

Transit-oriented development and transportation equity in mid-sized midwestern cities: a
case study of Cleveland, Ohio

by

Haley Massey

A THESIS

submitted in partial fulfillment of the requirements for the degree

MASTER OF REGIONAL AND COMMUNITY PLANNING

Department of Landscape Architecture and Regional and Community Planning
College of Architecture, Planning, and Design

KANSAS STATE UNIVERSITY

Manhattan, Kansas

2026

Approved by:

Major Professor
Dr. Huston Gibson

Copyright

© Haley Massey 2026.

ABSTRACT

Transit-oriented development (TOD) aims to reduce car dependence, promote sustainable land use practices, and enhance mobility options. However, questions remain about whether TOD equitably serves diverse populations, especially in mid-sized Midwestern cities shaped by deindustrialization and car-centric planning. This study examines Cleveland, Ohio's HealthLine bus rapid transit (BRT) corridor to evaluate how TOD affects transportation equity. The analysis uses a descriptive case study method, reviewing policy documents, AllTransit metrics, and Census data.

The findings show that the HealthLine improved transit accessibility, connected residents to more than 180,000 jobs within a 30-minute commute, and spurred \$9.5 billion in corridor investment. Households near the HealthLine exhibited higher rates of transit commuting and lower car ownership than citywide averages. Yet, equity outcomes proved uneven. Early TOD policies prioritized economic development over equity protections, with affordable housing or anti-displacement measures introduced only after development pressures intensified. While many low-income and Black residents live within the corridor and gained improved access, gentrification and affordability concerns limited the reach of these benefits.

This research finds that while TOD increases transit access and spurs reinvestment in mid-sized Midwestern cities, equity is not guaranteed. Embedding equity as a guiding principle from the outset, through affordable housing, inclusive zoning, and equity-focused transit policies, is necessary if TOD is to meet its promise of equitable urban mobility.

Table of Contents

List of Figures.....	v
List of Tables.....	vi
Chapter 1 - Introduction.....	1
Chapter 2 - Literature Review.....	5
Theoretical Foundations of Transit-Oriented Development.....	5
TOD and the Reduction of Car Dependency.....	6
Equity Considerations in Transit-Oriented Development.....	7
Implementing TOD in Mid-Sized Midwestern Cities.....	8
Case Study: Cleveland, Ohio.....	10
Chapter 3 - Methods.....	15
Chapter 4 - Findings.....	21
Pre-2005: Cleveland Before The Healthline Development.....	21
2005: Euclid Corridor Transportation Project Planning Phase.....	23
2008: HealthLine BRT Launched with TOD Zoning Overlays.....	28
2010: Cleveland City Planning Commission Adopts TOD Guidelines.....	35
2015: Affordable Housing Incentives Tied to TOD Corridors.....	43
2020: RTA Introduces Equity-Focused Fare Policies.....	49
2023: Evaluation Reports on HealthLine Equity Impacts Published.....	58
Chapter 5 - Discussion.....	66
Corridor Performance and Systemwide Change.....	66
Accessibility and Mobility Dynamics.....	70
Affordability, Income, and Housing Pressures.....	72
Demographic Continuity and Spatial Inequality.....	74
Conclusion.....	77
Planning Recommendations.....	80
Study Limitations.....	81
Suggestions for Future Research.....	82
References.....	84

List of Figures

Figure 4.1- Population Graph (1950-2005).....	24
Figure 4.2 - Race and Ethnicity (2000).....	24
Figure 4.3 - Funding Breakdown.....	26
Figure 4.4 - Cleveland RTA Map.....	30
Figure 4.5 - HealthLine Corridor Map With Neighborhoods.....	30
Figure 4.6 - Relative Difference Corridor vs Citywide (2008).....	33
Figure 4.7 - Relative Difference Corridor vs Citywide (2010).....	40
Figure 4.8 - Relative Difference Corridor (2008-2010).....	41
Figure 4.9 - Relative Difference Citywide (2008-2010).....	42
Figure 4.10 - Relative Difference Corridor vs Citywide (2015).....	45
Figure 4.11 - Relative Difference Corridor (2010-2015).....	46
Figure 4.12 - Relative Difference Citywide (2010-2015).....	48
Figure 4.13 - Relative Difference Corridor vs Citywide (2020).....	53
Figure 4.14 - Relative Difference Corridor (2015-2020).....	57
Figure 4.15 - Relative Difference Citywide (2015-2020).....	57
Figure 4.16 - Relative Difference Corridor vs Citywide (2023).....	62
Figure 4.17 - Relative Difference Corridor (2020-2023).....	63
Figure 4.18 - Relative Difference Citywide (2020-2023).....	63
Figure 5.1 - Relative Difference Corridor (2008-2023).....	68
Figure 5.2 - Relative Difference Citywide (2008-2023).....	68
Figure 5.3 - AllTransit Performance Score Graph.....	70
Figure 5.4 - Average Weekly Transit Trips Available Graph.....	71
Figure 5.5 - Jobs Within 30-min Transit Commute Graph.....	71
Figure 5.6 - % Households Without Vehicles Graph.....	72
Figure 5.7 - % Workers Commuting by Transit.....	72
Figure 5.8 - Median Household Income Graph.....	73
Figure 5.9 - % Households Earning <\$25,000 Graph.....	73
Figure 5.10 - % Renter Occupied Households Graph.....	74
Figure 5.11 - Renter Burdened Households Graph.....	74
Figure 5.12 - Total Population Graph.....	75
Figure 5.13 - % Black Population Graph.....	76
Figure 5.14 - % White Population Graph.....	76

List of Tables

Table 4.1 - Key Transit and Demographic Indicators (2008).....	32
Table 4.2 - Policy Documents and TOD Guidelines (2010).....	37
Table 4.3 - Key Transit and Demographic Indicators (2008-2010).....	39
Table 4.4 - Key Transit and Demographic Indicators (2010-2015).....	44
Table 4.5 - Policy Documents and TOD Guidelines (2020).....	50
Table 4.6 - Key Transit and Demographic Indicators (2015-2020).....	52
Table 4.8 - Key Transit and Demographic Indicators (2020-2023).....	61
Table 5.1 - Key Transit and Demographic Indicators (2008-2023).....	67

Chapter 1 - Introduction

The United States has long been shaped by a transportation system that heavily prioritizes the automobile. Post-World War II urban planning policies encouraged sprawling suburban development and the decentralization of cities, often to the detriment of public transit networks and walkable neighborhoods. This automobile-centric approach has led to widespread consequences, including rising greenhouse gas emissions, significant land consumption, traffic congestion, and, crucially, inequitable access to transportation. While the physical form of American cities has historically made private vehicle ownership the dominant mode of travel, these same development patterns have disproportionately affected low-income and marginalized communities, who often have fewer resources to own or operate a personal vehicle.

In recent decades, urban planners and policymakers have increasingly adopted transit-oriented development (TOD) as a strategy to mitigate the negative consequences of car dependency, emphasizing compact, mixed-use development within walking distance of high-capacity public transit. The goal is to create vibrant, walkable communities with access to reliable public transportation, enabling residents to meet their daily needs without relying on a car. TOD strategies have been implemented in cities of varying sizes and contexts, often with a dual aim of encouraging more sustainable land use and transportation behavior, and improving access to mobility for a wider cross-section of residents.

While the benefits of TOD have been widely studied in large metropolitan regions with well-established transit systems and high ridership, like San Francisco, Washington D.C., and New York City, less is known about how TOD functions in mid-sized cities, particularly in the American Midwest. These cities often lack the density and transit infrastructure necessary to

support traditional TOD models as they have been applied in larger metros. Many midwestern cities were historically built around rail lines or streetcar corridors, but shifted toward car-centric development patterns in the mid-20th century. The Midwest also faces stagnation or decline in population, lower transit ridership, and unique economic and demographic challenges. As a result, the implementation of TOD in these places may yield very different outcomes than in coastal or Sun Belt metros.

This study focuses on Cleveland, Ohio, as a case through which to understand the equity dimensions of transit-oriented development (TOD) in a mid-sized, Midwestern context. Cleveland presents an ideal setting for such a study given its historical reliance on public transit, persistent socioeconomic inequality, and evolving mix of legacy rail infrastructure and contemporary TOD initiatives. Over the past two decades, the city and the Greater Cleveland Regional Transit Authority (RTA) have invested in and promoted TOD as a cornerstone of urban revitalization, particularly along the HealthLine, a high-capacity transit corridor connecting Downtown Cleveland to University Circle. These efforts have sought to attract investment, foster compact, mixed-use development, and expand access to economic opportunity for historically marginalized residents.

The central focus of this research is to assess whether TOD operates as an equitable planning strategy in mid-sized, post-industrial contexts like Cleveland. Specifically, it investigates who benefits from TOD and how access to high-quality transit infrastructure varies across socioeconomic and racial lines. By comparing demographic, economic, and transit accessibility indicators between TOD and non-TOD areas, this study evaluates whether the HealthLine corridor has advanced or undermined transportation equity goals. Three central research questions guide this inquiry: (1) Do TOD zones in Cleveland serve diverse populations

equitably in terms of income and race? (2) To what extent does access to frequent, reliable transit differ between TOD and non-TOD neighborhoods? And (3) How do temporal changes in TOD-related indicators reflect progress toward or divergence from mobility equity? Together, these questions aim to clarify whether Cleveland's model of TOD represents a pathway toward more inclusive urban mobility or a continuation of existing spatial and social disparities.

Crucially, this study does not presume that TOD is inherently equitable or inequitable, instead it seeks to evaluate its impacts empirically. Cleveland, like many mid-sized cities, faces a legacy of racial segregation, economic disinvestment in certain neighborhoods, and unequal infrastructure investment. If TOD zones are disproportionately located in or attract higher-income, predominantly white residents while pushing out low-income residents and people of color, the policy may exacerbate transportation inequities even as it improves transit infrastructure. On the other hand, if TOD is being used strategically to invest in underserved areas and to expand mobility for those most in need, it may represent a valuable tool for inclusive planning. Understanding the real-world outcomes of TOD implementation is therefore essential for informing both local policy and broader debates about urban equity and transportation justice.

By focusing on Cleveland as a case study, one that has intentionally integrated transit-oriented development (TOD) into its urban planning framework, this research provides a detailed examination of how TOD operates within the context of a mid-sized, post-industrial city. The insights drawn from Cleveland's experience not only inform the city's ongoing transit and development strategies but also hold broader relevance for similar Midwestern cities facing comparable challenges. Cities such as St. Louis, Milwaukee, and Indianapolis share many of Cleveland's defining characteristics, including post-industrial economic decline, widespread

suburbanization, and entrenched racial and economic segregation. Each faces the dual task of modernizing aging transit infrastructure while promoting equitable access to new investment and growth. These cities also confront similar tensions between downtown revitalization and neighborhood-level inclusion, often amid constrained municipal resources. By analyzing Cleveland's TOD trajectory through both its achievements and shortcomings, this study offers lessons that can guide the implementation of more equitable, sustainable, and context-sensitive TOD across the Midwest and other regions facing analogous urban transitions.

Chapter 2 - Literature Review

Transit-Oriented Development (TOD) is a pivotal urban planning strategy designed to address automobile dependency, enhance sustainability, stimulate economic development, and promote equitable mobility (Cervero et al., 2004; Ewing et al., 2007). The foundational principle of TOD is to intentionally create high-density, mixed-use neighborhoods that promote public transportation, directly confronting private vehicle reliance. Through integrating living, working, and leisure spaces within walking distance of transit hubs, TOD aims to drive a shift away from automobile travel, thus alleviating congestion, reducing emissions, and increasing urban livability (Bozovic, 2025; Speck, 2012).

Despite extensive study in large metropolitan areas, the application of TODs in mid-sized Midwestern cities is less explored, posing an important gap in knowledge. Cities like Cleveland, Ohio, with their unique historical development patterns and socio-economic dynamics, present distinct challenges and opportunities for TOD. This literature review synthesizes key research on TOD, focusing on its potential to reduce car dependency, promote equitable mobility, and stimulate economic development in mid-sized Midwestern cities, with a particular emphasis on Cleveland.

Theoretical Foundations of Transit-Oriented Development

The TOD concept is rooted in theories emphasizing compact, pedestrian-friendly development around transit. Early advocates, such as Calthorpe (1993), stressed the integration of land use and transportation to counter suburban sprawl. Cervero et al. (2004) later defined TOD design principles, including denser development near transit, pedestrian-oriented streets, mixed land uses, and reduced parking. These principles aim to promote transit use and build vibrant, walkable communities that improve quality of life.

TOD is often contrasted with traditional auto-focused development, which favors sprawling suburbs, extensive road networks, and high car usage. Scholars have linked this type of urban growth to problems such as traffic jams, air pollution, and social isolation (Ewing et al., 2007; Douay & Minja, 2021). In response, TOD offers a different approach that focuses on sustainable travel and city efficiency.

TOD and the Reduction of Car Dependency

A major benefit of TOD is that it can lower car use by giving easy alternatives to driving. Research shows that people living in TOD areas tend to use public transit, walk, or bike more than those in regular suburbs (Cervero & Sullivan, 2011; Ewing et al., 2007). For instance, Cervero et al. (2004) found that people in TOD areas of Portland, the San Francisco Bay Area, and Washington, D.C. owned fewer cars and drove less than people in the suburbs.

Car dependency remains a significant issue in many mid-sized cities, where the built environment has been designed primarily to accommodate automobiles. Bozovic (2025) argues that the dominance of car-centric infrastructure poses a major barrier to TOD adoption, as residents accustomed to driving may be reluctant to switch to public transit unless it offers comparable convenience and reliability. Mattioli and Colleoni (2015) further highlight the financial implications of car dependency, noting that the high costs of vehicle ownership disproportionately impact lower-income households. In this context, TOD presents an opportunity to enhance transportation affordability by reducing the need for private vehicle ownership.

However, not all TOD projects have been equally effective in cutting car use. Building on earlier barriers, Schuetz et al. (2018) found that while more people used transit near new developments in Los Angeles, car use remained high due to the city's strong driving culture and

extensive highway network. Similarly, Thomas and Bertolini (2020) suggest that cultural factors, such as people's preferences for driving and ideas about public transit, are crucial to the effectiveness of TOD in reducing car use.

Additionally, the effectiveness of TOD depends on the quality and coverage of the transit system itself. Maharjan et al. (2024) analyzed transit accessibility in American cities and found that TOD is most effective in reducing car dependency when integrated with high-frequency, reliable public transportation services. In cities with limited transit networks, TOD may struggle to achieve its intended mobility benefits.

Equity Considerations in Transit-Oriented Development

Beyond its potential to reduce car dependency, TOD has been promoted as a means of fostering transportation equity by improving access to mobility for historically marginalized and low-income populations. Building on its broader mobility benefits, equitable access to mobility is crucial for social and economic inclusion, as reliable transportation facilitates access to employment, education, healthcare, and other essential services (Sanchez et al., 2003). In principle, TOD should enhance mobility options for all residents by providing frequent and reliable transit service, increasing walkability, and reducing the financial burden of car ownership. However, concerns have been raised about whether TODs genuinely serve disadvantaged communities or if they contribute to processes of gentrification and displacement that ultimately reinforce existing inequities (Zuk et al., 2017).

The phenomenon of transit-induced gentrification (TIG) has been documented in various cities. TOD projects have led to rising property values and housing costs, displacing low-income residents (Dong, 2017; Grube-Cavers & Patterson, 2015). For example, in Denver, Bardaka et al. (2018) found that proximity to light rail stations increased property values. This benefited

property owners but created affordability challenges for renters. Similarly, in Minneapolis, Padeiro et al. (2019) observed that investments in light rail transit raised residential property values, heightening concerns about affordability for existing residents.

To address equity concerns, scholars and practitioners advocate for integrating equitable TOD (e-TOD) principles, including inclusive planning, affordable housing, and anti-displacement strategies (Pollack et al., 2010; Dittmar & Poticha, 2004). For example, the Fruitvale Village project in Oakland, California, often cited as a successful e-TOD model, combined mixed-use development, affordable housing, and community services. This resulted from a collaborative planning process with local stakeholders (Sandoval & Herrera, 2015). Led by the Unity Council and Bay Area Rapid Transit (BART), the project turned a neglected parking lot near the Fruitvale BART station into a vibrant neighborhood hub. The site features over 40,000 square feet of retail, 47 affordable housing units, and a public library, while preserving affordability for long-term residents (Cervero et al., 2004). This case demonstrates how community-driven planning can address gentrification, support transit efficiency, and promote social equity. It also offers a replicable model for mid-sized cities, such as Cleveland, seeking to balance growth with inclusive mobility.

Implementing TOD in Mid-Sized Midwestern Cities

Mid-sized Midwest cities face distinct challenges in implementing TOD. Unlike coastal areas with old transit networks, many Midwestern cities grew around cars, as urban planning prioritized highways and suburbanization (Chapple & Loukaitou-Sideris, 2019). This history has entrenched car dependency, making the shift to transit-oriented urbanism harder.

Thomas and Bertolini (2020) identify political resistance as a major barrier to TOD adoption in car-centric cities. Suburban commuters, local businesses, and residents accustomed

to driving often resist measures that prioritize public transit over roads. Elengold (2024) adds that municipalities also face financial constraints when funding transit expansion, especially in cities with limited revenue sources.

Another major challenge is spatial inequity in transit access. Maharjan et al. (2024) found that transit services in many American cities are disproportionately concentrated in central business districts. As a result, lower-income suburban residents have limited mobility options. This raises concerns that TOD investments may mainly benefit already well-served urban cores while neglecting underserved communities.

Despite these challenges, several Midwestern cities have made concerted efforts to integrate TOD principles into their urban planning frameworks, each adapting the concept to its unique transportation infrastructure and economic conditions. Minneapolis, for instance, has developed a network of TODs around its light rail system, particularly along the Blue and Green Lines, which connect downtown to major employment centers and the airport. These corridors have successfully attracted dense, mixed-use developments, boosting property values while increasing transit ridership (Fan et al., 2012). However, the success of Minneapolis's TODs has also raised concerns about affordability and gentrification, as rising housing costs have displaced some lower-income residents from transit-proximate neighborhoods (Goetz et al., 2019).

Kansas City's approach, centered on its modern streetcar line, has focused more narrowly on downtown revitalization and economic redevelopment. The streetcar corridor, launched in 2016, has stimulated over \$2 billion in new investment within a two-mile stretch, primarily in commercial and residential projects aimed at attracting young professionals and visitors (Kansas City Streetcar Authority, 2025). While this has been celebrated as a catalyst for urban renewal, the benefits have been geographically concentrated, with limited improvements to regional

transit connectivity or equity for residents in outlying neighborhoods who continue to rely on automobiles.

Cleveland's HealthLine, by contrast, represents a hybrid model of Midwestern TOD implementation that blends economic redevelopment with corridor-based equity goals. Unlike Minneapolis's rail-based system or Kansas City's downtown-focused streetcar, Cleveland leveraged its bus rapid transit (BRT) infrastructure to transform the Euclid Avenue corridor, linking downtown with University Circle, into a mixed-use, transit-accessible development zone. This approach allowed for lower capital costs while delivering measurable improvements in transit accessibility and investment along the corridor. Yet, questions remain regarding the equitable distribution of these benefits, particularly whether low-income and minority residents have shared equally in the economic and mobility gains spurred by the HealthLine. Thus, Cleveland presents an instructive case for examining how BRT-based TOD can foster equitable access to transit in mid-sized, post-industrial cities, laying the groundwork for the analysis that follows.

Case Study: Cleveland, Ohio

Cleveland serves as a compelling and instructive case study for examining the implementation and equity outcomes of transit-oriented development (TOD) within a mid-sized, post-industrial city in the Midwest. Once a thriving manufacturing hub, Cleveland experienced decades of population loss, suburban flight, and economic decline beginning in the mid-20th century, leaving behind a fragmented urban landscape marked by disinvestment and spatial inequality (Keating, 2010). Between 1950 and 2000, the city's population fell by more than half, while job centers and economic activity dispersed outward to the suburbs (Glaeser & Kahn, 2004). This shift, coupled with heavy investment in highways during the postwar period,

entrenched car dependency and eroded the viability of Cleveland's once-robust public transit system. The resulting urban form, characterized by low density, vacant land, and concentrated poverty, presented significant challenges to creating efficient and equitable transportation networks (Hanlon & Vicino, 2007). Against this backdrop, the city's efforts to reintroduce transit-oriented planning through the HealthLine Bus Rapid Transit (BRT) corridor in the early 2000s represented not only an infrastructure investment but also an attempt to reverse decades of disinvestment through transit-led redevelopment.

The HealthLine BRT, launched in 2008 along Euclid Avenue, is widely recognized as one of the most ambitious BRT projects in the United States. Spanning 6.8 miles, it connects two of Cleveland's most important employment and cultural anchors, downtown Cleveland and University Circle, while passing through neighborhoods such as Midtown, Fairfax, and Central, which have historically struggled with high poverty rates and limited access to opportunity (RTA, 2023; NOACA, 2017). The project was developed through a \$200 million partnership among the Greater Cleveland Regional Transit Authority (RTA), the City of Cleveland, and regional and institutional stakeholders, including the Cleveland Clinic and Case Western Reserve University. Its design incorporated features typically associated with rail transit, including dedicated bus lanes, level boarding, off-board fare collection, and high-quality station amenities, earning it a "Gold Standard" designation from the Institute for Transportation and Development Policy (Hook et al., 2013). The corridor's branding as the "HealthLine," a nod to its institutional anchors, further reinforced its dual purpose of enhancing mobility and stimulating economic development in a corridor long considered blighted.

Since its launch, the HealthLine has been credited with catalyzing significant reinvestment and urban redevelopment along Euclid Avenue. According to the RTA (2022) and

NJTOD (2023), the corridor has generated roughly \$9.5 billion in economic development, resulting in the addition of new hotels, commercial offices, and over 8,800 residential units. The Midtown neighborhood, once dotted with abandoned factories and vacant lots, has seen the rise of new technology firms, research facilities, and mixed-use developments. Similarly, downtown Cleveland has experienced substantial residential growth, with an increasing number of market-rate housing projects marketed to professionals seeking proximity to transit and employment centers. This transformation aligns with broader national trends in TOD, where high-quality transit infrastructure has been leveraged as a tool for urban revitalization and economic competitiveness (Cervero et al., 2004). Cleveland's case is particularly notable because it demonstrates that BRT, traditionally perceived as a lower-cost, second-tier alternative to rail, can generate similar TOD outcomes when supported by coordinated land use planning and institutional investment (Deng & Nelson, 2013).

However, while the HealthLine has been celebrated for its economic impact, the equity implications of its success are far more complex. As Chapple and Loukaitou-Sideris (2019) and Zuk et al. (2017) argue, TOD often carries a dual potential, it can improve accessibility and investment in underserved areas, but it can also accelerate gentrification and displacement if not accompanied by strong affordability and anti-displacement measures. In Cleveland, these dynamics are increasingly evident along Euclid Avenue. While investment has revitalized key segments, particularly between downtown and University Circle, long-term residents in neighborhoods such as Fairfax and Central, areas with predominantly African American, low-income populations, face growing concerns about affordability and exclusion from the new wave of development (Center for Community Solutions, 2024). For instance, property values along the corridor have risen by over 60% since 2008, and median rents have climbed in some

tracts near University Circle by as much as 35% (U.S. Census Bureau, 2021). These shifts, while indicative of economic recovery, raise important questions about whether the benefits of TOD are reaching the populations most in need of improved access to transit, employment, and housing stability.

Furthermore, Cleveland's HealthLine corridor operates within a broader regional context marked by structural inequities in transit provision. The city's east-west divide, long reinforced by racial segregation and economic disinvestment, continues to influence mobility patterns. The eastern neighborhoods, through which the HealthLine runs, remain predominantly Black and lower-income, yet they have also borne the brunt of historical redlining, housing discrimination, and disinvestment. Although the HealthLine has improved transit service frequency and connectivity, many residents in adjacent areas still face barriers to accessing jobs located in suburban employment centers that are beyond the reach of the RTA's fixed-route service (Rothwell & Massey, 2010). Moreover, fare affordability and service reliability remain persistent concerns. While the introduction of equity-focused fare policies in 2020, such as reduced-fare programs for low-income riders, marked progress, these efforts were largely reactive to advocacy rather than being embedded in the initial TOD framework.

Despite these equity challenges, Cleveland's TOD experience remains a significant case for understanding how transit-led redevelopment unfolds in mid-sized cities. Compared to coastal or high-growth metropolitan areas, Cleveland's slower market dynamics, limited fiscal capacity, and historical dependence on institutional anchors shape both the pace and distribution of TOD impacts. As Douay and Minja (2021) note, urban planning in cities undergoing post-industrial transitions often reflects competing objectives, such as economic regeneration, fiscal stability, and social inclusion, which must be carefully balanced. In Cleveland, TOD has

functioned as both an infrastructure strategy and a place-making tool, one that has succeeded in transforming key corridors but has yet to fully resolve underlying mobility inequities.

Taken together, the literature reveals that while the HealthLine corridor exemplifies how well-planned BRT can spur transit-oriented growth and urban reinvestment, its social outcomes remain uneven. TOD in Cleveland demonstrates both the promise and the pitfalls of linking transit investment with urban redevelopment in mid-sized, post-industrial cities. The city's experience underscores the importance of coupling physical and economic revitalization with policies that intentionally prioritize mobility equity, such as affordable housing mandates, inclusive zoning, and targeted fare programs to ensure that the benefits of TOD are shared broadly. As such, Cleveland stands as both a model and a cautionary tale, illustrating that the success of transit-oriented development cannot be measured solely by the scale of investment or ridership growth but must also account for the distributional fairness of those outcomes.

Chapter 3 - Methods

This study employs a mixed-methods, single-case study design and a descriptive-analytical framework. It examines how transit-oriented development (TOD) influences car dependency and mobility equity in Cleveland, Ohio. Cleveland's unique history marked by deindustrialization, population decline, and uneven urban reinvestment makes it a typical example for understanding the challenges faced by mid-sized, post-industrial cities transitioning to sustainable, equitable transit systems. The case study approach enables close exploration of how TOD is conceived, implemented, and experienced along the HealthLine Bus Rapid Transit (BRT) corridor. This provides a rich understanding of how transportation planning, land use, and equity outcomes interconnect. This design is well-suited for capturing complex, local processes where infrastructure, institutional action, and community dynamics interact over time.

Building on this framework, a descriptive-analytical approach is used to document and interpret TOD's evolution in Cleveland, without imposing overly deterministic or causal assumptions. Rather than testing a hypothesis or employing a comparative cross-city model, this study develops a longitudinal narrative that traces the evolution of TOD policy, implementation, and outcomes from 2005 to 2023. This approach enables temporal and contextual sensitivity, highlighting how transit-oriented investments have both shaped and been shaped by broader economic and demographic forces. By focusing on one city in depth, the study reveals how TOD operates within the realities of Cleveland's political, fiscal, and spatial landscape, rather than abstracting the process into generalized regional patterns.

The methodological approach integrates qualitative and quantitative data to capture both policy intent and material outcomes. The qualitative component focuses on analyzing local and

regional planning documents, zoning codes, transportation master plans, and agency reports produced by entities such as the Greater Cleveland Regional Transit Authority (RTA), the City of Cleveland, the Northeast Ohio Areawide Coordinating Agency (NOACA), and relevant advocacy organizations. Key materials include the Connecting Cleveland 2020 Citywide Plan (2007), HealthLine Corridor Development Guidelines (2008), Cleveland Climate Action Plan (2018), and NOACA's AIM Forward 2040 and Equity in Mobility reports (2017, 2023). These documents are systematically analyzed through a thematic content analysis, in which policy language, stated objectives, and implementation tools are coded to identify recurring goals, underlying values, and specific mechanisms guiding TOD implementation. Particular attention is given to how each document defines and operationalizes concepts such as transportation equity, accessibility, and affordable housing, including the presence of measurable targets, regulatory tools, and programmatic strategies. This approach allows for comparison across time, revealing shifts in policy emphasis from growth-oriented development to more explicit equity-centered frameworks. This review also clarifies how the city's understanding of TOD shifted from an initial focus on economic revitalization and corridor redevelopment to a more explicit emphasis on inclusion, affordability, and climate resilience.

To provide further context, quantitative data serve to complement and contextualize this policy analysis, providing empirical evidence of the outcomes associated with TOD implementation. The study draws on data from the AllTransit database, which provides standardized measures of transit accessibility, coverage, and performance, as well as from the American Community Survey (ACS) for socioeconomic and demographic indicators. AllTransit metrics, such as the Performance Score, average weekly transit trips available, and jobs accessible within a 30-minute commute, offer quantifiable measures of mobility and service

quality within and beyond the HealthLine corridor. Meanwhile, ACS data on household vehicle access, commute mode share, median income, poverty rates, and housing tenure provide essential context for evaluating whether TOD benefits have been equitably distributed. Together, these sources allow for the construction of a longitudinal profile of the corridor's transit accessibility, socioeconomic composition, and development trajectory.

With these data sources in place, the analysis proceeds by using standard comparative and rate-of-change calculations. A comparative analysis is conducted by calculating Corridor vs. Citywide ratios to determine how HealthLine neighborhoods perform relative to Cleveland overall in key indicators, such as car ownership, transit commuting, and income. This approach isolates the effects of TOD in relation to broader citywide conditions, revealing whether the corridor exhibits distinct or divergent trends. Change-rate calculations, defined as $((\text{Value at Year 2} - \text{Value at Year 1}) / \text{Value at Year 1}) \times 100$, track temporal shifts between benchmark years (2005, 2010, 2015, 2020, and 2023). Each benchmark year is intentionally selected to correspond with key phases in the HealthLine's planning, implementation, and maturation. The year 2005 serves as a pre-implementation baseline, capturing conditions prior to the completion of the Euclid Corridor Transportation Project. The year 2010 represents the immediate post-implementation period, reflecting early impacts following the HealthLine's 2008 launch. The 2015 benchmark captures a mid-point in corridor redevelopment, when TOD-related investment and policy responses began to accelerate. The year 2020 provides insight into a mature phase of TOD while also accounting for the disruptive effects of the COVID-19 pandemic, which exposed and intensified existing inequities in transit access and socioeconomic conditions. Finally, 2023 reflects the most current conditions available, offering a post-pandemic perspective on the corridor's long-term trajectory and the durability of earlier gains. Together,

these intervals allow for a longitudinal assessment of progress or decline across transit and equity measures, illustrating how policy interventions and market dynamics have influenced the pace and direction of change. For example, changes in AllTransit Performance Scores and weekly trips are compared against shifts in median income, renter rates, and vehicle ownership to assess whether increased transit access is associated with equitable social outcomes.

Following the quantitative analysis, equity serves as the central analytical lens through which all findings are interpreted. In this study, equity is defined not only as equal access to transit infrastructure, but as the fair distribution of mobility benefits and burdens across different socioeconomic and racial groups, particularly those historically marginalized. This includes an emphasis on transportation equity (who can reliably access jobs and services), housing equity (whether residents can afford to remain in transit-rich areas), and distributional equity (whether gains from TOD are shared across populations). Data on income, race, poverty, and car ownership are therefore examined to assess how low-income households, zero-vehicle households, and minority populations who are most dependent on transit, have fared as TOD has expanded along the corridor. The analysis evaluates whether improvements in transit accessibility translated into meaningful gains in mobility and opportunity, or whether rising costs and redevelopment pressures offset these benefits.

To further clarify interpretation, all quantitative visualizations incorporate a consistent color-coding framework to signal their relationship to equity outcomes. Indicators shown in green represent trends generally associated with positive equity outcomes, such as increased transit accessibility, higher transit usage, or reductions in low-income households. Indicators shown in red represent negative equity outcomes, including rising rent burdens, increasing housing cost pressures, or declining affordability. Indicators shown in yellow denote trends that

require careful interpretation, as they are not inherently positive or negative. For example, increases in renter occupancy or population growth may indicate reinvestment and stabilization, but can also signal heightened vulnerability to displacement or market pressure. This visual system ensures that the analysis consistently distinguishes between improvements in infrastructure performance and improvements in lived socioeconomic conditions, reinforcing the study's focus on distributive outcomes rather than technical success alone.

Policy documents are reviewed through this same equity lens, with particular attention to the presence, strength, and timing of explicit equity measures. This includes identifying affordability targets, anti-displacement strategies, community benefits agreements, and mechanisms for inclusive public participation. By pairing these qualitative insights with quantitative trends, the analysis situates statistical findings within the broader political and institutional context that ultimately determines who benefits from TOD and who does not.

In addition to equity, governance is a key component of this methodology. The study examines how agencies such as the Greater Cleveland Regional Transit Authority (RTA), the City Planning Commission, the Northeast Ohio Areawide Coordinating Agency (NOACA), and major institutional anchors like the Cleveland Clinic and Case Western Reserve University have collaborated in shaping the evolution of TOD. Through document analysis, the research traces how these actors have prioritized, funded, and implemented transit and development initiatives, and how their differing objectives have influenced outcomes along the HealthLine corridor. This governance lens highlights the political economy of TOD in Cleveland, illustrating how decisions about transit investment, land use regulation, and housing policy are not purely technical, but are shaped by power, institutional priorities, and the capacity, or willingness, to embed equity into implementation.

With these perspectives integrated, this methodological framework addresses the central research questions. It examines whether transit-oriented development zones in mid-sized Midwestern cities serve diverse populations equitably. It also asks how access to high-quality transit differs by income and race between TOD and non-TOD areas. Additionally, it explores how changes in these variables mirror shifts in Cleveland's planning priorities, from transit expansion to equity integration. By triangulating policy analysis, demographic data, and transit metrics, the study captures both structural patterns and human implications of TOD in Cleveland.

The mixed-method design and descriptive focus make the results both empirical and rich in context. Quantitative comparisons show measurable patterns of accessibility and equity. Qualitative insights explain how these patterns are linked to institutional histories and policy. This approach clarifies the links among transportation infrastructure, economic development, and social equity. It gives a more complete understanding of urban change in mid-sized, post-industrial cities.

Ultimately, this methodological approach shows that studying TOD needs both precision and context. As a conclusion, Cleveland's HealthLine is not merely a transit corridor. It is a microcosm of broader tensions between growth and equity that define urban policy today. By combining rate-of-change analysis and qualitative interpretation, this study reveals how transit-oriented planning both increases mobility and reinforces structural inequities. This methodology offers a framework for future TOD studies in similar cities, providing a model for comparison and a foundation for more equitable, data-informed planning.

Chapter 4 - Findings

This section presents the findings of the study on transit-oriented development (TOD) and transportation equity in Cleveland, Ohio, organized chronologically by the planning and implementation phases of the HealthLine bus rapid transit (BRT) corridor. It begins by examining the policy frameworks and institutional arrangements that shaped the Euclid Corridor project, including the federal, state, and local partnerships that made its development possible. Subsequent sections trace how these early planning decisions translated into measurable outcomes in accessibility, land use, and neighborhood change over time. The findings also document how demographic and socioeconomic conditions evolved along the HealthLine corridor compared to citywide trends, revealing both the successes and limitations of Cleveland's TOD strategy in achieving equitable mobility outcomes.

Pre-2005: Cleveland Before The Healthline Development

Prior to the HealthLine's development, the Euclid Avenue corridor reflected decades of economic and demographic decline that had left it fragmented and underutilized. Cleveland had been losing population steadily since its mid-20th century peak of approximately 915,000 residents, falling to around 478,000 by 2000. Outmigration, deindustrialization, and suburban expansion contributed to the city's shrinking footprint, while concentrated poverty, racial segregation, and disinvestment shaped neighborhoods along the corridor, particularly on the East Side. These broader trends were clearly visible in the urban fabric of Euclid Avenue, where land use patterns and building conditions revealed the consequences of long-term decline.

Historically, Euclid Avenue had been Cleveland's premier residential corridor, home to the city's wealthiest industrialists on what was once called "Millionaires' Row." By the late 20th century, however, this elite residential character had largely disappeared. The grand mansions

had been demolished, subdivided, or converted to other uses, leaving behind a mix of aging residential structures, small-scale commercial properties, and vacant parcels. In many areas, housing remained but was predominantly older stock in varying states of disrepair, often converted into multi-family units or rooming houses to accommodate a declining population. Vacancies were common, and some stretches of the corridor were punctuated by lots cleared of buildings entirely.

Commercial development along Euclid Avenue had also shifted. Many buildings were low-intensity, auto-oriented commercial structures, including strip-style retail and small office buildings, interspersed with surface parking lots. Large expanses of underutilized land created gaps in the corridor, disrupting the continuity of the urban streetscape. These surface parking lots, often replacing former residential or mixed-use structures, reflected a broader trend toward car-oriented development that had intensified as residents and businesses left the area. In some locations, institutional uses, particularly smaller medical or educational facilities, were present, but they did not dominate the corridor, which remained largely fragmented and underperforming.

Vacancy, fragmented land use, and inconsistent building conditions gave the corridor a “hollowed-out” character. East of downtown, small residential clusters persisted but were often isolated amid parking lots and deteriorated commercial properties. Retail activity existed but was uneven, with many establishments struggling to attract customers due to the surrounding low-density, automobile-centered environment. Formerly cohesive neighborhoods were disconnected physically and socially, and the corridor lacked a continuous, vibrant street life. The combination of vacant lots, aging infrastructure, and scattered residential and commercial uses created an urban environment that was underutilized and visually disconnected, yet still embedded with important institutional anchors, such as hospitals and universities further east.

Transit along Euclid Avenue prior to 2005 was limited to conventional bus service operating in mixed traffic. Buses provided critical access for local residents, but service was slow, unreliable, and often insufficient to support the corridor's potential as a major commuting route. The existing Red Line ran south of Euclid Avenue and served primarily longer-distance trips, leaving many key destinations along the corridor underserved. As a result, Euclid Avenue presented a corridor that was simultaneously important for regional mobility and deeply challenged in terms of land use, infrastructure, and accessibility.

In sum, the Euclid corridor prior to the HealthLine was a patchwork of declining residential buildings, low-intensity commercial properties, surface parking, and vacant lots. Its urban fabric was fragmented, with visible signs of disinvestment, vacancy, and physical deterioration, yet it remained a corridor of strategic importance, linking Downtown Cleveland with University Circle. The landscape reflected decades of demographic change, economic decline, and the gradual erosion of the corridor's historic character, providing a clear picture of the conditions that any future redevelopment or transit improvement would need to address.

2005: Euclid Corridor Transportation Project Planning Phase

By 2005, Cleveland stood at a critical inflection point economically, socially, and spatially. The city was confronting the compounded legacies of deindustrialization, population loss, and suburban sprawl that had redefined its urban form over the previous half-century. As shown in Figure 4.1, Cleveland's population had fallen to roughly 452,000, just half of its 1950 peak of 914,808, making it one of the most rapidly shrinking cities in the United States (U.S. Census Bureau, 2005). The population decline was paired with increasing racial and spatial segregation. Figure 4.2 shows that African Americans made up approximately 51% of the city's population, with concentrations exceeding 80% in several East Side neighborhoods, including

Fairfax, Hough, and Central (U.S. Census Bureau, 2005). Median household income in

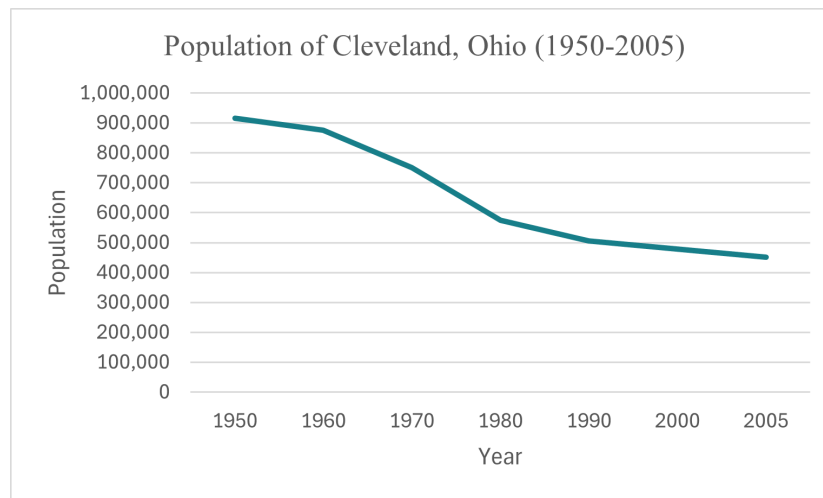


Figure 4.1 - Population of Cleveland, Ohio (1950-2005)

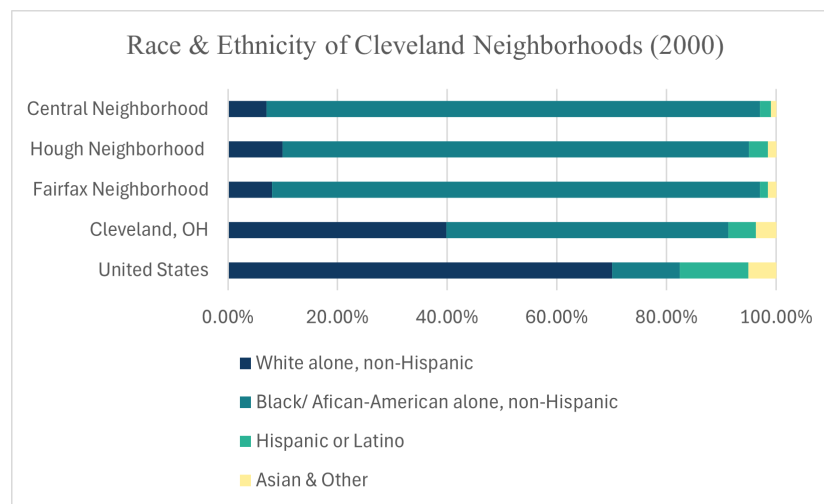


Figure 4.2 - Race & Ethnicity of Cleveland, Ohio (2000)

Cleveland stood at just \$25,928, less than two-thirds of the national median, and more than 30% of residents lived below the poverty line (U.S. Census Bureau, 2005). These inequities were especially pronounced along the Euclid Avenue corridor, where decades of disinvestment had left behind boarded-up storefronts, vacant lots, and declining housing stock. Once known as “Millionaire’s Row” during Cleveland’s industrial heyday, Euclid Avenue had, by the early 2000s, become symbolic of the city’s broader economic decline (Hayden, 2004; Keating, 2010).

Transit access in 2005 reflected this economic geography. Census Transportation data showed about 28% of Cleveland households did not own a vehicle, nearly triple the national average, highlighting a strong dependence on public transit, especially among low-income residents (U.S. Census Bureau, 2005). Yet, the Greater Cleveland Regional Transit Authority (RTA) struggled to meet demand due to falling ridership, service cuts, and an aging fleet. Euclid Avenue, served by the #6 bus, was notorious for congestion, inconsistent service, and poor reliability. Transit trips between downtown and University Circle often exceeded 40 minutes for less than seven miles. This limited access to jobs and healthcare in the city's main institutional corridor. These conditions underscored a core planning dilemma: how could Cleveland modernize its transportation to attract investment and improve mobility for transit-dependent residents?

It was within this economic and demographic context that the Euclid Corridor Transportation Project, later known as the HealthLine, emerged. Conceived in the mid-1990s, the project gained momentum by 2005, serving as both a mobility intervention and an urban redevelopment strategy. According to planning documents from the Northeast Ohio Areawide Coordinating Agency (NOACA), the corridor was a “catalyst for regional reinvestment.” This vision aligned with federal priorities under the Federal Transit Administration's (FTA) New Starts program (FTA, 2012). The New Starts program provided competitive funding for high-capacity transit projects, emphasizing potential economic and environmental benefits. Thus, for Cleveland, the corridor became not only a transportation project, but a linchpin in the city's broader recovery efforts.

The Transportation Plan 2025 identified three key objectives for the Euclid Corridor project. First, the plan aimed to reduce congestion and improve transit reliability. Second, it

promoted compact, mixed-use development. Third, it fostered economic revitalization through transit-oriented growth (NOACA, 2006). The corridor’s 6.8-mile alignment linked Public Square downtown to University Circle, chosen for its potential to connect major employment hubs, including the Cleveland Clinic, University Hospitals, and Case Western Reserve University. Together, these “anchor institutions” were projected to provide over 60,000 jobs and ongoing investment in the health and education sectors (Rosentraub, 2009). City officials and planners viewed Euclid Avenue as a test case for how the emerging “eds and meds” economy could rebuild Cleveland’s economic base.

By 2005, the Euclid Corridor project had assembled an estimated \$200 million in total funding, reflecting a highly coordinated, multi-agency effort. Figure 4.3 shows the breakdown of financing, including \$82 million from the Federal Transit Administration’s New Starts program, \$75 million in contributions from the state of Ohio, and approximately \$30 million in local matching funds provided jointly by the Greater Cleveland Regional Transit Authority (RTA), the City of Cleveland, and several major institutional partners along the corridor (Federal Transit Administration, 2012). Managing this complex funding structure underscored the institutional

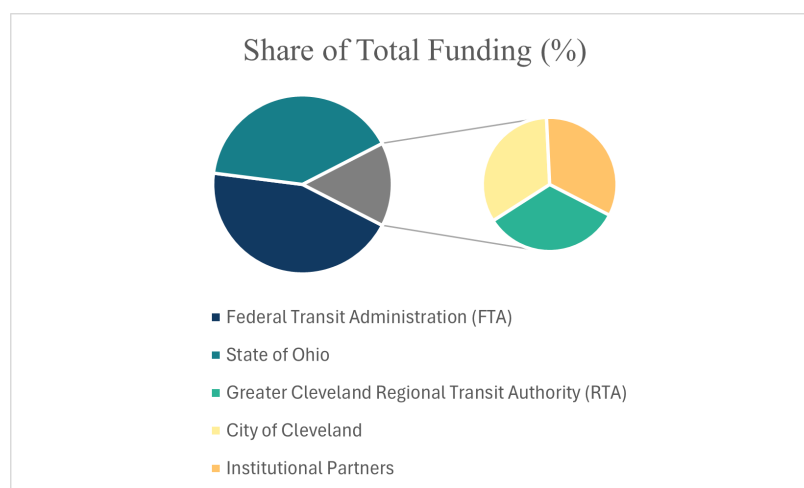


Figure 4.3 - Funding Breakdown of Corridor Project (2005)

collaboration required to advance a major transit investment within a fiscally constrained urban

environment. Within this partnership, RTA served as the lead implementing agency, responsible for overseeing project design, infrastructure construction, and service delivery for what would become the HealthLine bus rapid transit system. The Cleveland City Planning Commission played a coordinating role, revising zoning ordinances and land-use policies to encourage compact, mixed-use development and ensure the physical design of the corridor supported transit-oriented principles. Meanwhile, the Northeast Ohio Areawide Coordinating Agency (NOACA) provided regional oversight, integrating the project into the metropolitan long-range transportation plan and ensuring compliance with federal mobility, air quality, and sustainability goals. Together, these entities created a governance model that combined local land-use authority, regional planning coordination, and federal funding oversight.

Concurrently, the City of Cleveland was developing the Connecting Cleveland 2020 Citywide Plan, which circulated in draft form by late 2005. Early drafts of this comprehensive plan positioned the Euclid Corridor as a “demonstration project” for integrated land use and transit planning. The plan identified Euclid Avenue as a “priority redevelopment corridor.” It emphasized mixed-use, high-density development adjacent to transit stops as a strategy for stabilizing declining neighborhoods and curbing outward suburban sprawl (City of Cleveland, 2007). Three guiding principles were outlined for Euclid Avenue’s redevelopment. Firstly, restoration of Euclid Avenue as a civic and economic spine, reconnecting fragmented urban neighborhoods, and attracting private investment. The plan also promoted a strategic linkage between downtown and University Circle, capitalizing on anchor institutions to create a continuous economic corridor. Finally, it aimed for enhanced mobility for low-income and transit-dependent residents, ensuring equitable access to new opportunities created by corridor investment (City of Cleveland, 2007).

While the plan's language nodded to equity, the emphasis remained on catalyzing economic growth and reinvestment. Early land use strategies proposed rezoning Euclid Avenue to accommodate higher density and mixed-use development, particularly around planned BRT stations. The Cleveland City Planning Commission's preliminary zoning overlays (2005) introduced reductions in parking minimums and allowed greater floor-area ratios (FAR) near transit nodes (Cleveland CPC, 2005). These are key features of transit-oriented development. However, these strategies focused mainly on attracting private development rather than embedding social equity mechanisms, such as inclusionary zoning or affordable housing requirements.

From a governance standpoint, the 2005 Euclid Corridor planning process showed multi-scalar coordination among federal, state, regional, and local actors. The RTA's transit expertise, NOACA's policy alignment with federal sustainability goals, and the City's land use authority were all essential to advancing the project. However, as Thomas and Bertolini (2020) note, such collaborations in post-industrial cities often risk prioritizing institutional and economic agendas over community equity. This tension grew as the HealthLine moved from planning to implementation.

2008: HealthLine BRT Launched with TOD Zoning Overlays

Technically, the HealthLine differed from conventional bus service by incorporating features common to bus rapid transit (BRT), such as those found in light rail. These included dedicated median-running lanes, off-board fare collection, level boarding, real-time digital arrival signage, and traffic signal prioritization (Levinson et al., 2003; Hook et al., 2013). As illustrated in Figure 4.4, the HealthLine runs along Euclid Avenue, forming the central spine of Cleveland's transit network and linking downtown's Public Square with University Circle.

Figure 4.5 provides a closer view of the HealthLine corridor, highlighting the location of adjacent development nodes. These design elements increased average travel speeds by nearly 25% and improved system reliability. As a result, the HealthLine achieved service quality comparable to rail at a fraction of the cost.

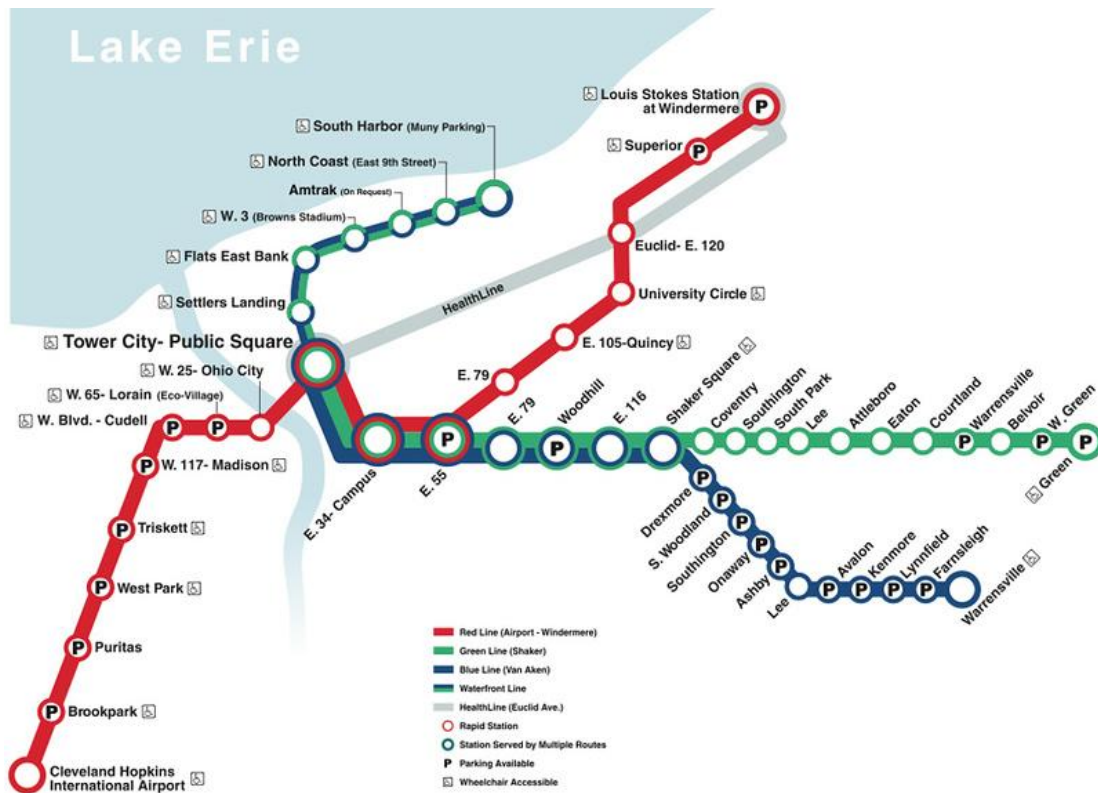


Figure 4.4 - Map of Cleveland's Transit System with the HealthLine in Gray
Provided by The Greater Cleveland Regional Transit Authority (2008)



Figure 4.5 - Map of Cleveland's HealthLine and Adjacent Neighborhoods
(2026)

The HealthLine also marked a shift to transit-oriented development (TOD) principles in Cleveland's planning. With the BRT's launch, Cleveland adopted the HealthLine Corridor Development Guidelines (2008), a comprehensive zoning overlay promoting higher-density, mixed-use, and pedestrian-friendly design through five main policy changes:

1. Mixed-use zoning overlays allowing for vertical integration of residential, commercial, and institutional uses;
2. Reduced parking minimums by up to 50% within a quarter-mile radius of BRT stations;
3. Increased allowable floor-area ratios (FAR) and building heights in designated TOD nodes such as Playhouse Square and Midtown;
4. Pedestrian-oriented design standards requiring transparent facades, sidewalk-level entrances, and active ground-floor uses; and
5. Design review provisions put in place to ensure aesthetic continuity and public realm improvements, such as trees, street lighting, and bike facilities (Cleveland City Planning Commission, 2008).

These regulatory reforms represented a significant shift from Cleveland's postwar zoning paradigm, which had long favored automobile-oriented development patterns. Accordingly, the HealthLine Guidelines articulated a new vision of Euclid Avenue as a "civic spine," positioning the corridor as a place where transit infrastructure, economic reinvestment, and urban design were deliberately aligned to foster compact, walkable neighborhoods.

Turning to economic impacts, early indicators suggest that this strategy achieved immediate success in attracting private development. By the end of 2008, the City of Cleveland's Department of Economic Development reported nearly \$2 billion in announced or ongoing projects within the HealthLine corridor. Major examples include: The Playhouse Square

mixed-use redevelopment, introducing new market-rate and student housing, retail, and entertainment space near downtown; The Cleveland Clinic Heart Center expansion, a \$500 million project that established the corridor as a premier medical employment hub; and The University Hospitals and Case Western Reserve University expansions, adding research and residential facilities that reinforced University Circle as a center for education and healthcare innovation (Rosentraub, 2009). These investments signaled the corridor’s reemergence as a focal point of Cleveland’s new “eds and meds” economy.

Table 4.1 - Key Transit and Demographic Indicators (2008)

Indicator	2008 Corridor	2008 Citywide	Corridor Vs Citywide (2008)
AllTransit Performance Score (0-10)	6.1	5.1	-
Average Weekly Transit Trips Available	5,000	2,600	+92.31%
Jobs Within 30-min Transit Commute	160,000	95,000	+68.42%
% Households Without Vehicles	31%	19%	+63.16%
% Workers Commuting by Transit	15%	6%	+150.00%
Median Household Income (USD)	\$23,500	\$30,400	-22.70%
% Households Earning < \$25,000	39%	33%	+18.18%
% Renter-Occupied Housing	60%	52%	+15.38%
% Rent-Burdened Households (>35% income to rent)	45%	40%	+12.50%
Total Population	24,752	424,000	-94.16%
% Black or African American Population	66%	51%	+29.41%
% White Population	34%	33%	+3.03%

As summarized in Table 4.1, the HealthLine corridor already displayed stronger transit accessibility, higher rates of zero-vehicle households, and greater transit reliance compared to

citywide averages. For instance, households within the corridor took advantage of nearly twice the weekly transit trips available citywide, and jobs accessible within a 30-minute transit commute were roughly 68% higher than for the city overall. Meanwhile, the corridor’s median household income lagged citywide levels by nearly 23%, underscoring the alignment between early TOD investments and lower-income, transit-dependent populations.

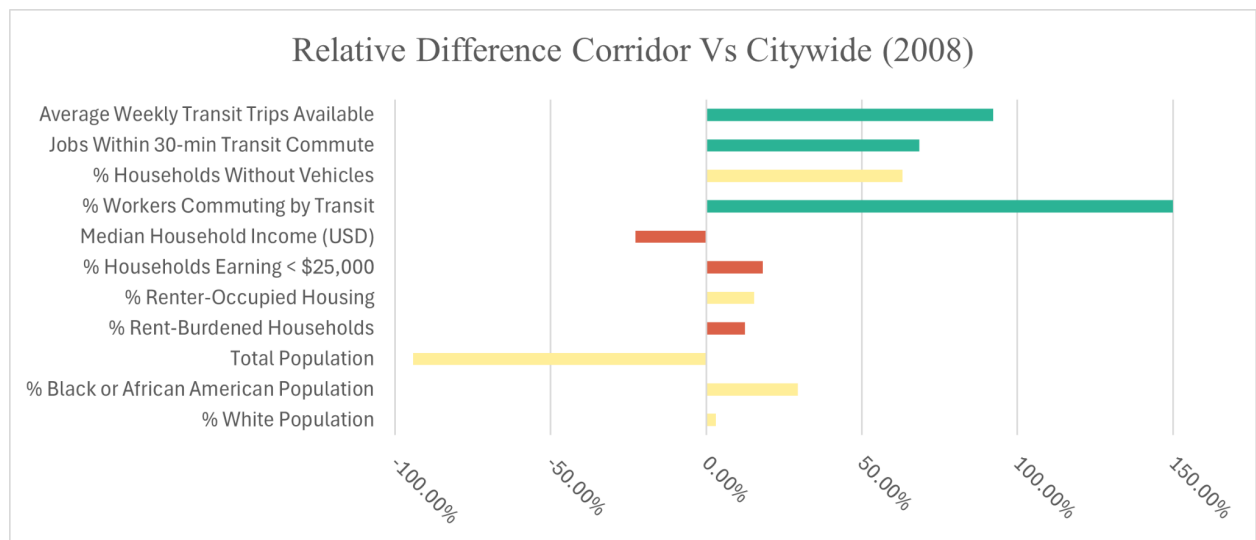


Figure 4.6 - Relative Difference Between the HealthLine Corridor and the City of Cleveland (2008) where Green is beneficial to equity, Red is non-beneficial, and Yellow is cautionary

Figure 4.6 visually reinforces these disparities, illustrating the contrast between the HealthLine corridor and citywide averages in terms of accessibility, income, and demographic composition. The coloring of the data in the figure indicates whether the difference is beneficial (green), non-beneficial (red), or an ambivalent option to remain aware of (yellow). The figure highlights that while the HealthLine substantially improved access to jobs and transit, it also intersected with neighborhoods already marked by economic disadvantage and racial segregation, with a 66% Black population compared to 51% citywide (U.S. Census Bureau, 2005).

In terms of mobility outcomes, the HealthLine immediately enhanced transit access for thousands of Cleveland residents. According to AllTransit data (CNT, 2023), residents within a half-mile of the corridor had access to approximately 5,000 weekly transit trips, nearly double the service frequency of comparable neighborhoods farther west. The AllTransit Performance Score, a composite indicator of frequency, connectivity, and job accessibility, reached 8.2 out of 10 for HealthLine-adjacent census tracts, compared to 5.1 for non-TOD areas. Combined with the finding that over 160,000 jobs were reachable within a 30-minute transit commute from HealthLine neighborhoods, these measures reinforce the system's dual role in mobility and economic access.

Complementary American Community Survey (ACS) data from 2005 to 2009 further underscore the corridor's alignment with transit-dependent populations. Approximately 31% of households within a half-mile of Euclid Avenue lacked access to a private vehicle, compared to 19% citywide (U.S. Census Bureau, 2005). Public transit commuting accounted for 15% of work trips in corridor tracts, nearly triple the city average of 6%, and walking rates were also notably higher. The median household income in HealthLine neighborhoods was approximately \$23,000, which is roughly 15% below the citywide median. Meanwhile, African Americans comprised between 65% and 85% of the population in core East Side segments, such as Fairfax and Central. This data confirms that the HealthLine initially served, and was intentionally routed through, areas with substantial concentrations of low-income, transit-dependent residents.

Yet despite these accessibility improvements, early evaluations highlighted concerns about equity and inclusion in TOD implementation. While the HealthLine Corridor Development Guidelines (2008) prioritized design, density, and investment attraction, they included no enforceable provisions for affordable housing, anti-displacement protections, or community land

trusts. As property values began to rise, housing affordability pressures emerged, particularly near Cleveland State University and Playhouse Square. Community advocates warned that without policy safeguards, TOD-induced redevelopment risked exacerbating spatial inequality by pricing out the very residents most reliant on transit access.

The 2008 launch of the HealthLine stands as both a landmark in urban reinvestment and a case study in the complexities of equitable TOD implementation. Specifically, it demonstrated that BRT could deliver rail-quality service and catalyze billions in economic development. At the same time, it revealed that transit infrastructure alone cannot overcome deeply embedded socioeconomic divides without explicit equity frameworks in place. These outcomes set the foundation for subsequent policy shifts in Cleveland, first through the development of formal TOD guidelines in 2010, followed by the later introduction of affordable housing and fare equity measures in the following decade.

2010: Cleveland City Planning Commission Adopts TOD Guidelines

The 2010 guidelines codified lessons learned from the HealthLine's initial implementation, transforming the corridor's design and planning experiments into a formalized policy model. The guidelines introduced higher allowable residential and commercial densities within a half-mile radius of major transit stops, reduced or eliminated parking minimums, and permitted vertical mixed-use development through overlay zoning districts (Cleveland City Planning Commission, 2010). They also emphasized pedestrian-oriented design standards such as minimal building setbacks, transparent ground-floor facades, and active street-level uses to promote walkability and vibrancy. Supporting measures included requirements for bicycle infrastructure, improved street lighting, and enhancements to crosswalks to strengthen first- and last-mile connectivity. These elements collectively marked a significant shift toward

transit-supportive land use, departing from the postwar suburban-style zoning code that had dominated Cleveland since the 1950s. These policy commitments are summarized in Table 4.2, which outlines the contributions of each institutional partner to shaping the TOD framework.

Institutionally, the adoption of the guidelines was the result of coordinated governance across municipal, regional, and institutional stakeholders. For example, the RTA sought to boost ridership and long-term returns on its \$200 million HealthLine investment by advocating for TOD as a growth strategy. NOACA integrated the city's TOD vision into its Connections+ 2035 Long-Range Transportation Plan, highlighting TOD as a means to reduce vehicle miles traveled (VMT) and advance federal sustainability goals (NOACA, 2012). Meanwhile, private and nonprofit actors such as University Circle, Inc., the Cleveland Foundation, and MidTown Cleveland, Inc. supported the framework to attract investments into key employment and cultural districts (Rosentraub, 2009). The resulting public-private coalition became central to TOD implementation in Cleveland, ensuring institutional development, transit planning, and local zoning were aligned.

By the time the guidelines were adopted, tangible results from the HealthLine corridor had already begun to materialize, reinforcing the policy's timeliness. Between 2008 and 2010, over \$3 billion in announced or completed investments occurred along Euclid Avenue (City of Cleveland, 2010; RTA, 2010). This figure marked an extraordinary increase compared to pre-HealthLine projections, which had estimated less than half that amount over the same period. New developments included the Cleveland Clinic Heart Center expansion, the University Hospitals Seidman Cancer Center, student housing near Cleveland State University, and multiple mixed-use infill projects in the Playhouse Square and MidTown districts.

Table 4.2 - Policy Documents and TOD Guidelines (2010)

Policy Document	Key TOD Guidelines and Provisions	Equity or Affordability Measures
Cleveland TOD Guidelines	• Established TOD Overlay Districts along BRT and rail corridors. • Allowed 25-40 dwelling units/acre within ½ mile of stations. • Reduced parking minimums to ≤1 space per unit. • Required active, transparent ground floors and pedestrian-oriented streetscapes. • Permitted mixed-use vertical zoning and encouraged bike infrastructure.	• General equity language (“access for all”) but non-binding. • No inclusionary zoning or renter protections.
Greater Cleveland RTA Strategic Plan 2010-2020	• Positioned TOD as a core ridership and reinvestment strategy. • Developed Station Area Plans and joint development partnerships. • Integrated real-time data, off-board payment, and station improvements.	• Focused on systemwide affordability and service reliability. • Lacked targeted affordability or equity monitoring tools.
NOACA Connections+ 2035 Long Range Transportation Plan	• Prioritized TOD corridors for federal funding. • Set performance metrics (density, ridership, mode share). • Identified Euclid Avenue as a TOD demonstration corridor. • Linked TOD to environmental goals (reduced CO₂, improved air quality).	• Recognized “access for low-income communities” as a guiding principle. • No enforcement or accountability mechanisms.
City of Cleveland Zoning Code Amendments (TOD Overlays)	• Created Euclid Avenue and Urban Form Overlay Zones. • Reduced lot size minimums and increased height limits near BRT stations. • Allowed shared/off-site parking and adaptive reuse of industrial buildings.	• No explicit equity or affordability provisions. • Focused on land-use flexibility and private investment.
Cleveland Climate Action Plan (Draft Framework)	• Promoted TOD as a carbon-reduction strategy. • Supported Complete Streets retrofits and multimodal connectivity. • Linked density targets to emissions goals.	• Framed mobility equity as climate justice. • Proposed tracking low-income transportation costs; no binding requirements.

Data from the AllTransit database (CNT, 2023) show clear improvements in transit performance metrics. By 2010, census tracts along the Euclid corridor achieved AllTransit Performance Scores averaging 7.6 out of 10, up from 6.1 in 2008 and notably higher than the citywide average of 5.2. These corridor tracts provided access to over 6,800 weekly transit trips, nearly double the service availability in neighborhoods located more than one mile from Euclid Avenue. Job accessibility also improved dramatically, with nearly 180,000 jobs reachable within a 30-minute transit commute from the HealthLine corridor, compared to approximately 155,000 prior to the BRT’s launch in 2008. These increases underscore the HealthLine’s early

effectiveness as both a mobility enhancement and a catalyst for development, expanding access to employment hubs while stimulating commercial reinvestment.

Findings from the American Community Survey (ACS 2006-2010) further demonstrate how the HealthLine's catchment area diverged from broader city trends. Households along Euclid Avenue continued to exhibit higher rates of transit dependency than Cleveland overall. Approximately 33% of corridor households lacked access to a private vehicle, compared to 20% citywide (U.S. Census Bureau, 2010). Transit commuting comprised 16% of work trips in HealthLine-adjacent census tracts, compared to 6% citywide, confirming that TOD areas maintained a significantly stronger reliance on public transit.

Income and racial composition also reveal significant contrasts. Median household income along the corridor was \$24,100, compared to \$27,500 citywide. This reflects persistent economic marginality in East Side neighborhoods such as Central, Fairfax, and Hough. Racially, these tracts were 70-85% African American, while Cleveland's overall population was 53% Black and 33% White (U.S. Census Bureau, 2010). Thus, the HealthLine corridor primarily served historically marginalized, transit-dependent communities. This was lauded as socially progressive, yet sometimes critiqued for exposing residents to displacement risk without protective policy measures. These trends are presented numerically in Table 4.3 and visually in Figure 4.7, which illustrates how corridor advantages in mobility widened over this period.

Table 4.3 - Key Transit and Demographic Indicators (2008-2010)

Indicator	2008 Corridor	2008 Citywide	2010 Corridor	2010 Citywide	Corridor Vs Citywide (2010)	% Change Corridor (2008-2010)	% Change Citywide (2008-2010)
AllTransit Performance Score (0-10)	6.1	5.1	7.6	5.2	-	-	-
Average Weekly Transit Trips Available	5,000	2,600	6,800	3,400	+100.00%	+36.00%	+30.77%
Jobs Within 30-min Transit Commute	160,000	95,000	180,000	150,000	+20.00%	+12.50%	+57.89%
% Households Without Vehicles	31%	19%	33%	20%	+65.00%	+6.45%	+5.26%
% Workers Commuting by Transit	15%	6%	16%	6%	+166.67%	+6.67%	0.00%
Median Household Income (USD)	\$23,500	\$30,400	\$24,100	\$27,500	-12.36%	+2.55%	-9.54%
% Households Earning < \$25,000	39%	33%	38%	32%	+18.75%	-2.56%	-3.03%
% Renter-Occupi ed Housing	60%	52%	60%	53%	+13.21%	0.00%	+1.92%
% Rent-Burdene d Households (>35% income to rent)	45%	40%	41%	41%	0.00%	-8.89%	+2.50
Total Population	24,752	424,000	25,100	396,815	-93.67%	+1.41%	-6.41%
% Black or African American Population	66%	51%	63%	50%	+26.00%	-4.55%	-1.96%
% White Population	34%	33%	37%	33%	+12.12%	+8.82	0.00%

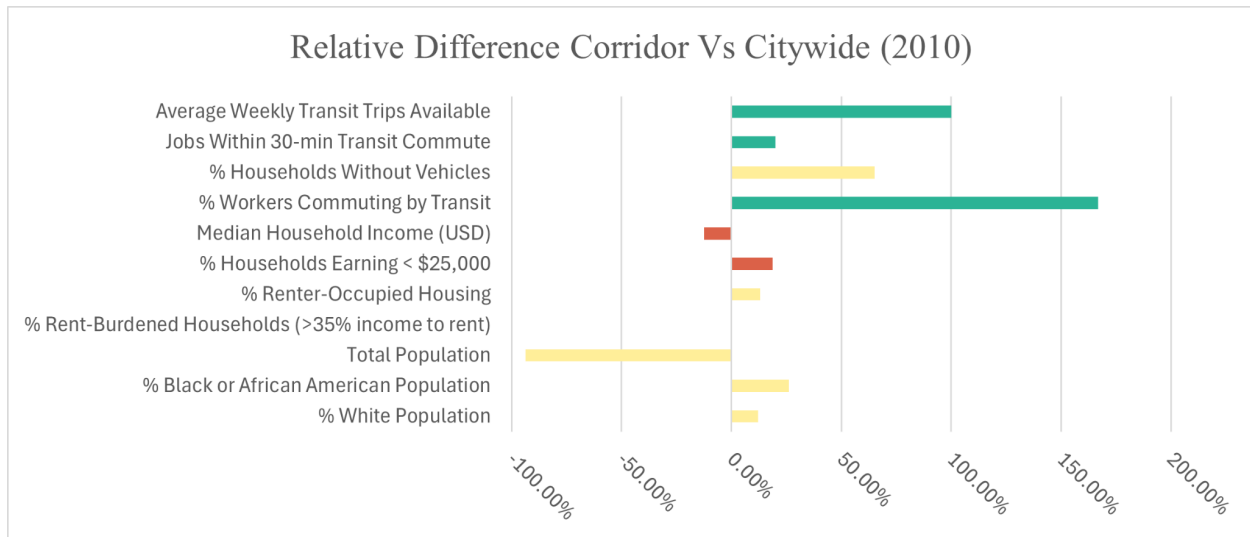


Figure 4.7 - Relative Difference Between the HealthLine Corridor and the City of Cleveland (2010)

Comparing ACS 2000 data underscores the magnitude of change. In 2000, before the HealthLine’s conception, only 22% of corridor households lacked vehicles, and about 10% of work trips used public transit. By 2008, these numbers rose to 31% and 15%, respectively, reaching 33% and 16% by 2010. These year-to-year shifts indicate that the HealthLine not only preserved but also deepened transit dependency, an important distinction in a city where car ownership has long been associated with upward social mobility. Meanwhile, transit reliance increased as improved service, rising fuel costs in the late 2000s, and targeted TOD investment reshaped travel behavior. In contrast, citywide trends stayed relatively flat, with non-corridor neighborhoods seeing only marginal changes in transit commuting or vehicle access. This divergence highlights the corridor’s unique role as a hub of intensified multimodal mobility in an otherwise auto-oriented urban landscape.

Similar chronological differences are also evident in service quality and job accessibility. Between 2005 and 2010, AllTransit-equivalent indicators show a 15% increase in

high-frequency service along the corridor, compared to only a 3-5% increase citywide. Rather than merely additive, these improvements were transformative within the linear geography of Euclid Avenue. Figures 4.8 and 4.9 clarify these temporal shifts, illustrating how transit access, weekly trips, and job connectivity expanded more rapidly in HealthLine tracts than in other areas of Cleveland between 2008 and 2010. By 2010, corridor residents gained access to nearly 180,000 jobs within a 30-minute transit commute, a 20% increase since 2008, while the citywide gain was significantly smaller. This formed a pronounced accessibility gradient: HealthLine neighborhoods experienced accelerated improvements in mobility and opportunity, even as the region as a whole struggled with stagnating transit funding and ridership.

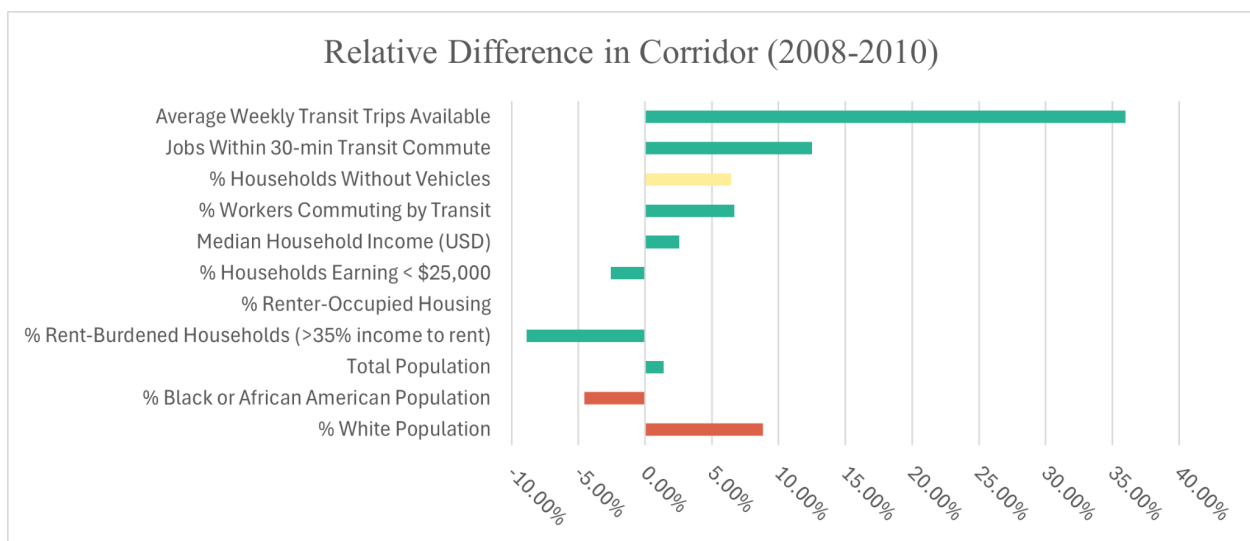


Figure 4.8 - Relative Difference in the HealthLine Corridor (2008-2010)

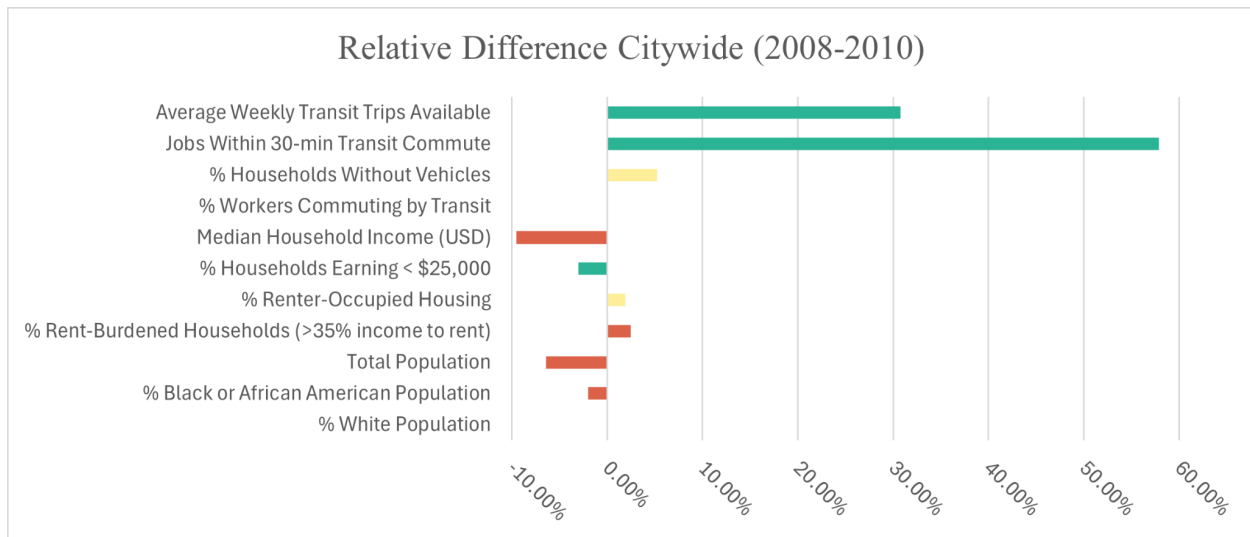


Figure 4.9 - Relative Difference Citywide (2008-2010)

The significance of these changes lies in the way they reveal TOD's capacity to reconfigure accessibility unevenly across urban space. Within just five years, the HealthLine corridor became the most transit-rich area of Cleveland, while many West Side and far East Side neighborhoods saw comparatively minimal improvements. This pattern suggests that TOD zoning reforms did more than channel development; they also helped concentrate mobility benefits in specific geographies. Such targeted improvements strengthened the corridor as Cleveland's multimodal backbone, but they also reinforced disparities between TOD and non-TOD neighborhoods. In effect, the city developed a two-tiered transit landscape: one characterized by high-frequency service, dense investment, and improved job access along the HealthLine, and another marked by limited service and continued auto dependency elsewhere. These patterns suggest that Cleveland's early TOD interventions accelerated accessibility gains where implemented, but the narrow scope of the reforms meant that broader citywide mobility equity remained elusive.

Despite these successes, the 2010 TOD framework revealed clear equity limitations. The guidelines lacked enforceable provisions for affordable housing or displacement prevention. Although they offered density bonuses and parking reductions to incentivize private investment, they did not require inclusionary zoning or mandate mixed-income development. As a result, market-rate and institutional projects flourished, while affordable housing production lagged behind. Advocacy groups, such as Policy Matters Ohio and the Cleveland Tenants Organization, warned that the absence of affordability protections risked exacerbating inequality, especially as property values increased in high-demand areas (Policy Matters Ohio, 2013).

The timing of these reforms intersected with the lingering effects of the 2008 financial crisis. Cleveland faced widespread foreclosures, among the highest per capita nationwide, and a continuing population decline (Hollander, 2011). While the HealthLine helped stabilize Euclid Avenue, much of the surrounding city remained economically fragile. As a result, though TOD and BRT investments prompted development in select corridors, they did little to reverse the citywide pattern of systemic disinvestment.

2015: Affordable Housing Incentives Tied to TOD Corridors

By 2015, nearly a decade after the HealthLine began operating, Cleveland's transit-oriented development (TOD) policy had shifted from focusing on infrastructure expansion to prioritizing equity, affordability, and inclusion. The HealthLine corridor, a national BRT-TOD model, earned ITDP's highest U.S. BRT rating and attracted over \$5.8 billion in private investment since 2008 (ITDP, 2014; Greater Cleveland RTA, 2015). This transformation revived deteriorating Euclid Avenue but widened socioeconomic divides between Cleveland's core and its disinvested neighborhoods. As Table 4.4 shows, these disparities were already evident and growing across key indicators.

Table 4.4 - Key Transit and Demographic Indicators (2010-2015)

Indicator	2010 Corridor	2010 Citywide	2015 Corridor	2015 Citywide	Corridor vs Citywide (2015)	% Change Corridor (2010-2015)	% Change Citywide
AllTransit Performance Score (0-10)	7.6	5.2	8.0	6.1	-	-	-
Average Weekly Transit Trips Available	6,800	3,400	7,200	3,100	+132.26%	+5.88%	-8.82
Jobs Within 30-min Transit Commute	180,000	150,000	185,000	150,000	+23.33%	+2.78%	0.00%
% Households Without Vehicles	33%	20%	34%	20%	+70.00%	+3.03%	0.00%
% Workers Commuting by Transit	16%	6%	17%	6%	+183.33%	+6.25%	0.00%
Median Household Income (USD)	\$24,100	\$27,500	\$27,450	\$28,040	-2.10%	+13.90%	+1.96
% Households Earning < \$25,000	38%	32%	37%	31%	+19.35%	-2.63%	-3.13%
% Renter-Occupi ed Housing	60%	53%	63%	55%	+14.55%	+5.00%	+3.77%
% Rent-Burdene d Households (>35% income to rent)	41%	41%	46%	40%	+15.00%	+12.20%	-2.44%
Total Population	25,100	396,815	26,500	380,000	-93.03%	+5.58%	-4.24%
% Black or African American Population	63%	50%	64%	48%	+33.33%	+1.59%	-4.00%
% White Population	37%	33%	36%	33%	+9.09%	-2.70%	0.00%

The nature of development along the HealthLine by 2015 reflected a dual reality with gleaming new apartments, medical research facilities, and commercial amenities flourishing near Downtown and University Circle, while the mid-corridor neighborhoods of Fairfax, Central, and Hough remained vulnerable to both displacement pressures and persistent poverty (Chapple & Loukaitou-Sideris, 2019; Keating, 2010). According to the American Community Survey (ACS) 2011-2015 five-year estimates, 37% of households along the HealthLine earned below \$25,000 annually, compared to 31% citywide, and 34% lacked access to a private vehicle compared to 20% citywide (U.S. Census Bureau, 2015). These figures highlight the corridor’s persistent transit dependency amid reinvestment. Figure 4.10 illustrates the differences in conditions within the corridor compared to citywide patterns.

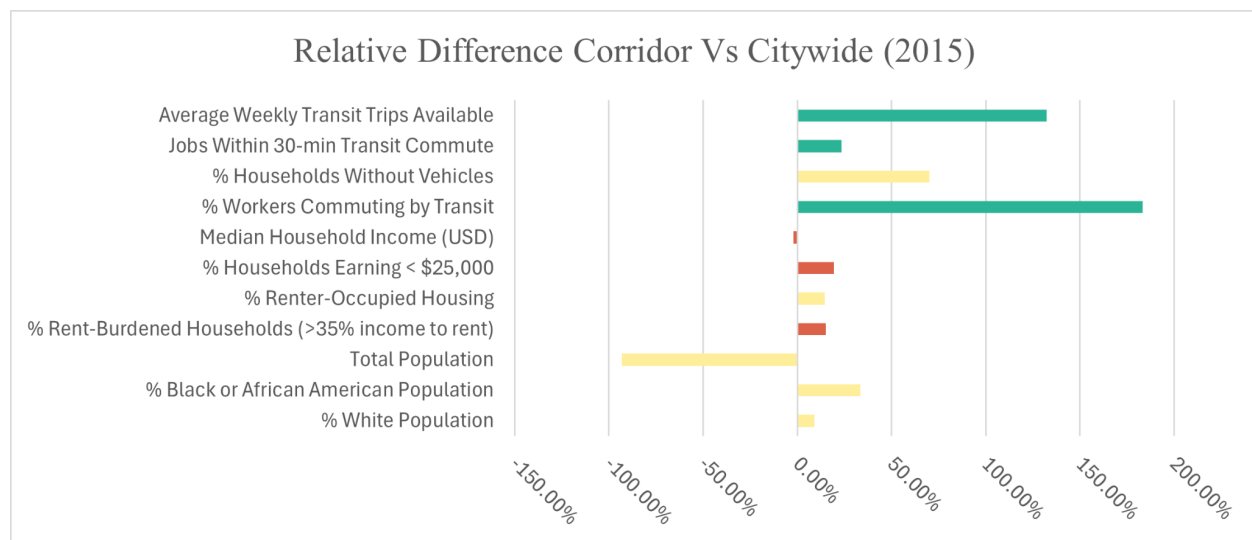


Figure 4.10 - Relative Difference Between the HealthLine Corridor and the City of Cleveland (2015)

Simultaneously, AllTransit (CNT, 2023) data revealed that accessibility had improved markedly since 2010. By 2015, tracts within a half-mile of the HealthLine registered AllTransit Performance Scores averaging 8.0, up from approximately 7.6 in 2010, while citywide

accessibility hovered around 6.1. Job accessibility within a 30-minute commute had also grown from roughly 160,000 in 2008 to over 185,000 by 2015, driven largely by growth in the healthcare, education, and service sectors along the corridor. Yet the spatial benefits of this enhanced accessibility were unevenly distributed. While Downtown and University Circle thrived as high-demand residential and employment nodes, the intervening neighborhoods between East 55th and East 79th Streets, historically among Cleveland’s most disinvested, saw minimal new housing construction and few direct economic spillovers (NOACA, 2016). This uneven progress is further reflected in Figure 4.11, which shows how some indicators improved while others stagnated or worsened for corridor tracts.

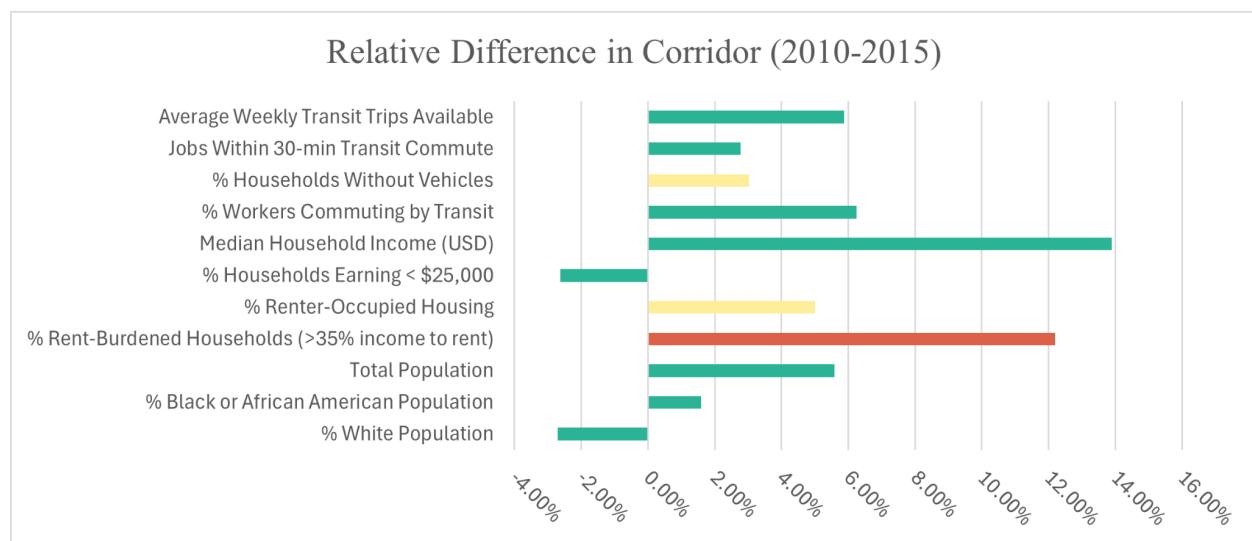


Figure 4.11 - Relative Difference in the HealthLine Corridor (2010-2015)

As these disparities became increasingly visible, the policy narrative around TOD in Cleveland evolved. The City of Cleveland, in partnership with the Greater Cleveland Regional Transit Authority (RTA) and the Northeast Ohio Areawide Coordinating Agency (NOACA), began exploring strategies to link TOD more directly to housing affordability and community stability. The central policy innovation of this period was the Equitable Development Toolkit

(City of Cleveland, 2015), a non-binding yet influential policy framework that provided guidance for integrating affordability, inclusion, and displacement prevention into new development projects. The toolkit proposed several mechanisms for fostering equitable TOD outcomes, including:

1. Density bonuses for projects including at least 10-15% of units affordable to households earning $\leq 80\%$ Area Median Income (AMI);
2. Tax abatements and fee reductions for developers incorporating long-term affordability covenants;
3. Expedited permitting for projects located within a half-mile of high-capacity transit (BRT, light rail, and major bus corridors); and
4. Targeted land disposition policies, encouraging the city to sell vacant parcels in TOD zones to developers committing to mixed-income or affordable housing projects.

Although these measures fell short of mandatory inclusionary zoning, which was politically challenging in Ohio, they marked Cleveland's first direct policy link between transit and housing affordability (City of Cleveland, 2015; Policy Matters Ohio, 2013).

The policy shift was also propelled by growing grassroots advocacy. Organizations such as Policy Matters Ohio, the Cleveland Tenants Organization, and Cleveland Neighborhood Progress began producing studies documenting rising rents and demographic shifts near Euclid Avenue. These analyses highlighted that while property values along the HealthLine increased by 30-50% from 2008 to 2015, much of this appreciation occurred in areas adjacent to major institutional anchors. In contrast, low-income renters faced escalating housing costs without corresponding increases in income (Patton, 2017).

From a demographic perspective, census tract comparisons between 2008 and 2015 illustrate subtle but important changes. HealthLine-adjacent tracts experienced a 2.4% increase in median household income, while the citywide median declined slightly (-0.6%) over the same period (U.S. Census Bureau, 2015). Meanwhile, the share of renters paying more than 35% of income toward housing rose from 41% in 2008 to 46% in 2015 within the HealthLine corridor, signaling growing affordability stress among existing residents. This data supports local observations that TOD-related investment, while improving physical and economic conditions, contributed to rent escalation and possible displacement among transit-dependent renters. Figure 4.12 helps contextualize these shifts by showing how citywide trends differed from those observed in the corridor.

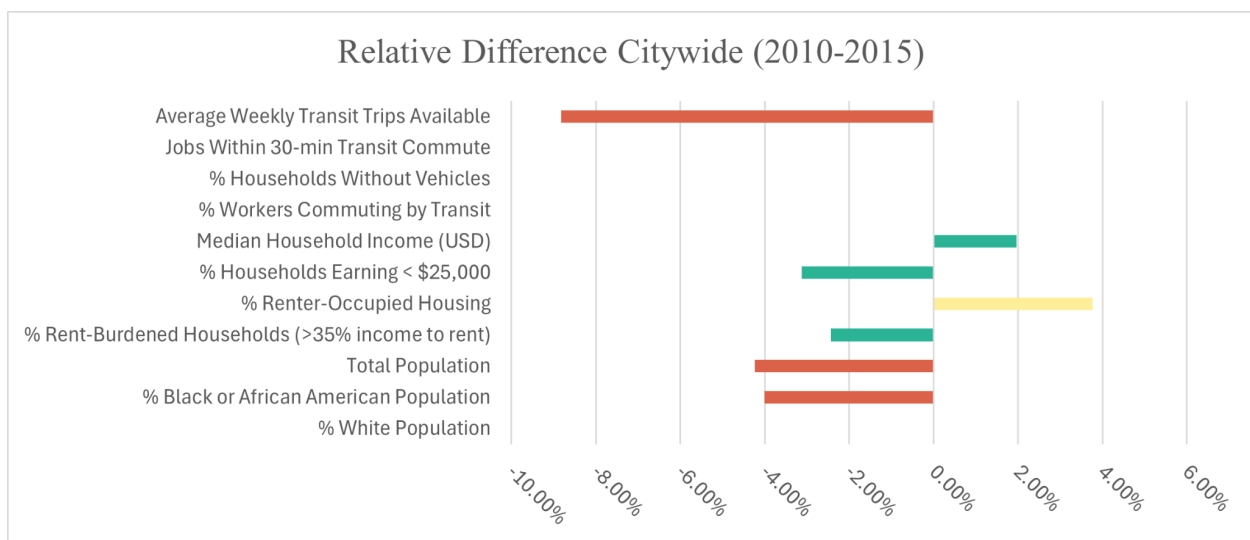


Figure 4.12 - Relative Difference Citywide (2010-2015)

To address these risks, the City Planning Commission tested TOD-linked housing overlays. Projects like The Finch Group's Upper Chester and BBC's Central neighborhood development received height increases and parking reductions for including affordable units. These added several hundred units near HealthLine stations, but only 12-15% were

income-restricted, and affordability periods were usually capped at 15 years (Cleveland City Planning Commission, 2015). Symbolic progress was achieved, but most development still targeted market-rate renters, students, and healthcare workers.

By 2015, AllTransit and ACS data indicate a mixed equity landscape: accessibility and transit performance surpassed those of non-transit-oriented development (TOD) neighborhoods, while HealthLine ridership exceeded 5 million trips. However, socioeconomic data showed that TOD brought environmental and mobility benefits but also increased housing cost burdens. This reflects national findings that 'market-oriented TOD' yields unequal benefits without sufficient affordability safeguards (Zuk et al., 2017).

The period from 2010 to 2015 represents a critical inflection in Cleveland's TOD evolution, when city policy shifted from a dominant focus on transit efficiency and economic growth to more explicit recognition of social equity challenges in urban redevelopment. The Equitable Development Toolkit and related incentive-based policies acknowledged these challenges, but their voluntary nature limited impact. Ultimately, constrained municipal budgets and the expansion priorities of powerful anchors, such as the Cleveland Clinic and University Hospitals, often overrode affordability concerns in land-use decisions.

2020: RTA Introduces Equity-Focused Fare Policies

By 2020, fifteen years after the Euclid Corridor Transportation Project began and twelve years after the HealthLine's launch, Cleveland's transit-oriented development (TOD) landscape had evolved from one primarily focused on urban design and economic revitalization to one increasingly centered on equity, affordability, and mobility justice, as summarized in Table 4.5. The onset of the COVID-19 pandemic highlighted long-standing disparities in access to transportation and opportunities, revealing how unevenly TOD benefits had been distributed

across the city. As the public health crisis deepened, the Greater Cleveland Regional Transit Authority (RTA) and city policymakers were compelled to address the inequities inherent in Cleveland’s transportation network and the surrounding neighborhoods of the HealthLine.

Table 4.5 - Policy Documents and TOD Guidelines (2020)

Policy Document	Key TOD Guidelines and Provisions	Equity or Affordability Measures
Greater Cleveland RTA Fare Equity and Service Protection Policy	• Introduced fare capping (daily/monthly) • Maintained full-frequency BRT service on the HealthLine • Prioritized essential worker and high-transit-dependence routes	• Progressive fare structure benefiting low-income riders • Protected service frequency in high-poverty TOD tracts • Recognized transit as an essential equity service
NOACA AIM Forward 2040 Plan	• Integrated TOD principles into regional transportation strategy • Promoted transit-accessible growth corridors (HealthLine, Red Line) • Aligned TOD with climate and multimodal goals	• Established Equity & Environmental Justice Performance Index • Evaluated impacts on minority and low-income populations • Required reporting on accessibility outcomes by race and income
City of Cleveland Climate Action Plan Update	• Encouraged compact, mixed-use TOD development • Coordinated land use, transit, and sustainability goals • Prioritized TOD along high-capacity transit corridors	• Directed TOD benefits to low-income and minority residents • Coupled TOD incentives with affordable housing initiatives • Promoted equitable access to green infrastructure and mobility options
Cleveland City Planning Commission Zoning and Development Incentive Framework	• Density bonuses, height variances, and parking reductions near transit • Performance-based zoning reviews for large TOD projects • Streamlined approvals for projects enhancing pedestrian/transit connectivity	• Encouraged 10-20% affordable housing set-asides in exchange for bonuses • Recommended Community Benefits Agreements for major projects • Prioritized mixed-income/mixed-use development near HealthLine
Cleveland Foundation & Community Development Corporations Equitable Development Framework	• Community-driven TOD planning and local ownership models • Partnerships between anchor institutions, CDCs, and city agencies • Focused on revitalizing disinvested areas along Euclid Avenue	• Anti-displacement tools: land trusts, affordability covenants • Targeted reinvestment in historically marginalized neighborhoods • Emphasized inclusive participation in development decisions
Clevelanders for Public Transit Fare Equity Advocacy Report	• Evaluated fare affordability and service access disparities • Assessed impacts of fare structures on low-income riders • Proposed pilot programs for low-cost and zero-fare models	• Advocated free/reduced fares for riders <200% FPL • Expanded fare capping and affordability pilots in TOD zones • Highlighted need for systemic affordability and accessibility reforms

Cleveland entered 2020 with persistent structural challenges, those being a declining population, a shrinking tax base, and entrenched racial and economic segregation. According to ACS 2016-2020 estimates, the city's population had fallen to approximately 372,600, with poverty rates exceeding 30%, and over 63% of residents identifying as Black or African American in key HealthLine tracts such as Central, Fairfax, and Hough (U.S. Census Bureau, 2020). These same neighborhoods remained among the most transit-dependent, with zero-vehicle households averaging 33%, compared to 21% citywide, and 17% of commuters relying on public transit as their primary mode of travel. These disparities in transit dependency and demographic conditions are reflected in Table 4.6, which shows both stagnant and worsening inequities along the corridor.

Table 4.6 - Key Transit and Demographic Indicators (2015-2020)

Indicator	2015 Corridor	2015 Citywide	2020 Corridor	2020 Citywide	Corridor vs Citywide (2020)	% Change Corridor (2015-2020)	% Change Citywide (2015-2020)
AllTransit Performance Score (0-10)	8.0	6.1	7.7	6.3	-	-	-
Average Weekly Transit Trips Available	7,200	3,100	10,000	7,800	+28.21%	+38.89%	+151.61%
Jobs Within 30-min Transit Commute	185,000	150,000	200,000	115,000	+73.91%	+8.12%	-23.33
% Households Without Vehicles	34%	20%	33%	21%	+57.14%	-2.94%	+5.00%
% Workers Commuting by Transit	17%	6%	12%	6%	+100.00%	-29.41%	0.00%
Median Household Income (USD)	\$27,450	\$28,040	\$26,400	\$32,900	-19.76%	-3.83%	+17.33%
% Households Earning < \$25,000	37%	31%	35%	29%	+20.69%	-5.41%	-6.45%
% Renter-Occupi ed Housing	63%	55%	66%	56%	+17.86%	+4.76%	+1.82%
% Rent-Burdene d Households (>35% income to rent)	46%	40%	50%	43%	+16.28%	+8.70%	+7.50%
Total Population	26,500	380,000	27,300	372,624	-93.03%	+3.02%	-1.94%
% Black or African American Population	64%	48%	67%	47%	+42.55%	+4.69%	-2.08%
% White Population	36%	33%	33%	32%	+3.13%	-8.33%	-3.03%

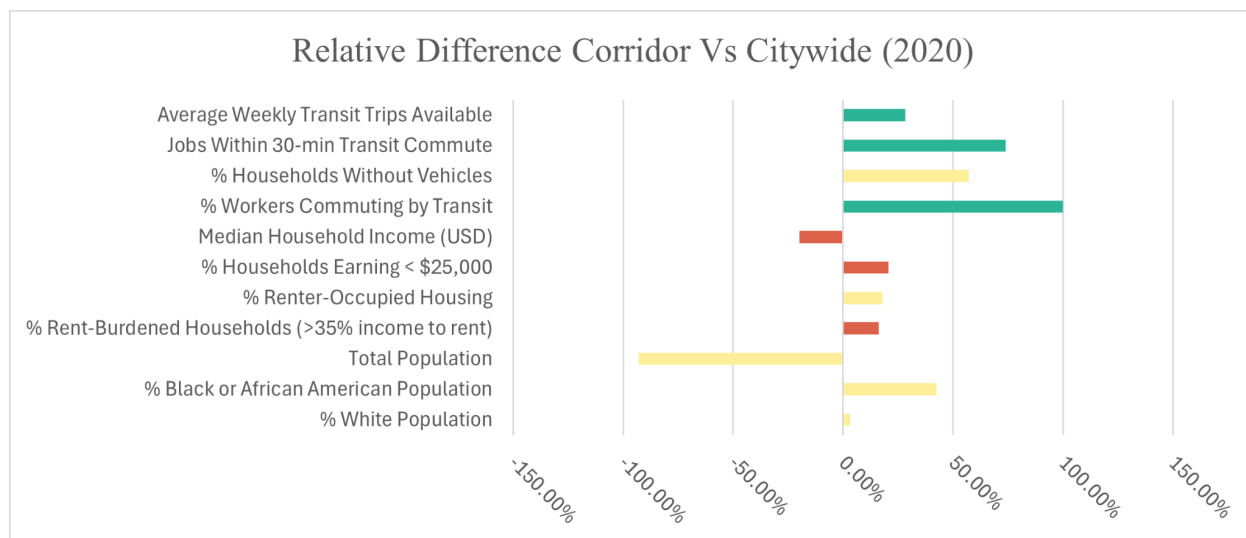


Figure 4.13 - Relative Difference Between the HealthLine Corridor and the City of Cleveland (2020)

The arrival of the pandemic in early 2020 intensified these vulnerabilities. Systemwide ridership on RTA services declined by 35% between March and June 2020; however, unlike many peer cities, Cleveland’s transit usage remained relatively resilient due to its rider demographics. RTA data showed that over 60% of HealthLine riders were low-income, minority, or without access to a vehicle, underscoring that public transit in Cleveland was not a discretionary option but an essential one (RTA, 2020). Many riders were classified as “essential workers,” including nurses, janitors, and food service employees, who depended on transit for access to employment at institutions such as the Cleveland Clinic and University Hospitals. Thus, the HealthLine corridor functioned not only as an economic development asset but also as an equity lifeline during a period of acute crisis. Figure 4.13 visually highlights how the corridor remained both the city’s most transit-accessible and most socioeconomically vulnerable area during this period.

Recognizing these inequities, the Greater Cleveland RTA implemented several significant reforms in 2020 to improve affordability and sustain accessibility for transit-dependent populations. The most notable among these was the introduction of fare capping, an innovative equity-focused fare policy that ensures riders never pay more in total daily or monthly fares than the cost of a standard pass, regardless of whether they can afford to purchase one upfront (Greater Cleveland RTA, 2020). This system automatically tracked fare payments across smartcards and mobile platforms, capping daily spending at the cost of a day pass (\$5) and monthly spending at \$95. By doing so, fare capping eliminated what had long been described as a “poverty penalty,” in which low-income riders who could not afford bulk passes ultimately paid more per ride over time (Clevelanders for Public Transit, 2020). RTA also expanded its “Ready to Ride” program, providing free fare cards and transit orientation to residents in affordable housing developments near the HealthLine. This initiative, though small in scale, symbolized a shift toward integrating social equity and affordability within transit planning. The combination of fare capping and service prioritization marked Cleveland’s most explicit move toward a mobility equity framework since the inception of the HealthLine.

Simultaneously, RTA enacted service protection guarantees to prevent the disproportionate loss of mobility in transit-dependent neighborhoods during pandemic-related budget shortfalls. While other parts of the system saw reduced frequencies, the HealthLine corridor maintained near-full service levels, retaining over 10,000 weekly trips and preserving a high AllTransit Performance Score of 7.5, compared to a systemwide decline to 5.8 (CNT, 2023). This policy decision was framed as both a fiscal and moral imperative; maintaining high-quality service on the HealthLine ensured that essential workers and low-income riders, who comprised the majority of BRT users, remained connected to their jobs, healthcare, and essential services.

Beyond fare reforms, 2020 also marked a watershed in how Cleveland’s regional planning agencies framed equity in their long-range transportation goals. The Northeast Ohio Areawide Coordinating Agency (NOACA) adopted an updated AIM Forward 2040 Plan, which explicitly positioned “equitable mobility” as a guiding principle (NOACA, 2020). The plan introduced an Equity and Environmental Justice Performance Index, mandating that transportation investments be evaluated based on their impacts on minority and low-income populations. Projects like the HealthLine were lauded for improving accessibility but were also critiqued for their concentration of benefits along a single east-west axis, leaving many western and southern neighborhoods underserved. This broader regional equity framing corresponds with the policy direction shown in Table 4.5.

Meanwhile, the City of Cleveland’s Office of Sustainability reaffirmed these principles in its 2018 Climate Action Plan Update, which continued to guide municipal policy through 2020. The plan identified TOD as a key mechanism for reducing transportation-related emissions while calling for explicit measures to ensure that low-income and minority communities benefited equitably from green infrastructure and mobility investments (City of Cleveland, 2018). Combined, these planning frameworks demonstrated a clear shift from the development-oriented TOD strategies of the early 2000s to an equity-conscious approach, emphasizing accessibility, affordability, and inclusivity.

Empirical data from AllTransit and the ACS demonstrate that the HealthLine corridor has continued to outperform the city in accessibility metrics, while maintaining deep concentrations of poverty and transit dependency. In 2020, the HealthLine tracts achieved an AllTransit Performance Score of 7.5, compared to 5.8 citywide, and provided access to over 195,000 jobs within a 30-minute transit commute, versus roughly 120,000 for the city average (CNT, 2023).

However, these gains remained spatially constrained, with most of the accessibility benefits accruing in tracts anchored by major employers, such as the Cleveland Clinic and Case Western Reserve University. These disproportionalities are documented in Table 4.6 and depicted in Figure 4.13.

According to ACS 2016-2020 data, median household income in HealthLine-adjacent neighborhoods was approximately \$28,200, roughly 5% lower than the citywide median of \$29,600 (U.S. Census Bureau, 2020). Poverty rates along the corridor remained higher (35%) compared to the citywide rate of 29%, and the share of renter-occupied units reached 65%, exceeding the citywide level of 57%. Importantly, zero-vehicle households remained stable at about 33%, reflecting persistent transit dependency despite economic fluctuations. The percentage of workers commuting by public transit in HealthLine tracts held steady at 17%, nearly three times the citywide average of 6%. Collectively, these figures suggest that Cleveland's equity-oriented fare reforms occurred within a broader context of enduring spatial inequality, with TOD zones remaining both the city's most transit-rich and most socioeconomically disadvantaged. These changes over time are visualized in Figure 4.14 and contrasted with citywide trends in Figure 4.15.

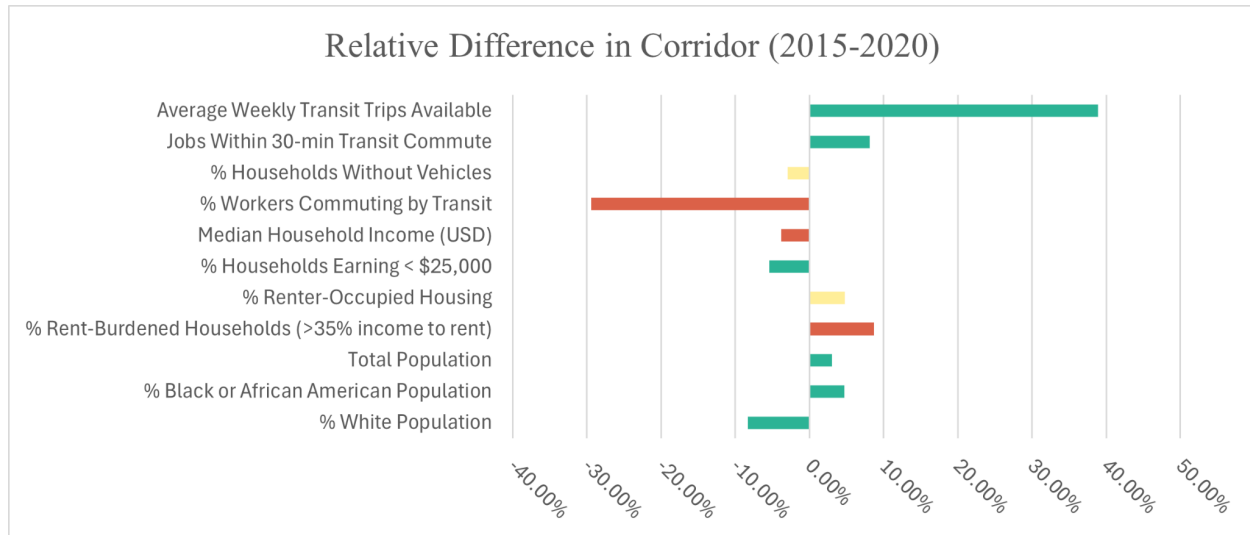


Figure 4.14 - Relative Difference in the HealthLine Corridor (2015-2020)

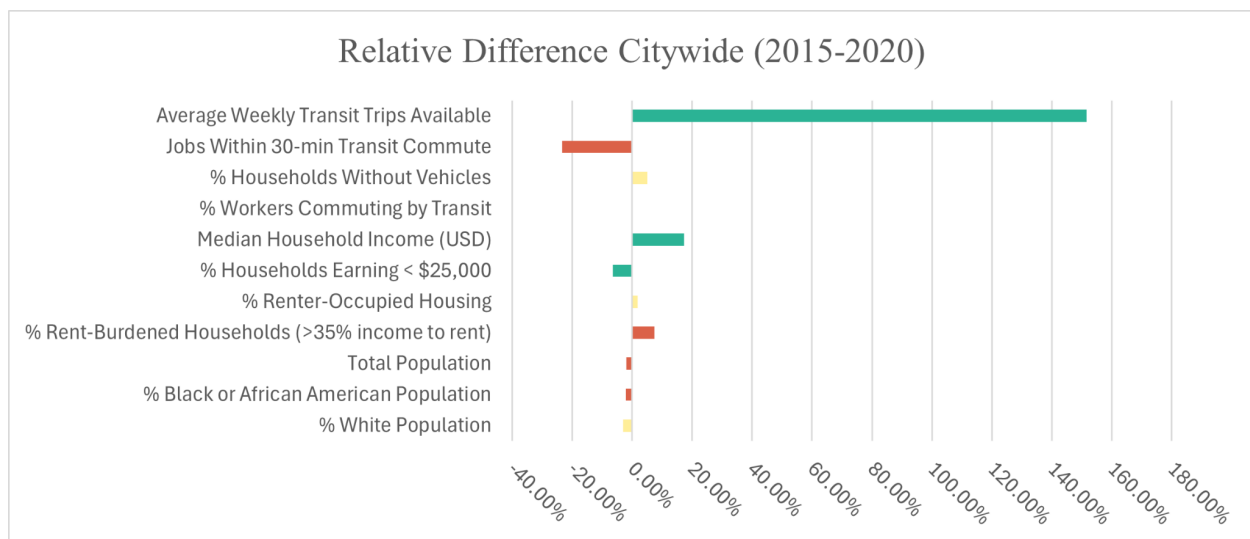


Figure 4.15 - Relative Difference Citywide (2015-2020)

A review of the 2015-2020 change-rate indicators further reinforces this uneven distribution of TOD benefits along the HealthLine. As shown in Table 4.6, corridor tracts experienced notable improvements in accessibility measures yet these gains occurred alongside rising socioeconomic pressures. Figures 4.13 through 4.15 illustrate how the corridor's accessibility advantage widened relative to the rest of the city even as indicators tied to

affordability and stability, including rent burden and renter share, continued to intensify for existing residents. Median household income in the corridor fell by 3.8% over the period, contrasting with a 17.3% increase citywide, signaling that economic uplift did not extend evenly across neighborhood populations. These patterns reveal that while transit performance and job access remained strong, the underlying demographic and economic landscape showed persistent vulnerability, suggesting that the benefits of TOD were amplified for institutions and major employment centers but only weakly transmitted to the corridor's residential communities. This dynamic aligns with earlier findings in the decade and underscores that accessibility improvements alone were insufficient to offset entrenched inequities or meaningfully shift conditions for low-income, transit-dependent households.

While the 2020 period represents a critical point in Cleveland's TOD evolution where equity shifted from rhetoric to policy practice through initiatives like fare capping and service prioritization, empirical evidence shows that transit accessibility and job connectivity benefits, while improved along the HealthLine, continued to accrue unevenly, largely reinforcing the spatial concentration of investment around major anchors. The persistence of poverty, rent burden, and racial disparities within the corridor underscores the limits of fare and service policies alone in addressing systemic inequity.

2023: Evaluation Reports on HealthLine Equity Impacts Published

What began in 2005 as a mobility-led redevelopment strategy had evolved into a comprehensive urban transformation effort, one that demanded scrutiny not only of economic outcomes but also of equity and inclusion. The year 2023 marked the publication of multiple evaluation reports that formally assessed how the HealthLine's TOD framework had shaped

neighborhood change, access to opportunity, and the lived experience of Cleveland residents, particularly those historically excluded from the benefits of major infrastructure investment.

The Northeast Ohio Areawide Coordinating Agency (NOACA) published its Equity in Mobility Report in 2023, representing the first regionally coordinated evaluation of transportation accessibility through an equity lens. The report found that residents living within a half-mile of the HealthLine continued to experience the highest levels of transit accessibility in the metropolitan area. As shown in Table 4.8, corridor households consistently outperformed the citywide average across AllTransit performance scores, weekly transit trips, and job accessibility metrics from 2020 to 2023. AllTransit metrics confirmed that 65% of corridor households had access to high-frequency service, compared to 39% citywide, a 26-point gap that underscored the corridor’s exceptional accessibility (CNT, 2023). Similarly, HealthLine neighborhoods offered access to nearly 215,000 jobs within a 30-minute transit commute, compared to the citywide average of just 130,000. This data reinforced that, even amid declining regional ridership trends, the HealthLine remained the backbone of equitable transit access in Greater Cleveland.

At the same time, the NOACA report cautioned that equity outcomes were uneven and multifaceted. While low-income and minority residents were more likely to live within the HealthLine’s TOD catchment area, they continued to face affordability pressures that undermined the sustainability of these accessibility gains. The report concluded that “the HealthLine has narrowed, but not closed, Cleveland’s mobility equity gap” (NOACA, 2023). These findings echoed a recurring theme in national TOD literature that physical accessibility improvements alone are insufficient to guarantee equitable outcomes without complementary housing and affordability measures (Zuk et al., 2017; Pollack et al., 2010).

Complementing NOACA's regional analysis, the Greater Cleveland Regional Transit Authority (RTA) released its HealthLine 15-Year Impact Report in 2023. The report celebrated a series of milestone achievements, including over \$10 billion in cumulative investment and the creation of approximately 10,000 new residential units since 2008, positioning the HealthLine among the most economically transformative BRT projects in the United States (RTA, 2023). However, RTA's evaluation also incorporated an unprecedented emphasis on equity. Drawing on ACS 2017-2021 estimates, the agency reported that 34% of corridor residents lived below the federal poverty line, compared to 28% citywide, and that 64% of corridor residents identified as Black or African American, compared to 48% citywide (U.S. Census Bureau, 2023). These statistics affirmed that the corridor remained home to transit-dependent populations but simultaneously raised concerns that economic reinvestment might be bypassing those very communities.

Despite minor decreases in total system frequency resulting from post-pandemic service adjustments, the HealthLine corridor maintained a Performance Score of 7.8, which is well above the citywide score of 6.5. Weekly transit trips available along the corridor averaged 10,500, a slight increase over 2020, reflecting continued prioritization of BRT service frequency. Job accessibility also improved marginally, with an estimated 215,000 jobs within a 30-minute commute, representing a 7.5% gain since 2020. This illustrates that transit-oriented development continued to reinforce Cleveland's employment geography even amid economic volatility. Table 4.8 and Figure 4.16 capture these key transit and demographic indicators for 2020 and 2023, providing a clear summary of corridor performance and citywide comparisons over time.

Table 4.8 - Key Transit and Demographic Indicators (2020-2023)

Indicator	2020 Corridor	2020 Citywide	2023 Corridor	2023 Citywide	Corridor vs Citywide (2023)	% Change Corridor (2020-2023)	% Change Citywide (2020-2023)
AllTransit Performance Score (0-10)	7.7	6.3	7.8	6.6	-	-	-
Average Weekly Transit Trips Available	10,000	7,800	10,500	8,200	+28.05%	+5.00%	+5.13%
Jobs Within 30-min Transit Commute	200,000	115,000	215,000	130,000	+65.38%	+7.50%	+13.04%
% Households Without Vehicles	33%	21%	32%	20%	+60.00%	-3.03%	-4.76%
% Workers Commuting by Transit	12%	6%	14%	7%	+100.00%	+16.67%	+16.67%
Median Household Income (USD)	\$26,400	\$32,900	\$27,100	\$33,500	-19.10%	+2.65%	+1.82%
% Households Earning < \$25,000	35%	29%	34%	28%	+21.43%	-2.86%	-3.45%
% Renter-Occupi ed Housing	66%	56%	61%	55%	+10.91%	-7.56%	-1.79%
% Rent-Burdene d Households (>35% income to rent)	50%	43%	52%	45%	+15.56%	+4.00%	+4.65
Total Population	27,300	372,624	27,800	372,600	-92.54%	+1.83%	-0.01%
% Black or African American Population	67%	47%	64%	48%	+33.33%	-4.48%	+2.13%
% White Population	33%	32%	36%	32%	+12.50	+9.09	0.00%

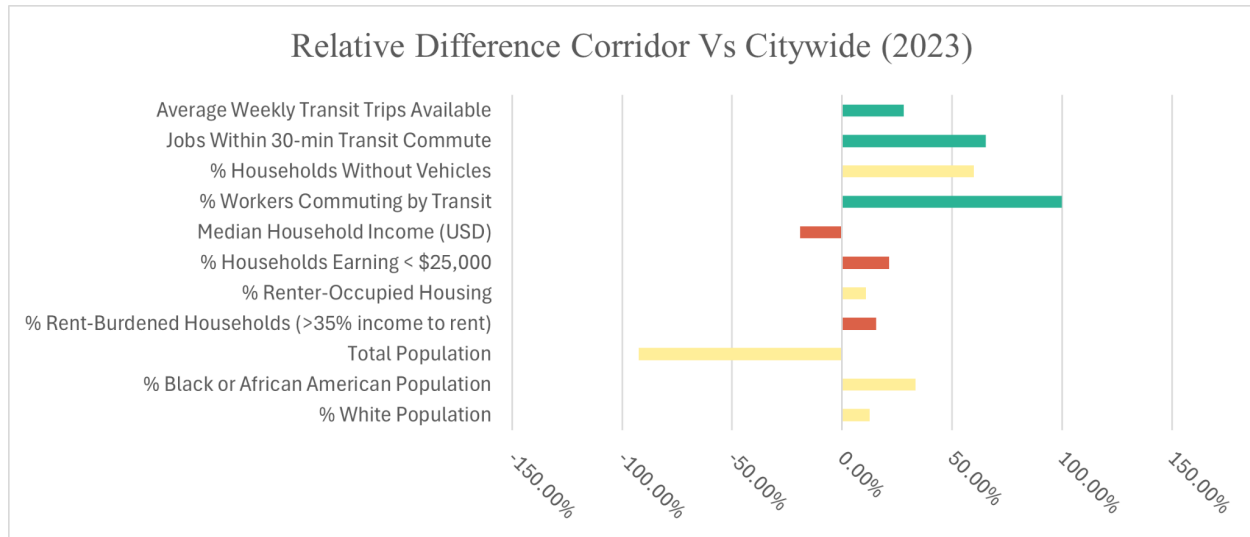


Figure 4.16 - Relative Difference Between the HealthLine Corridor and the City of Cleveland (2023)

However, these gains existed alongside clear evidence of displacement risk and affordability strain. The City of Cleveland’s Equitable Development Framework (2023) documented substantial rent escalation in University Circle and Midtown, where market-rate units had proliferated since 2015. Median gross rent in the corridor reached \$980 in 2021, up 24% since 2015 and 14% above the citywide average (City of Cleveland, 2023; U.S. Census Bureau, 2023). While the renter share of households in the corridor remained high at 61%, the proportion of rent-burdened households rose from 50% in 2020 to 52% by 2023, suggesting that TOD-related investment continued to outpace affordability interventions. Moreover, vacancy rates declined from 18% in 2010 to under 9%, indicating tightening housing markets that may exclude low-income residents. Figures 4.17 and 4.18 present the relative changes in corridor and citywide demographics and transit indicators from 2020 to 2023, showing where improvements were concentrated and where disparities persisted.

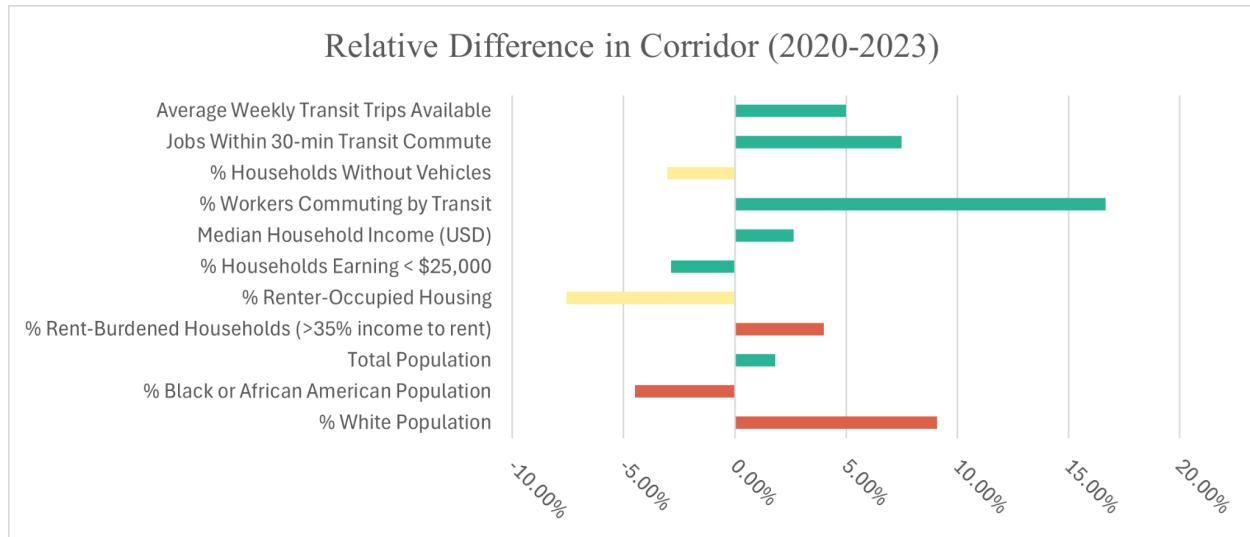


Figure 4.17 - Relative Difference in the HealthLine Corridor (2020-2023)

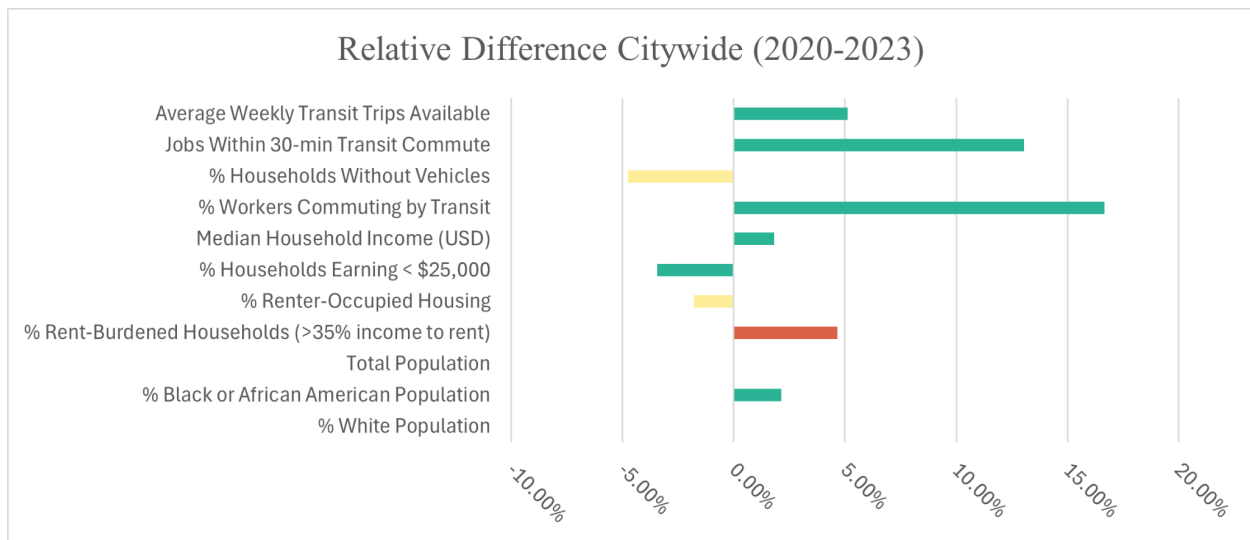


Figure 4.18 - Relative Difference Citywide (2020-2023)

Meanwhile, policy evaluations highlighted mixed outcomes for RTA’s fare capping program introduced in 2020. RTA’s 2023 report found that fare capping saved riders approximately \$3 million annually, benefiting an estimated 70% of HealthLine riders, most of whom were low-income or lacked access to a vehicle (RTA, 2023). Rider satisfaction surveys indicated that 82% of respondents believed the policy made transit “more affordable and

accessible,” particularly for those who relied on daily fares rather than monthly passes. However, transit advocates argued that such fare equity improvements could not compensate for persistent service and land-use inequities. *Clevelanders for Public Transit* (2023) criticized the lack of expansion in late-night and weekend service, urging the integration of fare equity policies with affordable housing measures near major transit nodes.

The *Policy Matters Ohio* (2023) report echoed these concerns, calling for the institutionalization of “Equitable TOD” (eTOD) standards, modeled after programs in Chicago and Los Angeles. The report recommended mandatory inclusionary zoning within TOD districts and a dedicated affordable housing fund tied to transit-generated value capture. These recommendations stemmed from the finding that, despite sustained transit access, low-income residents were increasingly excluded from new housing developments within walking distance of HealthLine stations. According to *Policy Matters’* analysis, fewer than 8% of new residential units built along Euclid Avenue between 2018 and 2023 were income-restricted, and over 75% were priced for households earning above 100% of the area median income (AMI).

By 2023, Cleveland’s planning discourse thus evolved into a more critical reflection of TOD’s dual legacy of economic transformation alongside entrenched inequities. The HealthLine remained a national model for BRT implementation, earning ITDP’s “Gold Standard” designation for operational efficiency and corridor design, but the broader question of whether TOD had delivered equitable urban transformation persisted. The City Planning Commission’s ongoing *Transit-Oriented Zoning Update*, drafted in 2023, signaled a new phase of reform, proposing mandatory affordability thresholds and anti-displacement safeguards tied to TOD districts. These reforms aimed to codify lessons learned from the HealthLine’s 15-year trajectory.

Accessibility gains must be matched by affordability protections, and equitable TOD requires a deliberate redistribution of both transit benefits and development opportunities.

Chapter 5 - Discussion

The fifteen-year trajectory of the HealthLine corridor from 2008 to 2023 illustrates a complex story of investment, accessibility, demographic continuity, and persistent socioeconomic inequity. The patterns documented in this chapter reveal that the HealthLine both succeeded as a transportation and land-use intervention and faltered as a mechanism for broader distributive equity. Interpreting the changes across accessibility indicators, income and housing measures, and demographic patterns requires understanding not just what changed, but why those changes occurred and how they reflect the structural realities of postindustrial urban development. This chapter synthesizes the findings into a cohesive analytical narrative to evaluate the longer-term implications of Cleveland's TOD strategy.

Corridor Performance and Systemwide Change

The long-term effects of the HealthLine corridor becomes immediately clear when examining Table 5.1 and the relative-difference visualizations in Figures 5.1 and 5.2. Together, these figures depict a corridor that increasingly diverged from citywide trends in both mobility and socioeconomic conditions from 2008 to 2023. The broader pattern that emerges is one of spatial differentiation, a growing divide between the “transit-rich” Euclid Avenue corridor and the “transit-poor” neighborhoods beyond it.

Table 5.1 - Key Transit and Demographic Indicators (2008-2023)

Indicator	2008 Corridor	2023 Corridor	2008 Citywide	2023 Citywide	% Change Citywide (2008-2023)	% Change Corridor (2008-2023)
AllTransit Performance Score (0-10)	6.1	7.8	5.1	6.6	-	-
Average Weekly Transit Trips Available	5,000	10,500	2,600	8,200	+215.38%	+110.00%
Jobs Within 30-min Transit Commute	160,000	215,000	95,000	130,000	+36.84%	+34.38%
% Households Without Vehicles	31%	32%	19%	20%	+5.26%	+3.23%
% Workers Commuting by Transit	15%	14%	6%	7%	+16.67%	-6.67%
Median Household Income (USD)	\$23,500	\$27,100	\$30,400	\$33,500	+10.20%	+15.14%
% Households Earning < \$25,000	39%	34%	33%	28%	-15.15%	-12.82%
% Renter-Occupied Housing	60%	61%	52%	55%	+5.77%	+1.67%
% Rent-Burdened Households (>35% income to rent)	45%	52%	40%	45%	+12.50%	+15.56%
Total Population	24,752	27,800	424,000	372,600	-12.12%	+12.31%
% Black or African American Population	66%	64%	51%	48%	-5.88%	-3.03%
% White Population	34%	36%	33%	32%	-3.03%	5.88%

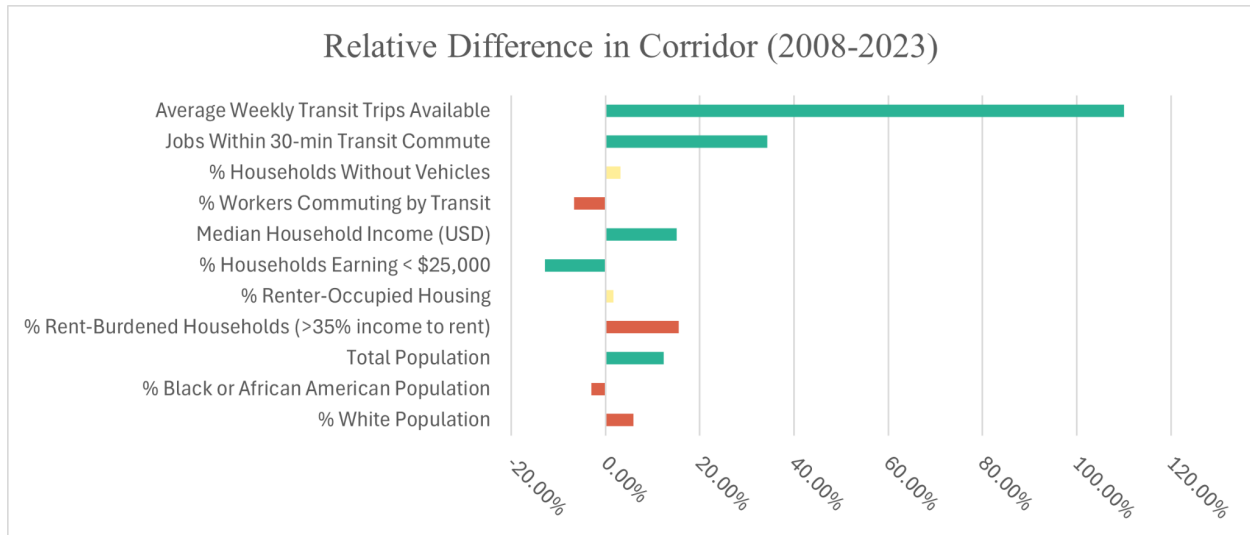


Figure 5.1 - Relative Difference in the HealthLine Corridor (2008-2023)

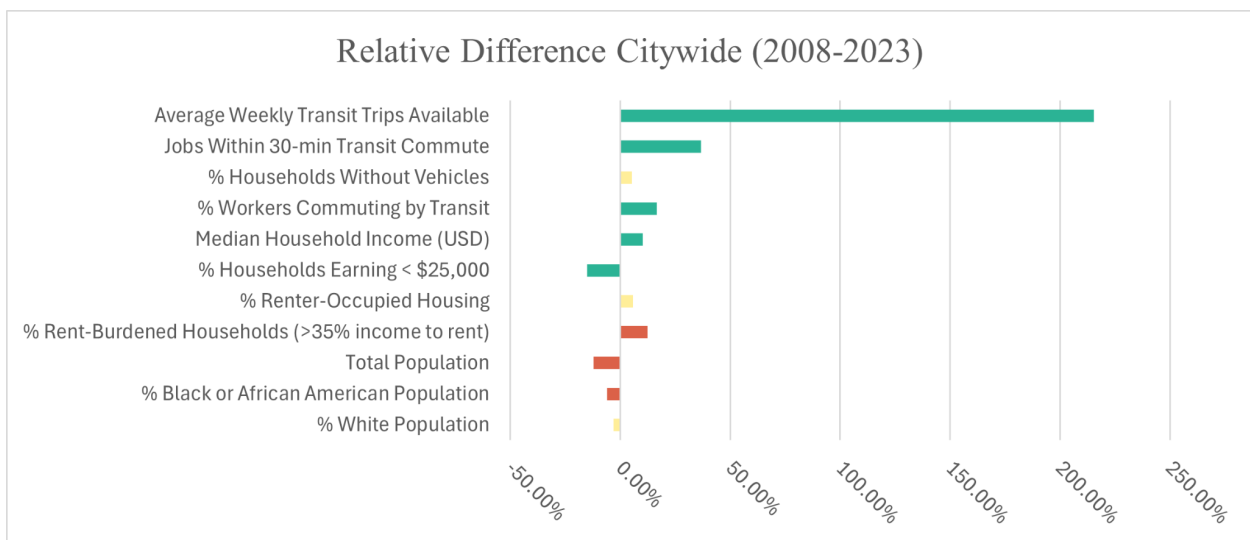


Figure 5.2 - Relative Difference Citywide (2008-2023)

Within the corridor (Figure 5.1), nearly all mobility-related indicators increased. The AllTransit Performance Score rose, reflecting improvements in frequency, reliability, and multi-route connectivity. Weekly transit trips more than doubled, a strong positive outcome that indicates enhanced access to transit service. Jobs accessible within a 30-minute transit ride grew, signaling that the corridor became more tightly woven into the region’s employment geography.

These are clear successes where investments in high-capacity BRT translated into tangible gains in mobility, especially in neighborhoods with high transit reliance.

Citywide changes (Figure 5.2) in these same metrics, however, were far more modest. The AllTransit Performance Score increased only slightly, and while jobs accessible within 30 minutes improved, weekly trips systemwide grew far more unevenly and from a much lower baseline. The much larger citywide increase in weekly trips reflects RTA's broader network redesign, not an overall rise in transit demand. The extremely low 2008 baseline shows how systemwide service had eroded prior to the HealthLine's construction. Even with this increase, citywide transit remained substantially less accessible than the corridor.

The socioeconomic indicators reveal an even more complicated dynamic. Corridor median income increased from \$23,500 to \$27,100, a moderate rise but still far below the citywide median, which grew from \$30,400 to \$33,500. The share of low-income households declined both corridor-wide and citywide, suggesting some improvement, however, the corridor still retained a much higher concentration of poverty than the city as a whole. These shifts are neither clearly positive nor negative, rather they indicate modest income growth but persistent economic vulnerability.

More concerning are the affordability indicators. Corridor rent-burdened households increased sharply from 45% to 52%, a worse trend than the citywide increase from 40% to 45%. Renter share also inched upward in both geographies, but the corridor remained substantially more renter-dominated. These shifts represent negative outcomes, signaling rising pressure on already vulnerable renters and limited progress toward economic security.

Demographically, the corridor's population grew by 12.3%, even as the city lost over 50,000 residents. This stabilization is a meaningful positive outcome for a shrinking city,

indicating that TOD can create pockets of demographic resilience. Yet the racial composition shifted little. The Black population share decreased slightly, while the White population increased slightly. Citywide, the Black share fell more substantially. These small shifts suggest that the corridor did not experience large-scale displacement, but the persistence of racial concentration highlights continued patterns of segregation.

Combined, these changes show that the HealthLine corridor has become an exceptional zone within Cleveland. A location where transit access, job connectivity, and population all increased despite citywide decline. Yet these improvements were paired with rising rent burdens, stagnant income growth relative to need, and continued demographic concentration. In effect, the corridor became more connected and more desirable, but not necessarily more equitable. Improved accessibility did not resolve affordability pressures or longstanding socioeconomic disparities, and in some cases, rising demand may have deepened them.

Accessibility and Mobility Dynamics

The set of mobility indicators show how deeply and consistently the HealthLine enhanced transit accessibility in the corridor. However, interpreting these indicators together reveals a dynamic interrelationship between transit performance, institutional land use, rider characteristics, and broader structural shifts such as the COVID-19 pandemic.

The AllTransit Performance Score (Figure 5.3) increased rapidly after the HealthLine's completion, peaking in 2015 and stabilizing thereafter. This initial surge reflects improvements

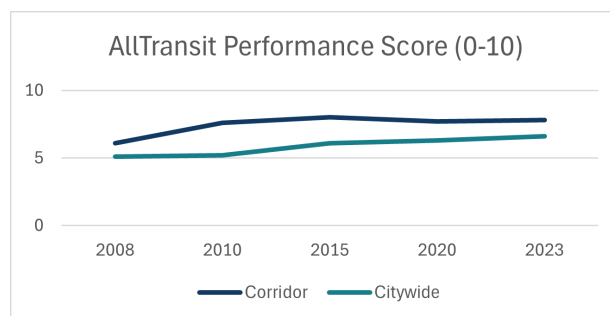


Figure 5.3 - AllTransit Performance Score (2008-2023)

in service frequency, reliability, and route connectivity. These conditions are heavily shaped by the corridor’s anchors such as the Cleveland Clinic and University Circle. The stability of the score after 2015 indicates that the corridor succeeded in maintaining high performance even when the regional transit system struggled with fiscal constraints and ridership declines. In comparison, citywide improvements were incremental, indicating that the HealthLine’s superior performance was not replicated elsewhere.

Figures 5.4 and 5.5 further illustrate how Euclid Avenue became Cleveland’s mobility core. Weekly trips doubled in the corridor, and job access grew substantially even as citywide job accessibility declined between 2015 and 2020 before recovering. The sharp growth between 2015 and 2020 coincided with institutional expansions in University Circle and the medical campus areas, which drew employment eastward. The pandemic also played a key role. While other routes saw service cuts, the HealthLine retained full service due to its high share of essential workers. These dynamics reveal how transit investment interacts with economic geography. The HealthLine’s performance was bolstered not only by transportation planning but by the clustering of major employers that drew both workers and transit resources to the corridor.

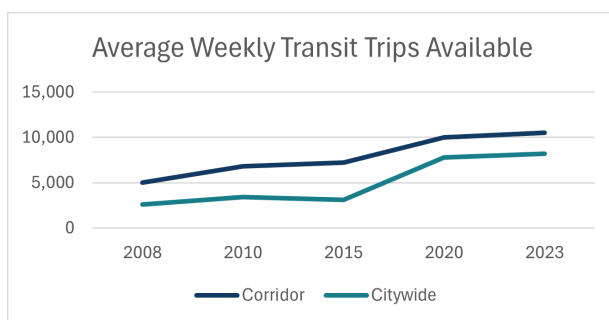


Figure 5.4 - Weekly Transit Trips Available (2008-2023)

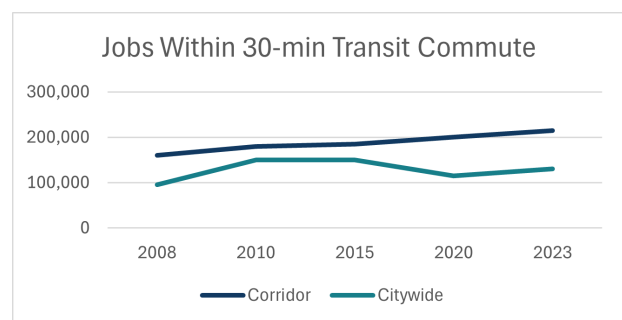


Figure 5.5 - Jobs Within 30-min Transit Commute (2008-2023)

Figures 5.6 and 5.7 show that despite rising access, the corridor remained home to disproportionately transit-dependent residents. The persistent rate of zero-vehicle households indicates that many residents were not “choice riders” but relied on transit out of necessity. Transit commuting trends show a dip in 2020 due to pandemic disruptions but a rebound by 2023. The continued reliance on transit despite the pandemic underscores the essential nature of BRT service for low-income corridor residents.

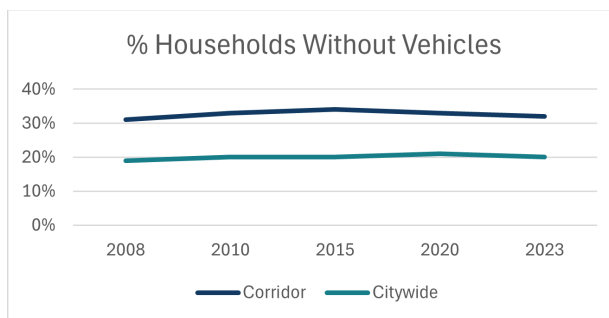


Figure 5.6 - % Households Without Vehicles (2008-2023)

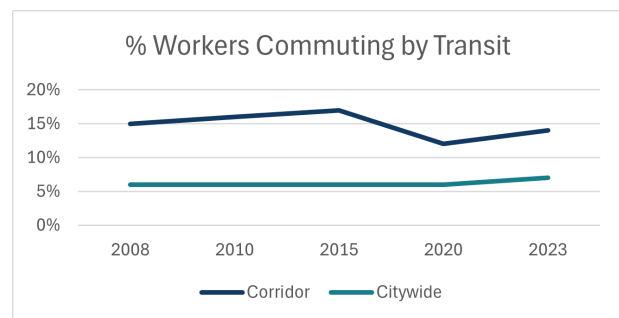


Figure 5.7 - % Workers Commuting by Transit (2008-2023)

These mobility indicators collectively reveal the corridor’s dual role as both an accessibility hub and a space of need. The significance of these findings lies in the interplay between investment and vulnerability. Improved mobility is essential in neighborhoods with high levels of transit dependency, yet mobility alone cannot address structural inequities related to income, housing, or employment. Accessibility is necessary, but not sufficient, for mobility justice.

Affordability, Income, and Housing Pressures

The income and housing indicators bring into focus one of the central tensions revealed by this research. Even as transit accessibility improved, affordability pressures grew, and income gains were limited. When considered together, these indicators depict a corridor where mobility

improved, but cost-of-living pressures intensified, particularly for renters who form the majority of the population.

Median household income (Figure 5.8) increased modestly, but remained consistently below the citywide median. This gap reflects structural inequalities tied to Cleveland’s racial and economic geography. High-poverty neighborhoods like Hough, Fairfax, and Central have long struggled with limited upward mobility due to labor market segmentation, low-wage service-sector employment, and barriers to accessing regional job centers. Even though job accessibility improved dramatically, the types of jobs available within reachable areas were not necessarily matched to residents’ skills or wages. Increases in accessibility alone cannot overcome wage stagnation or limited employment pipelines. Thus, the income trend underscores that TOD can improve mobility without altering deeper structural determinants of economic inequality.

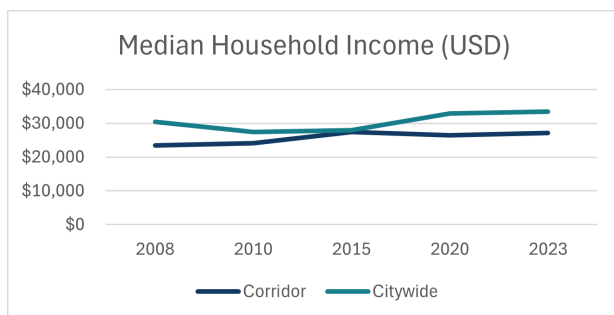


Figure 5.8 - Median Household Income (2008-2023)

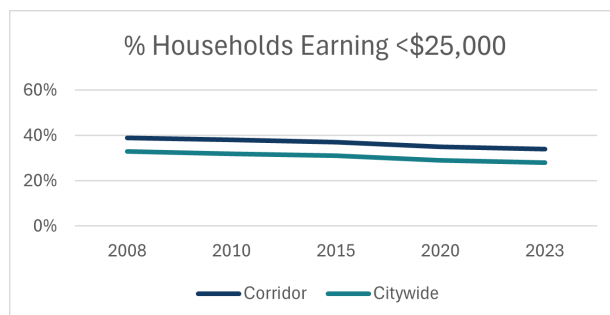


Figure 5.9 - % Households Earning <\$25,000 (2008-2023)

The percentage of households earning less than \$25,000 (Figure 5.9) declined slightly, but the corridor still maintained a much higher percentage of extremely low-income households than the citywide average. This affordability vulnerability interacts directly with the housing indicators. Renters remained the majority (Figure 5.10), climbing to 66% at their peak in 2020. The slight decline by 2023 does not reflect improved affordability, rather, it reflects modest shifts in tenure that often accompany redevelopment. Rent-burdened households (Figure 5.11)

decreased slightly during the early years of the HealthLine but increased consistently from 2010-2023. Rising rent burdens illustrate the most direct expression of TOD's affordability paradox, investment attracts development, development raises demand, and demand increases rents. Without protective mechanisms such as inclusionary zoning or affordability set-asides, TOD can unintentionally increase financial strain on the very populations it aims to serve.

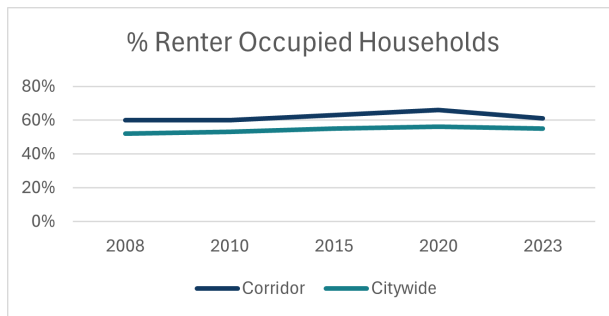


Figure 5.10 - % Renter Occupied Households (2008-2023)

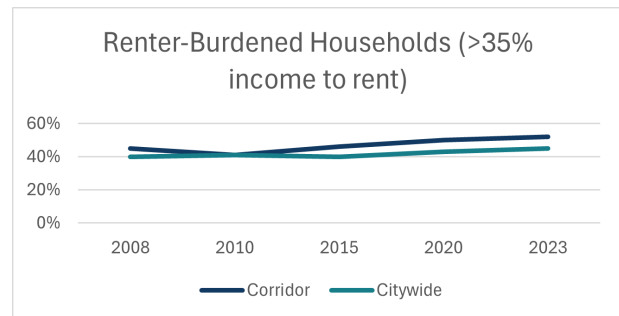


Figure 5.11 - % Renter Burdened Households (2008-2023)

These indicators show that accessibility gains did not translate into meaningful improvements in economic security. Instead, rising rents and stagnant incomes created a widening affordability gap. This reinforces a growing body of TOD literature that warns of “transit-rich displacement.” Even in cities with sluggish real estate markets like Cleveland, improvements in transit can fuel demand for housing near high-frequency corridors. The HealthLine corridor demonstrates that displacement pressures need not manifest as dramatic demographic turnover, they can also manifest as increasing rent burdens and deepening precarity among existing residents.

Demographic Continuity and Spatial Inequality

The final set of indicators adds a critical dimension to understanding the long-term impact of the HealthLine from 2008 to 2023. Unlike many TOD corridors in rapidly growing

cities, where transit investments coincide with major demographic turnover, the HealthLine corridor demonstrates striking continuity. Across the 15-year span, the demographic structure of the corridor changed only marginally, remaining majority Black, majority renter, and disproportionately low-income with relatively stable population growth. This stability contrasts sharply with the rest of Cleveland, where population loss and demographic shifts were far more pronounced.

Figure 5.12 illustrates one of the clearest divergences. The corridor's population increased steadily from 24,752 residents in 2008 to 27,800 in 2023, a growth of 12.3%. Meanwhile, the citywide population fell dramatically from 424,000 in 2008 to 372,600 in 2023, a decline of 12.1%. In shrinking, segregated cities like Cleveland, this divergence is significant. It

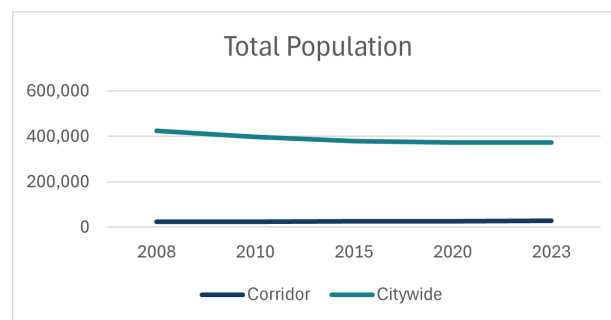


Figure 5.12 - Total Population (2008-2023)

suggests that the HealthLine acted as a stabilizing force, anchoring population, even attracting modest growth, within neighborhoods that otherwise faced persistent economic hardship. Rather than experiencing displacement-driven churn, as is common in TOD contexts such as Portland, Denver, or Washington, DC, the corridor's demographic trends were characterized by incremental, steady increases rather than rapid reshaping.

Yet the reasons behind this stability are complex. On one hand, the lack of population displacement indicates that the corridor did not undergo the steep land-value escalation typical of high-demand TOD markets. On the other hand, the persistence of extreme rent burden, low

median income, and high poverty rates suggests that many residents lacked the financial capacity to relocate to opportunity-rich neighborhoods elsewhere. In this sense, the corridor's population stability may reflect not a protective effect of TOD policy but the structural constraints of poverty and limited housing mobility. Residents stayed because they could not afford to leave, not because conditions improved enough to support upward residential mobility.

Figures 5.13 and 5.14 further underscore this pattern of racial continuity, though with an important nuance. While the share of African American residents in the corridor remained relatively stable across the entire 2008-2023 period, the White population fluctuated in ways that did not amount to a long-term shift. The African American population held consistently indicating that the corridor remained a predominantly Black set of neighborhoods despite major transit improvements and ongoing institutional investment. The White population, by contrast, moved more irregularly, increasing from 2008 to 2010, then declining steadily by 2020, before rising again. Importantly, these short-term fluctuations did not translate into a sustained demographic realignment, the corridor ends the period with nearly the same racial composition it began with. In contrast, citywide trends show gradual declines in both Black and White population shares, reflecting broader demographic churn across Cleveland. The HealthLine

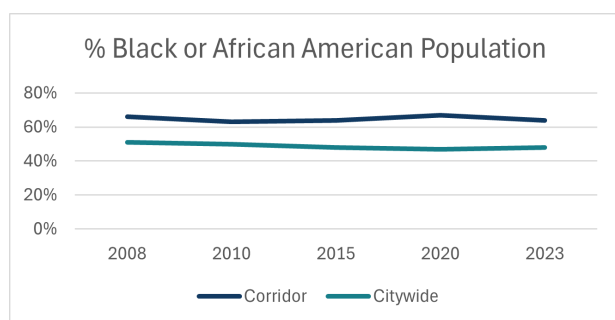


Figure 5.13 - % Black or African American Population (2008-2023)

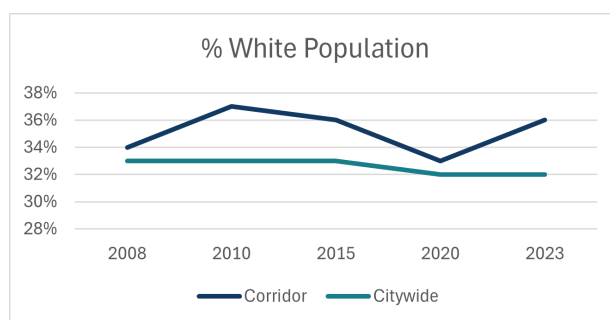


Figure 5.14 - % White Population (2008-2023)

corridor maintaining such consistent racial makeup suggests that the project did not fundamentally reshape the deeply rooted racial geography of central Cleveland.

However, demographic stability does not equate to racial equity. The corridor has long been home to some of Cleveland's most heavily redlined and institutionally constrained neighborhoods. These communities were shaped by decades of disinvestment, demolition, and the expansion of powerful anchor institutions. The persistence of a Black corridor population, combined with rising rent burdens and only modest income gains, reveals that TOD did little to disrupt the structural inequalities born from this history. While the HealthLine improved physical access to jobs, services, and mobility, it did not produce corresponding improvements in wealth-building or housing stability for most of the corridor's long-term Black residents.

Taken together, the population and racial-composition trends suggest that the HealthLine achieved stability but not transformation. It preserved the demographic profile of the corridor without meaningfully addressing the economic precarity that defines life for many residents. In this sense, the HealthLine may have reinforced a longstanding pattern of high accessibility yet low upward mobility.

Conclusion

Transit-oriented development (TOD) is often framed as a comprehensive solution to urban challenges of mobility, sustainability, and economic revitalization. However, the findings of this thesis demonstrate that the outcomes of TOD are deeply contingent on local socioeconomic conditions, institutional arrangements, and the timing of equity-oriented interventions. The fifteen-year evolution of Cleveland's HealthLine corridor offers a nuanced case study that complicates prevailing TOD narratives, particularly those rooted in high-growth metropolitan contexts. Rather than representing a straightforward success or failure, the

HealthLine illustrates how TOD functions in a shrinking, post-industrial city where accessibility gains can coexist with persistent structural inequality.

In its most measurable dimensions, the HealthLine achieved many of its intended goals. Between 2008 and 2023, transit accessibility improved substantially along the Euclid Avenue corridor. Service frequency increased, travel reliability improved, and access to employment within a 30-minute transit commute expanded significantly. Weekly transit trips more than doubled, and the AllTransit Performance Score rose steadily, signaling durable improvements in system performance in a city where transit decline has otherwise been common. These outcomes are significant: they demonstrate that even in fiscally constrained, depopulating cities, targeted transit investment can reshape opportunity structures and provide reliable mobility for transit-dependent populations.

Yet the equity outcomes of the HealthLine were more limited. Despite improved accessibility and substantial capital investment, demographic and socioeconomic conditions along the corridor changed only modestly. Poverty rates remained high, rent burdens increased, and the corridor continued to be characterized by a predominance of low-income, renter, and minority households. While median household income rose slightly, these gains were insufficient to offset rising housing costs. Population growth along the corridor, unusual in a shrinking city, did not translate into broad-based upward mobility for existing residents. Instead, the corridor exhibited remarkable demographic stability, remaining approximately two-thirds African American from 2008 to 2023. These findings suggest that, while large-scale TOD-induced displacement did not occur, residents also faced limited capacity to access higher-opportunity neighborhoods.

This raises important questions about the goals and consequences of development. Is development inherently desirable? The HealthLine demonstrates that development can stabilize and improve infrastructure without necessarily replacing existing housing, though rising costs do create pressure on affordability. Gentrification, as the saying goes, “is good until it’s not.” Along Euclid Avenue, gentrification pressures were muted, but the broader question remains: to what extent can redevelopment and TOD occur without displacing vulnerable residents? The Cleveland case suggests that, in a city with limited market growth, accessibility improvements and capital investment alone are insufficient to produce widespread displacement, but neither do they guarantee equitable outcomes. TOD in this context functioned as a stabilizing rather than transformative force, improving infrastructure and mobility while leaving structural inequalities largely intact.

The HealthLine’s governance structure further illustrates this tension. A coalition of public agencies and private anchor institutions was highly effective at securing funding, delivering infrastructure, and catalyzing redevelopment. However, this same governance framework prioritized growth-oriented objectives over redistributive outcomes. Anchor institutions exerted significant influence over land use and development patterns, while equity-oriented policies, particularly around housing affordability, were introduced only after land markets had already shifted. Equity, in this case, functioned as a retrofit rather than a foundational principle, limiting its effectiveness.

Ultimately, the HealthLine serves as both a model and a mirror. It models how high-quality transit can stabilize and reinvest in a disinvested corridor, and it mirrors the enduring structural inequalities that constrain the social reach of infrastructure-led revitalization. Its legacy underscores a central lesson of this thesis: while transit can enable transformation, it

cannot guarantee justice without intentional governance, redistribution, and accountability. TOD can improve mobility, expand access, and enhance infrastructure, but it must be paired with deliberate policies aimed at preserving affordability, preventing displacement, and aligning development with the broader goal of equitable urban growth.

Planning Recommendations

The findings of this study point to several clear planning recommendations for Cleveland and other mid-sized, post-industrial cities pursuing TOD as a revitalization strategy. First, equity must be embedded at the earliest stages of TOD planning rather than introduced reactively. This includes adopting binding tools such as inclusionary zoning, community land trusts, and long-term affordability requirements tied directly to transit investment. Reliance on voluntary incentives or post hoc affordability programs is insufficient once land values have already increased.

Second, TOD governance structures should be rebalanced to ensure meaningful community representation alongside institutional and private-sector stakeholders. While anchor institutions can play a critical role in financing and stabilizing redevelopment, their priorities should not dominate land use decisions to the exclusion of resident needs. Formal community benefits agreements, stronger tenant protections, and participatory planning mechanisms can help align TOD outcomes with local equity goals.

Third, TOD should be approached as a regional strategy rather than a corridor-specific intervention. The HealthLine succeeded in creating a high-accessibility spine but also reinforced Cleveland's "linear inequity," leaving many west-side and peripheral neighborhoods underconnected. Future TOD efforts should prioritize cross-town connectivity, improve suburban transit access, and coordinate transportation investments with regionwide housing and land-use

policies. Regional planning agencies such as NOACA are well positioned to integrate TOD into broader strategies aimed at reducing spatial inequality rather than concentrating benefits.

Finally, transit agencies should continue expanding operational equity measures, including fare-capping, reduced-fare programs, and service reliability improvements, while recognizing that these measures alone cannot substitute for broader socioeconomic policy interventions. TOD works best when transportation, housing, and economic development policies are aligned toward shared equity objectives.

Study Limitations

This study is subject to several limitations that should be acknowledged. First, the analysis relies primarily on secondary data sources, including AllTransit scores and U.S. Census and ACS data. While these sources provide valuable longitudinal and comparative insights, they may obscure neighborhood-level variation and lived experiences that qualitative data could better capture. The absence of interviews, focus groups, or ethnographic research limits the ability to assess residents' perceptions of change, displacement pressures, or mobility improvements, which are often critical for understanding the social dimensions of transit-oriented development.

Second, the use of census and ACS data introduces specific methodological constraints. Benchmark years for population, socioeconomic, and housing variables may not align perfectly with the timing of the HealthLine's development and subsequent impacts. For example, ACS estimates are produced as rolling averages over multiple years, which can create overlaps between consecutive benchmark periods, potentially smoothing or obscuring short-term fluctuations in demographic or economic conditions. These temporal overlaps may reduce the

precision of pre- and post-intervention comparisons, making it challenging to attribute observed changes directly to the HealthLine rather than broader regional trends.

Third, the corridor-based focus of the study, while intentional, constrains the generalizability of the findings. The HealthLine is a unique project shaped by Cleveland's institutional landscape, demographic composition, and economic history. While the conclusions offer transferable lessons, they should not be interpreted as universally applicable to all TOD contexts, particularly in rapidly growing metropolitan areas with different housing markets, institutional capacities, and commuter patterns.

Finally, the study evaluates outcomes only through 2023 and therefore cannot fully capture longer-term effects of recent policy interventions or post-pandemic shifts in travel behavior, housing markets, and employment patterns. TOD impacts often unfold over multiple decades, and some equity-oriented initiatives may require more time to produce measurable outcomes. Collectively, these limitations suggest that while the study provides a robust assessment of the HealthLine corridor, the findings should be interpreted with caution, particularly when extrapolating to different contexts or projecting future impacts.

Suggestions for Future Research

Future research could build on this study in several important ways. First, incorporating qualitative methods such as resident interviews, focus groups, or community surveys would provide deeper insight into how accessibility gains are experienced at the household level and how residents perceive changes in affordability, displacement pressure, and neighborhood stability.

Second, comparative research across multiple shrinking or post-industrial cities would help determine whether Cleveland's experience represents a broader pattern of TOD outcomes in

low-growth contexts. Comparing BRT-based TOD corridors in cities such as Detroit, St. Louis, or Buffalo could illuminate how different governance models and policy frameworks influence equity outcomes.

Third, future studies should examine the long-term impacts of specific equity interventions, such as fare-capping or inclusionary housing policies, to assess their effectiveness when implemented alongside TOD. Longitudinal evaluations that track households over time could help clarify whether improved accessibility eventually translates into socioeconomic mobility or whether structural barriers continue to constrain outcomes.

Finally, additional research is needed on regional TOD strategies that move beyond corridor-based investments. Understanding how network-level transit improvements, suburban TOD, and regional housing coordination interact with urban corridors would provide a more comprehensive picture of how TOD can contribute to reducing spatial inequality at the metropolitan scale.

The Cleveland HealthLine reveals how meaningful gains in accessibility and urban reinvestment can coexist with persistent inequality when equity is not embedded as a guiding principle from the outset. By situating TOD within the realities of a shrinking, post-industrial city, this study contributes to a more grounded and nuanced understanding of what transit can, and cannot, accomplish on its own. Ultimately, the future of equitable TOD depends on whether planners, policymakers, and institutions are willing to treat mobility not merely as a technical challenge, but as a question of justice, shared responsibility, and long-term collective wellbeing.

References

- Bardaka, E., Delgado, M., and Florax, R. J. G. M. (2018). Causal identification of transit-induced gentrification and spatial spillover effects: The case of the Denver Light Rail. *Journal of Transport Geography* 71. <https://doi.org/10.1016/j.jtrangeo.2018.06.025>
- Bozovic, T. (2025). *Urban walkability and equity in the car-centric city*. In A. Bailey & K. Otsuki (Eds.), *Inclusive cities and global urban transformation* (chapter 7). Springer. https://doi.org/10.1007/978-981-97-7521-7_7
- Calthorpe, P. (1993). *The next American metropolis: Ecology, community, and the American dream*. Princeton Architectural Press. https://books.google.com/books/about/The_Next_American_Metropolis.html?id=WtKU5L0ajA8C
- Center for Community Solutions. (2024). *Cleveland neighborhood fact sheets and data profiles*. Center for Community Solutions. <https://www.communitysolutions.com/fact-sheet/cleveland-neighborhoods>
- Center for Neighborhood Technology (CNT). (2023). *AllTransit™ - Transit performance metrics (Cleveland, OH)*. AllTransit. <https://alltransit.cnt.org/metrics/?addr=Cleveland%2C+OH>
- Cervero, R., Ferrell, C., & Murphy, S. (2004). Transit-oriented development and joint development in the United States: A literature review. *TCRP Research Results Digest* 52. Transportation Research Board. https://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rrd_52.pdf
- Cervero, R., & Sullivan, C. (2011). Green TODs: Marrying transit-oriented development and green urbanism. *International Journal of Sustainable Development & World Ecology*, 18(3), 210-218. <https://doi.org/10.1080/13504509.2011.570801>
- Chapple, K., & Loukaitou-Sideris, A. (2019). *Transit-oriented displacement or community*

- dividends? Understanding the effects of smarter growth on communities.* MIT Press.
<https://mitpressbookstore.mit.edu/book/9780262536851>
- City of Cleveland. (2007). *Connecting Cleveland 2020 Citywide Plan*. Cleveland City Planning Commission. <https://planning.clevelandohio.gov/cwp/planIntro.php>
- City of Cleveland. (2010). *Annual Economic Development Report: Euclid Corridor*. Cleveland, OH. <https://cplorg.contentdm.oclc.org/digital/collection/p16014coll6/id/23753>
- City of Cleveland. (2015). *Equitable Development Toolkit*. Cleveland, OH.
- City of Cleveland. (2018). *Cleveland Climate Action Plan Update*. Office of Sustainability. <https://cplorg.contentdm.oclc.org/digital/collection/p16014coll33/id/45/>
- City of Cleveland. (2023). *Equitable Development Framework*. Cleveland City Planning Commission.
- Cleveland City Planning Commission. (2008). *HealthLine Corridor Development Guidelines*. Cleveland, OH.
- Cleveland City Planning Commission. (2010). *Transit-Oriented Development Guidelines*. Cleveland, OH. <https://www.riderta.com/tod/guidelines>
- Cleveland City Planning Commission. (2015). *Transit-Oriented Development Zoning Overlays*. Cleveland, OH.
- Clevelanders for Public Transit. (2020). *Fare Equity Campaign Materials*. Cleveland, OH. <https://clefortransit.org/category/fair-fares/>
- Deng, T., & Nelson, J. D. (2013). Bus rapid transit implementation in Beijing: An evaluation of performance and impacts. *Research in Transportation Economics*, 39(1), 108-113.
<https://doi.org/10.1016/j.retrec.2012.06.002>
- Dittmar, H., & Poticha, S. (2004). Defining transit-oriented development: The new regional

- building block. In H. Dittmar & G. Ohland (Eds.), *The new transit town: Best practices in transit-oriented development*, 19-40. Island Press.
- <https://islandpress.org/books/new-transit-town>
- Dong, H. (2017). Rail-transit-induced gentrification and the affordability paradox of TOD. *Journal of Transport Geography*, 63, 1-10. <https://doi.org/10.1016/j.jtrangeo.2017.07.001>
- Douay, N., & Minja, M. (Eds.). (2021). *Urban planning for transitions*. John Wiley & Sons.
- <https://onlinelibrary.wiley.com/doi/book/10.1002/9781119821670>
- Elengold, K. S. (2024). Debt, race, and physical mobility. *Cal. L. Rev.*, 112, 833.
- https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4366039&utm_source=chatgpt.com
- Ewing, R., Bartholomew, K., Winkelman, S., Walters, J., & Chen, D. (2007). *Growing Cooler: The Evidence on Urban Development and Climate Change*. Urban Land Institute.
- https://rosap.nrl.bts.gov/view/dot/17370/dot_17370_DS1.pdf
- Fan, Y., Guthrie, A., & Levinson, D. (2012). Impact of light-rail implementation on labor market accessibility: A transportation equity perspective. *Journal of Transport and Land Use*, 5(3), 28-39. <https://doi.org/10.5198/jtlu.v5i3.240>
- Federal Transit Administration. (2012). *Before-and-After Studies of New Starts Projects: Euclid Corridor Transportation Project*. Washington, D.C.
- https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/2012_Before_and_After_Studies_of_New_Starts_Projects.pdf
- Glaeser, E. L., & Kahn, M. E. (2004). Sprawl and urban growth. In J. V. Henderson & J. F. Thisse (Eds.), *Handbook of regional and urban economics* (4), 2481-2527. Elsevier.
- [https://doi.org/10.1016/S1574-0080\(04\)80013-0](https://doi.org/10.1016/S1574-0080(04)80013-0)
- Goetz, E. G., Williams, R. A., & Damiano, A. (2019). Gentrification in Minneapolis and the role

- of transit investment. *Housing Policy Debate*, 29(5), 761-780.
<https://doi.org/10.1080/10511482.2018.1524444>
- Greater Cleveland Regional Transit Authority (RTA). (2020). *2020 Comprehensive Annual Financial Report*. Cleveland, OH.
<https://www.riderta.com/CAFR/2020>
- Greater Cleveland Regional Transit Authority (RTA). (2023). *HealthLine 15-Year Impact Report*. Cleveland, OH.
<https://www.riderta.com/blogs/gcrtas-positive-impact-program-highlighted-during-national-apprentice-week>
- Grube-Cavers, A., & Patterson, Z. (2015). Urban rapid rail transit and gentrification in Canadian urban centres: A survival analysis approach. *Urban Studies*, 52(1), 178-194.
<https://doi.org/10.1177/0042098014524287>
- Hanlon, B., & Vicino, T. J. (2007). The fate of inner suburbs: Evidence from metropolitan Baltimore. *Urban Geography*, 28(3), 249-275.
<https://doi.org/10.2747/0272-3638.28.3.249>
- Hayden, D. (2004). *Building suburbia: Green fields and urban growth, 1820-2000*. Vintage.
https://www.google.com/books/edition/Building_Suburbia/tYtIDwAAQBAJ?hl=en&gbpv=0
- Hollander, J. B. (2011). *Sunburnt cities: The great recession, depopulation, and urban planning in the American Sunbelt*. Routledge. <https://doi.org/10.4324/9780203834381>
- Hook, W., Lotshaw, S., & Weinstock, A. (2013). *More development for your transit dollar: An analysis of 21 North American transit corridors*.
<https://crcogct.gov/wp-content/uploads/2016/07/MoreDevelforTransitDollar.pdf>

- Kansas City Streetcar Authority. (2025). *Economic Development Report*. Kansas City Streetcar Authority. <https://kcstreetcar.org/route/economic-development-2/>
- Keating, W. (2010). *The suburban racial dilemma: Housing and neighborhoods*. Temple University Press.
https://www.google.com/books/edition/The_Suburban_Racial_Dilemma/CNZFYPT_k4EC?hl=en&gbpv=0
- Levinson, H. S., Zimmerman, S., Clinger, J., Bast, J., Rutherford, S., & Bruhn, E. (2003). *Bus rapid transit, volume 2: Implementation guidelines*.
<https://www.worldtransitresearch.info/research/3041/>
- Maharjan, S., Janatabadi, F., & Ermagun, A. (2024). Spatial inequity of transit and automobile access gap across america for underserved population. *Transportation research record*, 2678(1), 674-690. <https://doi.org/10.1177/03611981231171914>
- Mattioli, G., & Colleoni, M. (2015). Transport disadvantage, car dependence and urban form. In *Understanding mobilities for designing contemporary cities*, 171-190. Cham: Springer International Publishing.
https://link.springer.com/chapter/10.1007/978-3-319-22578-4_10
- NOACA. (2006). *Transit 2025 long range plan*. Northeast Ohio Areawide Coordinating Agency, Cleveland, OH.
https://www.riderta.com/sites/default/files/pdf/transit2025/TRANSIT_2025_March_2006_Final_contents_exec.pdf
- NOACA. (2012). *Connections+ 2035 Long Range Transportation Plan*. Northeast Ohio Areawide Coordinating Agency. <https://www.eneo2050.com/vision-plan>
- NOACA. (2012). *Development Trends Along Major Transit Corridors*. Cleveland, OH.

https://s3.countyplanning.us/wp-content/uploads/2022/12/TOD_2022-Development-Summary-Report_12-5-22.pdf

NOACA. (2019). *Workforce Accessibility and Mobility*. Northeast Ohio Areawide Coordinating Agency.

<https://www.noaca.org/home/showpublisheddocument/24551/637117481132970000>

NOACA. (2020). *AIM Forward 2040 Plan Update*. Northeast Ohio Areawide Coordinating Agency.

<https://www.noaca.org/regional-planning/major-planning-documents/aim-forward-2040>

Padeiro, M., Louro, A., & Da Costa, N. M. (2019). Transit-oriented development and gentrification: a systematic review. *Transport Reviews*, 39(6), 733-754.

<https://doi.org/10.1080/01441647.2019.1649316>

Patton, W. (2017). Last chance to stop Ohio transit from falling off the cliff. Policy Matters Ohio. <https://policymattersohio.org/research/last-chance-to-stop-ohio-transit-from-falling-off-the-cliff/>

Policy Matters Ohio. (2013). Opportunity cost of the Opportunity Corridor.

<https://policymattersohio.org/research/opportunity-cost-of-the-opportunity-corridor/>

Policy Matters Ohio. (2023). State of Working Ohio 2023.

<https://policymattersohio.org/research/state-of-working-ohio-2023/>

Pollack, S., Bluestone, B., & Billingham, C. (2010). Maintaining diversity in America's transit-rich neighborhoods: Tools for equitable neighborhood change.

[https://www.reimaginepe.org/files/TRN_Equity_final\(2\).pdf](https://www.reimaginepe.org/files/TRN_Equity_final(2).pdf)

Rosentraub, M. S. (2009). Major league winners: Using sports and cultural centers as tools for economic development. Routledge. <https://doi.org/10.1201/9781439801628>

- Rothwell, J. T., & Massey, D. S. (2010). Density zoning and class segregation in US metropolitan areas. *Social science quarterly*, 91(5), 1123-1143.
<https://doi.org/10.1111/j.1540-6237.2010.00724.x>
- Sanchez, T. W., Stolz, R., & Ma, J. S. (2003). Moving to equity: Addressing inequitable effects of transportation policies on minorities. <https://escholarship.org/uc/item/5qc7w8qp>
- Sandoval, G. F., & Herrera, R. (2015). Transit-oriented development and equity in Latino neighborhoods: A comparative case study of MacArthur Park (Los Angeles) and Fruitvale (Oakland). <http://dx.doi.org/10.15760/trec.58>
- Schuetz, J., Giuliano, G., & Shin, E. J. (2018). Does zoning help or hinder transit-oriented (re) development?. *Urban Studies*, 55(8), 1672-1689.
<https://doi.org/10.1177/0042098017700575>
- Speck, J. (2013). *Walkable city: How downtown can save America, one step at a time*. Macmillan.
https://www.google.com/books/edition/Walkable_City/kbfeAQAAQBAJ?hl=en&gbpv=0
- Thomas, R., & Bertolini, L. (2020). Persistent challenges and potential solutions: equitable TOD. In *Transit-Oriented Development: Learning from International Case Studies*, 73-93. Cham: Springer International Publishing.
https://link.springer.com/chapter/10.1007/978-3-030-48470-5_4
- U.S. Census Bureau. (2005). *Census 2000 Summary File 3 and 2005 American Community Survey*. <https://data.census.gov/table?q=Cleveland+city,+Ohio&y=2000>
- U.S. Census Bureau. (2010). *American Community Survey 5-Year Estimates: Cleveland, OH*.
<https://data.census.gov/table/ACSDP5Y2010.DP05?q=Cleveland+city,+Ohio>
- U.S. Census Bureau. (2015). *American Community Survey 5-Year Estimates: Cleveland, OH*.

<https://data.census.gov/table/ACSDP5Y2015.DP05?q=Cleveland+city,+Ohio>

U.S. Census Bureau. (2020). *American Community Survey 5-Year Estimates: Cleveland, OH*.

<https://data.census.gov/table/ACSDP5Y2020.DP05?q=Cleveland+city,+Ohio>

U.S. Census Bureau. (2023). *American Community Survey 5-Year Estimates: Cleveland, OH*.

<https://data.census.gov/table/ACSDP5Y2023.DP05?q=Cleveland+city,+Ohio>

Zuk, M., Bierbaum, A. H., Chapple, K., Gorska, K., & Loukaitou-Sideris, A. (2018).

Gentrification, displacement, and the role of public investment. *Journal of Planning*

Literature, 33(1), 31-44. <https://doi.org/10.1177/0885412217716439>