The Hidden Costs of Decline:
Health Disparities in America's Diminishing Micropolitan Areas

by

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Abstract

This study examines the relationship between long-term population change and health outcomes in U.S. micropolitan areas, with a focus on life expectancy and mortality disparities. Using a county typology based on the historical population trajectories of micropolitan cores from 1940 to 2020, this analysis reveals that health outcomes are substantially worse in places that experienced sustained decline. These disparities persist even after controlling for demographic and socioeconomic characteristics, suggesting that population loss itself is a key driver of poor public health. Declining micropolitan areas are older, less educated, and report high rates of behavioral risk factors, including smoking, excessive drinking, and physical inactivity. By linking historical demographic trends to tract-level data, this analysis highlights the distinct challenges facing the urban cores of shrinking micropolitan areas. Population decline emerges not only as a demographic trend, but as a marker of structural disadvantage with measurable consequences for community health.

Keyword: Micropolitan, life expectancy, health disparities, population decline, public health geography

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[*] Any opinions and conclusions expressed herein are those of the authors and do not represent the views of the U.S. Census Bureau. This paper does not use any confidential Census Bureau data.

Introduction

The history of the United States has been marked by sustained population growth and expanding urbanization, with urban areas in all regions swelling to populations of a million or more. Even where cities have experienced decline, the broader metropolitan areas have often continued their expansion, with suburban gains eclipsing any losses in core areas. Within this prevailing story of expansion, however, another less examined trajectory has unfolded involving smaller cities and towns that have experienced sustained, often significant, population contraction. Small cities in many parts of the country have not shared in the extensive national growth, and this study aims to shed light on the profound effects of such sustained population decline. This paper argues that the long-term demographic decline of micropolitan areas has had profound and measurable consequences for population health.

This study grew out of an effort to apply the current Core Based Statistical Area (CBSA) standards to historical data (Gardner, 2025). While the concept of "micropolitan areas" (urban cores of 10,000 to 49,999 inhabitants and their associated counties) was not introduced until the 2000 census, sufficient data exists to identify these areas back to 1940. Micropolitan areas once played a substantial role in the nation's urban network, but their influence has steadily declined. It is somewhat ironic that these areas gained official recognition only after their collective prominence was decidedly on the wane. In 1940 micropolitan areas accounted for 18.3 percent of the U.S. population. Although the number of micropolitan areas peaked in 1960 and their total population peaked in 1980, they have since experienced a steady decline in their numbers and in their share of the national population, as shown in Table 1.

Table 1. Micropolitan Areas in the United States, 1940-2020

Year	Micropolitan Areas	Micropolitan Population	Percent of US Population
1940	472	24,073,575	18.3
1950	520	26,411,363	17.5
1960	539	28,235,245	15.8
1970	495	27,690,008	13.7
1980	475	28,604,795	12.7
1990	456	28,272,524	11.4
2000	430	28,198,941	10.1
2010	419	27,435,094	8.9
2020	388	24,859,533	7.6

Source: Author's analysis of HHUUD10 and LTDB data

From the mid-twentieth century through 2020, micropolitan areas underwent an array of population change trajectories. Some experienced robust growth, eventually surpassing the 50,000 population threshold to be reclassified as metropolitan areas. Others, situated near larger urban centers, became enveloped by extensive suburbanization, effectively absorbed as outlying metropolitan counties. A substantial number of micropolitan areas did not partake in the widespread population growth seen elsewhere, however, and have remained in the micropolitan category. Many of these places have entered periods of prolonged decline. This study examines the relationship between these varied population trajectories and subsequent health outcomes. The findings reveal a compelling link: areas that experienced population decline, particularly those with severe and sustained losses, show notably poorer health outcomes compared to their counterparts that experienced population growth. This paper aims not only to demonstrate the severity of these overlooked disparities but also serves as a call to further investigate the underlying mechanisms driving such pronounced disparities.

Literature Review

The growing body of literature on health outcomes in the United States highlights significant disparities based on geographic location, particularly for populations residing outside of major urban centers. A prominent theme within this scholarship is the "rural mortality penalty," which asserts that residents of rural areas experience systematically higher mortality rates and poorer health outcomes compared to their urban counterparts. While this urban advantage is now well established, it is a relatively recent development. Early in the 20th century, urban areas were often associated with higher mortality due to crowding, infectious disease, and poor sanitation. As public health infrastructure improved and access to medical care expanded, the advantage shifted decisively in favor of urban areas.

Eberhardt and Pamuk (2004) compare urban, suburban and rural health measures and found that suburban populations had the greatest advantage. Cosby et al. (2019) note an “emerging non-metropolitan mortality penalty” after comparing age-adjusted mortality rates in metropolitan and non-metropolitan counties from 1968 to 2005. Other studies, such as Singh and Siahpush (2014), document a widening gap in life expectancy between rural and urban populations over several decades, underscoring a persistent disadvantage particularly for the most rural places. Varghese et al. (2024) link rural disadvantage to chronic health conditions like diabetes and obesity. Rees-Punia et al. (2022) emphasize the role of modifiable risk factors in explaining the gap between urban and rural mortality rates.

Much of the work in this field relies on data collected at the county level and employs county-level typologies for their analyses. While some counties are entirely rural or completely urbanized, most counties are a mixture of urban and rural territory. The Economic Research Service of the U.S. Department of Agriculture has produced a variety of county classification schemes and most of the studies in this area rely on ERS classifications for their analyses. The most widely used ERS classification is the Rural Urban Continuum Codes (RUCC), which is based on population size and adjacency to metropolitan areas (USDA ERS, Rural-Urban Continuum Codes). The Rural-Urban Commuting Area (RUCA) Codes are also based on the metropolitan or micropolitan status of counties, but take commuting flows into account (USDA ERS, Rural-Urban Commuting Area Codes). The Urban Influence Codes (UIC) emphasize the size of neighboring urban counties, with larger proximate urban areas exerting a greater influence over non-metropolitan counties (USDA ERS, Urban Influence Codes). The National Center for Health Statistics (NCHS) has developed its own county classification that is better suited to health research, the *NCHS Urban-Rural Classification Scheme for Counties* (NCHS, 2024). The NCHS system emphasizes differences within metropolitan counties, but it also includes a micropolitan category. Interestingly, the Economic Research Service produced their own report, *The Nature of the Rural-Urban Mortality Gap*, but their analysis compares metropolitan and non-metropolitan counties (Thomas et al., 2024). James et al. (2022) use the three major county urban-rural classifications in their mortality study and conclude that the rural disadvantage is evident regardless of which classification system is used.

Eberhardt and Pamuk (2004) use a modified version of the UIC codes to place counties in a five-level classification from “most urban” to “most rural,” while Varghese et al. (2024) expand this to six levels. Rees-Punia et al. (2022) use RUCA classifications in their study. Like Singh and Siahpush (2014), Jones et al. (2023) use the RUCC classifications to highlight the rural disadvantage in COVID-19 morbidity and mortality. Cosby et al. (2019) employ the CDC WONDER data (1970–2016) with RUCC classifications to examine the disparity between mortality rates in rural and urban areas. They argue that although rural mortality rates are declining, urban mortality rates are declining more rapidly, resulting in increasing disparity. Monnat (2022) argues that the disparity between urban and rural mortality is “wide and growing” across a variety of causes of death, particularly for the working-age population. Monnat (2022) collapses the RUCC classifications into metro and rural categories and uses the terms “rural” and “nonmetro” interchangeably.

Few studies in this area focus on micropolitan areas. A time-series study using RUCC classifications by James (2014) finds the rural mortality penalty exists in all non-metropolitan classifications, but that it is not distributed evenly. James (2014) identifies key contributing factors like healthcare access, socioeconomic conditions, cultural aspects, and evolving rural demographics and finds the greatest disadvantage in counties with an urban population of 5,000 to 20,000, adjacent to a metro area (RUCC code 6), while the counties with an urban population of fewer than 5,000, not adjacent to a metro area (RUCC code 9) had relatively better outcomes. Rees-Punia et al. (2022) start from RUCA classifications and separate the micropolitan population from areas outside of CBSAs, but still frame their discussion primarily as urban versus rural.

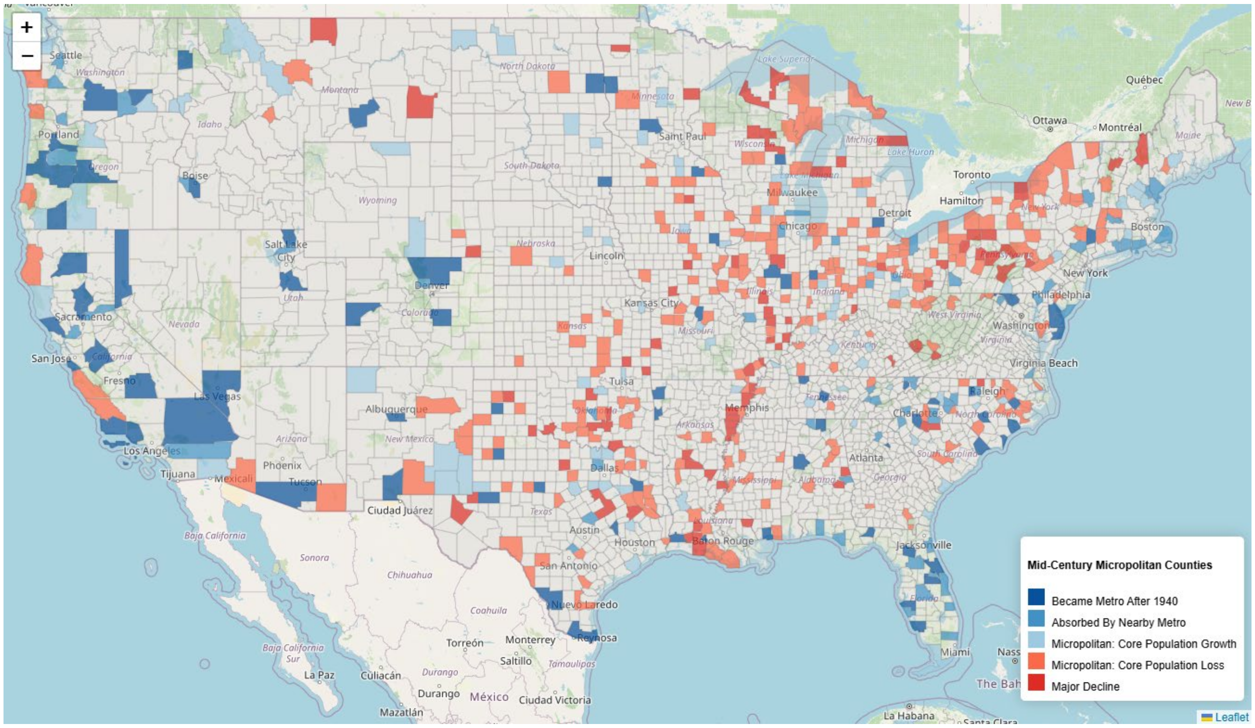
One study that explicitly incorporates population change into its framework is Lichter and Johnson's (2025) "Depopulation, Deaths, Diversity, and Deprivation: The 4Ds of Rural Population Change." They find that while some nonmetropolitan counties are growing and urbanizing, those that are not have experienced demographic challenges regarding "the 4Ds." Nonmetropolitan counties with stagnant or declining populations experience elevated mortality, poverty and widening economic disparities. Their work underscores the need to account for long-term demographic trajectories when examining geographic disparities in health.

Methods

This study seeks to complement the existing literature by broadening the focus from rural or non-metropolitan disadvantage in general to also incorporate the specific challenges faced by declining urban places outside major metropolitan cores. This study treats population decline as a determinative factor in understanding health disparities in rural and small-town America, and focuses on micropolitan areas and their urban cores, places that historically served as regional economic and social hubs but have experienced sustained population loss over the past several decades. To implement this approach, I classified counties and census tracts according to historical patterns of urban growth and contraction, using census tracts as defined in 2010 and drawing on data from the Historical Housing Unit and Urbanization Database, 2010 (HHUUD10) (Markley, et al., 2025) and the Longitudinal Tract Data Base (LTDB) (Logan, 2025). I identified contiguous clusters of urban census tracts that form CBSA cores and used commuting data from historical decennial censuses and the American Community Survey to establish commuting ties to these cores from surrounding counties. Where commuting data were unavailable prior to 1960, I estimated those values by extrapolating from the time series of available data.

The areas under investigation in this study are those that met the micropolitan classification criteria in either 1940, 1950, or 1960. This time window is particularly noteworthy as it captures a period of overall micropolitan population growth and predates the transformative impact of the Interstate Highway System. A total of 641 distinct areas were identified as micropolitan during this crucial mid-century period. The subsequent analytical step involved tracking the long-term population trajectory of the urban cores associated with this set of micropolitan areas. Figure 1 shows the five categories used in this study, which are based on population change in the urban areas that form the cores of mid-century micropolitan areas.

Figure 1. Population Trajectories of Mid-Century Micropolitan Areas



Source: author's analysis of HHUUD10 and LTDB data

Micropolitan cores that grew to be reclassified at metropolitan – Some cores experienced substantial population growth following World War II. In many cases these areas gained sufficient population to be reclassified as metropolitan. The largest of these by 2020 was Orlando, which had a population of just over 40,000 inhabitants in 1940, but by 2020 the population of the Orlando-Lakeland, FL urban area exceeded 3,000,000. The Riverside, CA urban area started from roughly the same population in 1940 but grew to more than 2,000,000 by 2020. Las Vegas had a population of less than 10,000 in 1940 but after decades of growth the population is now well over 2,000,000. Of course, these are the most dramatic cases of micropolitan-to-metropolitan growth but given the population growth in the United States as a whole over these decades, it's clear that such growth potential was possible for areas across the country.

Micropolitan cores that were absorbed by larger nearby cores – Several micropolitan cores have been absorbed by nearby cores and are now part of the suburban territory of larger areas. Examples of this include the Gastonia, Salisbury, Kannapolis-Concord, and Rock Hill areas in North Carolina, all of which were absorbed by the Charlotte, NC metropolitan area.

Micropolitan cores that experienced moderate population gain – In many cases micropolitan cores made incremental population gains but not enough to be reclassified as metropolitan. In some cases, the population gains were significant in percentage terms, albeit with a modest initial population. What distinguishes these micropolitan areas from the categories that follow is that these areas were still growing in 2020.

Micropolitan cores that experienced moderate population loss – Many micropolitan cores grew in the decades following World War II but have experienced population losses in recent years. The urban areas in this category peaked prior to 2020 and experienced moderate population loss in the years that followed.

Micropolitan cores in major decline – Much like the previous category, the urban areas that constituted the cores of these micropolitan areas have experienced decades of population losses. What sets this category apart from the previous category is that by 2020, the urban areas in this category had declined to less than 50 percent of their peak population. Also included in this category are micropolitan cores where the population dropped below 10,000, meaning that they are no longer classified as micropolitan.

Table 2. Mid-Century Micropolitan Areas and Counties by Core Population Trajectory

Category	Mid-Century Micropolitan Areas	Counties
Reclassified as Metro	170	189
Absorbed by Larger Metro	66	72
Moderate Growth	86	90
Moderate Population Loss	232	238
Major Decline	87	89
Total Mid-Century Micropolitan	641	678

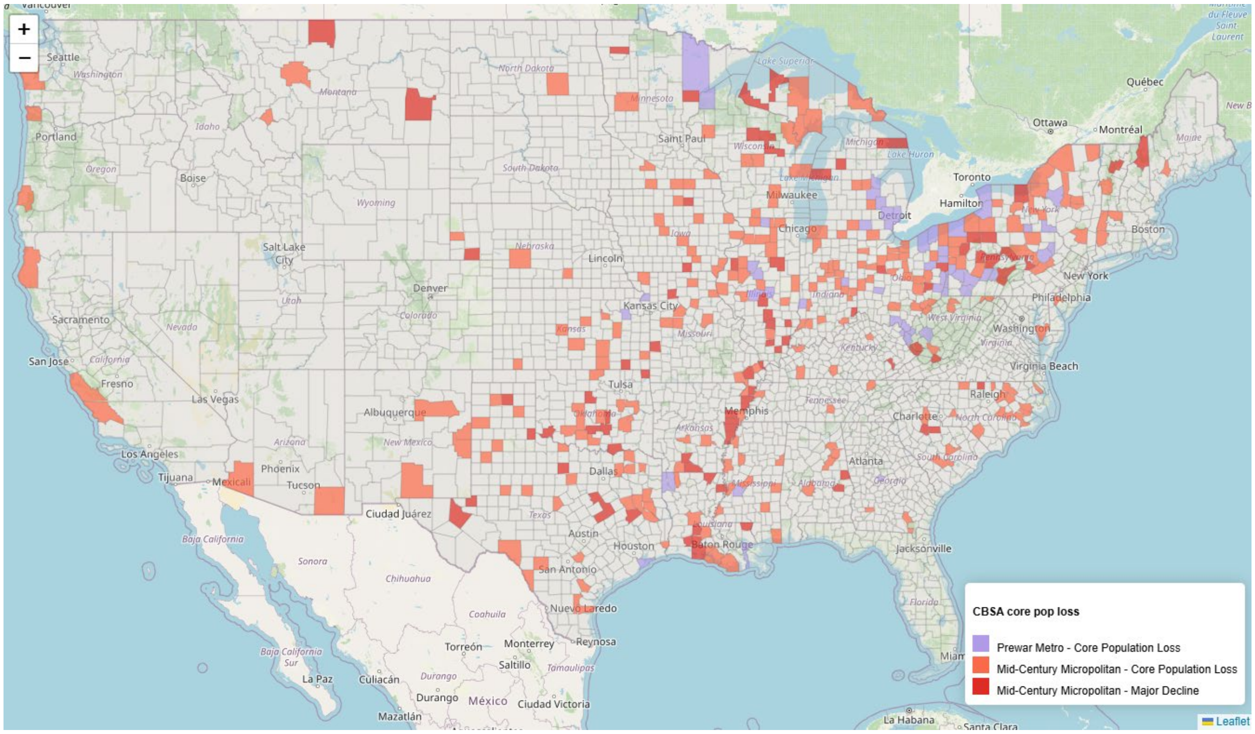
Source: author's analysis of HHUUD10 and LTDB data

Once the population cores have been identified and categorized, the next step is to list the counties associated with these cores. The building blocks of micropolitan areas are counties and this study examines health outcomes at the county level. In this study counties associated with cores that had similar population trajectories are combined into the categories listed in Table 2. It's interesting to note that while 170 micropolitan areas grew to be reclassified as metropolitan, a larger number of micropolitan areas experienced population losses.

Figure 2 shows the counties associated with metropolitan and micropolitan cores that have lost population. While the metropolitan areas with core population losses can be explained largely by deindustrialization, that does not tell the story of many of the declining micropolitan areas. Johnson and Lichter (2019) emphasize that rural depopulation is a long-term process shaped by selective out-migration, demographic aging, and natural decrease. Lobao and Stofferahn (2008) show how the industrialization and consolidation of agriculture led to population losses and eroded civic life in many small communities.

Together, these processes contributed to the disparities in health outcomes explored in this paper.

Figure 2. CBSAs with Core Population Losses to 2020



Source: author's analysis of HHUUD10 and LTDB data

Data

A wealth of county-level data pertaining to the health and well-being of the population has become available in recent years. One of the most useful sources of health data is the County Health Rankings & Roadmaps (CHR&R) program, which is a collaboration between the Robert Wood Johnson Foundation and the University of Wisconsin Population Health Institute. CHR&R provides annual county-level health measures for nearly all counties in the United States. As CHR&R has become more established it has expanded the number of factors it measures, including health behaviors, social and economic factors, and the physical environment. Another valuable source of county-level data is the Institute for Health Metrics and Evaluation (IHME), which is an independent global health research center at the University of Washington. Through its Global Burden of Disease (GBD) study, IHME tracks trends in mortality, diseases, injuries, and risk factors. Though the GBD is worldwide in scope, IHME collects county-level data to identify and track disparities across a variety of areas. For some variables I use data from both CHR&R and IHME. Additionally, this study makes use of county-level diabetes data made available by the Center for Disease Control and Prevention (CDC).

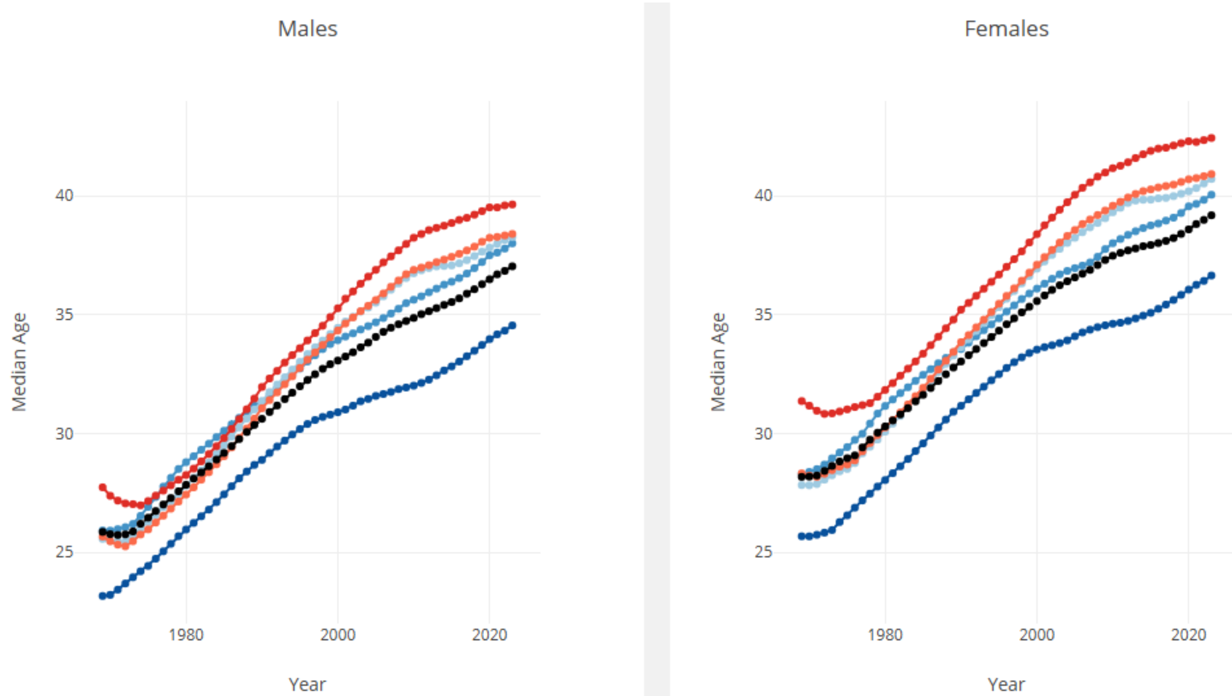
To aggregate some of the measures to the county groupings described above we need single year of age estimates of the population. The decennial census long-form data, historically a rich source of county-level demographic and socioeconomic information, was collected only every ten years. While the American Community Survey (ACS) replaced the long-form census and is conducted annually, detailed county-level data is produced by pooling five single-year ACS files. Due to the inherent overlap in these pooled five-year datasets, truly distinct county-level information is, in effect, available only every five years. To address this limitation, this study makes use of data from the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) Program. SEER has harmonized and processed available data to produce single year of age estimates for all counties from 1969 through the present. Additionally, SEER provides harmonized annual estimates of the racial and ethnic population for each county, categorized into five groups (Non-Hispanic White, Non-Hispanic Black, Native American, Asian, and Hispanic), for all years from 1980.

Results

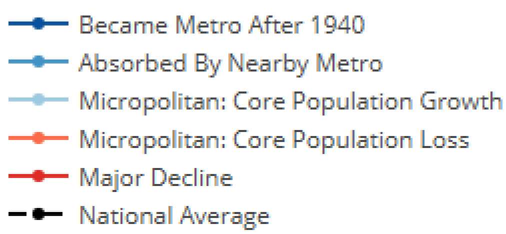
In historical micropolitan areas, urban core population trajectories are strongly associated with differences in health outcomes. Micropolitan counties with core populations experiencing moderate or major decline consistently exhibited less favorable outcomes compared to micropolitan areas that transitioned to metropolitan status or those absorbed by larger cores. These disparities were evident across key health metrics, including life expectancy, cancer mortality, and prevalence rates of chronic conditions such as obesity and diabetes. Concurrently, populations in declining micropolitan areas also showed higher rates of certain lifestyle-related characteristics, such as smoking and lower physical activity, and displayed accelerated population aging.

Micropolitan areas experiencing core population decline are aging faster than the general population. In 2022, the median age in the United States was 36.9 years. In stark contrast, micropolitan areas with moderate population loss had a median age exceeding 40 years, and those in major decline reached 42.3 years. Conversely, micropolitan areas with growing or stable cores exhibited median ages that remained much closer to the national average, as demonstrated in Figure 3. In 2022 declining micropolitan areas had a substantially higher percentage of residents in older age groups. For men, 19.2 percent in declining micropolitan areas were aged 65 or older, compared to the national average of 16.2 percent. A similar trend was observed among women, with 22.5 percent in declining micropolitan areas aged 65 or older, notably higher than the nationwide figure of 19.2 percent.

Figure 3. Median Age by Area Type, 1969-2023

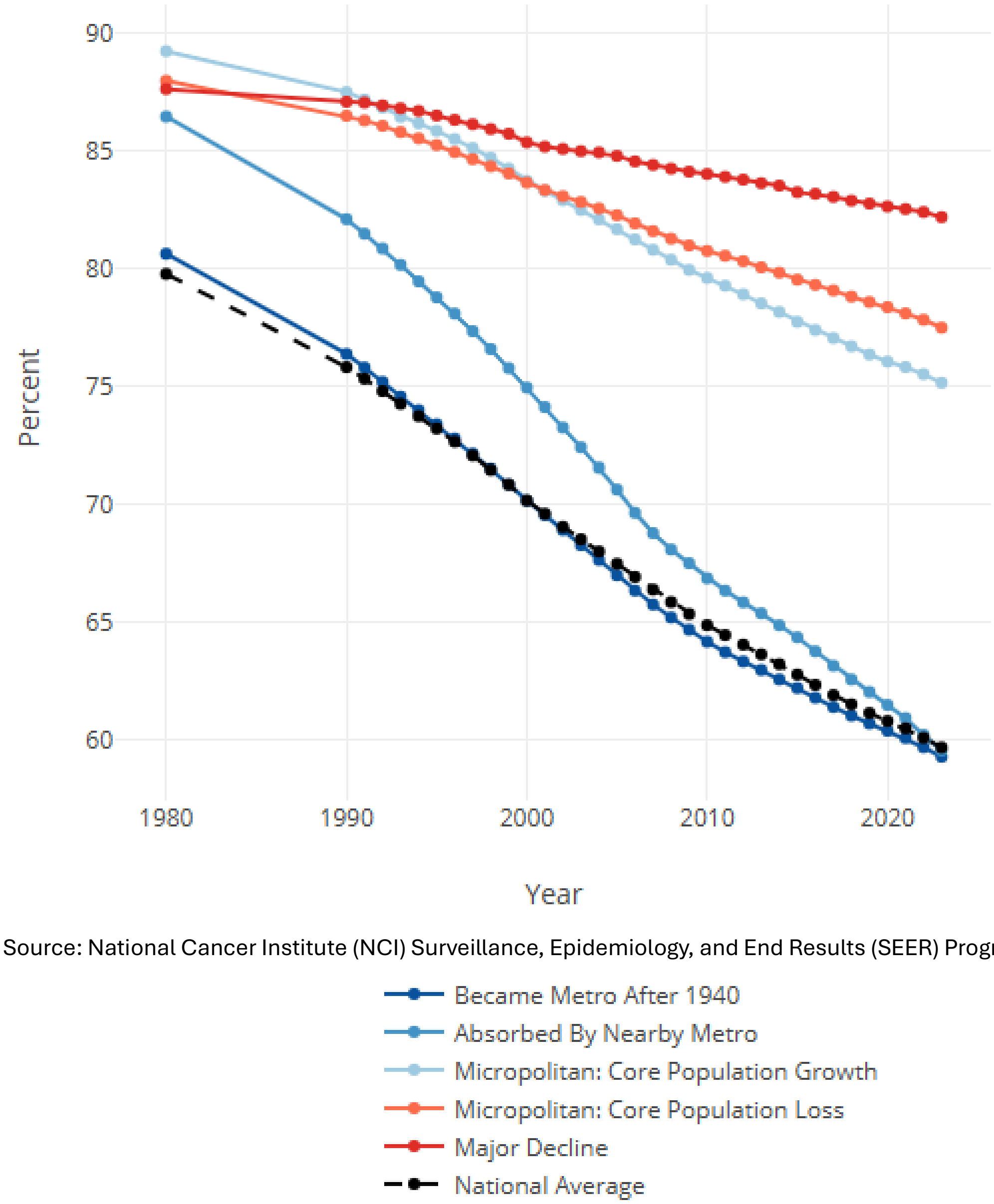


Source: National Cancer Institute (NCI) Surveillance, Epidemiology, and End Results (SEER) Program



Examination of the racial composition within the various area types reveals distinct demographic profiles. Historically, and continuing to the present, the population of micropolitan areas experiencing population decline has been disproportionately non-Hispanic White. This stands in contrast to broader national demographic shifts; while non-Hispanic White individuals constituted 80 percent of the national population in 1980, decreasing to just under 60 percent by 2023, their representation in micropolitan areas experiencing population decline remained significantly higher, still above 80 percent in 2023. This indicates a slower rate of diversification in these communities compared to the overall U.S. population, as shown in Figure 4.

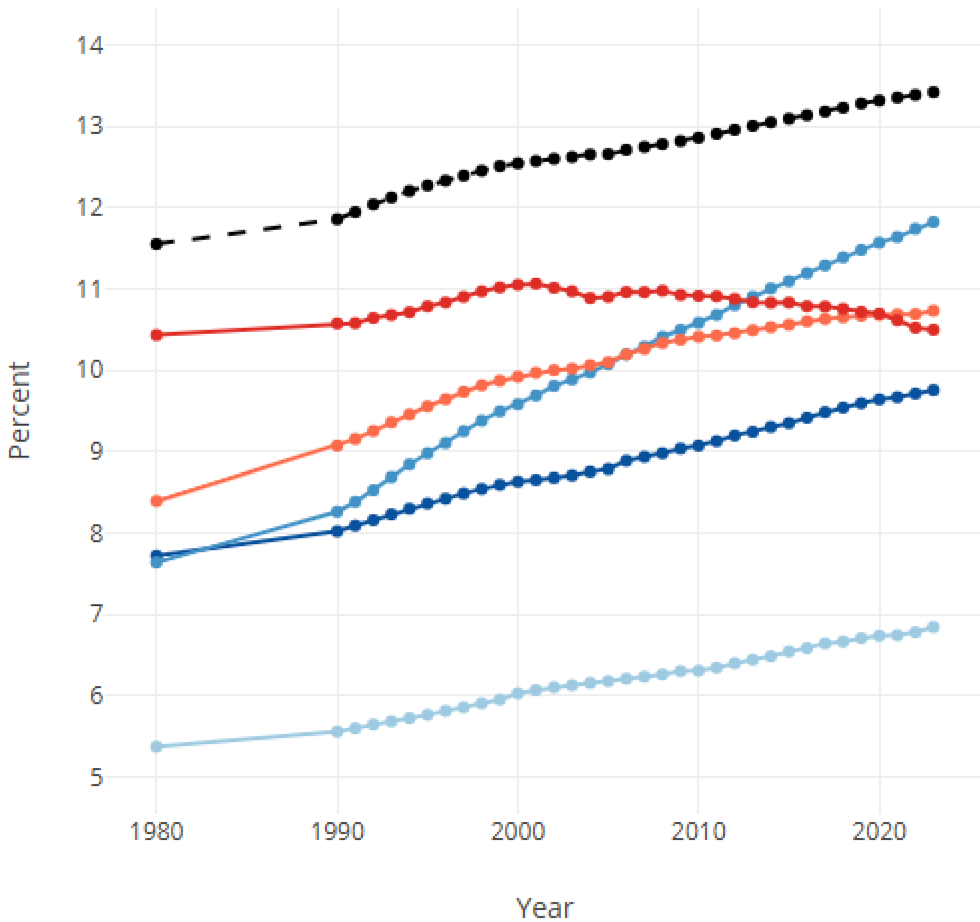
Figure 4. Percent Non-Hispanic White by Area Type, 1980-2023



Source: National Cancer Institute (NCI) Surveillance, Epidemiology, and End Results (SEER) Program

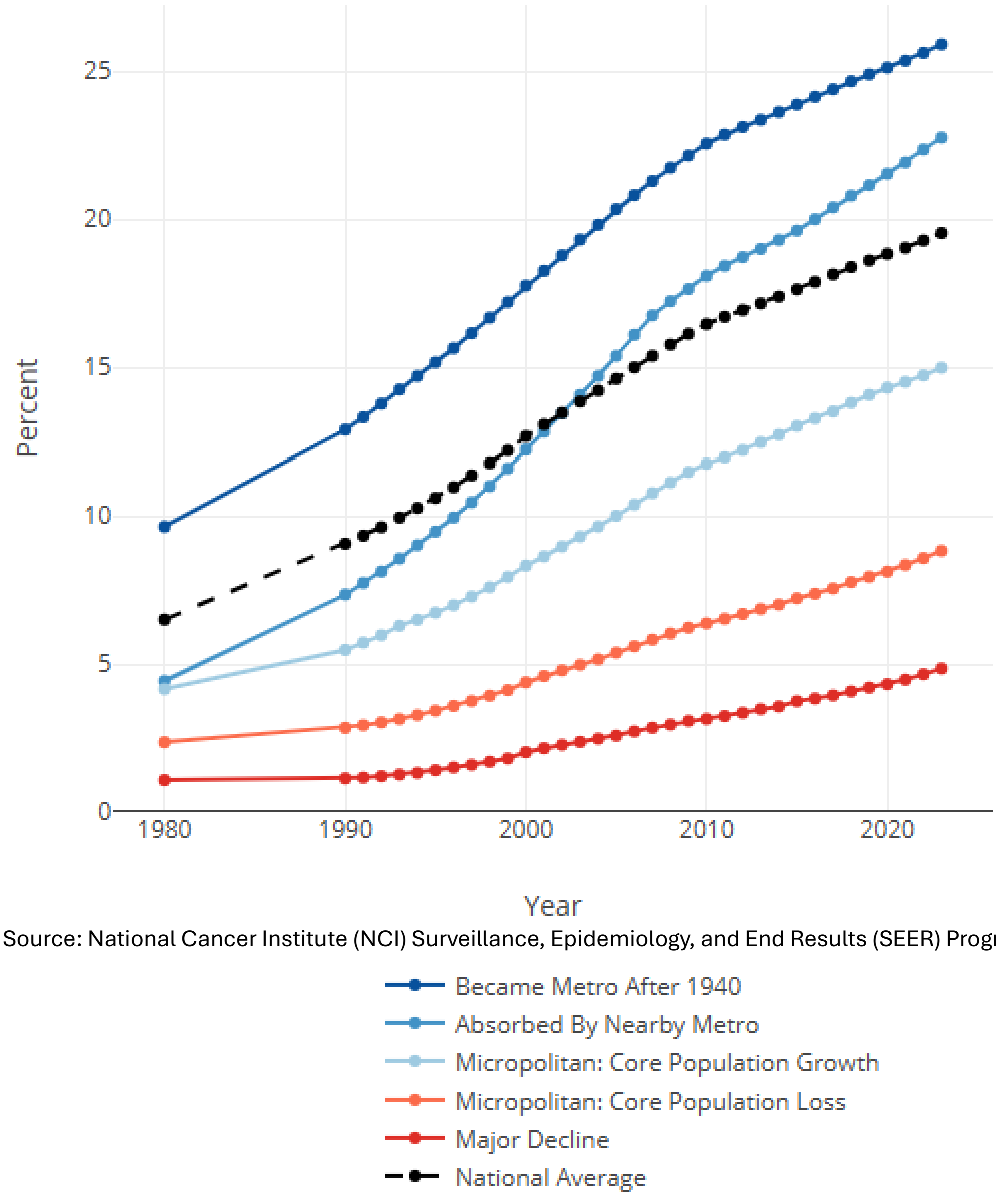
Conversely, the non-Hispanic Black population is consistently underrepresented across all mid-century micropolitan categories, as shown in Figure 5. The Hispanic population shows notable disparities in representation across the typology, as well. In micropolitan areas that remained micropolitan or experienced population loss, the Hispanic population is underrepresented compared to the national average. In micropolitan areas that transitioned to metropolitan status, however, the Hispanic population is represented at a percentage greater than the national average, as shown in Figure 6. These patterns underscore the varying demographic shifts experienced by different types of micropolitan areas over time.

Figure 5. Percent Non-Hispanic Black by Area Type, 1980-2023



Source: National Cancer Institute (NCI) Surveillance, Epidemiology, and End Results (SEER) Program

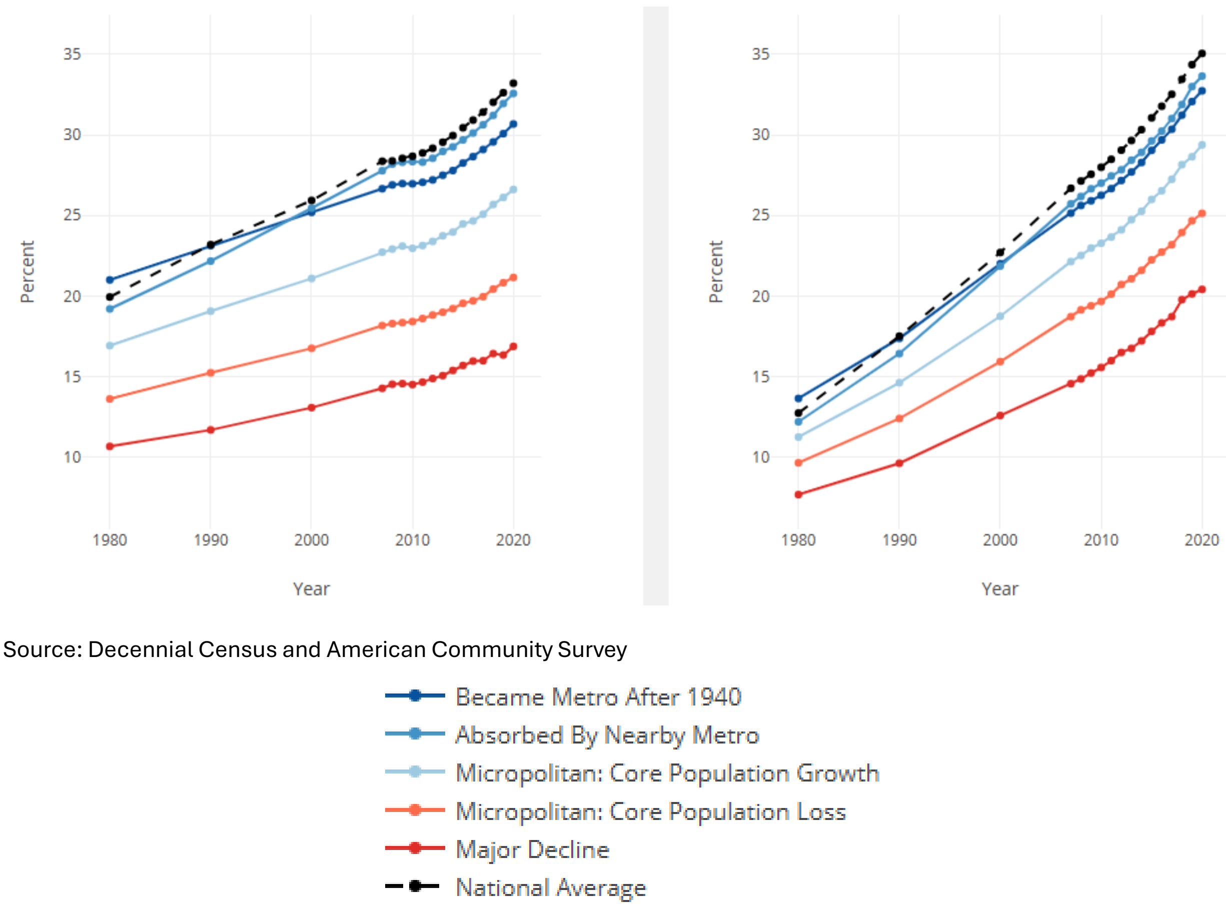
Figure 6. Percent Hispanic by Area Type, 1980-2023



Source: National Cancer Institute (NCI) Surveillance, Epidemiology, and End Results (SEER) Program

Educational attainment patterns across the typology highlight another area of disparity, with micropolitan areas experiencing population decline notably lagging behind national averages. In 1980, approximately 20 percent of men and just under 13 percent of women aged 25 and over nationwide held at least a college degree. While educational attainment in declining micropolitan areas has shown a steady increase since 1980, the progress remains slower than the national pace. By 2020, only about 17 percent of men in these areas had attained a college degree. Similarly, despite recent improvements, only around 21 percent of women in micropolitan areas experiencing population decline had earned a college degree by 2020. This persistent gap in higher education contributes to the broader socioeconomic differences observed across the area types, as shown in Figure 7.

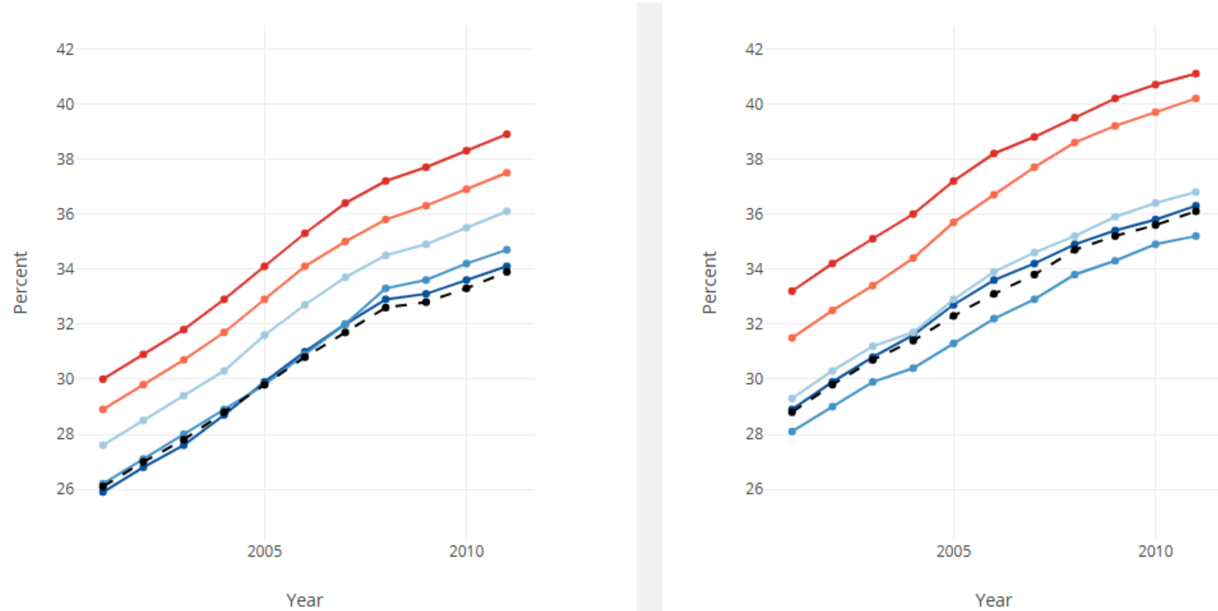
Figure 7. Percent with a College Degree by Area Type, 1980-2020



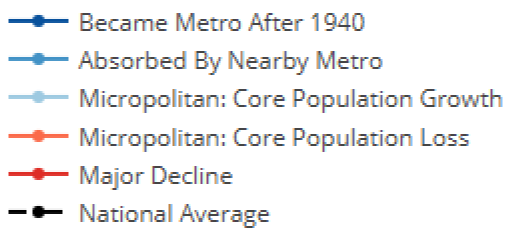
Source: Decennial Census and American Community Survey

In general, more positive health outcomes are associated with population growth and negative outcomes are associated with population decline. Rates of obesity exhibit this pattern, as rates of obesity have increased at a substantial rate between 2001 and 2011. As shown in Figure 8, at the end of this period over 38 percent of men and over 40 percent of women in stagnant micropolitan areas were obese. Rates of obesity are increasing over all area types, but more rapidly in declining areas. Among areas absorbed by metro areas or emerging metropolitan areas, just over one third of men and just under 36 percent of women were obese. These are troubling trends for all area types, but especially so for declining micropolitan areas.

Figure 8. Prevalence of Obesity by Area Type, 2001-2011

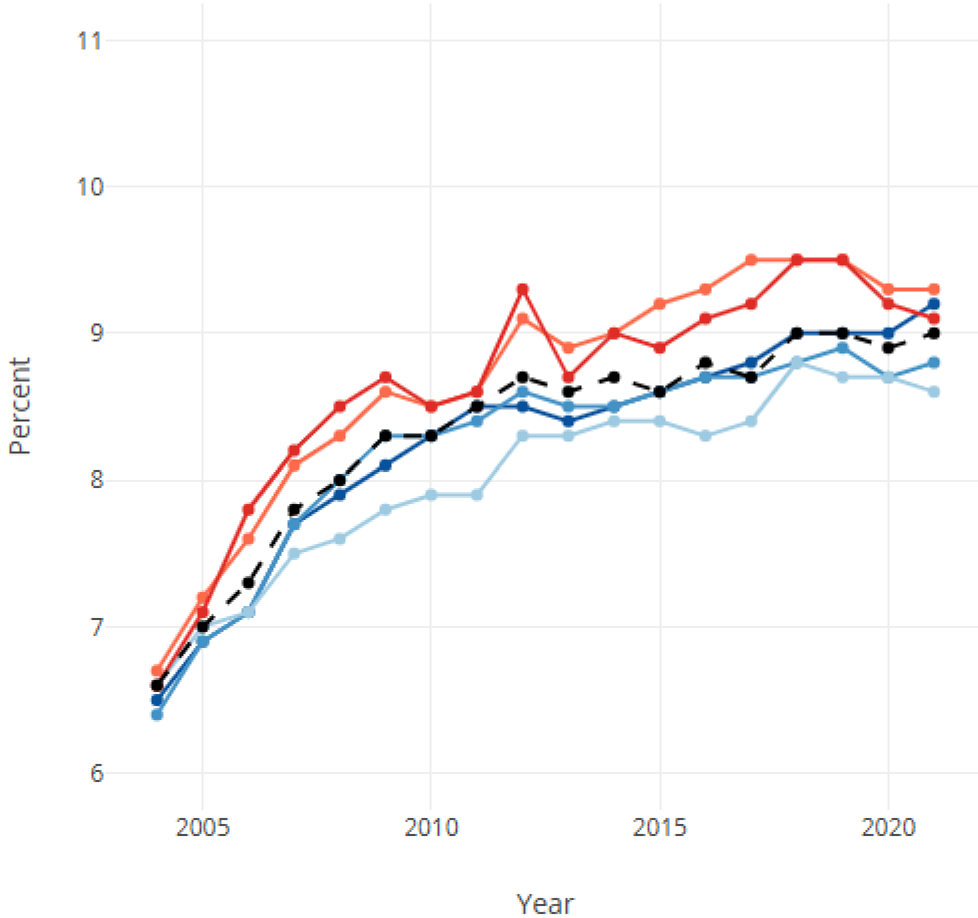


Source: Institute for Health Metrics and Evaluation



Diabetes prevalence exhibited a clear disparity across area types, with declining micropolitan areas consistently showing higher rates than other categories, particularly in the years leading up to the COVID-19 pandemic. In the years before the COVID-19 pandemic, declining micropolitan areas reported a higher percentage of the population with diabetes compared to micropolitan areas that transitioned to metropolitan status. By 2019, diabetes prevalence in declining micropolitan areas reached approximately 9.5 percent overall, while the national average and transitioning micropolitan areas stood at around 9.0 percent. The COVID-19 pandemic may have disrupted this pattern, but the pre-existing higher burden of diabetes in declining micropolitan areas was a consistent factor, as shown in Figure 9.

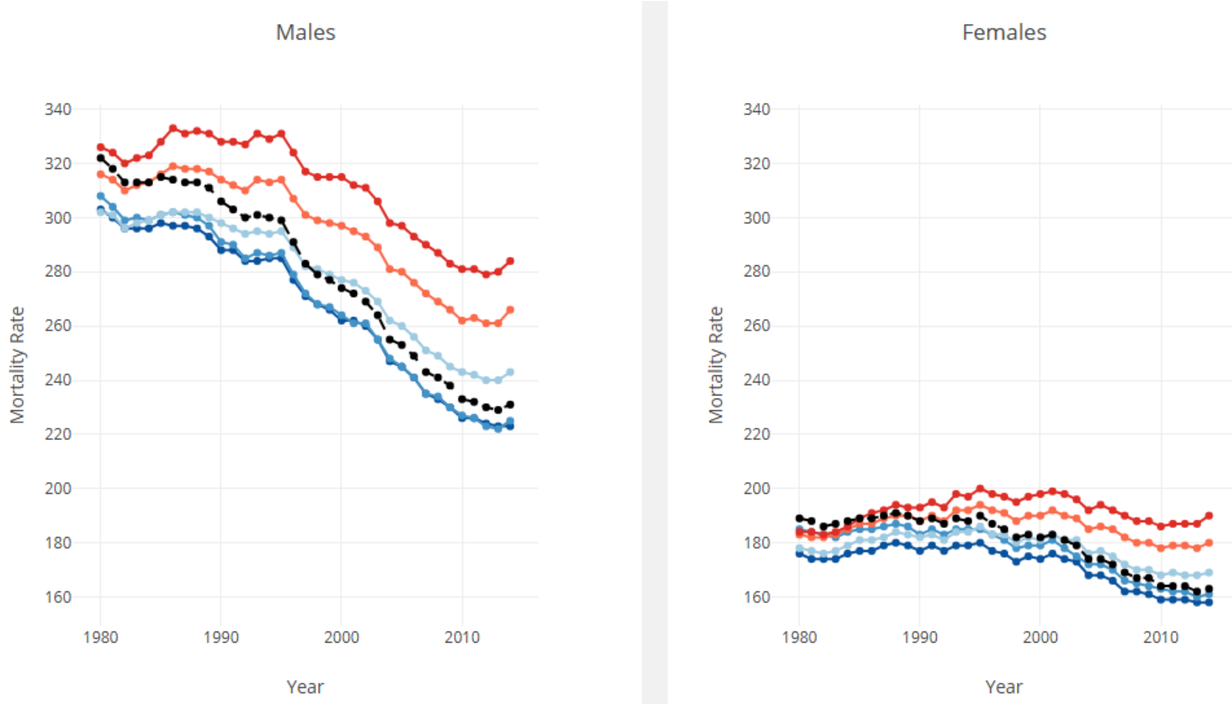
Figure 9. Diabetes Prevalence by Area Type, 2004-2021



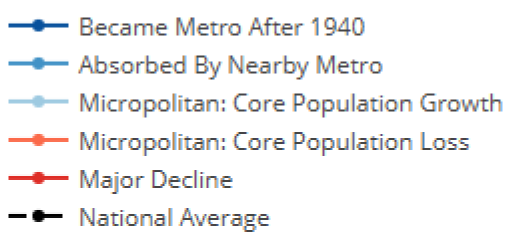
Source: Centers for Disease Control and Prevention

Cancer mortality rates also reveal significant disparities across the different micropolitan area types. While the nation experienced a general decline in cancer mortality from 1980 to 2014, areas experiencing population decline consistently exhibited higher rates than growing areas. In 1980, the national average for cancer mortality was 241.0 deaths per 100,000 population, with males experiencing notably higher rates (321.9) than females (189.1). By 2014, these national rates had fallen to 231.8 overall, 163.6 for females, and 229.5 for males. In declining micropolitan areas, however, cancer mortality rates remained elevated throughout the period. In 2014, micropolitan areas in major decline still recorded rates around 283.5 deaths per 100,000 for men and 188.5 for women, significantly higher than the national figures. Micropolitan areas that transitioned to metropolitan status consistently showed cancer mortality rates closer to or below the national average, as shown in Figure 10.

Figure 10. Cancer Mortality by Area Type, 1980-2014

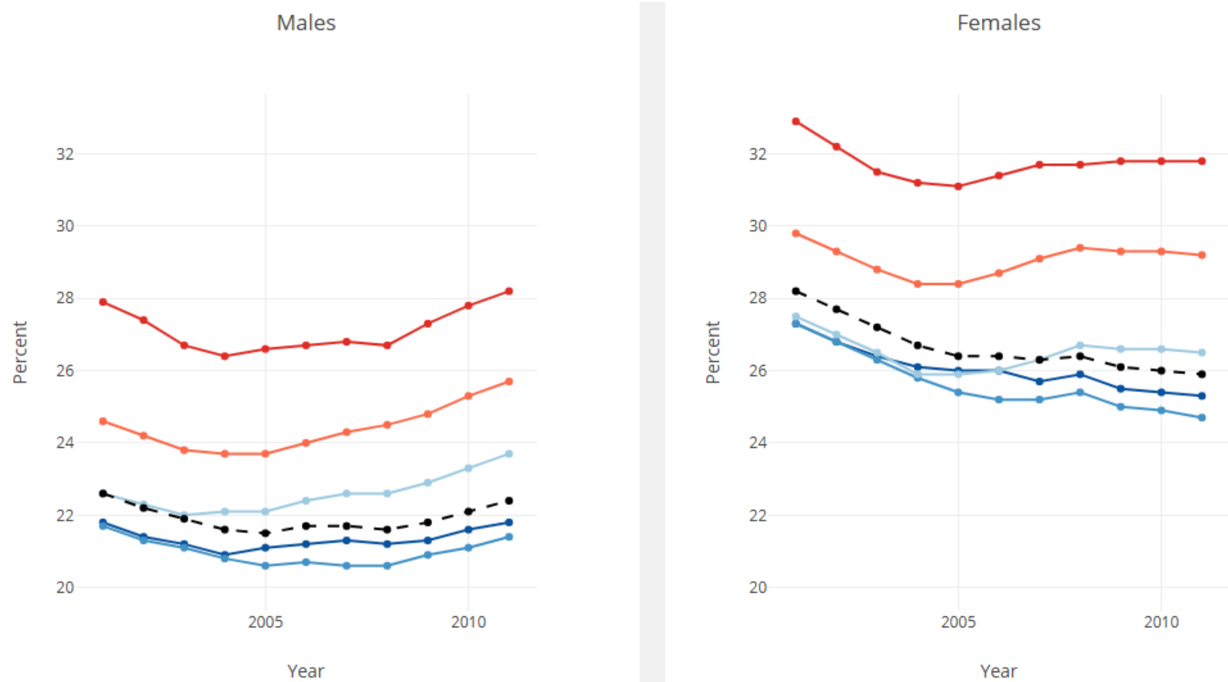


Source: Institute for Health Metrics and Evaluation

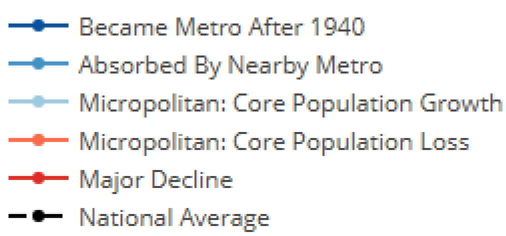


Some of the disparities are a result of lifestyle choices and constraints associated with the built environment. A recent systematic review found that in rural areas, the availability of sidewalks and facilities for recreation and exercise strongly influences physical activity levels, while the absence of such infrastructure acts as a barrier (Müller et al., 2024). As shown in Figure 11, more than a quarter of the population of micropolitan areas with stagnant populations report have no physical activity. This is especially an issue for women in these areas, as over 30 percent of women in declining micropolitan areas have no physical activity. In micropolitan areas that have experienced substantial population growth, or of those that have been absorbed into large metropolitan areas, the percentage of the population with no physical activity is lower, about 20 percent of men and just under a quarter of the population of women, which is closer to the national average of 22 percent of men and about 26 percent of women having no physical activity.

Figure 11. Percent of the Population Reporting No Physical Activity by Area Type, 2001-2011

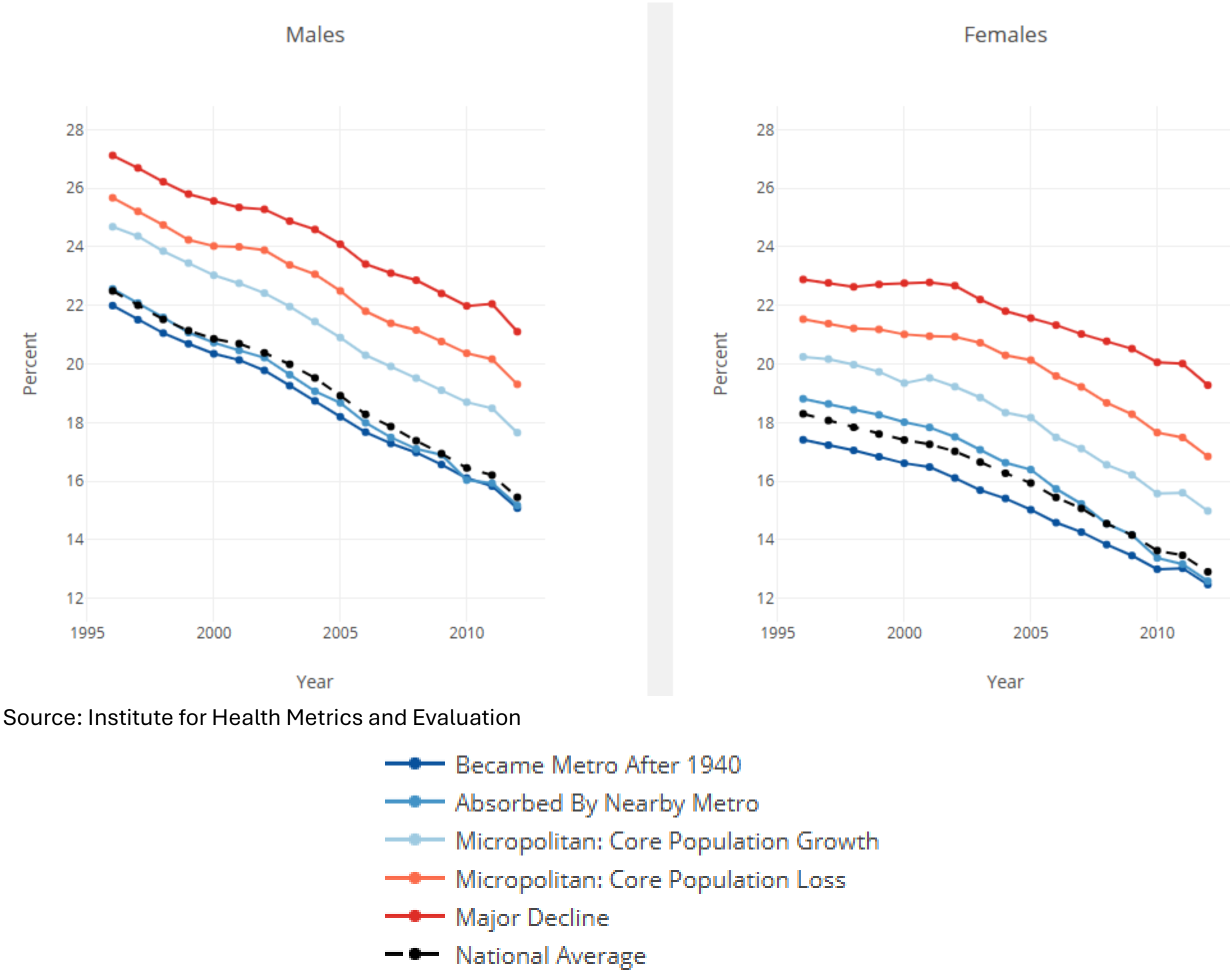


Source: Institute for Health Metrics and Evaluation



The prevalence of smoking is higher in declining areas. The percentage of adults who are daily smokers has been broadly declining in recent years, but a greater share of small-town residents were smokers from 1996 to 2012. Where the national average of daily smokers had fallen to about 16.6 percent of the men and just under 13 percent of women, almost 21 percent of men and 19 percent of women in declining micropolitan areas were daily smokers. Emerging metro areas and absorbed counties are at or below the national average rate of smoking, but modestly growing and declining micropolitan areas have had persistently higher rates of smoking through these years, as shown in Figure 12.

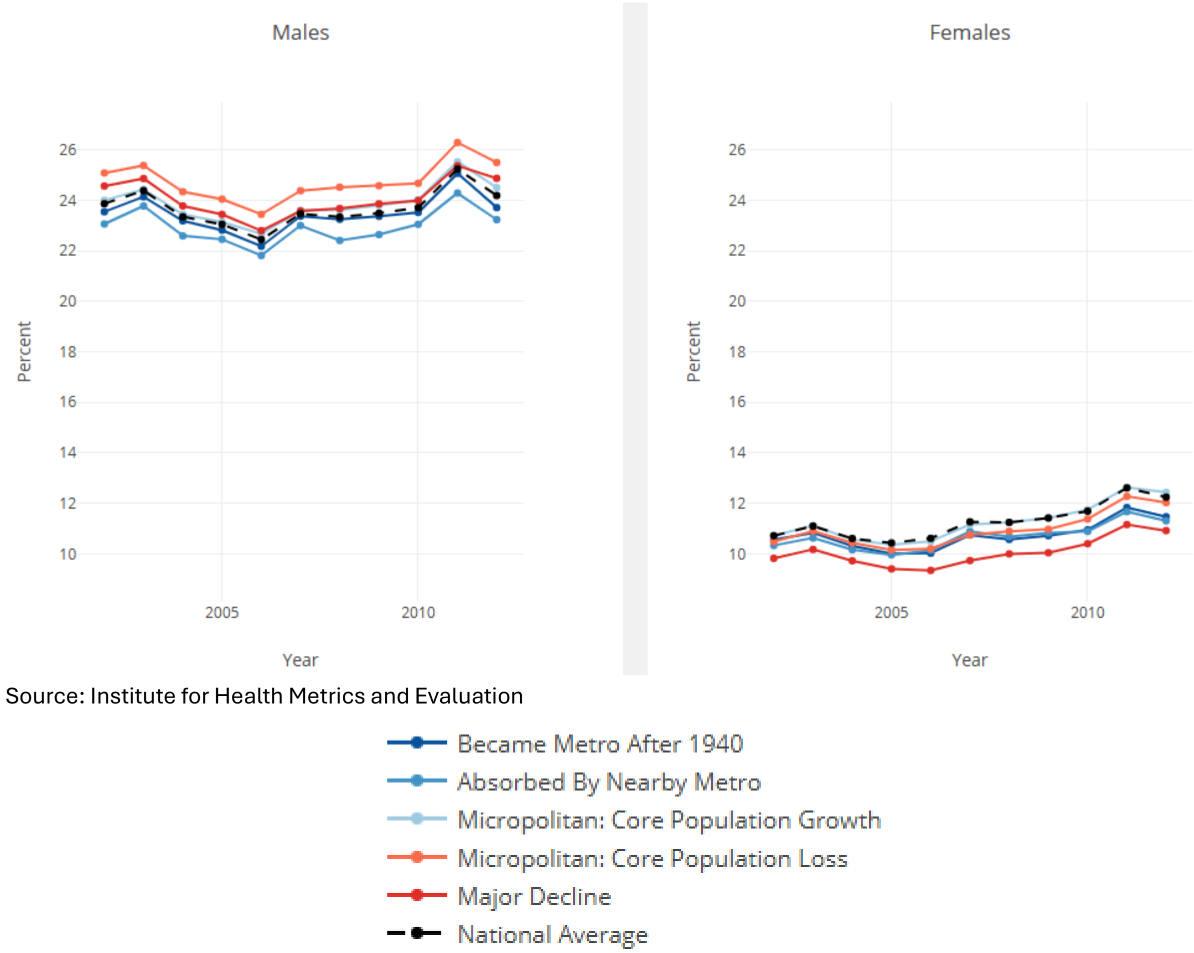
Figure 12. Percent Smoking Daily by Area Type, 1996-2012



Source: Institute for Health Metrics and Evaluation

Analysis of drinking habits from 2002 to 2012 reveals distinct patterns across the area types, particularly regarding binge drinking among men. Men residing in declining micropolitan areas exhibited higher rates of binge drinking compared to the national average. For instance, in 2012, over one quarter of men in declining micropolitan areas had engaged in binge drinking. In contrast, women in all micropolitan area types engaged in binge drinking at lower rates than the national average, as shown in Figure 13.

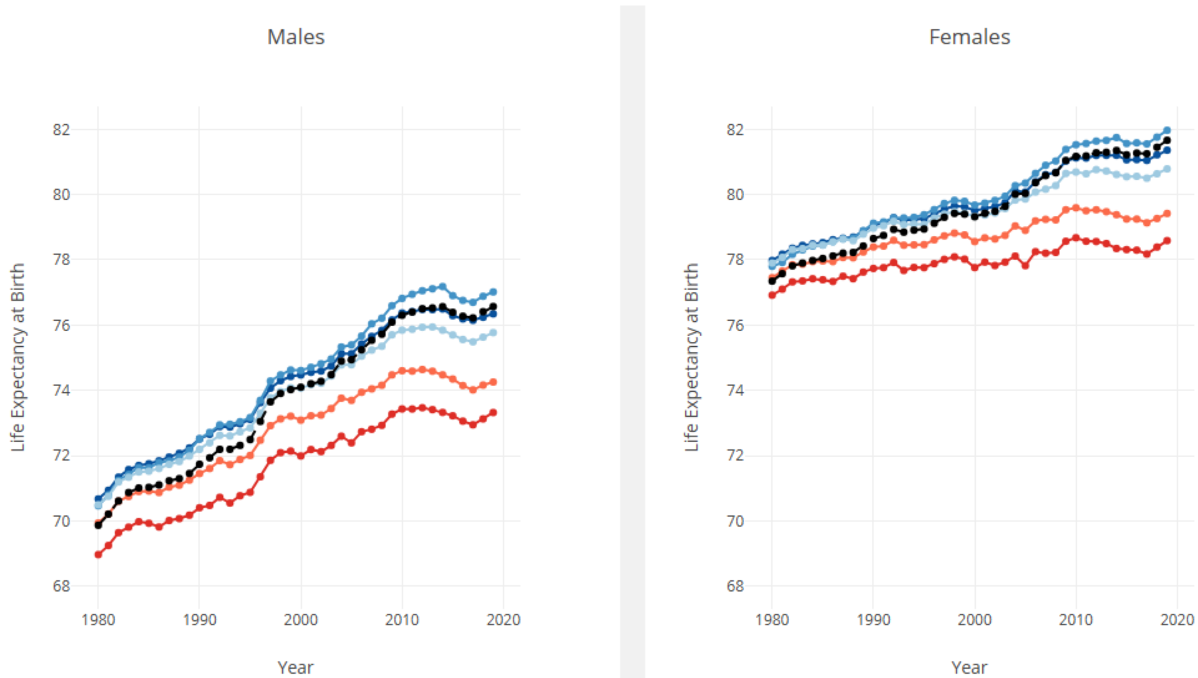
Figure 13. Binge Drinking by Area Type, 2002-2012



Source: Institute for Health Metrics and Evaluation

Perhaps the most significant indicator of how micropolitan areas experiencing population decline are falling behind the rest of the country is life expectancy. In 1980, overall life expectancy nationwide was 73.6 years, with most of the micropolitan area types were relatively close to this national average. While life expectancies in areas experiencing population decline were just below the national average in 1980, a dramatic divergence in life expectancy emerged over the subsequent decades. By 2019, on the eve of the COVID-19 pandemic, micropolitan areas with moderate population loss and those in major decline had fallen more than three full years below the national average life expectancy. This widening gap applies consistently to both men and women: while both sexes in these declining areas were just slightly below their respective national averages in 1980, they too had dropped more than three years below by 2019. These stark disparities are vividly illustrated in Figure 14, underscoring the long-term health consequences associated with sustained population decline in these communities. Formal statistical tests confirm the robustness of these differences. Weighted least squares (WLS) models with year fixed effects show that micropolitan county types experiencing core population loss or major decline have significantly lower adjusted life expectancy compared to other micropolitan categories ($p < 0.001$). These results hold consistently for both sexes and when analyzed separately for men and women. Figure 15 highlights these findings, showing adjusted mean life expectancy across micropolitan types with 95% confidence intervals. Full regression output, sex-specific adjusted means, and supporting plots are presented in Appendix A.

Figure 14. Life Expectancy by Area Type, 1980-2019



Source: Institute for Health Metrics and Evaluation and County Health Rankings & Roadmaps

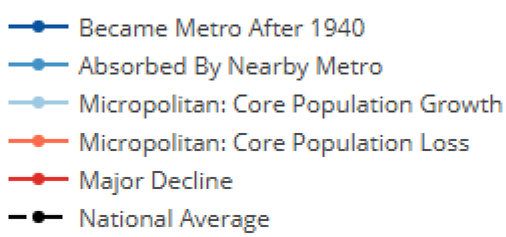
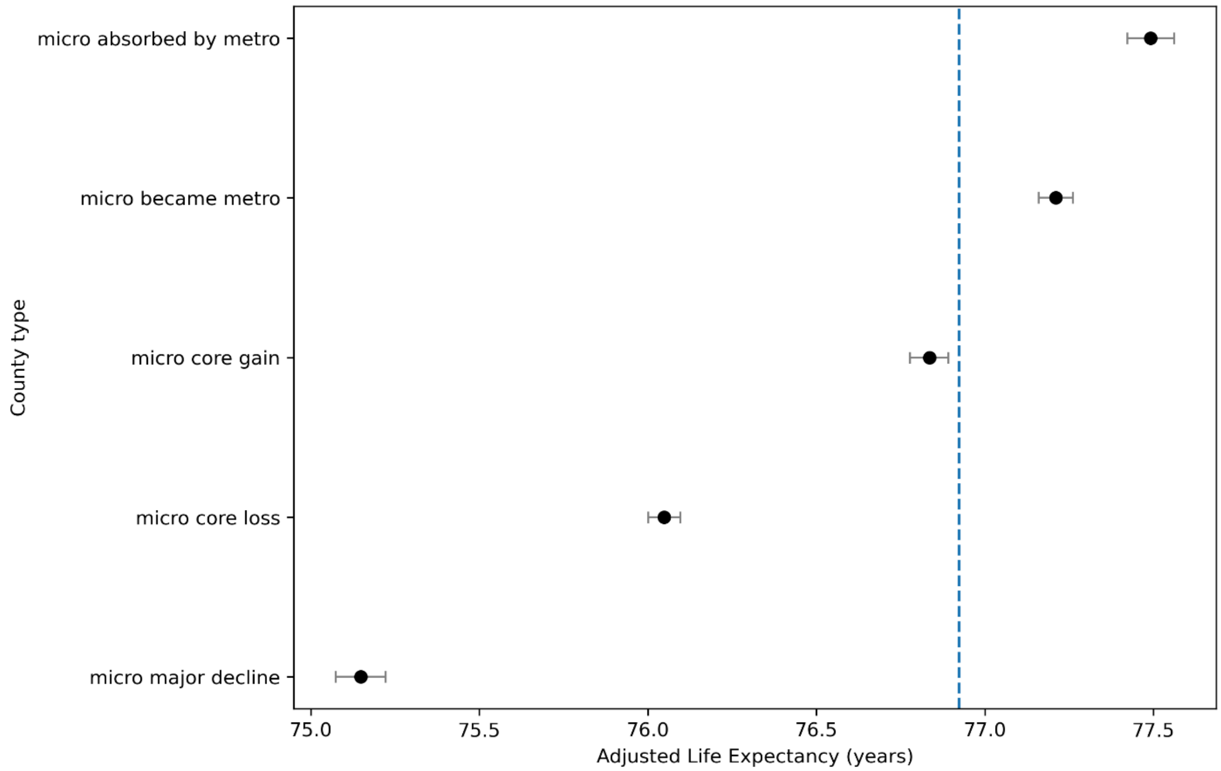


Figure 15. Adjusted Life Expectancy by Area Type, Both Sexes, 1980-2019



Source: Institute for Health Metrics and Evaluation and County Health Rankings & Roadmaps

Points show population-weighted, year-adjusted marginal means from WLS models with year fixed effects; whiskers represent 95% confidence intervals. The vertical dashed line indicates the overall mean. Micropolitan areas experiencing population decline (core loss and major decline) have significantly lower life expectancy than other types ($p < 0.001$).

Micropolitan areas contain both urban and rural territory so it's reasonable to ask if the effects described above pertain more to the urban or rural parts of the micropolitan areas in question. The HHUUD10 database provides a variable that designates census tracts as urban or rural, and since tracts nest within counties, we can divide the micropolitan population into rural and urban components. Unfortunately, we don't have much data at the census tract level pertaining to health outcomes, but the Longitudinal Tract Data Base (LTDB) does contain several variables with estimates for census tracts as defined in 2010. Using LTDB data in association with the HHUUD10 urbanization measure we can examine some demographic and economic factors that can provide some insight into the relative well-being of urban and rural parts of micropolitan areas.

Table 3. Characteristics of Urban and Rural Territory by Area Type, 1990-2017

Percent in Poverty	Urban				Rural			
	1990	2000	2010	2017	1990	2000	2010	2020
Micropolitan, Became Metro After 1940	15.2	14.7	18.1	16.4	12.6	11.1	12.9	11.6
Micropolitan Absorbed by Nearby Metro	10.4	10.5	13.4	11.9	9.1	8.3	10.4	9.5
Micropolitan Core Population Gain	13.5	12.8	16.1	14.9	11.3	9.5	11.7	10.5
Micropolitan Core Population Loss	17.1	15.8	19.9	18.5	13.4	11.3	13.8	12.9
Micropolitan Major Decline	**22.6**	**20.0**	**22.9**	**22.7**	17.0	13.6	14.9	14.2
Outside CBSA Rural					19.9	16.5	18.5	17.1
National Average	13.1	12.4	14.9	13.4				

Income Per Capita	Urban				Rural			
	1990	2000	2010	2017	1990	2000	2010	2020
Micropolitan, Became Metro After 1940	13,158	19,417	24,596	29,521	12,588	19,678	26,532	32,396
Micropolitan Absorbed by Nearby Metro	14,844	22,054	28,005	33,700	13,956	21,350	29,022	35,140
Micropolitan Core Population Gain	12,875	19,365	25,208	30,418	12,420	19,415	25,816	31,641
Micropolitan Core Population Loss	11,593	17,576	22,108	26,442	11,437	17,833	23,865	28,965
Micropolitan Major Decline	10,070	15,114	19,557	22,831	10,301	16,276	22,072	26,662
Outside CBSA Rural					9,720	15,672	20,815	25,268
National Average	14,410	21,586	28,047	34,376				
Income Per Capita (US=100)								
Micropolitan, Became Metro After 1940	91.3	90.0	87.7	85.9	87.4	91.2	94.6	94.2
Micropolitan Absorbed by Nearby Metro	103.0	102.2	99.9	98.0	96.8	98.9	103.5	102.2
Micropolitan Core Population Gain	89.3	89.7	89.9	88.5	86.2	89.9	92.0	92.0
Micropolitan Core Population Loss	80.5	81.4	78.8	76.9	79.4	82.6	85.1	84.3
Micropolitan Major Decline	**69.9**	**70.0**	**69.7**	**66.4**	71.5	75.4	78.7	77.6
Outside CBSA Rural					67.5	72.6	74.2	73.5
National Average	100.0	100.0	100.0	100.0				

Percent Unemployed	Urban				Rural			
	1990	2000	2010	2017	1990	2000	2010	2020
Micropolitan, Became Metro After 1940	6.4	6.5	9.9	5.7	5.9	5.3	8.5	4.8
Micropolitan Absorbed by Nearby Metro	5.8	5.4	10.1	5.5	5.4	4.4	8.9	4.8
Micropolitan Core Population Gain	6.4	5.9	8.9	5.1	5.7	4.6	7.9	4.5
Micropolitan Core Population Loss	7.5	6.9	10.2	6.3	6.6	5.4	8.7	5.0
Micropolitan Major Decline	**9.4**	**7.8**	**10.6**	**7.2**	8.0	5.8	8.5	5.4
Outside CBSA Rural					7.2	6.1	9.0	5.5
National Average	6.3	5.8	9.3	5.3				

Source: Longitudinal Tract Data Base

Table 3 shows data on income and employment using census tract LTDB estimates from 1990 to 2017. Also, the urban population in declining micropolitan areas have the lowest incomes in the US, less than two-thirds of the national average in the most recent data. Similarly, this population has the highest poverty rates in the country. These areas have consistently high rates of unemployment, as well.

Table 4. Characteristics of Urban and Rural Territory by Area Type, 1990-2017

Percent Age 75 and Over	Urban				Rural			
	1990	2000	2010	2017	1990	2000	2010	2020
Micropolitan, Became Metro After 1940	4.9	5.6	5.7	6.0	4.1	4.7	5.3	6.2
Micropolitan Absorbed by Nearby Metro	6.1	6.8	6.6	6.9	4.3	4.9	5.4	6.4
Micropolitan Core Population Gain	6.1	6.9	6.8	6.7	4.7	5.1	5.7	6.8
Micropolitan Core Population Loss	7.0	7.9	7.5	7.4	5.2	5.8	6.4	7.5
Micropolitan Major Decline	**9.0**	**9.5**	**8.6**	**8.6**	6.0	6.6	7.0	8.0
Outside CBSA Rural					7.3	7.5	7.6	8.7
National Average	5.3	5.9	6.0	6.4				

Percent with College Degree	Urban				Rural			
	1990	2000	2010	2017	1990	2000	2010	2020
Micropolitan, Became Metro After 1940	21.6	24.6	27.4	30.4	15.4	19.4	23.5	27.1
Micropolitan Absorbed by Nearby Metro	20.4	24.9	28.9	32.0	16.1	20.3	25.1	28.9
Micropolitan Core Population Gain	18.7	21.8	25.4	28.3	14.0	17.3	21.0	24.1
Micropolitan Core Population Loss	15.8	18.4	21.0	23.2	12.0	14.9	18.0	20.8
Micropolitan Major Decline	**11.9**	**13.8**	**15.7**	**17.6**	10.2	12.6	15.2	17.6
Outside CBSA Rural					10.3	12.8	15.3	17.4
National Average	20.3	24.4	28.5	32.1				

Percent with Disability	Urban				Rural			
	1990	2000	2010	2017	1990	2000	2010	2020
Micropolitan, Became Metro After 1940	11.8	18.2	9.8	10.4	12.5	18.1	11.1	11.3
Micropolitan Absorbed by Nearby Metro	12.0	18.2	9.3	9.8	12.5	17.9	10.8	11.0
Micropolitan Core Population Gain	13.1	18.9	11.4	11.5	12.6	17.9	11.2	11.2
Micropolitan Core Population Loss	14.4	19.4	13.1	14.1	13.6	18.7	12.7	12.9
Micropolitan Major Decline	**17.8**	**22.6**	**16.7**	**17.0**	15.9	20.2	14.8	14.9
Outside CBSA Rural					17.4	22.2	15.6	15.6
National Average	12.1	18.6	10.0	10.3				

Source: Longitudinal Tract Data Base

Table 4 shows demographic characteristics of the mid-century micropolitan characteristics from 1990 to 2017. The urban population of declining micropolitan areas is aging faster than other mid-century micropolitan populations, as well as faster than the national average. The measure used in this study is the percentage of the population that is 75 years of age or older, and while that number declined somewhat from 1990 to 2017, the percentage of elderly people in urban parts of micropolitan areas was consistently above not only other micropolitan populations but of rural populations, as well. The urban population in declining micropolitan areas maintained higher rates of disability throughout this period, as well. The rural population in declining micropolitan areas and the rural population outside of CBSAs has low educational attainment, but the urban population in declining micropolitan areas is roughly comparable in this regard, as measured by the percentage of people with at least a college degree.

Table 5. Household Characteristics of Urban and Rural Territory by Area Type, 1990-2017

Percent Female-Headed Households with Children	Urban					Rural			
	1990	2000	2010	2017		1990	2000	2010	2020
Micropolitan, Became Metro After 1940	11.2	13.3	14.4	13.5		7.0	8.4	9.2	8.6
Micropolitan Absorbed by Nearby Metro	9.4	11.6	12.5	11.5		6.1	7.4	7.6	7.2
Micropolitan Core Population Gain	10.6	12.8	14.4	13.4		6.6	8.2	8.9	8.1
Micropolitan Core Population Loss	12.2	14.8	16.8	16.0		7.1	8.8	9.7	9.1
Micropolitan Major Decline	**14.2**	**17.1**	**19.0**	**19.1**		7.4	8.8	9.8	9.2
Outside CBSA Rural						8.4	10.0	10.9	10.4
National Average	10.4	12.3	12.9	11.9					

Vacancy Rate	Urban					Rural			
	1990	2000	2010	2017		1990	2000	2010	2020
Micropolitan, Became Metro After 1940	9.6	8.8	11.3	11.7		11.6	10.6	12	12.7
Micropolitan Absorbed by Nearby Metro	13.0	11.0	13.5	13.5		12.6	10.6	12.2	13.1
Micropolitan Core Population Gain	10.3	9.5	11.5	12.4		15.1	12.4	13.9	15.2
Micropolitan Core Population Loss	7.9	8.6	10.3	12.8		13.0	12.4	14.1	16.4
Micropolitan Major Decline	**9.8**	**10.6**	**12.5**	**16.1**		15.0	14.7	16.5	19.7
Outside CBSA Rural						20.1	19.9	22.8	26.5
National Average	10.1	9	11.4	12.1					

Source: Longitudinal Tract Data Base

Table 5, which shows household-level measures, reveals that the urban population in declining micropolitan areas has very high rates of female-headed households with children, substantially above the national average and well above their rural counterparts. This table also shows the vacancy rate of housing units, and on this measure rural parts of declining micropolitan areas have higher rates than urban territory, suggesting that population losses have had a strong impact on rural areas. These figures reveal that the urban populations of declining micropolitan areas exhibit poor outcomes in the measures that are available at the census tract level. These areas have an older population, higher rates of unemployment, poverty, and disability, and lower incomes than their rural counterparts.

To further investigate the disparities and disentangle the independent contributions of urban and rural segments within micropolitan counties I performed a series of regressions. Using county-level life expectancy in 1990, 2000, 2010, and 2017 as the dependent variable, I included most of the socioeconomic and demographic characteristics of the urban and rural populations within each county as independent variables. I performed the analysis first only on those micropolitan counties experiencing major decline, and then on all micropolitan county types to provide broader context. The results, which are summarized in Table 6, supported many of the associations revealed on Tables 3-5, but also produced some unexpected results.

Table 6. Summary of Regression Coefficients and Significance for County Life Expectancy

	Micropolitan major decline counties				All mid-century micropolitan counties			
Variable	1990	2000	2010	2017	1990	2000	2010	2017
Intercept	75.337***	77.834***	75.699***	78.587***	77.200***	79.785***	79.877***	79.395***
% Age 75+ Urban	0.071	0.064	0.259***	0.053	0.119***	0.044	0.061**	0.051
% Age 75+ Rural	0.261***	0.088	0.121	0.096**	0.160***	0.014	0.070**	0.047
% In Poverty Urban	-0.083***	-0.051	-0.002	-0.02	-0.040***	-0.056***	-0.024**	-0.02
% In Poverty Rural	0.036	-0.017	-0.080**	-0.037	0.039***	0.067***	0.028	0.003
% Unemployed Urban	0.083	0.089	0.044	0.012	0.025	0.057**	0.058***	0.024
% Unemployed Rural	0.049	0.007	0.029	0.001	0.105***	0.091***	0.009	0.028
% Female-Headed HH Urban	0.041	0.005	-0.009	-0.019	-0.047***	-0.067***	-0.076***	-0.058***
% Female-Headed HH Rural	-0.269***	-0.161**	-0.026	-0.108***	-0.220***	-0.164***	-0.052**	-0.078***
% Disabled Urban	-0.02	-0.018	0.052	-0.007	-0.072***	-0.025	-0.054***	-0.039**
% Disabled Rural	-0.159***	-0.134***	-0.311***	-0.206***	-0.193***	-0.189***	-0.255***	-0.236***
% Vacant Housing Units Urban	-0.065**	-0.066	-0.068**	-0.086***	-0.027***	-0.025**	-0.037***	-0.057***
% Vacant Housing Units Rural	0.018	0.039**	0.050***	0.045***	0.007	0.032***	0.041***	0.039***
% College Educated Urban	0.046	0.074**	0.078**	0.075***	0.055***	0.052***	0.057***	0.060***
% College Educated Rural	0.076**	0.003	0.01	0.024	0.048***	0.027**	0.018**	0.036***
R-squared	0.837	0.831	0.805	0.717	0.766	0.736	0.74	0.718
N	N=89				N=676			

*Note: Significance levels: *** p < 0.001; ** p < 0.01; * p < 0.05. Coefficients without asterisks are not statistically significant at p < 0.05.*

Across the time series, several key predictors consistently emerged as statistically significant determinants of county-level life expectancy, including housing vacancy and educational attainment of the urban population, as well as rates if disability and female-headed households with children for the rural population. These results support the notion that economic and social distress in small cities is linked to unfavorable health outcomes and highlights the vital role of human capital and socioeconomic advantage within these areas. The significant negative effect of disability rates and female-headed households with children indicates a strong link between the presence of vulnerable populations and overall county life expectancy.

Some variables, such as poverty rates, fluctuated across the time series. Urban poverty was significantly negatively associated with life expectancy in 1990 and 2000 but not in the later years. Similarly rural poverty showed a positive association in 1990 and 2000 but a negative one in 2010. Unemployment showed inconsistent associations for both urban and rural populations, as well. Interestingly, a counter-intuitive result emerged regarding housing vacancy rates in rural areas. From 2000 to 2017 in all micropolitan area types a higher percentage of vacant housing units in rural segments showed a statistically significant *positive* association with life expectancy. This would seem to go against logic and warrants further investigation.

Finally, I used these variables in a Random Forest regression model to estimate tract-level life expectancy. This nonparametric method builds multiple decision trees and averages their predictions, allowing for complex, nonlinear relationships and interactions between predictors. Once I had the tract-level estimates of life expectancy, I aggregated them by area type and separated the urban and rural results. The results are shown in Table 7.

Table 7. Life Expectancy for Urban and Rural Tracts by Area Type, 1990-2017

	Life Expectancy							
	Urban				Rural			
County Type	1990	2000	2010	2017	1990	2000	2010	2017
Mid-Century Micropolitan: Became Metro After 1940	75.76	76.09	77.63	78.04	75.82	76.56	78.02	78.47
Mid-Century Micropolitan: Absorbed by Metro Area	76.24	76.69	78.45	78.84	76.15	76.99	78.53	78.96
Mid-Century Micropolitan: Core Population Gain	75.68	76.15	77.36	77.84	75.84	76.61	77.98	78.44
Mid-Century Micropolitan: Core Population Loss	75.13	75.59	76.50	76.69	75.50	76.24	77.39	77.75
Mid-Century Micropolitan: Major Decline	**74.10**	**74.57**	**75.25**	**75.40**	75.01	75.76	76.81	77.07
Outside CBSA: Rural Population					74.84	75.42	76.38	76.79
National Average	75.93	76.40	78.09	78.59				

Source: Tract-level estimates using LTDB data in a Random Forest model

The lowest life expectancies are in the urban parts of declining micropolitan areas, and the poorest outcomes are in those micropolitan areas that have experienced steep population losses. The urban parts of declining micropolitan areas have lower life expectancies than their counterparts in declining micropolitan areas, and rural populations outside of any CBSA. While rural populations have health outcomes that are below the national average, these results suggest that we may need to broaden the focus of inquiry into the "rural mortality penalty." To change the reference from "rural" to "non-metropolitan" may be missing an essential part of the story, that remoteness by itself does not explain health disparities, but instead the focus should shift to include areas experiencing population losses, and the inability to retain a younger, healthier, better educated population.

Conclusion

This study demonstrates that health disparities in small-town and rural America are not solely a matter of remoteness, but of long-term population decline. Communities that have experienced sustained population decline exhibit significantly poorer health outcomes than those that have transitioned to metropolitan status, particularly in their urban cores. These declining areas are aging more rapidly, have higher rates of chronic disease, elevated cancer mortality, and shorter life expectancies than their growing counterparts. At the same time, they remain less racially and ethnically diverse, have lower rates of educational attainment and are struggling economically. These patterns are consistent across a wide range of indicators and are evident not only in county-level data but also at the census tract level, where urban portions of declining micropolitan areas often appear more disadvantaged than even rural territory outside any CBSA.

There is clear evidence of a rural mortality penalty, as remoteness itself fosters health disparities. What has been left out, however, is that long-term population decline is also an important driver of poor health outcomes. By replacing the broad urban–rural or metro/non-metro dichotomy with a typology grounded in historical population change, this study offers a more precise lens for understanding spatial health disparities. Reframing the rural mortality penalty as a penalty of decline highlights that some of the most challenging outcomes occur in places that were once thriving regional centers. These findings suggest that it is not remoteness alone, but the cumulative impact of decline, that underpins these disparities.

By linking health outcomes to population trajectories, this study underscores the importance of considering historical dynamics when evaluating place-based health inequities. Public health interventions that overlook the specific context of shrinking communities risk misallocating resources or misidentifying needs. Similarly, demographic typologies that fail to distinguish between declining and growing small towns may overlook the causal pathways shaping health. Future research should build on this work by investigating how factors like institutional disinvestment, outmigration of younger residents, and local economic restructuring contribute to health decline.

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Appendix A. Statistical Tests for Life Expectancy by Area Type

This appendix provides full regression output, adjusted mean life expectancy estimates, and supporting plots referenced in the main text. Weighted least squares (WLS) models with year fixed effects were estimated separately for both sexes combined, men, and women, using population weights and heteroscedasticity-robust (HC1) standard errors.

A1. Regression Results

The main text reported a global test of equality across micropolitan area types ($p < 0.001$). Table A1 summarizes the adjusted mean life expectancy for each area type, with associated standard errors and 95% confidence intervals.

Table A1. Adjusted life expectancy by micropolitan county type, 1980–2019

Area Type	Both Sexes Mean (95% CI)	Males Mean (95% CI)	Females Mean (95% CI)
Micropolitan, Became Metro After 1940	77.21 (77.16–77.26)	74.40 (74.34–74.45)	79.96 (79.91–80.01)
Micropolitan Absorbed by Nearby Metro	77.49 (77.42–77.56)	74.73 (74.66–74.81)	80.19 (80.12–80.25)
Micropolitan Core Population Gain	76.84 (76.78–76.89)	74.02 (73.96–74.08)	79.65 (79.59–79.70)
Micropolitan Core Population Loss	76.05 (76.00–76.10)	73.13 (73.08–73.18)	78.92 (78.88–78.96)
Micropolitan Major Decline	75.15 (75.07–75.22)	72.10 (72.01–72.18)	78.19 (78.13–78.26)

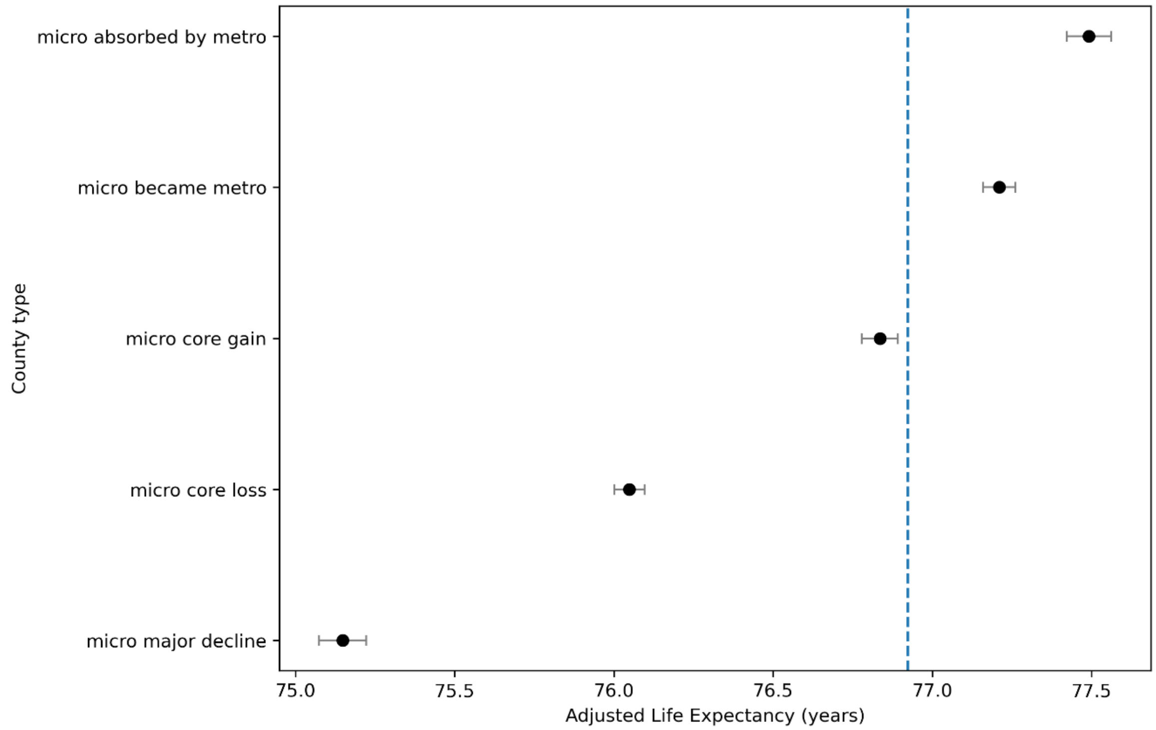
Source: Institute for Health Metrics and Evaluation and County Health Rankings & Roadmaps

Values are population-weighted, year-adjusted marginal means from WLS models with year fixed effects. Parentheses show 95% confidence intervals based on HC1 robust standard errors.

A2. Dot-and-Whisker Plots

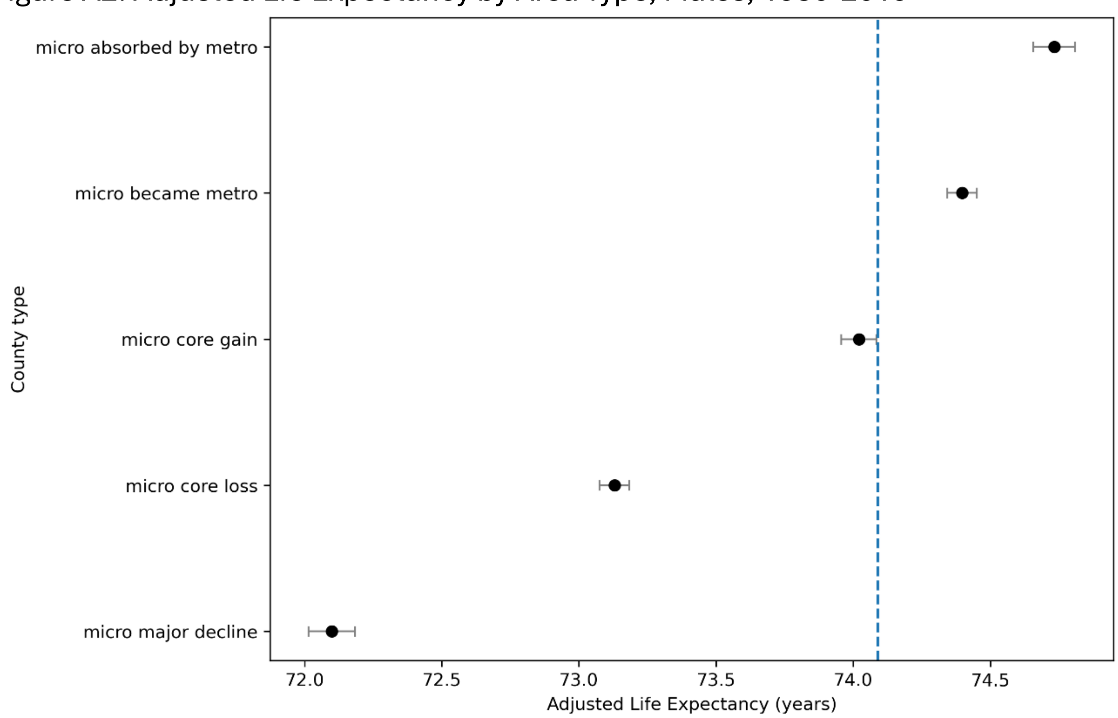
Figures A1–A3 present dot-and-whisker plots for adjusted life expectancy by area type, for both sexes combined (A1), males (A2), and females (A3). Points represent population-weighted, year-adjusted marginal means; whiskers denote 95% confidence intervals based on HC1 robust standard errors.

Figure A1. Adjusted Lfe Expectancy by Area Type, Both Sexes, 1980-2019



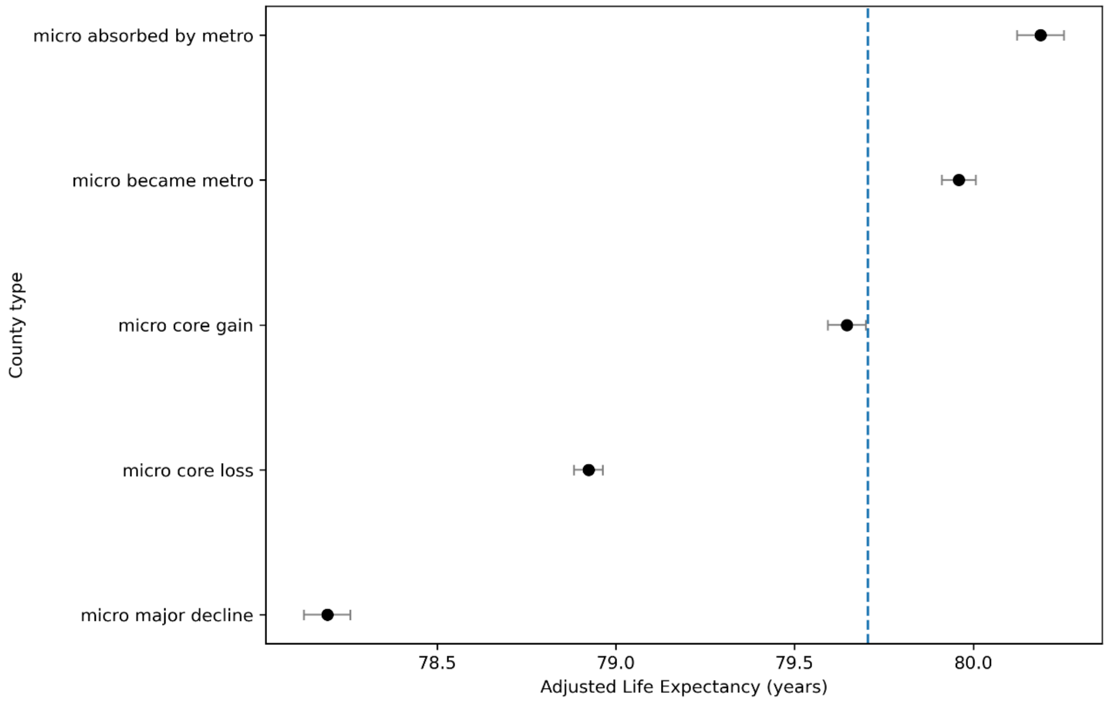
Source: Institute for Health Metrics and Evaluation and County Health Rankings & Roadmaps

Figure A2. Adjusted Lfe Expectancy by Area Type, Males, 1980-2019



Source: Institute for Health Metrics and Evaluation and County Health Rankings & Roadmaps

Figure A3. Adjusted Lfe Expectancy by Area Type, Females, 1980-2019



Source: Institute for Health Metrics and Evaluation and County Health Rankings & Roadmaps

Points show population-weighted, year-adjusted marginal means from WLS models with year fixed effects; whiskers represent 95% confidence intervals. The vertical dashed line indicates the overall mean. Micropolitan areas experiencing population decline (core loss and major decline) have significantly lower life expectancy than other types ($p < 0.001$).

A3. Notes on Methodology

- Models estimated using weighted least squares (WLS).
- Year fixed effects account for national life expectancy trends.
- Counties weighted by population each year.
- Robust (HC1) standard errors used to calcualte 95% confidence intervals.

A4. Additional Analyses

Parallel statistical tests were conducted for other outcome variables used in this study. Results are consistent with the patterns documented here for life expectancy. Full details are available from the author upon request.