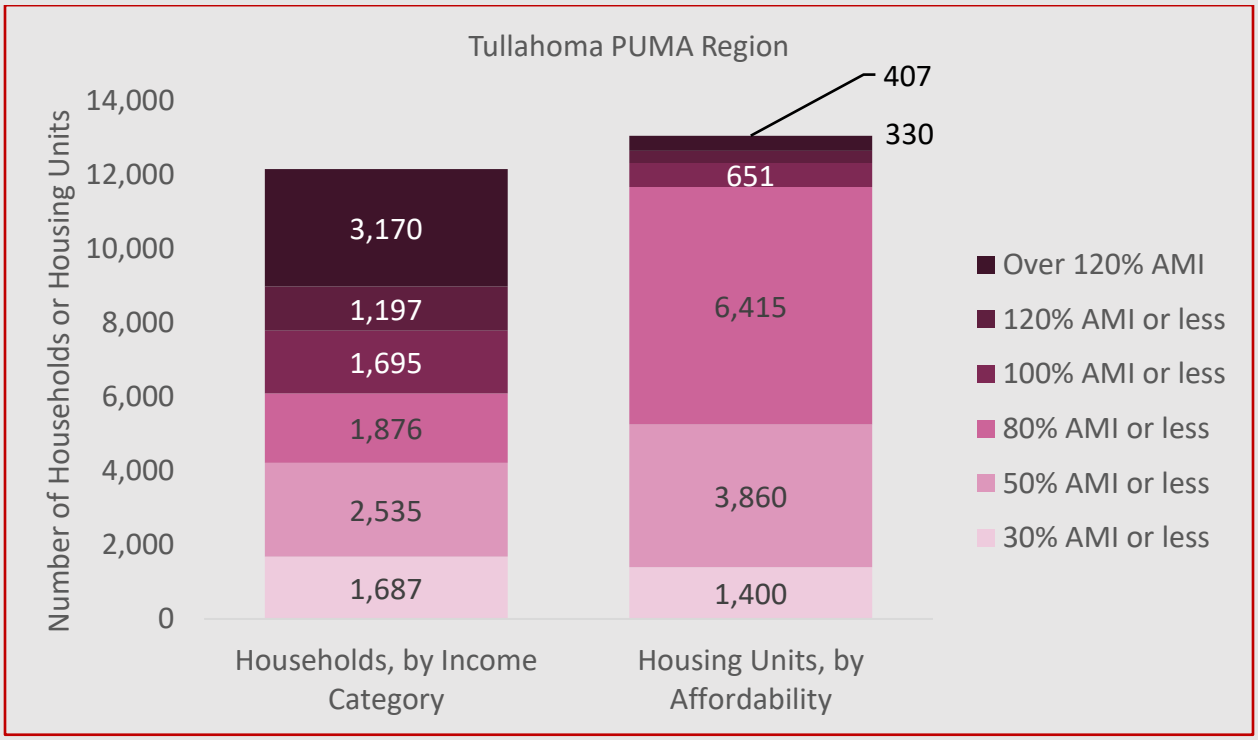
Figures C1O-C1P: Number of Affordable Units and Households by AMI for all Combined PUMA Regions



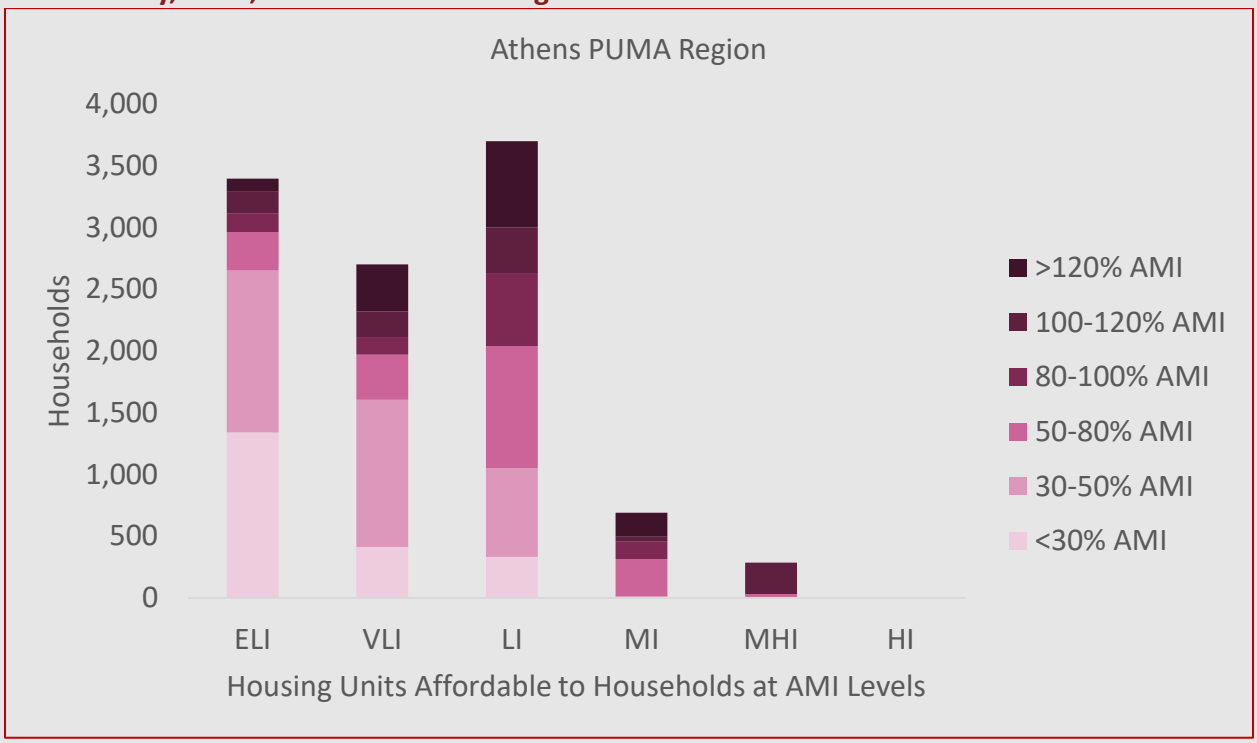


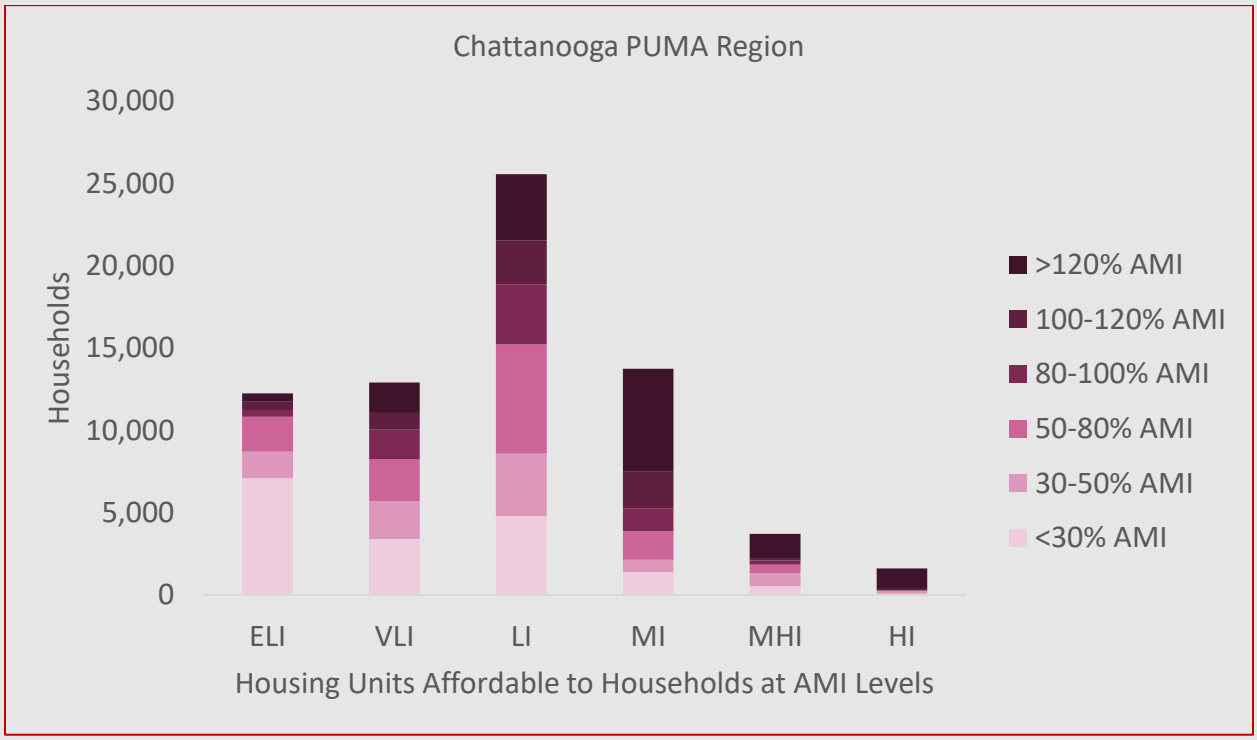
Figures C1Q-C1R: Number of Affordable Units and Households by AMI for all Combined PUMA Regions



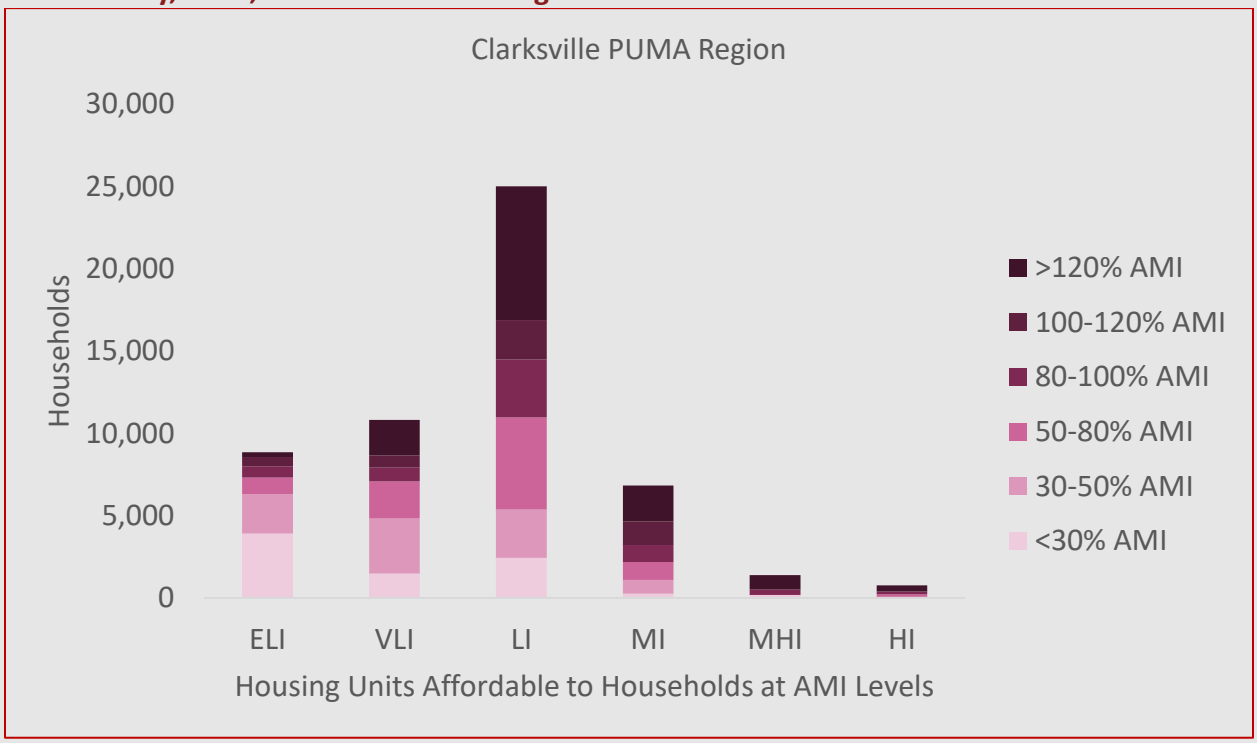


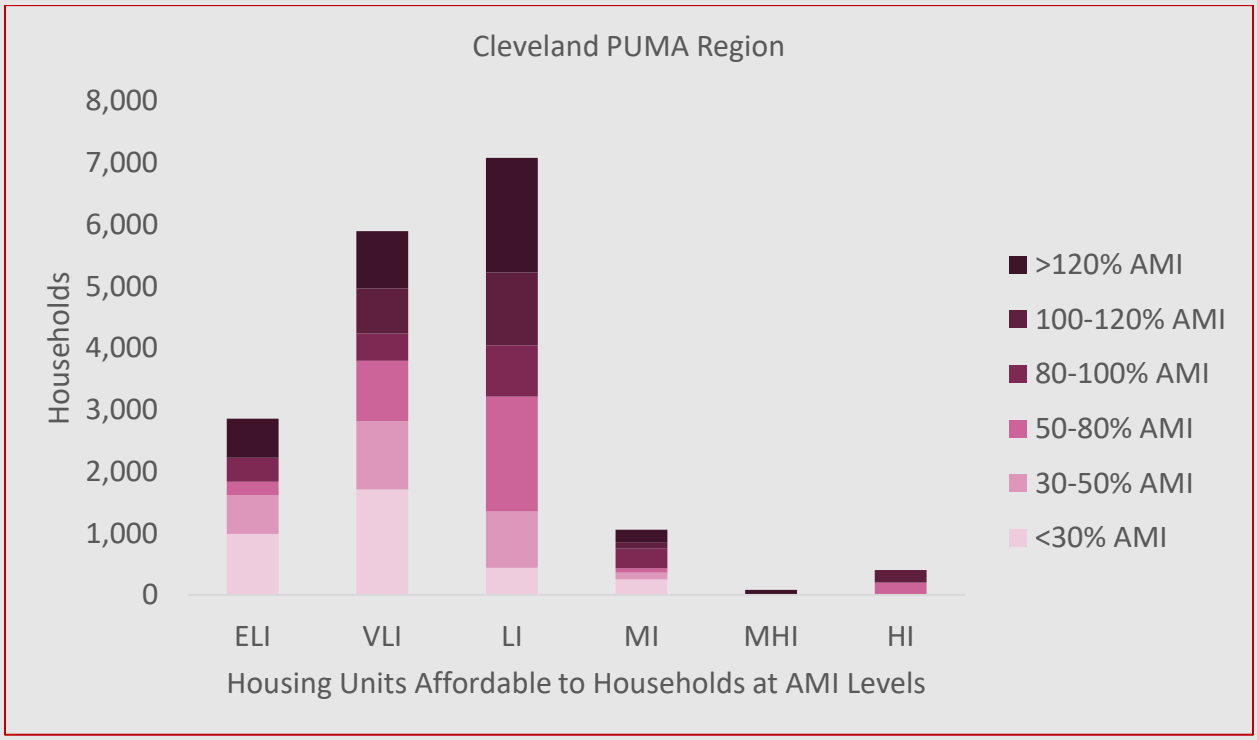
Figures C2A-C2B: Availability of Rental Homes and Renter Households by Income and Affordability, 2024, Combined PUMA Regions



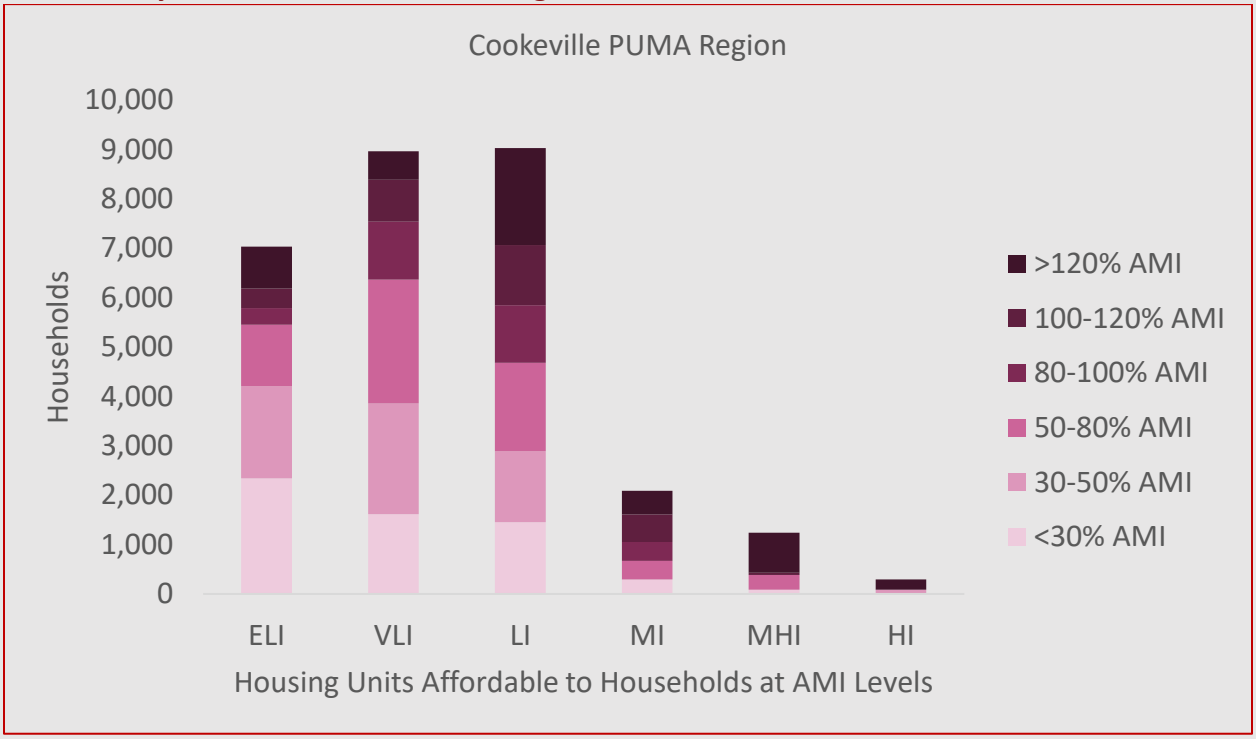


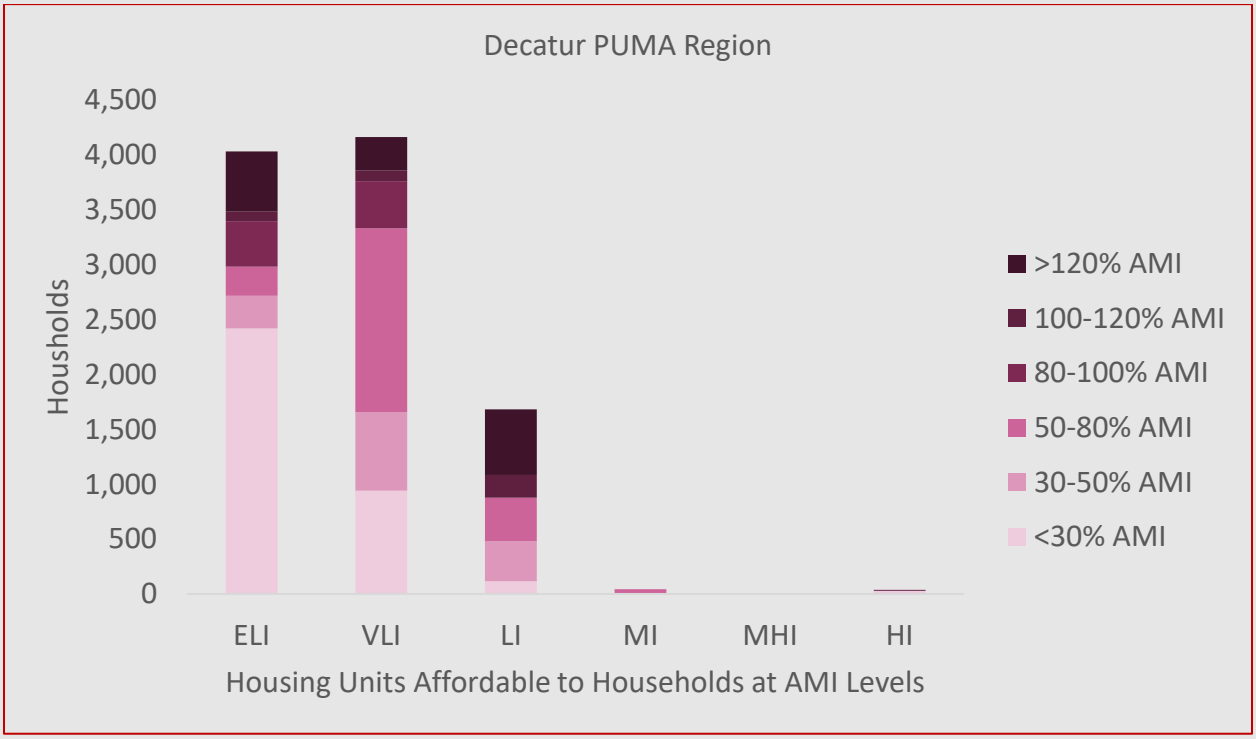
Figures C2C-C2D: Availability of Rental Homes and Renter Households by Income and Affordability, 2024, Combined PUMA Regions



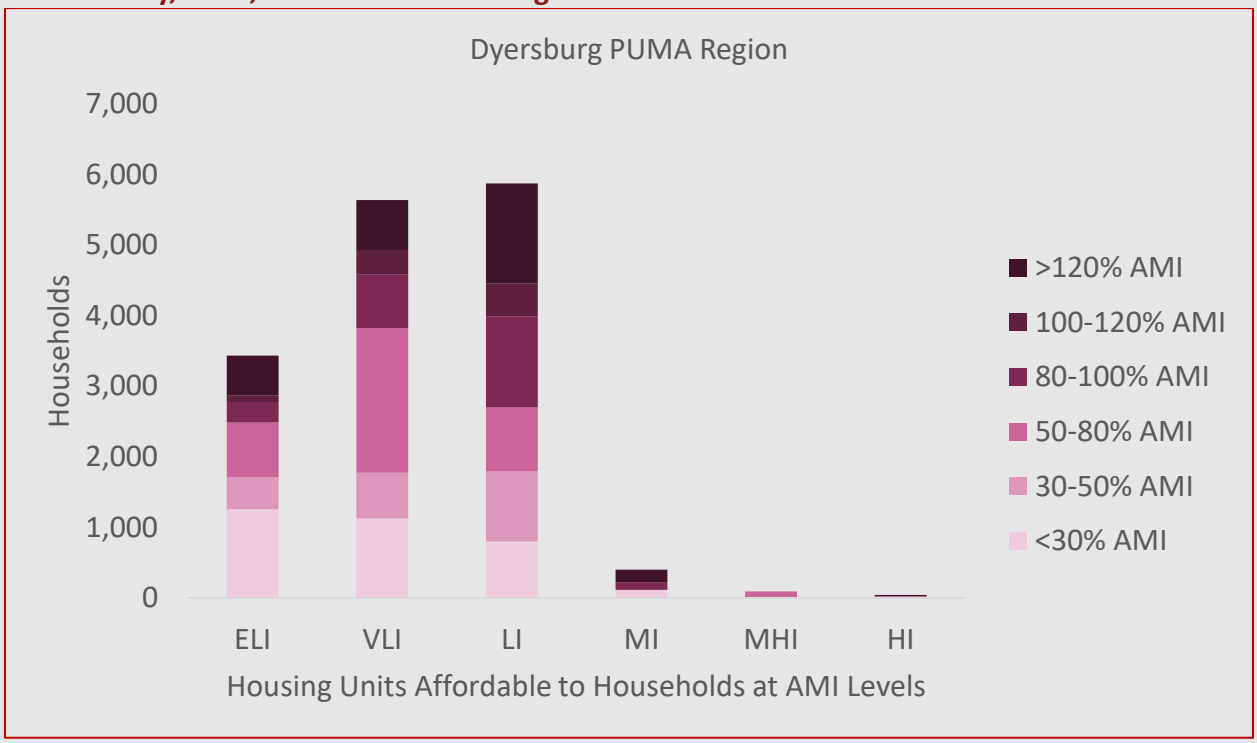


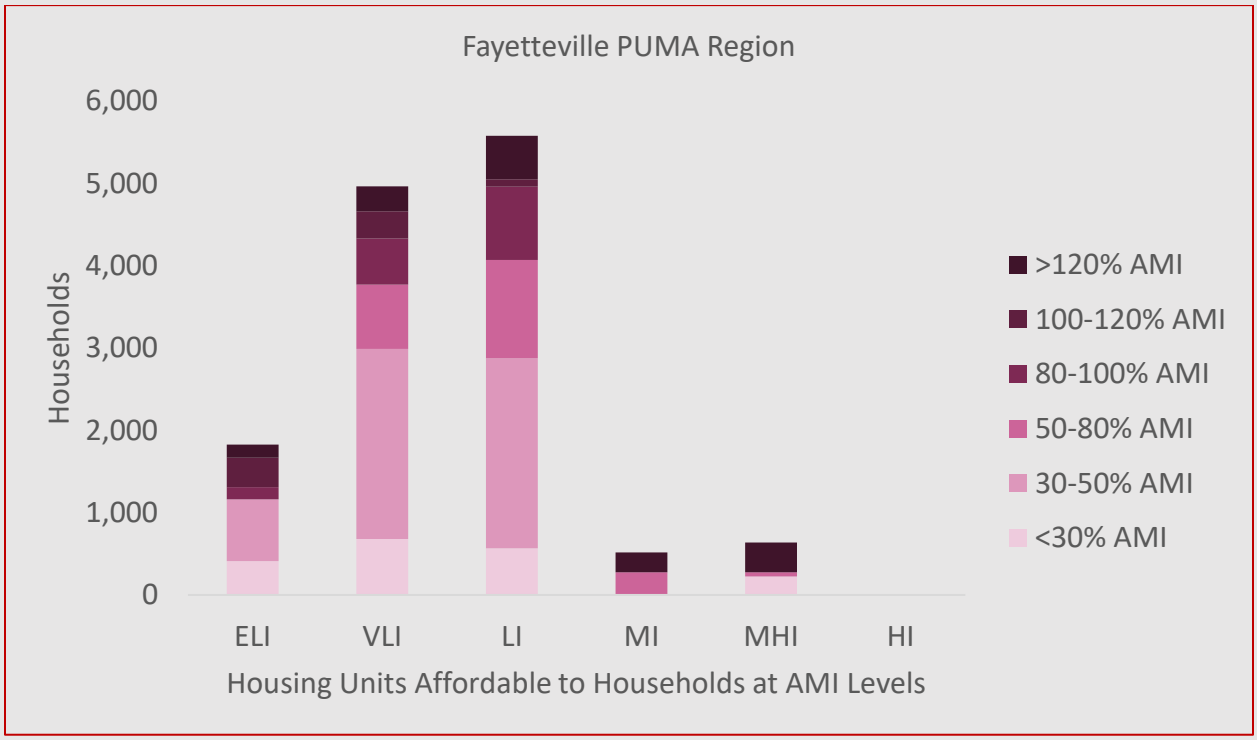
Figures C2E-C2F: Availability of Rental Homes and Renter Households by Income and Affordability, 2024, Combined PUMA Regions



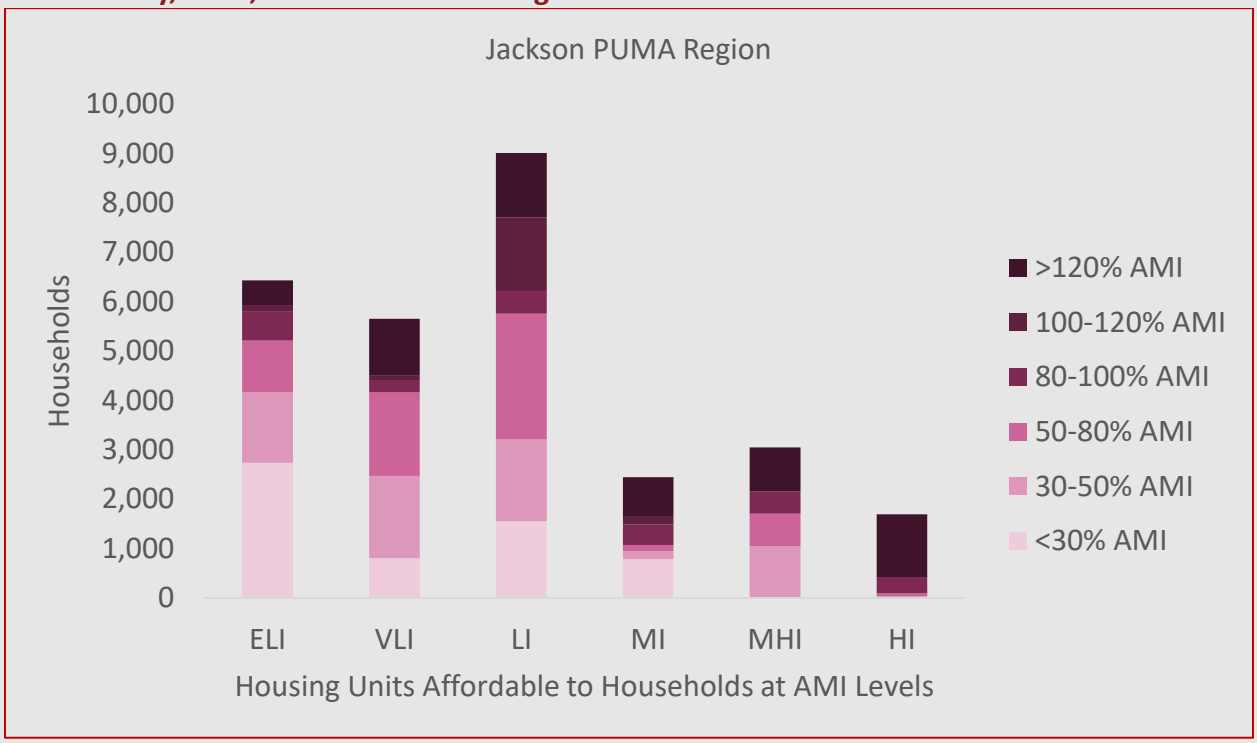


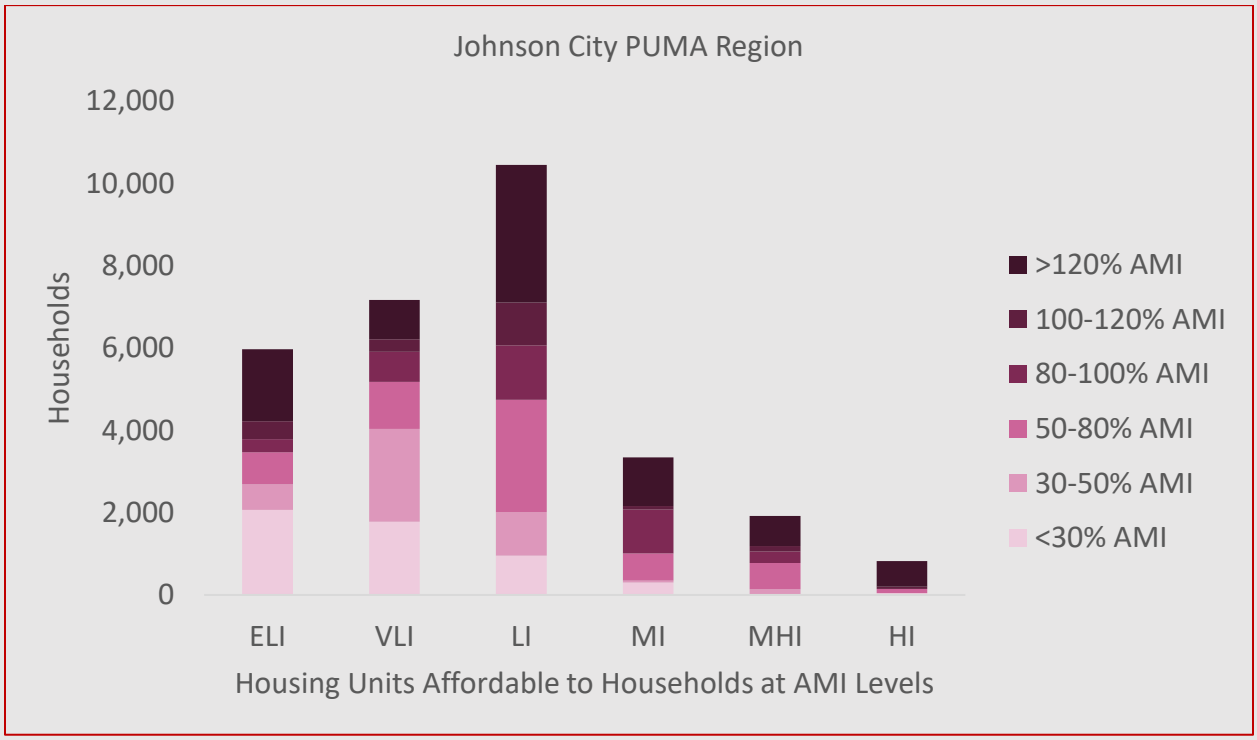
Figures C2G-C2H: Availability of Rental Homes and Renter Households by Income and Affordability, 2024, Combined PUMA Regions



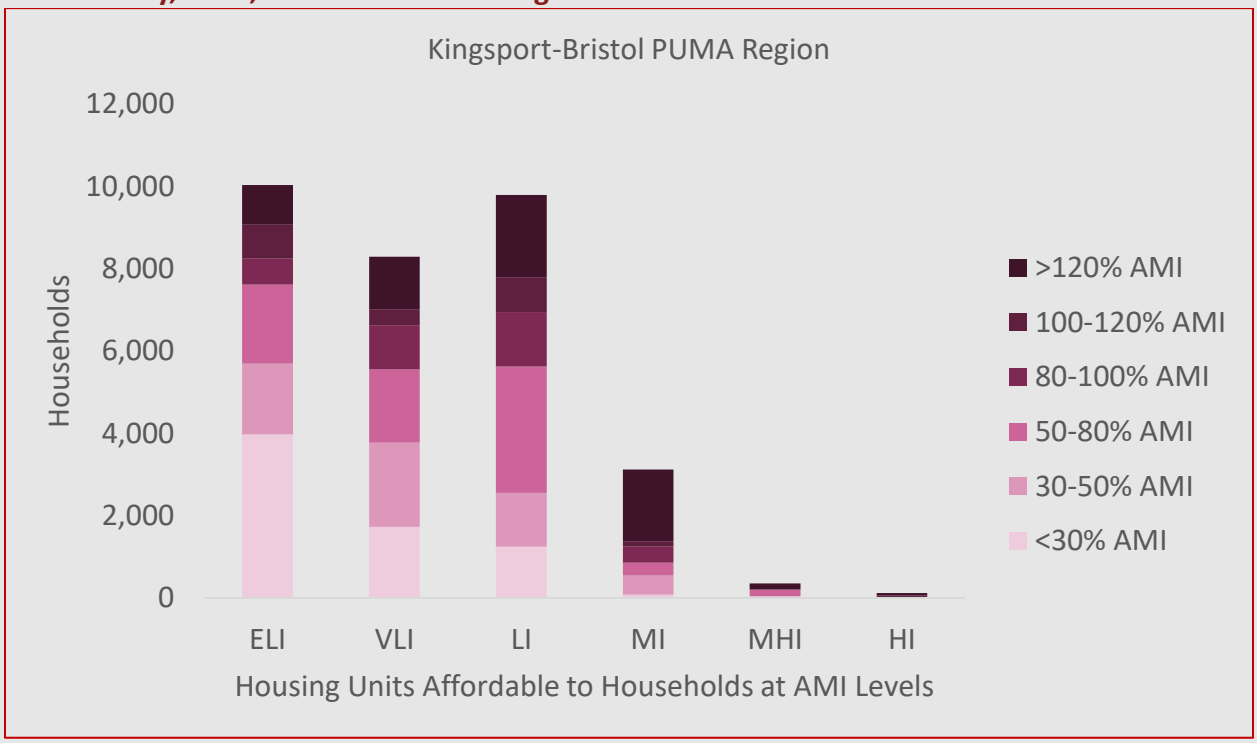


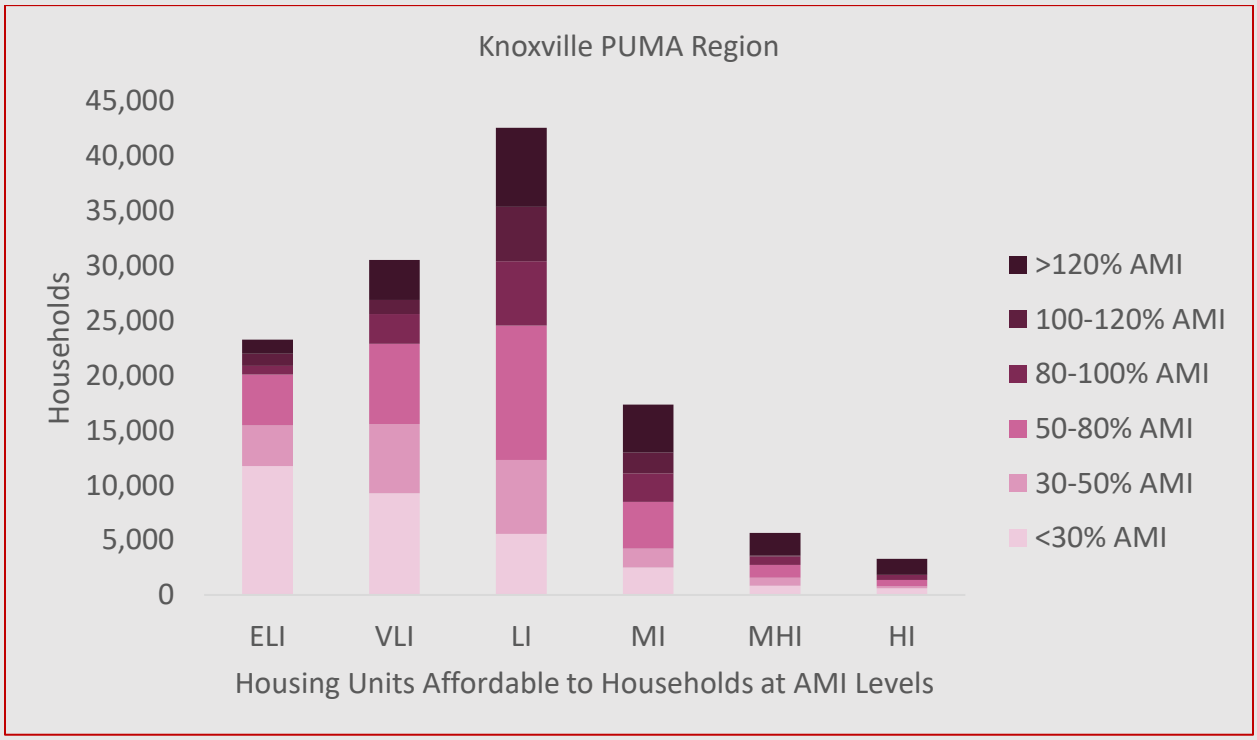
Figures C2I-C2J: Availability of Rental Homes and Renter Households by Income and Affordability, 2024, Combined PUMA Regions



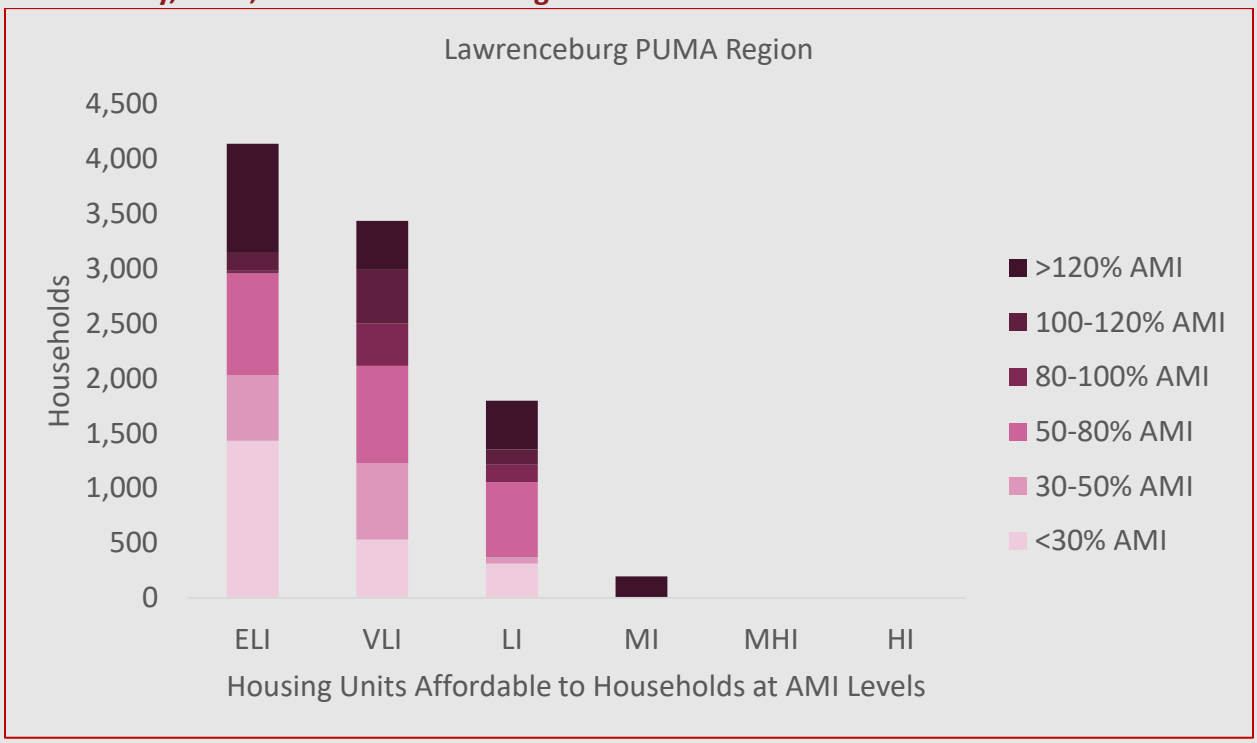


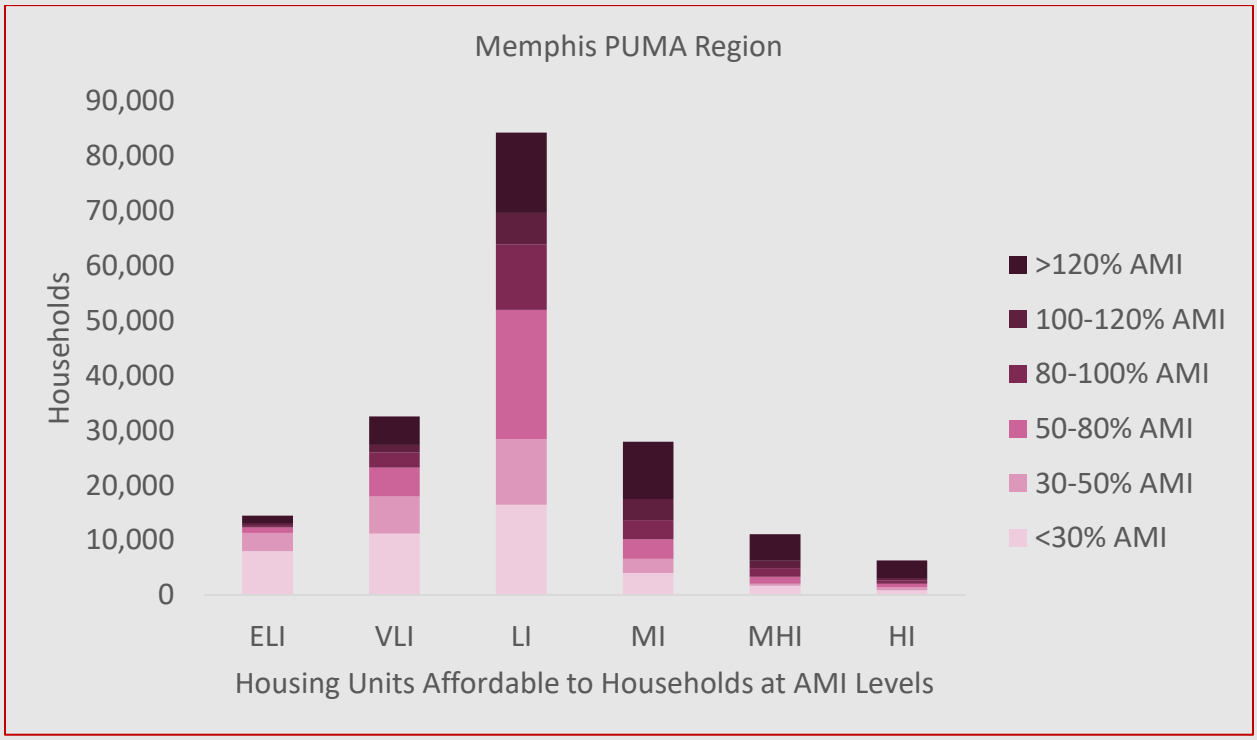
Figures C2K-C2L: Availability of Rental Homes and Renter Households by Income and Affordability, 2024, Combined PUMA Regions



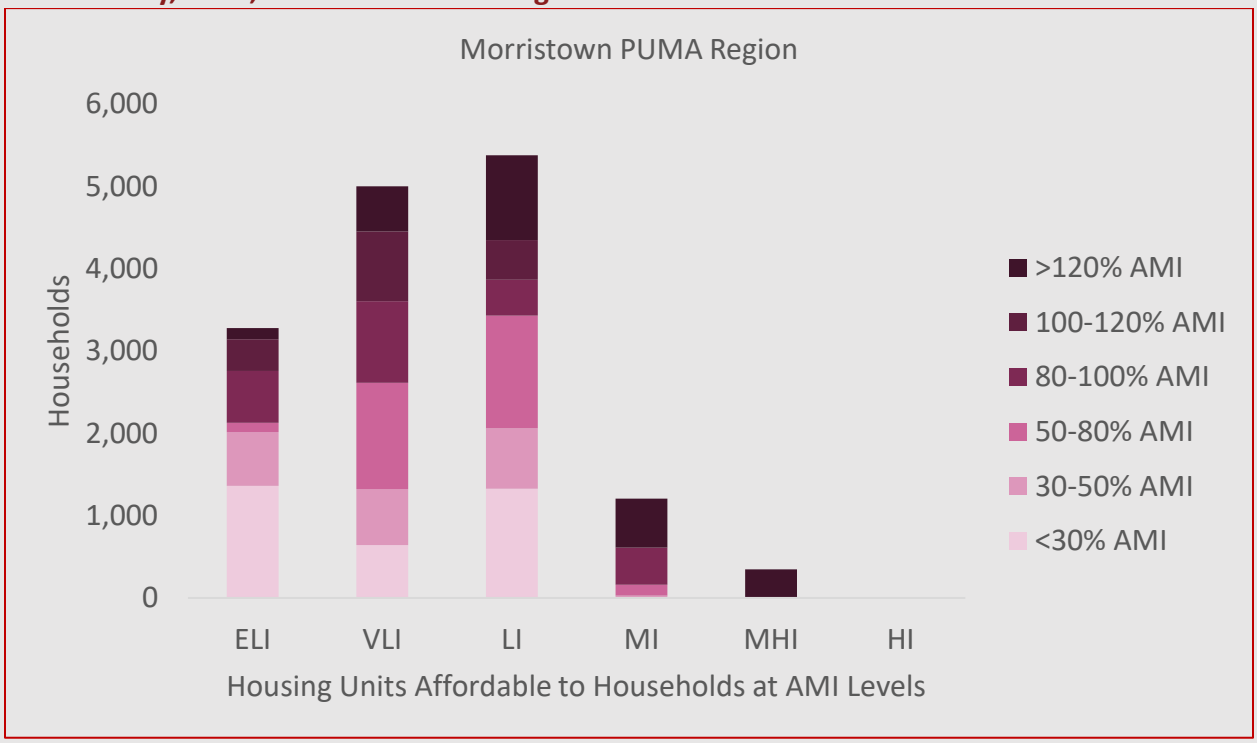


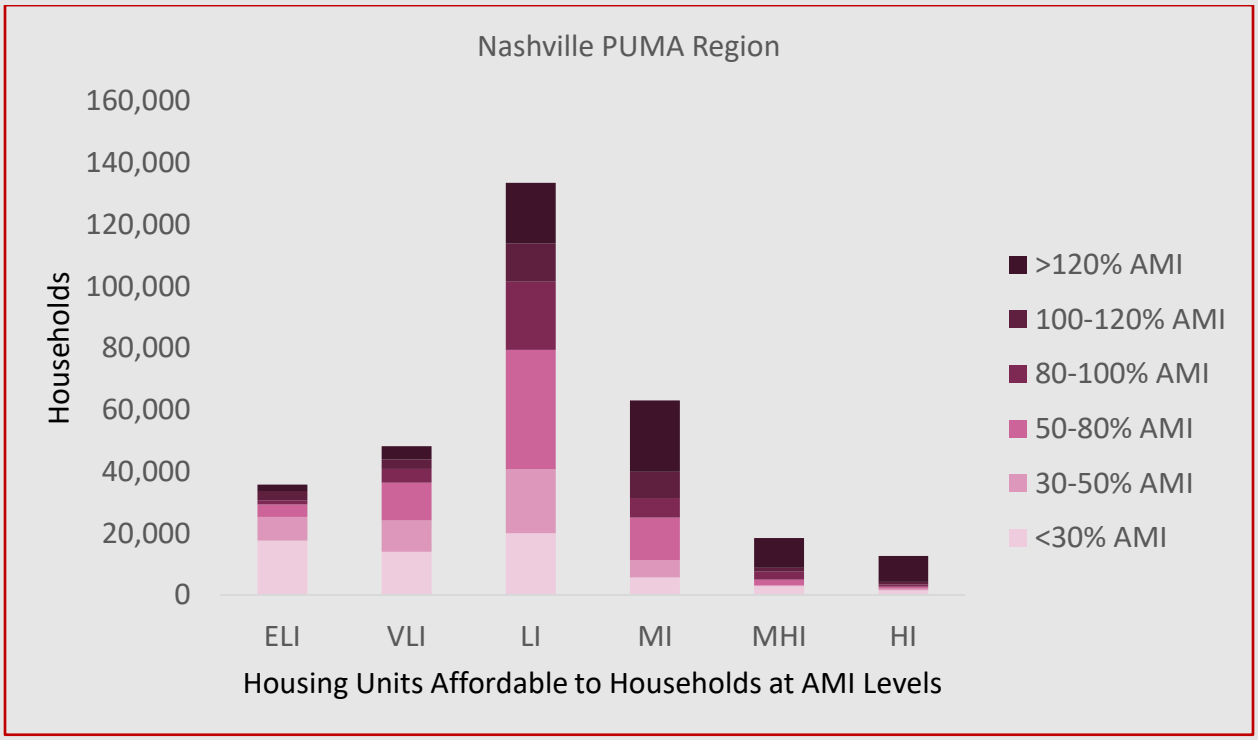
Figures C2M-C2N: Availability of Rental Homes and Renter Households by Income and Affordability, 2024, Combined PUMA Regions



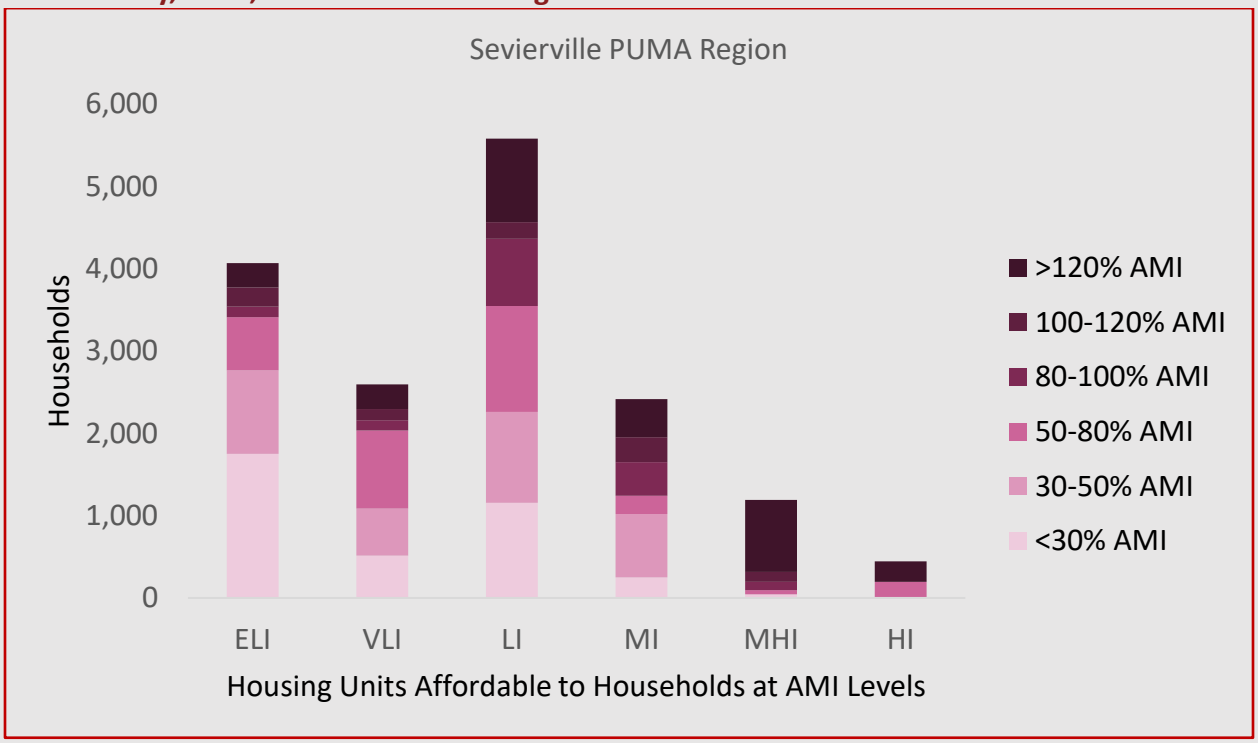


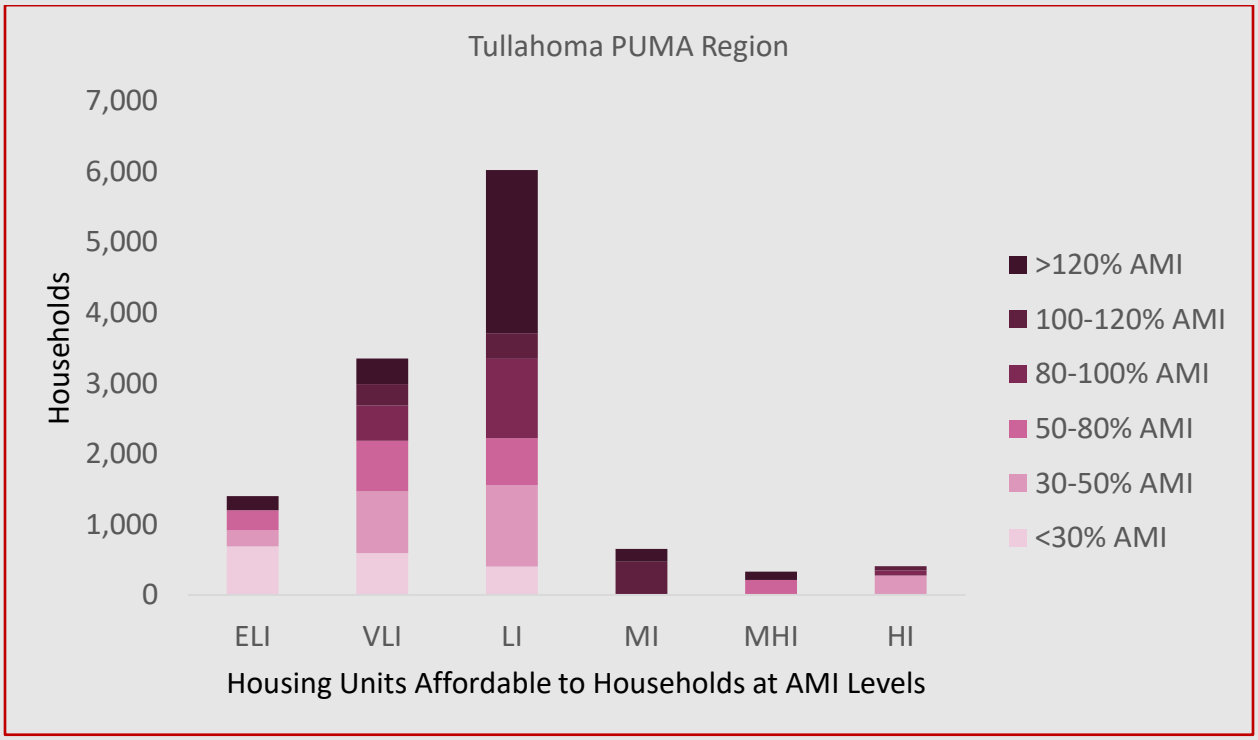
Figures C2O-C2P: Availability of Rental Homes and Renter Households by Income and Affordability, 2024, Combined PUMA Regions



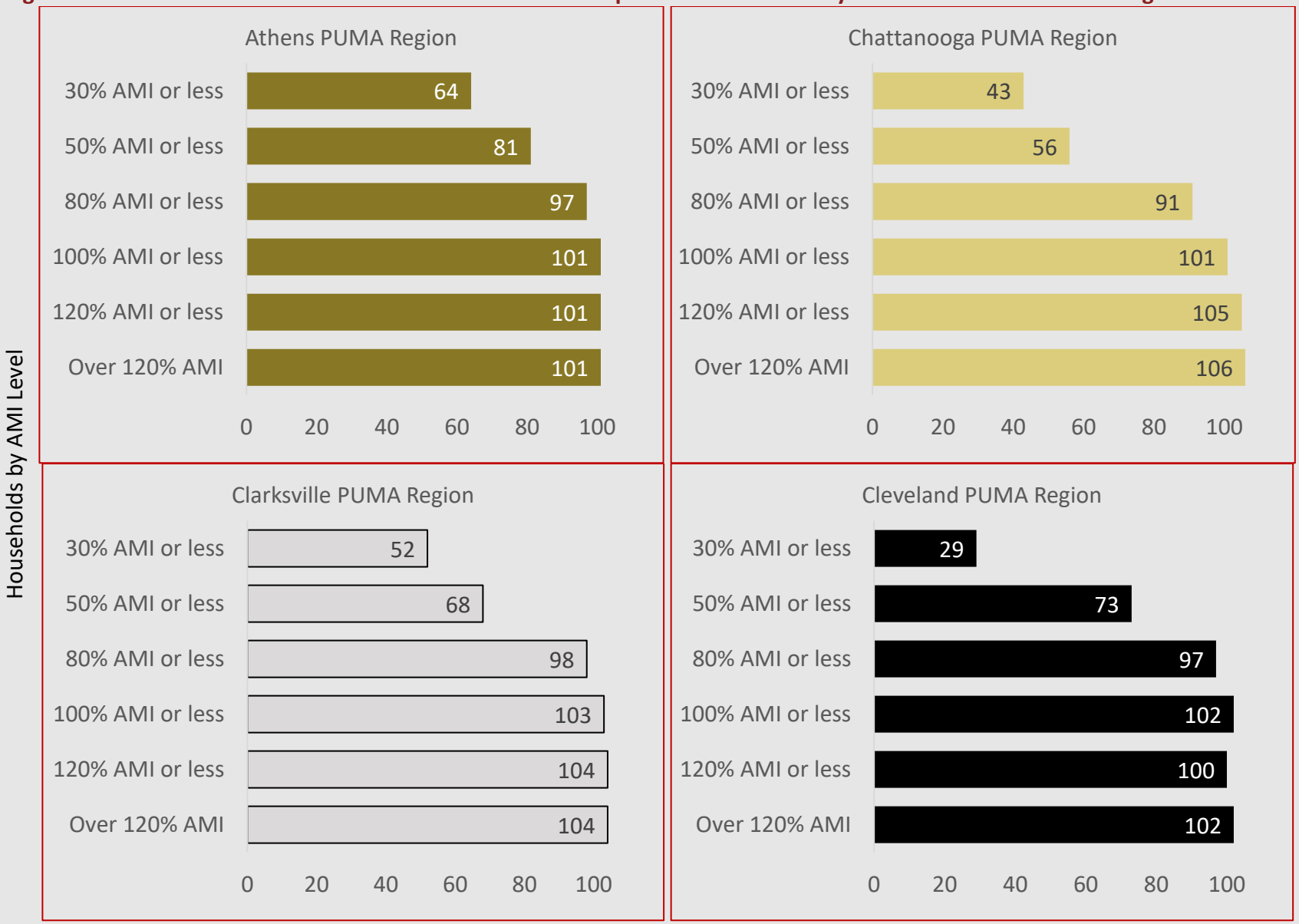


Figures C2Q-C2R: Availability of Rental Homes and Renter Households by Income and Affordability, 2024, Combined PUMA Regions

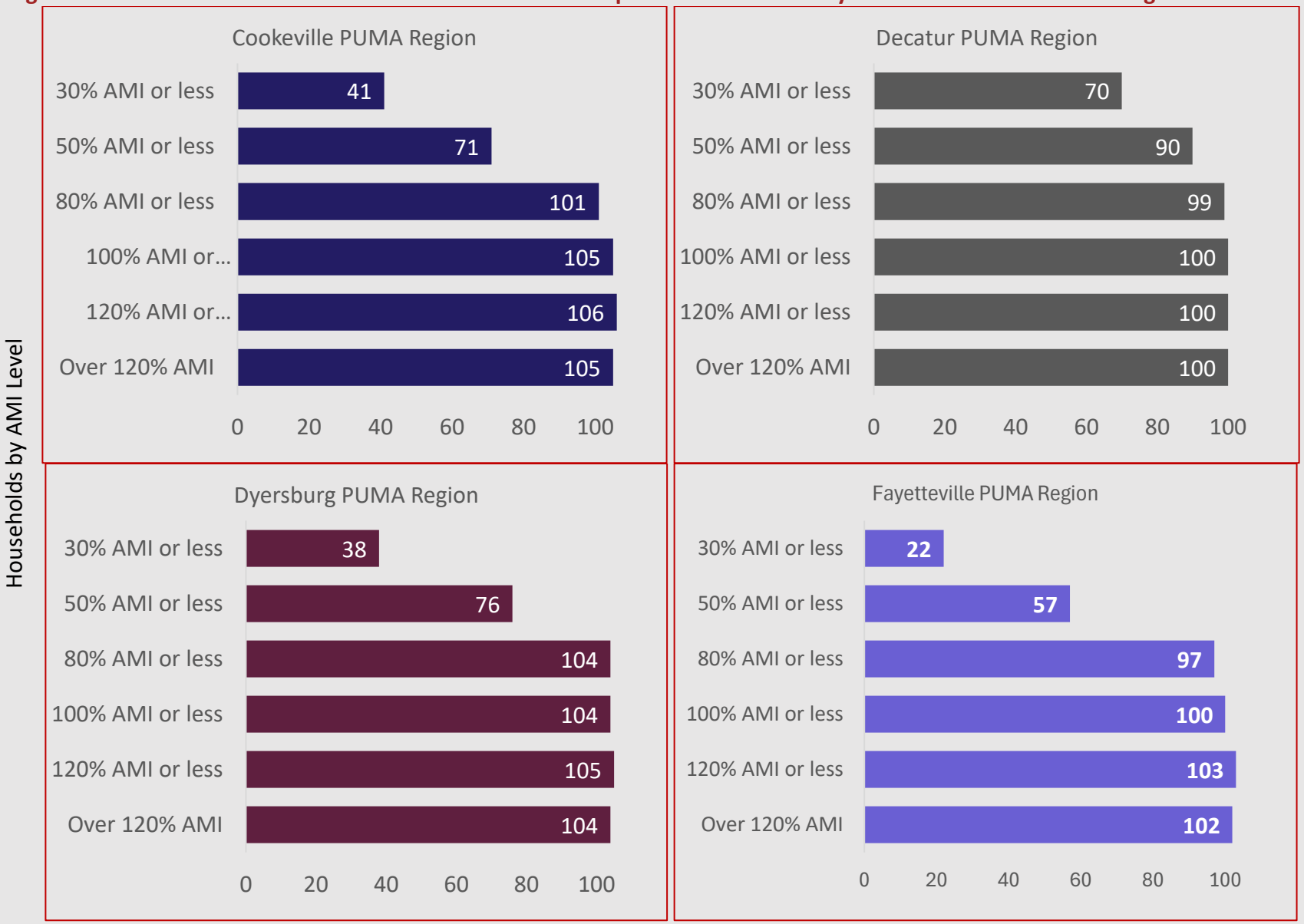




Figures C3A-C3D: Number of Affordable and Available Units per 100 Households by AMI for Combined PUMA Regions

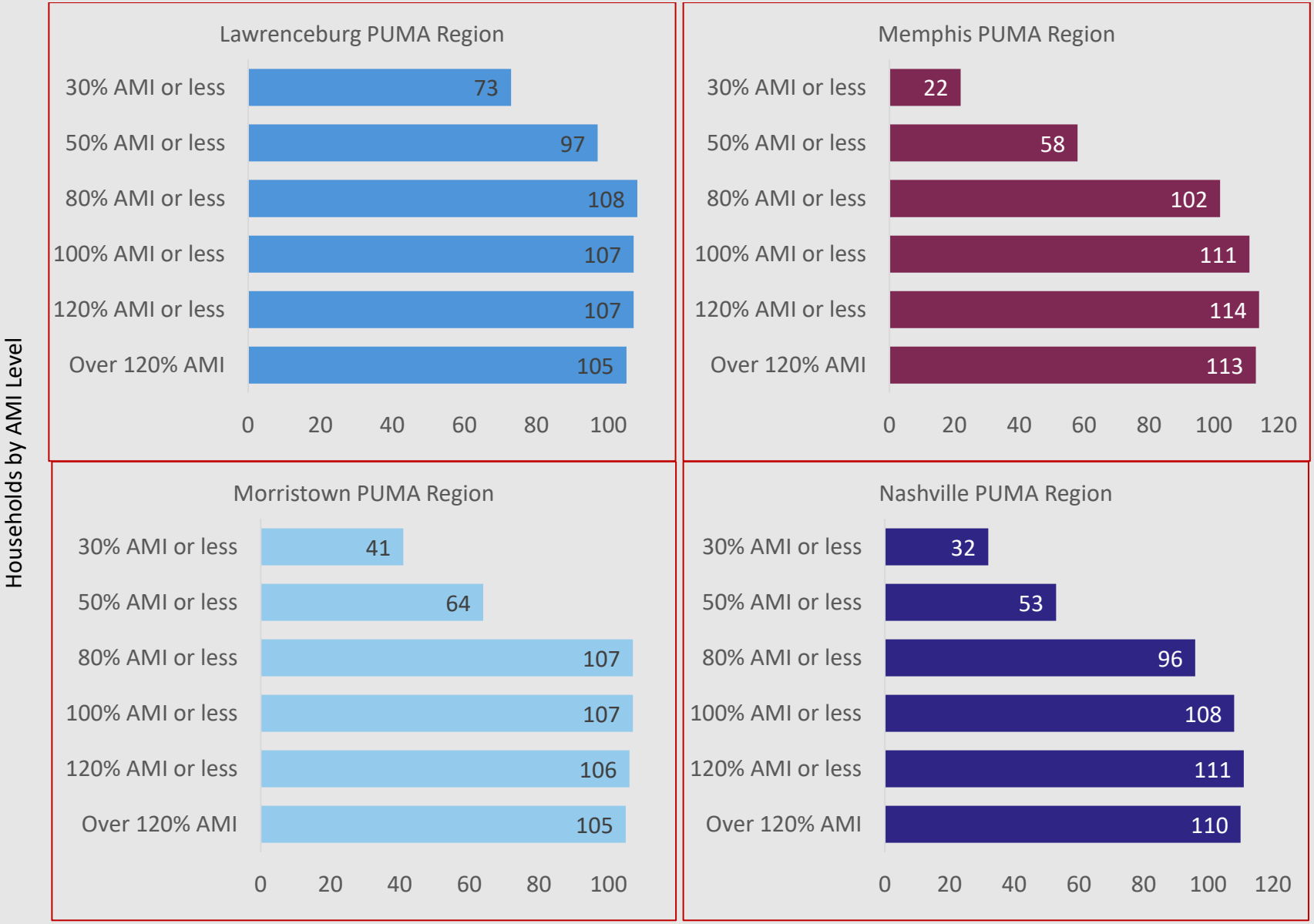


Figures C3E-C3H: Number of Affordable and Available Units per 100 Households by AMI for Combined PUMA Regions

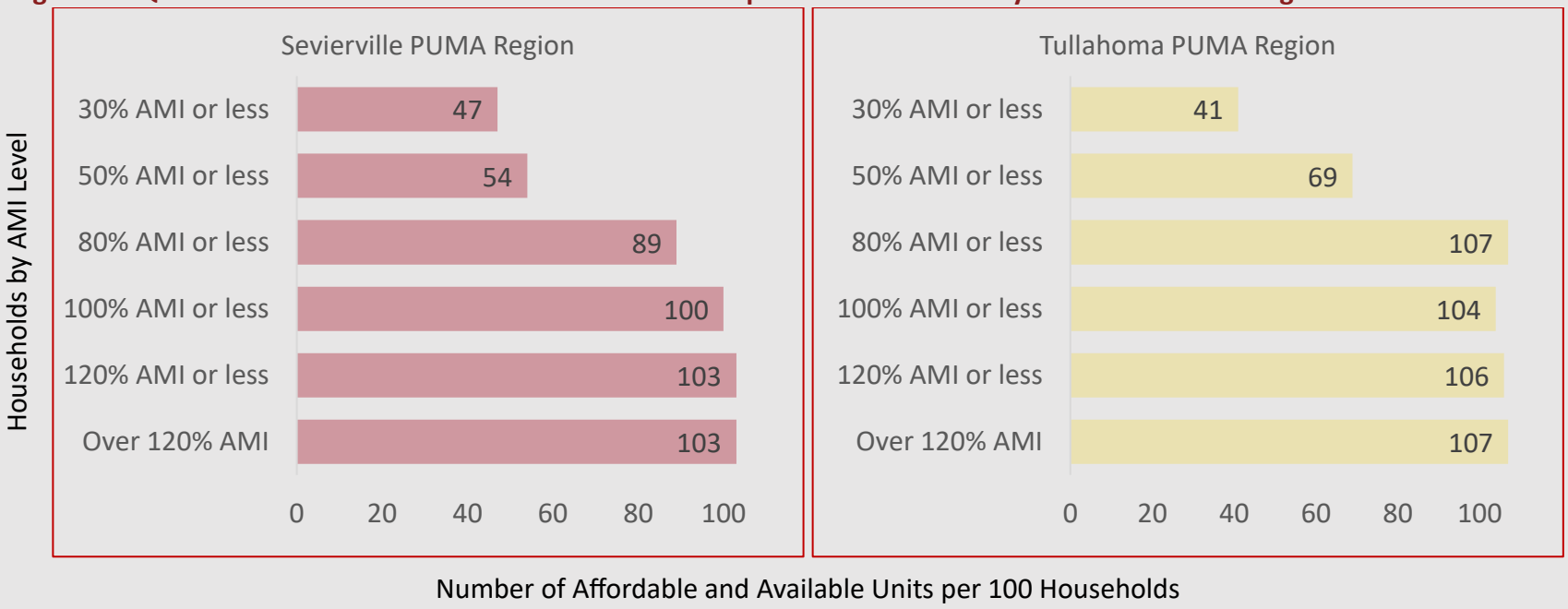


Figures C3I-C3L: Number of Affordable and Available Units per 100 Households by AMI

Figures C3M-C3P: Number of Affordable and Available Units per 100 Households by Combined PUMA Region



Figures C3Q-C3R: Number of Affordable and Available Units per 100 Households by Combined PUMA Region



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[i] To project the future number of households, we used population projections from Tennessee State Data Center, which include expected net migration as determined by recent trends. We

did not make any adjustment to the population projections based on the recent changes in immigration policy, resulting in a sharp slowdown in net migration to the United States. In forthcoming analysis, we anticipate adjusting measures to account for the slow-down in foreign net migration to the United States and Tennessee.

[ii] THDA includes substandard and occupied housing units in the "available" stock to provide an estimate that considers both preservation as well as new construction needs. In Atlanta Federal Reserve Bank's SERAT, housing units without complete kitchen or indoor plumbing or without a heating source are excluded when determining the affordable and available housing units, yielding a more expansive estimate than THDA's.

[iii] THDA's analysis uses IPUMS estimates from the most recent American Community Survey (ACS) (Ruggles, et al.) to estimate affordability and availability across income levels, following the methodology used in Atlanta Federal Reserve Bank's Southeastern Rental Affordability Tracker (SERAT). Combined PUMA regions are constructed to approximate Tennessee's major metro and micropolitan areas.

[iv] Extremely low income (ELI) includes households whose income is less than or equal to 30% of AMI; Very low income (VLI) includes households whose income is between 30.1 and 50% AMI; Low income (LI) includes households whose income is between 50.01 to 80% AMI; Middle income includes households whose income is between 80.01 to 100% AMI; Upper income includes households whose income is both between 100 to 120% percent AMI and over 120%.

[v] In a multiple regression model, we forecast the variable of interest using a linear combination of predictors. In an autoregression model, we forecast the variable of interest using a linear combination of past values of the variable. The term autoregression indicates that it is a regression of the variable against itself. It is like a multiple regression but with lagged values of the interest variable (headship rate in our case) as predictors. We refer to this as an AR(p) model, an autoregressive model of order p. A moving average model uses past forecast errors in a regression-like model rather than using past values of the forecast variable in a regression. If we combine differencing with autoregression and a moving average model, we obtain

AutoRegressive Integrated ("integration" is the reverse of differencing) Moving Average (ARIMA) model.

[vi] In determining the income categories, we placed the households with zero or negative income in the ELI category, increasing the apparent demand for ELI units (those also include the vacant units).

[vii] Atlanta Fed's SERAT defines 80-120% AMI as moderate and more than 120% AMI as upper income. National Low Income Housing Coalition's (NLIHC) GAP report has middle income (80-100% AMI) and above median (more than 100% AMI). Our income categories are different than both.

[viii] To calculate the cost burden, we are using the IPUMS-coded variables (Selected monthly owner costs as a percentage of household income during the past 12 months (OCPIP) and Gross rent as a percentage of household income past 12 months (GRPIP)). OCPIP and GRPIP variables are coded as NA if the unit is vacant, rent is zero or household income is zero or negative. For those cases, the household is considered as "not cost burdened." This was in line with Atlanta Fed's methodology.

[ix] IPUMS data have a "gross rent" variable (GRNTP), but it is not calculated for vacant units, even if the units have a recorded asking rent. Similarly, no gross rent is recorded in IPUMS if a household pays utility costs but "no cash rent." To utilize all the available information in the IPUMS, we calculated a new "gross rent" variable by combining rental and utility cost data for occupied and vacant units, which is different than gross rent data provided by the Census Bureau for those cases.

[x] Following HUD guidance, the income thresholds at which units are deemed affordable are adjusted for the number of bedrooms.

[xi] In the Atlanta Fed's SERAT, substandard housing units, which are lacking complete kitchen or plumbing or do not have heating fuel are excluded from the count of "affordable and available" units because even if they are "affordable," they may not provide "ideal" living condition and therefore they are excluded. We decided to keep them in the affordable and available count but identify how many of those affordable units at each income category were substandard.